VIRTUAL CONFERENCE & EXHIBITION

APAO 2021

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The 36th Asia-Pacific Academy of Ophthalmology Congress

5-11 September 2021 https://2021.apaophth.org/

VISION BEYOND FRONTIERS CONTROL COVID

ABSTRACT BOOK

Contents

INSTRUCTION COURSES

Cornea, External Eye Diseases And Eye Banking

Sep 07, 2021 (Tue)
(GMT+8) 18:15 - 19:15
Livestream: 3

Comprehensive Management of Ocular Complications of Stevens-Johnson Syndrome and Toxic Epidermal Necrolysis in Asians

Chief Instructor: Kendrick SHIH
Instructor(s): Vanissa CHOW, Loraine CHOW, Alex Lap Ki NG, Hon Shing ONG

Objective: For Stevens- Johnson syndrome (SJS) and toxic epidermal necrolysis (TEN): 1) Select treatment for acute ocular surface inflammation, 2) Offer long term care for ocular surface rehabilitation, 3) Select patients who would benefit from surgical intervention.

Synopsis: The course is divided into 1) acute ocular care of patients with SJS/TEN, 2) long-term care of late ocular manifestations, 3) surgical options for visual and ocular surface rehabilitation. The procedures discussed for this session will include autologous serum treatment, scleral contact lens fitting, amniotic membrane transplantation, ocular surface reconstruction and cataract surgery in cicatrical conjunctivitis. This instruction course is intended for general ophthalmologists who are keen to develop a systematic and effective approach in the management of severe inflammatory ocular surface disease.

Course Outline: This is a comprehensive course on management of early and late ocular complications of SJS and TEN. Dr. Kendrick Shih - Diagnosis and classification: prognostic implications, 15 mins; Dr. Alex Ng - Management of acute ocular surface inflammation: paradigm shift towards early amniotic membrane transplantation, 15 mins; Dr. Tommy Chan - Autologous serum use and ocular surface reconstruction, 15 mins; Dr. Vanissa Chow - Use of scleral contact lenses for visual and ocular surface rehabilitation, 15 mins; Dr. Hon Shing Ong - Cataract surgery in cicatrising conjunctivitis, 20 mins.

Intraocular Inflammation, Uveitis And Scleritis

Sep 08, 2021 (Wed)
(GMT+8) 17:00 - 18:00
Livestream 2

Posterior Uveitis in the Asia-Pacific Region: From Diagnosis to Successful Management

Chief Instructor: Lawrence IU
Instructor(s): Marten BRELEN, Mary HO, Hiu Ping Frank LAI, Hoi Yau TANG

Objective: To provide a comprehensive review of the common causes, investigations and management of common posterior uveitis in the Asia-Pacific region and discuss the diagnostic and therapeutic algorithms.

Synopsis: The major causes of posterior uveitis include infectious, autoimmune, idiopathic and masquerade. Posterior uveitis often imposes diagnostic and therapeutic challenges because of the similar features of many posterior uveitic diseases and the treatment with steroid and other immunosuppressants come with many side effects. New imaging technology has provided new

information for diagnostic and prognostic purposes. Biologics and other emerging agents have expanded our treatment modalities and should be considered in the treatment regimens. This course provides a detailed review of the presentations, clinical features, imaging characteristics, diagnostic tools and treatment regimens for different posterior uveitic diseases common in Asia-Pacific region.

Course Outline: Presentation 1: Clinical Assessment and Investigational Workup for Posterior Uveitis; To discuss the approach and diagnostic algorithm with focus on how to differentiate various posterior uveitic diseases based on their clinical characteristics of retinitis, choroiditis, vasculitis and vitritis, and how to choose the appropriate tools for definitive diagnosis. Presentation 2: Imaging in Posterior Uveitis; To focus on multi-modal imaging for various posterior uveitic diseases using EDI-OCT, FFA, ICGA fundus autofluorescence, OCTA etc. and discuss how to differentiate the diseases early by their imaging features. Presentation 3: Infectious Posterior Uveitis; To review the manifestations, prognostic factors and management of viral, syphilitic and tuberculous uveitis. Presentation 4: Non-Infectious Posterior Uveitis; To review the presentations, prognostic factors and management for Behcet's disease, Vogt-Kayanagi-Harada disease and masquerade syndrome. Emerging treatments including biologics will be discussed. Presentation 5: Pediatric Posterior Uveitis; To review common causes and management strategy for different posterior uveitis in pediatric patients.

New Approaches To Patient Management And Dealing With Unmet Need In The Era Of Covid-19

Sep 10, 2021 (Fri)
(GMT+8) 20:45 - 21:45
Livestream 3

COVID-19 Associated Mucormycosis: A Battle within the War!

Chief Instructor: Tarjani DAVE
Instructor(s): Tarjani DAVE, Sachin GUPTA, Raghuraj HEGDE, Santosh HONAVAR, Akshay NAIR

Objective: To understand the immunopathogenesis, diagnostic pathway, imaging, staging and management paradigm of Covid-19 associated mucormycosis (CAM).

Synopsis: The rising incidence of rhino-orbito-cerebral mucormycosis (ROCM) in the background of COVID-19 in India and elsewhere has become a matter of grave concern. Recently there has been an explosive increase in these cases with emerging reports also from across the globe. The clinical and radiologic features which drive the diagnosis can vary from a full-blown picture on one side to subtle signs on the other. A high index of suspicion and astute assessment of the clinical and radiologic signs are paramount to limit morbidity and mortality. Appropriate disease staging and classification helps optimum treatment and maximizes outcome.

Course Outline: This course will have speakers with a rich experience of managing CAM. The speakers will elucidate the basic pathology of CAM over and above co-existent diabetes mellitus. The immune dysfunction caused by COVID-19 that leads to CAM will be discussed. This will be followed by

the classification, staging and guidelines for managing CAM. The speakers will also explain the importance and interpretation of MR imaging, with case examples, which forms the cornerstone of managing these patients. The course will sum up with elaborative talks on different treatment approaches and the rationale behind choosing them and rehabilitative approaches. At the end of this course, the audience shall become conversant with skills to suspect and diagnose the presence of CAM, interpret the MR imaging to stage the disease severity, decide upon an appropriate management approach and thus optimize the results in their patients.

Orbital And Oculoplastic Surgery

Sep 08, 2021 (Wed) (GMT+8) 20:45 - 21:45 Livestream 3

Using GPS to Reach the Destination: Navigation Guided Orbital Surgery

Chief Instructor: Aditi MEHTA
Instructor(s): Kasturi BHATTACHARJEE, Tarjani DAVE, Honglei LIU, Nattawut WANUMKARNG

Objective: Structured step-by-step video assisted demonstration of the features and applications of navigation guided systems, their utilization in various orbital pathologies and role in surgical decision making.

Synopsis: Surgical management of orbital diseases requires detailed planning and precision to prevent inadvertent damage to the vital structures like the optic nerve, ophthalmic artery, ciliary ganglion, which lie within close proximity as the orbit progressively narrows towards the apex. The utilization of intraoperative imaging-based navigation guided systems has immensely improved surgeons' accuracy. The science behind this system and its translation into varied applications across the field of neurosurgery has been time tested. We highlight its utilization in real time surgical planning and target verification for accurate post-surgical results in orbital surgeries performed by ophthalmologists.

Course Outline: In this course, we discuss the science and applications behind this system. A step-by-step guide to setting up the system and its various features including registration, surgical planning, mirroring and delineation of vital structures will be demonstrated. We will highlight its utilization in identifying, in real time, distortion of bony landmarks and planning of complex reconstructions with the help of mirroring. Video assisted demonstrations will include navigation guided orbital surgery for optic canal fractures and decompression in traumatic optic neuropathy, localization of tumors at the orbital apex and their resection, its role in thyroid related orbitopathy and orbital wall decompression surgery. The course will also discuss the advantages of the system in obtaining an intraoperative target visualization and verification for accurate post-surgical results.

Pediatric Ophthalmology And Strabismus

Sep 06, 2021 (Mon)
(GMT+8) 17:00 - 18:00
Livestream 3

Imaging in Strabismus: Good, the Bad and the Ugly

Chief Instructor: Savleen KAUR
Instructor(s): Jaspreet SUKHIJA, Shweta CHAURASIA, Shagun KORLA

Objective: The purpose of this instruction course is to review the current indications, merits and demerits of various imaging modalities in strabismus.

Synopsis: Imaging may contribute to clinical and surgical management of patients with strabismus. Ultrasound biomicroscopy (UBM) and anterior-segment optical coherence tomography (AS-OCT) may play a role in determining the location of EOMs and aid in devising a preoperative surgical plan, especially in cases of strabismus re-surgery. While neuroimaging provides important diagnostic information, orbital imaging studies the EOMs in detail as well as helps us in formulation of a treatment plan in complex strabismus, but only if performed properly. Retinal imaging adds to our diagnostic armamentarium.

Course Outline: 1. Ultrasound biomicroscope (UBM) for localizing muscle insertions. 2. Anterior segment optical coherence tomography (ASOCT) in strabismus-is it a replacement of the UBM? 3. Neuroimaging in strabismus-when, why and which one to order? 4. OCT angiography in strabismus and amblyopia–useful or useless? 5. A potpourri of clinical cases.

Retina 3 (Surgical)

Sep 06, 2021 (Mon)
(GMT+8) 18:15 - 19:15
Livestream 3

Challenging Scenarios in VR Surgery: A Video Based Series

Chief Instructor: Ramandeep SINGH
Instructor(s): Mohit DOGRA, Deeksha KATOCH, Simar Rajan SINGH

Objective: To highlight intra-operative surgical challenges and their management in a variety of complex vitreo-retinal (VR) scenarios.

Synopsis: Vitreo-retinal surgery has many challenging facets. With advancing indications for VR surgery, surgeons are faced with novel intra-operative and post-operative complications. Migration of endotamponade agents and heavy liquids into the subretinal space and presence of submacular blood need astute planning and management. This IC aims to present a series of video based case scenarios that look at tackling complicated surgical situations like posterior hyaloid removal in myopic RD, full thickness retinal autograft for OD pit related large macular hole, posterior hyaloid removal in ROP surgery, buphthalmic RD, management of iatrogenic giant retinal tears and retinal folds.

Course Outline: Subretinal air: Dr. Deeksha Katoch; Subretinal oil: Dr. Ramandeep Singh Subretinal; PFCL: Dr. Simar Rajan Singh; Buphthalmic RD with glaucoma drainage device: Dr. Deeksha Katoch; Submacular hemorrhage: Dr. Mohit Dogra; Cyclitic membrane dissection: Dr Ramandeep Singh; Iatrogenic giant retinal tear during posterior capsule removal: Dr. Simar Rajan Singh; Post Ozurdex endophthalmitis: Dr. Mohit Dogra;

Autologous retinal graft for large macular hole with total retinal detachment: Dr. Ramandeep Singh; Posterior hyaloid removal in ROP surgery: Dr. Deeksha Katoch; Full-thickness retinal fold: Dr. Mohit Dogra.

Sep 10, 2021 (Fri)
(GMT+8) 18:15 - 19:15
Livestream 3

Vitreo-Retinal Surgeon's Nightmares!

Chief Instructor: Bhuvan CHANANA
Instructor(s): Rajvardhan AZAD, Shih Jen CHEN,

Objective: This course will help to detect many vision threatening complications at the earliest, and also how to act swiftly. The course will be especially beneficial for young retinal surgeons.

Synopsis: In this symposium, we will discuss some of the gravest complications which may occur during vitreo-retinal surgery. These complications can lead to poor visual outcome, and give nightmares to the surgeon. Appropriate and timely intervention, may salvage vision in most of the eyes. Detailed lectures will be presented, discussing a step-by-step approach to detect and manage such complications.

Course Outline: 1. Sub-macular hemorrhage during vitrectomy for retinal detachment: how to proceed? 2. My infusion cannula is not in position: Subretinal or suprachoroidal displacement of infusion cannula. 3. Uncontrolled bleeding during diabetic vitrectomy. 4. Slippage of giant retinal tear flap: what to do next?

FREE PAPERS

Cataract And Cataract Surgery

Sep 07, 2021 (Tue)
(GMT+8) 17:00 - 18:00
Livestream 3

Constructing Intraocular Lens Power Calculation Models Based on Machine Learning

First Author: A-yong YU
Co-Author(s): Jian-qi MEI, Kai-jing ZHOU

Purpose: To develop a series of intraocular lens (IOL) power calculation models based on machine learning algorithms.

Methods: The following data were collected from 7131 eyes of 5461 patients who underwent cataract surgery from January 1, 2016, to June 1, 2020: age, gender, axial length, keratometry, anterior chamber depth, the constant and the power of the implanted IOL, postoperative refraction. The whole dataset was randomly divided into the training dataset, the validation dataset, and the testing dataset according to the ratio of 7:1:2. The preoperative data were used as input to predict postoperative refraction. Six machine learning algorithms (Decision tree, Random Forest, Adaptive Boosting, Gradient Boosting Decision Tree, eXtreme Gradient Boosting, Support Vector Regression) incorporated with 3 input strategies were trained by these data, constructing 18 IOL power calculation models in total. Using the testing dataset, the accuracy of these models was further compared with 10 existing IOL formulas: SRK/T, Haigis, Hoffer Q, Holladay 1, T2, EVO 2.0, KANE, Barrett Universal II, Ladas super formula, Hill-RBF 3.0.

Results: A percentage ranging from 55.33% to 71.51% of eyes showed a prediction error within ±0.50D. Ranked by "6-variable rank", our models (S2-RF, S2-XGBoost, S2-GB) outperformed any other existing formulas. The subgroup analysis showed S2-XGBoost was least affected by axial length and keratometry.

Conclusions: The IOL power calculation models constructed in this study are able to accurately calculate IOL power, and some of them (S2-RF, S2-GB, S2-XGBoost) yielde better predictions than existing formulas.

Sep 07, 2021 (Tue)
(GMT+8) 17:00 - 18:00
Livestream 3

Cost-Effectiveness of Virtual Reality and Wet Laboratory Phacoemulsification Cataract Surgery Simulation on Operating Theatre Performance

First Author: Danny NG
Co-Author(s): John FERRIS, Nai Man LAM, Shameema SIKDER, Clement THAM, Alvin YOUNG

Purpose: To evaluate the cost-effectiveness of preoperative phacoemulsification simulation training in virtual reality simulator and wet laboratory on operating theatre performance.

Methods: Trainees were randomized to preoperative intervention by a combination of virtual reality and wet laboratory phacoemulsification with synthetic eyes or wet laboratory phacoemulsification with synthetic eyes only. The main outcome measures were the International Council of Ophthalmology Surgical Competency Assessment Rubric:

phacoemulsification (ICO OSCAR phaco) scores by 2 masked independent graders and the actual cost data for each type of simulation facilities were used to determine the incremental net benefit. The net benefit regression model was constructed for sensitivity analysis with various willingness to pay (WTP) values per ICO OSCAR phaco score.

Results: Trainees who had virtual reality and wet laboratory phacoemulsification achieved higher mean ICO OSCAR phaco scores compared to trainees who only had wet laboratory and control. From the perspective of capital cost, if WTP per ICO OSCAR phaco score was above $22500, the combination of virtual reality and wet laboratory phacoemulsification would have higher probability of being cost-effective than wet laboratory phacoemulsification. From the perspective of annual cost, wet laboratory phacoemulsification achieved higher probability of cost-effectiveness for WTP per ICO OSCAR phaco score at $1400. However, if WTP threshold was slightly higher at $1850, the combination of virtual reality and wet laboratory phacoemulsification was more cost-effective.

Conclusions: Our economic model demonstrated the thresholds of WTP per unit of surgical skills transfer outcome for different phacoemulsification simulation strategies to be the most cost-effective.

Sep 07, 2021 (Tue)
(GMT+8) 17:00 - 18:00
Venue: Livestream 3

Experimental study of using isolated capsulorhexis flap to protect corneal endothelial cells infemtosecond laser-assisted cataract surgery

First Author: Shaowei LI

Purpose: To evaluate effects of novel technique that using isolated capsule flap to protect corneal endothelium during femtosecond laser-assisted cataract surgery

Methods: In this prospective, randomize, controlled animal research, the right eyes of 40 rabbits were equally divided into endothelium-protected(experimental) and control groups. In the experimental group, after femtosecond laser capsulotomy, the isolated capsule flap was lifted to the corneal endothelium by an ophthalmic viscosurgical device. Then, the endothelium was damaged for 1 minute with an ultrasonic energy (longitudinal phacoemulsificationpower:80%, phaco tip was placed 1.5-2.0mm from the endothelium). Irrigation/aspiration was used toremove the flap and residual lens material. The control group underwent the same surgery, except that the flap was removed immediately after capsulotomy. Corneal endothelioscopy was performed preoperatively and on postoperative days (PODs) 3 and 7 to observe endothelial cell density (ECD) and endothelial cell loss rate(ECL).

Results: There was no statistically significant difference in preoperative ECD between the two groups(2812 cells/mm2 and 2744 cells/mm2, respectively). At POD3, in the experimental group and control group, the ECD was 2711 cells/mm2 and 2421 cells/

mm2, respectively. And the ECL was 3.59% and 13.26%,respectively. The difference of ECD was statistically significant (P<0.000). At POD7, the ECD of two groups was 2730 cells/mm2 and 2457 cells/mm2, respectively. And the ECL was 2.92% and 11.97%, respectively. The difference of ECD was also statistically significant (P<0.000)

Conclusions: The isolated capsulotomy flap technique significantly reduces damage to the endothelium caused by ultrasonic energy and protectscorneal endothelial cells during phacoemulsification.

Sep 07, 2021 (Tue) (GMT+8) 17:00 - 18:00 Livestream 3

Initial Experience with 3-D Heads Up Display System for Cataract Surgery: A Comparative Study

First Author: Jai KELKAR
Co-Author(s): Aditya KELKAR

Purpose: To compare the complication rates, surgical time and learning curve using 3-D heads up display system in comparison with conventional microscope in cataract surgery.

Methods: Consecutive consenting adults with uncomplicated cataract were offered phacoemulsification using the 3-D heads up display system (ARTEVO 800 Carl Zeiss Meditec, USA) or the conventional microscope (Zeiss Lumera 700) by two experienced surgeons. Surgical time, measured from start of corneal incision to removal of microscope from the surgical field and complication rates were compared between the groups.

Results: Of the 343 eyes enrolled, 100 (29%) underwent surgery using the 3-D heads up display system. Surgical time for 3-D heads up display system was significantly higher in the 3-D group (8.4+2.1 vs. 6.5+1.8 minutes, p<0.001). There were no differences in surgical complications (2 % in 3-D vs. 2.5% in conventional microscope, p=0.28). Comparing across 4 quartiles within the 3-D group, mean surgical time was slightly higher during the 1st quartile (n=25, 9.1+1.9 minutes) compared to the last quartile (n=25, 8.2+1.9 minutes) (p=0.17). Complications in the 3-D group occurred only in the initial 50% of cases. Seven (7%) cases in the 3-D group were converted to conventional binocular microscope of which 3 each were due to difficulty in depth perception and low illumination while one was due to intraoperative pupillary constriction.

Conclusions: Phacoemulsification with 3-D heads up display system takes longer time but offers excellent visualization and safety compared to conventional microscopes. Experienced surgeons should be able to adapt easily after their first 50 surgeries.

Sep 07, 2021 (Tue) (GMT+8) 17:00 - 18:00 Livestream 3

Intracameral Levofloxacin (0.5%) versus Intracameral Cefuroxime (1mg/0.1ml) Effect on Corneal Endothelial Cell Count and Morphology in Uneventful Phacoemulsification Surgery

First Author: Prema CHENDRAN
Co-Author(s): Wan Haslina WAN ABDUL HALIM, Meng Hsien YONG, Safinaz KHIALDIN, Seng Fai TANG

Purpose: To compare cornea endothelial cell count and morphology between intracameral levofloxacin (0.5%) ophthalmic solution and intracameral cefuroxime (1mg/0.1ml) in uneventful phacoemulsification surgery.

Methods: This study was a randomized double-blinded prospective trial. Eyes undergoing uneventful phacoemulsification surgery were randomized for the intracameral antibiotics at the end of surgery.

Results: Sixty (60) eyes (29 eyes intracameral cefuroxime and 31 eyes with intracameral levofloxacin 0.5%) were compared postoperative 1-month. There is no adverse effect observed in both study groups. Both groups of antibiotics did not show any statistical difference in terms of cornea parameters at 1-month. The endothelial cell count for the cefuroxime group mean was 2309.8 ± 464.3 cells/mm2 while the levofloxacin group was 2370.8 ± 510.9 cells/mm2 (p= 0.474). The central corneal thickness for the cefuroxime group was 527.8±29.5µm and the levofloxacin group was 520.5±30.1µm (p=0.833). The coefficient variability for the cefuroxime group and levofloxacin was 35.8±4.2% and 31.1±5.8% respectively (p=0.146). Hexagonality for the cefuroxime group was 46.2±10.9% while 47.6±10.7% for the levofloxacin group (p=0.951). The anterior chamber cells showed no significant difference with p=0.581.

Conclusions: This study demonstrated that intracameral levofloxacin (0.5%) was safer compared to intracameral cefuroxime in terms of central corneal thickness, cornea morphology, and anterior chamber reaction after uneventful phacoemulsification surgery. However, effects on endothelial cell loss were seen in intracameral levofloxacin (0.5%). Further studies of intracameral levofloxacin on the cornea endothelium in a larger population with a longer duration of follow-up is suggested to prove it as a potential alternative in the prevention of acute postoperative endophthalmitis.

Sep 07, 2021 (Tue)
(GMT+8) 17:00 - 18:00
Livestream 3

Intraoperative Aberrometry versus Conventional Biometry for IOL Power Selection: A Prospective Observational Study from a Tertiary Referral Centre

First Author: Sandhya GAUR
Co-Author(s): Chirakshi DHULL, Sudarshan KHOKHAR

Purpose: To evaluate the peroperative IOL power calculation using intraoperative aberrometry (ORA) and its comparison with conventional methods.

Methods: This is a prospective observational study done in a tertiary care centre. Patients with cataract planned for phacoemulsification by a single surgeon under topical anesthesia were enrolled. All patients underwent preoperative biometry (Manual SRK-II and IOLMaster® 500) to determine the IOL power. Intraoperative aberrometry using ORA was also done; however, IOL was inserted according to IOLMaster® (SRK/T). Spherical equivalent (SE) was recorded on postoperative day 1,7 and 30. Patients were divided into three groups based on axial lengths

for analysis. Comparative analysis was done of the calculated IOL powers and prediction errors of ORA with conventional methods. Adjusted IOL power to calculate the emmetropic IOL using the LiHue formula was also determined and was compared with existing methods. A P-value less than 0.05 was considered statistically significant.

Results: A total of 115 eyes from 113 patients were included, with a median age of 54.90±14.3 years. The mean axial length was found to be 23.94±2.3mm. There was good agreement (87%) between ORA and IOLMaster® for calculated IOL powers with a mean difference of 0.047±0.5D between the two (P=0.33). A positive correlation was found between IOL power calculated using ORA, IOLMaster®, SRK-II and adjusted IOL.

Conclusions: The use of intraoperative aberrometry (ORA) to calculate IOL power in patients undergoing uncomplicated phacoemulsification does not appear to provide significant benefit relative to standard preoperative measurement and planning.

A Domestic Keratoprosthesis Reinforced by Ear Cartilage in the Treatment of End-Stage Corneal Blindness

First Author: Yifei HUANG
Co-Author(s): Liqiang WANG, Qun WANG

Purpose: To evaluate the effectiveness and safety of a domestic keratoprosthesis reinforced by ear cartilage in the treatment of complicated and severe end-stage corneal blindness.

Methods: 46 patients (46 eyes) with end-stage corneal blindness in both eyes who could not be restored by corneal transplantation or standard Boston type I KPro implantation were included in the clinical study. The implantation of a domestic Kpro was completed in two steps. In the first step, a titanium frame was implanted in the central lamellar corneal pocket. In the second step after 3 months, the polymethyl methacrylate optical cylinder was screwed into the titanium holder. At the same time, at any stage, autologous auricular cartilage transplantation is used to strengthen the KPro; and selective simultaneous surgery is performed according to the patient›s condition. Main outcome measures were retention rate, best corrected visual acuity, and intraoperative and postoperative complications.

Results: 45 patients completed the two-step

KPro implantation and followed up for 44.6±6.24 months. The most common indications of the enrolled patients were alkali burns, SJS and OCP, thermol burns, and sulfurid acid burns; followed by explosive injuries and multiple corneal transplant failures. At the last follow-up, KPro›s retention rate was 100%; BCVA of 88.9% patients improved to ≥20/200, and 55.6% patients› BCVA improved to ≥20/40. Postoperative complications included residual lens cortex, preprosthetic membrane, glaucoma, post-prosthetic membrane, macular edema and infectious endophthalmitis.

Conclusions: This domestic artificial cornea reinforced by autologous ear cartilage is an effective method for regaining eyesight in patients with end-stage corneal blindness in both eyes.

Sep 07, 2021 (Tue) (GMT+8) 20:45 - 21:45 Livestream 3

A Novel Approach of Harvesting Viable Single Cells from Donor Corneal Endothelium for Cell-Injection Therapy

First Author: Hon Shing ONG

Co-Author(s): Khadijah ADNAN, Heng-pei ANG, Viridiana KOCABA, Jodhbir MEHTA, Gary PEH

Purpose: Donor corneas with low endothelial cell densities (ECD) are deemed unsuitable for corneal endothelial transplantation. This study evaluated a two-step incubation and dissociation harvesting approach, to isolate single corneal endothelial cells (CECs) from donor corneas, for corneal endothelial cell-injection (CE-CI) therapy.

Methods: To isolate CECs directly from donor corneas, optimization studies were performed where donor Descemet's membrane/corneal endothelium (DM/CE) were peeled and incubated in either M4-F99 or M5-Endo media, before enzymatic digestion. Morphometric analyses were performed on the isolated single cells. The functional capacities of these cells, isolated using the optimized simple non-cultured endothelial cells ('SNEC') harvesting technique, for CE-CI therapy was investigated using a rabbit bullous keratopathy model. Two control groups were: positive control where rabbits received cultured CECs; negative control where rabbits received no CECs.

Results: Following SNEC-injection, mean central corneal thickness (CCT) of rabbits increased to 802.9±147.8µm on day 1, gradually thinned, and remained clear with a CCT of 385.5±38.6µm at week 3. Recovery of corneas was comparable to rabbits receiving cultured CE-CI ($p=0.40$, $p=0.17$, $p=0.08$ at weeks 1, 2, and 3, respectively). Corneas that did not receive any cells remained significantly thicker compared to both SNEC-injection and cultured CE-CI groups ($p<0.05$).

Conclusions: This study concluded that direct (non-culture) harvesting of single CECs from donor corneas for SNEC-injection allows the utilization of donor corneas unsuitable for conventional endothelial transplantation.

Sep 07, 2021 (Tue) (GMT+8) 20:45 - 21:45 Livestream 3

Comparison of Newer Procedural Therapies for Dry Eye: Intense Pulsed Light Therapy (Eye-Light and E-Eye) versus Thermal Pulsation Therapy (Lipiflow)

First Author: Sailie SHIRODKAR
Co-Author(s): Sharon DSOUZA

Purpose: To compare subjective, objective and molecular outcomes of intense pulsed light (IPL) therapy (Eye-Light and E-eye) versus thermal pulsation system (Lipiflow) for management of meibomian gland dysfunction (MGD) and evaporative dry eye (EDE) and to present an algorithmic approach to managing recalcitrant MGD patients.

Methods: 100 eyes (n=50) treated with Lipiflow, 70 eyes (n=35) treated with Eye-Light, 50 eyes treated with E-Eye (n=25) were included in the study. Preprocedural symptoms were evaluated by Ocular Surface Disease Index (OSDI) scoring followed by objective dry eye and MGD evaluation (Schirmer›s 1 & 2, tear break-up time/ TBUT) and meibomian gland assessment (meibography and tear film interferometry). These parameters were reassessed post-treatment at 1, 3 and 6 months. Change in the inflammation on the ocular surface was evaluated by comparing pre- and post-treatment tear samples.

Results: Treatment outcomes were evaluated subjectively by OSDI and objectively by TBUT and MGD assessment. Improvement in these parameters was taken as success, while lack thereof was considered treatment failure. 94% Lipiflow eyes, 93.4% Eye-Light and 92% E-Eye eyes showed statistically significant improvement in OSDI and TBUT ($p<0.001$). Pre- and post-treatment tear inflammatory markers correlated well with clinical changes. Decreased pro-nociceptive cytokines IL-1, IL-6, IL-8, TNF-α, IL-17A, IFN-γ, chemokines and cell adhesion molecules post-treatment could explain improvement in symptoms of patients.

Conclusions: Procedural therapies for MGD show promising and comparable outcomes, aiding management of nociception and inflammation in dry eye disease. This study provides an algorithmic approach to decoding MGD and EDE even in recalcitrant cases.

Sep 07, 2021 (Tue) (GMT+8) 20:45 - 21:45 Livestream 3

Definitive Evidence of Corneal Stiffening after Crosslinking from Polarization Sensitive Optical Coherence Tomography Imaging

First Author: Sneha GUPTA
Co-Author(s): Raghav NARASIMHAN, Rahul PATIL

Purpose: To study the changes and binding of collagen fibrils before and after crosslinking of eyes by using polarization sensitive optical coherence tomography (PS-OCT). It is a contact free and non-invasive tool which acquires high axial resolution images of cornea with a large field of view. The main bulk of the corneal stoma comprises of collagen fibers. Determining architecture of the same helps to understand biomechanics and optical function of cornea better. The collagen of the corneal stroma has the property to alter the

polarized light passing through it. This change is measured by PS-OCT.

Methods: We recruited 50 normal, 25 eyes of keratoconus before crosslinking and 25 eyes with keratoconus after crosslinking. These eyes were imaged on PS-OCT at one, three and six months. PS-OCT scans of 11mm diameter were captured. Corneal fibril distribution images were generated using phase retardation, axis orientation enface maps. Eyes were imaged 3 times for repeatability.

Results: Enface maps generated by PS-OCT of the eyes with keratoconus showed an abrupt change in preferential arrangement of collagen fibril structures. Binding of collagen fibrils appeared to be weak in keratoconus eyes. This weak binding of collagen fibrils strengthened at 3 months post crosslinking and stabilized at 6 months with a relatively stronger binding as compared to preoperative arrangements of collagen.

Conclusions: The binding density of collagen fibrils was observed to improve and strengthen after collagen crosslinking. Posterior corneal enface maps can be used to track changes in collagen fibrils aiding in analyzing the effect of crosslinking procedure.

Sep 07, 2021 (Tue) (GMT+8) 20:45 - 21:45 Livestream 3

Developing a New Treatment for Superficial Fungal Infection using the Antifungal Collagen-HSAF Dressing

First Author: Jing ZHONG
Co-Author(s): Zuo XIN, Jin YUAN

Purpose: Fungal pathogens are common causes for clinical superficial infection. Heat stable antifungal factor (HSAF) is a novel antifungal natural product with a unique structure. In this study, we developed a treatment mode that is suitable for HSAF playing an effective role-treatment of superficial fungal infection.

Methods: We analyzed the genome of L. enzymogenes YC36, and investigated the production of HSAF in L. enzymogenes YC36 with bacterial growth; then improved the HSAF production by indole. Next, we explored the effects of HSAF on the cytotoxicity and apoptosis of human corneal epithelial cells HCECs, the collagen membrane and Col-HSAF were co-cultured with HCEC for 24 h, and evaluated the inhibitory effects of Col-HSAF on fungal proliferation in vivo, two fungal infection mouse models were constructed, which were A. fumigatus keratitis (FK) and topical candidiasis.

Results: The marine-derived Lysobacter enzymogenes YC36 contains the HSAF biosynthetic gene cluster, which we activated by the interspecific signaling molecule indole. An efficient and high purity extraction strategy was used to significantly improve the purity of the antifungal to 95.3%. Then, we constructed type I collagen-based HSAF (Col-HSAF) composite membrane to test the therapeutic effects of HSAF on fungal infections. In two models of superficial fungal infection, fungal keratitis and skin infection, Col-HSAF had good therapeutic effects. In addition, Col-HSAF addresses the problem of water insolubility, provides continuous release of the antifungal, and reduces the toxicity of HSAF.

Conclusions: In conclusion, Col-HSAF is an antifungal reagent with significant clinical value in the treatment of superficial fungal infections.

Sep 07, 2021 (Tue) (GMT+8) 20:45 - 21:45 Livestream 3

Effect of Pterygium Excision on Calculation of Intraocular Lens Power and Correlation of Change in Intraocular Lens Power with Size of Pterygium

First Author: Neha ADLAKHA

Purpose: To evaluate the effect of pterygium excision on intraocular lens power calculation and correlation of changes in intraocular lens power with the size of pterygium.

Methods: A prospective comparative study was done on 700 patients who had undergone unilateral primary pterygium excision. Preoperative pterygium length and area was calculated. Preoperative and one week, one month and six months postoperatively biometry measurements were obtained for eyes with pterygium and their healthy fellow eyes (control group).

Results: 700 patients with primary pterygium (mean age 49.26±6.15 years) were included. Mean pterygium length was 2.96±0.74 mm and mean area was 5.98±2.2 mm2. Preoperative intraocular lens power calculation with all formulas were higher than the postoperative and control values ($p<0.0001$). Mean changes were 0.39 D for SRKII, 0.64 D for SRK/T, 0.52 D for Hoffer Q, 0.49 D for Haigis and 0.47 D for Holladay 2 formulas after pterygium surgery. Positive and significant correlation were found between pterygium length and change in intraocular lens power. Pterygium longer than 2.18 mm or 6.42 mm2 created approximately 0.5D deviation in intraocular lens power calculation.

Conclusions: If pterygium size is larger than 2.18 mm or 6.42 mm2 and simultaneous surgery is planned, implanted IOL power should be 0.5 D smaller than the calculated power. A significant myopic shift occurred postoperatively due to steepening of cornea after pterygium excision.

Sep 07, 2021 (Tue) (GMT+8) 20:45 - 21:45 Livestream 3

Efficacy of Ipsilateral, Focal-Simple Limbal Epithelial Transplantation for Large Primary Nasal Pterygia

First Author: Yashas GOYAL

Purpose: The purpose of this study is to present an alternative method to conjunctival autografting in patients with large pterygia and consequently a large limbal stem cell defect.

Methods: 38 patients with primary nasal pterygium of more than 5 mm limbal involvement were recruited. Pterygium excision was done followed by simple limbal epithelial transplantation (SLET) with human amniotic membrane graft placement over the bare sclera. Patients were followed-up weekly from post-operative day 1 up to one month and then three-monthly for a period of 12 months.

Results: From post-operative day 7, patients had significant improvement in symptoms and ocular surface morphology. A satisfactory outcome was seen in 94.73% of patients. Only 2 participants required a second surgical procedure, one for stem cell lenticule displacement because of eye rubbing and the other for recurrence due to non-compliance with topical medications and follow-up.

Conclusions: The long-term success of pterygium surgery is subject to treatment of the limbal stem cell defect. Focal-SLET is an effective alternative to conjunctival limbal autografting in patients with large pterygia where preservation of virgin conjunctiva is prudent for future ocular surgeries. Further randomized controlled trials with larger sample size in multiple centers with longer follow-up periods could validate the results of our study.

Sep 07, 2021 (Tue) (GMT+8) 20:45 - 21:45 Livestream 3

Evidence Based Case Report: Autologous Serum Eye Drops for Persistent Epithelial Defect

First Author: Faraby MARTHA
Co-Author(s): Indira AMELIA PUTRI, Annisa PERMADI, Syska WIRMAN

Purpose: Persistent epithelial defects (PED) are conditions where the wound healing process on cornea exceeds regular interval (>2 weeks). Several clinical cohort studies have reported successful use for persistent epithelial defects (PED). However, protocols for preparing and using autologous serum eye drops (ASED) still varied between studies. Our objective is to determine the best ASED concentrations used to treat PED in relation to re-epithelialization and review standard manufacturing protocols for preparation, storage and use of the ASED.

Methods: A comprehensive search was carried out on different databases, such as PubMed, Cochrane, and Google Scholar. The article selection process resulted in inclusion of 10 eligible studies (7 prospective interventional case series, 1 randomized controlled trial (RCT), and 2 retrospective observational studies).

Results: This analysis included 10 studies discussing different ASED concentration and preparation method (one was a level one study, seven were a level two study, and the remaining two were a level four study). Four prospective studies revealed effective results compared to others. Undiluted ASED (100% serum concentration) with centrifugation force of 3000g /15 minutes and clotting time of 5 minutes-2 hours gave better re-epithelization rate. Frequency of ASED every 1 to 3 hours was used in included studies. Range of time to complete re-epithelization was 3-27 days. Although number of samples was varied between studies, it was recorded that 87.16% to 100% of patients successfully experienced epithelialization.

Conclusions: Re-epithelization in PED with 100% ASED/undiluted serum is effective, safe, and tolerable for treatment of PED.

Sep 07, 2021 (Tue)
(GMT+8) 20:45 - 21:45
Livestream 3

Femtosecond Laser Assisted Intrastromal Negative Meniscus Lenticule Implantation with Accelerated Corneal Collagen Crosslinking

First Author: Rajesh SINHA
Co-Author(s): Tushar AGARWAL, Sridevi NAIR, Prasoon PRADEEP, Namrata SHARMA

Purpose: To investigate the outcomes of femtosecond laser assisted intrastromal negative meniscus lenticule implantation with accelerated corneal collagen crosslinking (CXL) in advanced keratoconus patients with thin corneas.

Methods: Pilot, prospective, interventional case series included 11 eyes of 10 patients with progressive keratoconus, thinnest pachymetry between 320-400 µm, and intolerance to rigid gas permeable contact lens (RGP-CL) who underwent the procedure. A corneal pocket was created at 120-µm depth using femtosecond laser, following which a negative meniscus allogenic stromal lenticule implantation into the pocket was performed along with simultaneous accelerated CXL. Outcomes measures were the change in maximum anterior keratometry (Kmax), uncorrected distance visual acuity (UDVA), best spectacle corrected visual acuity (BSCVA), manifest refractive spherical equivalent (MRSE), manifest refractive cylinder, thinnest corneal pachymetry one year after surgery.

Results: Ten eyes with twelve months follow-up were analyzed. Ectasia progression halted in all eyes. The mean Kmax decreased by 4.1 diopters (D) (P=0.02) and thinnest pachymetry increased by 83.8 µm at 1 year (P<0.001). The mean UDVA and BSCVA improved by 0.29 logMAR (P=0.005) and 0.30 logMAR (P=0.001) respectively. MRSE and refractive cylinder reduced by 2.19 D and 2.33 D (P<0.001) respectively. RGP-CL fitting was successfully performed in all cases. Complications included reactivation of viral keratitis and epithelial ingrowth in one case and posterior lenticular interface fibrosis in another case.

Conclusions: The preliminary results suggest that the technique is a safe and effective method to halt disease progression, improve visual outcomes and CL tolerance in advanced keratoconus patients with thin corneas.

Sep 07, 2021 (Tue)
(GMT+8) 20:45 - 21:45
Livestream 3

Long-term Outcomes of the MICOF Keratoprosthesis Surgery

First Author: Liqiang WANG
Co-Author(s): Xiezhou HE

Purpose: To evaluate long-term anatomical and functional outcomes of the MICOF keratoprosthesis to treat end-stage corneal blindness.

Methods: Between October 2000 and October 2015, a total of 132 eyes of 131 patients had undergone the MICOF keratoprosthesis implantation. Of those, 91 eyes of 90 patients were included in this study. Preoperative information, surgical procedures, and postoperative data (best-corrected visual acuity (BCVA), keratoprosthesis retention, and

significant postoperative complications were reported) were collected for each included eye.

Results: The most common indications for surgery were chemical or thermal burns (68.1%, 62 of 91 eyes) and explosive injury (12.1%, 11 of 91 eyes), followed by Stevens-Johnson Syndrome (10.0%, 9 of 91 eyes), Sjögren's syndrome (4.4%, 4 of 91 eyes), mucous membrane pemphigoid (3.3%, 3 of 91 eyes) and multi-penetrating keratoplasty failure (2.2%, 2 of 91 eyes). The mean follow-up duration was 8.38 ± 3.22 years (range: 5 – 17.25 yearsmedian: 7.67 years). All patients had a preoperative visual acuity of hand motions or worse. Postoperative visual acuity improved to 20/200 or better in 45.1% (41 of 91 eyes) at the last follow-up visit. The most common postoperative complications were overgrowth of the surface mucosa (31.9%, 29 of 91 eyes), glaucoma (25.3%, 23 of 91 eyes), and retro-prosthetic membrane (15.4%, 14 of 91 eyes). 84.6% (77 of 91 eyes) of the eyes retained their initial keratoprosthesis at the latest follow-up.

Conclusions: The MICOF keratoprosthesis is a reliable approach to rescue vision in end-stage corneally blinded patients and has better retention than the Boston Kpro Type II.

Sep 07, 2021 (Tue) (GMT+8) 20:45 - 21:45 Livestream 3

Preliminary Results of Implantation of an Artificial Corneal Endothelial Device: The Endoart

First Author: Ruth LAPID
Co-Author(s): Ofer DAPHNA, Arie MARCOVICH, Ivanka VAN DER MEULEN

Purpose: To report the results of the Dutch cohort of the Endoart First in Human Safety Trial.

Methods: In this prospective safety study 5 patients with corneal endothelial failure were included. All patients had a corneal indication for endothelial keratoplasty surgery, but with concurrent severe monocular comorbidity which was expected to limit visual gain from endothelial keratoplasty, with good visual acuity in the fellow eye. The Endoart was implanted and positioned against the interior cornea. In most patients after removal of the diseased endothelium. Patients were followed as per protocol. Study parameters were device attachment, shift, re-bubble rates, suturing of device, cornea thickness, and clarity, visual acuity, and adverse events.

Results: Five patients (5 eyes) were implanted with an Endoart implant. All Endoart devices remained attached after initial re-bubbling, 2 devices were sutured. Corneal thickness decreased in 4 of 5 eyes, from of 906 micron +/- 157 micron to 708 +/- 150 microns. One patient developed an epithelial defect, most probably related to a herpes infection in the past. Another patient experience corneal thickening after spectacular clearing and visual acuity recovery in the beginning. A device exchange to a larger diameter is planned. No device related adverse events occurred.

Conclusions: In the first 5 patients the Endoart was safely attached (9-18 months). In most the cornea thickness decreases, without thinning. Visual acuity improved in 2 patients, although patient selection for the study included only eyes with a guarded visual prognosis. Ongoing study is being done to improve the procedure and its outcomes.

Sep 07, 2021 (Tue) (GMT+8) 17:00 - 18:00 Livestream 1

Tear Soluble Factors and In Vivo Confocal Microscopy Features in Subjects with Ocular Surface Discomfort/Pain

First Author: Bhavya GORIMANIPALLI
Co-Author(s): Sharon DSOUZA, Arkasubhra GHOSH, Archana PADMANABHAN NAIR, Swaminathan SETHU

Purpose: Discordance between ocular surface symptoms (pain) and signs impact treatment planning in the management of ocular surface diseases. Hence, there is a need to explore the status of tear nociceptive factors and confocal microscopy features of cornea. This study aims to correlate in vivo confocal microscopy (IVCM) features and tear factors in patients with ocular surface discomfort.

Methods: IVCM images, OSDI score and TBUT from 134 subjects (267 eyes) were recruited to determine corneal dendritic cell density (DCD), sub-basal nerve plexus (SBNP) features and micro neuroma-like features. 13 soluble factors with nociceptive potential were measured using multiplex ELISA in tears from 76 subjects (88 eyes). Subjects were grouped into: 1, normal TBUT (≥10 secs) + normal OSDI (<12); 2, low TBUT + normal OSDI; 3, normal TBUT + increased OSDI; 4, low TBUT + increased OSDI.

Results: Group 2-4 had higher DCD than Group 1 ($p<0.05$). No relationship was observed between OSDI and SBNP/ microneuroma-like features. Group 3-4 had increased tear IL-17A (pro-nociceptive) and reduced VEGF-A (anti-nociceptive) levels ($p<0.05$).

Conclusions: Confocal microscopy analysis revealed that increased corneal dendritic cell density, but not sub-basal nerve plexus changes or microneuroma-like features to be associated with ocular surface pain. An imbalance in a pro- and anti-nociceptive cytokine in the tear fluid was also observed in subjects with ocular surface pain, irrespective of their tear film stability.

Sep 07, 2021 (Tue) (GMT+8) 20:45 - 21:45 Livestream 3

The Double-Deck Technique Protects the Corneal Endothelium in Penetrating Keratoplasty with Vitrectomy and Silicone Oil Tamponade for Severe Ocular Injury

First Author: Yun FENG

Purpose: To summarize the outcomes of a cost-effective novel surgical technique, in which a barrier is created to prevent silicone oil (SO) from damaging the corneal endothelium in aphakic eyes.

Methods: This retrospective case series comprised six eyes of six patients with no lens-iris diaphragm who underwent par plana vitrectomy, SO tamponade, and double-deck viscoelastic embedment. Clinical outcomes, including best corrected visual acuity (BCVA), intraocular pressure (IOP), corneal endothelial cell density (ECD), and double-deck viscoelastic fixation, were assessed at

1, 6, 12, 18, and 24 months postoperatively. ECD was measured with a Heidelberg Retina Tomograph confocal microscope.

Results: Postoperatively, patients' BCVA fluctuated from hand motion detection to 20/200, and the IOP ranged from 7 to 15 mmHg. The double-deck viscoelastic remained relatively fixed. Patients showed various degrees of ECD decline, with loss rates ranging from 8.0 to 91.0 cells/mm2/month in the first 6 months and declining thereafter.

Conclusions: SO–corneal endothelium interaction can be blocked stably by double-deck viscoelastic embedment in aphakic eyes.

Glaucoma And Glaucoma Surgery

Sep 09, 2021 (Thu) (GMT+8) 17:00 - 18:00 Livestream 3

A Clinical Manifestation of Juvenile Onset Open Angle Glaucoma in Malaysia

First Author: Faisal Ariff HASSAN
Co-Author(s): Siti Khadijah ABDUL RAHMAN, Liza Sharmini AHMAD TAJUDIN, Mohd Aziz HUSNI, Norhalwani HUSAIN, Azhany YAAKUB

Purpose: To obtain clinical representation of juvenile onset open angle glaucoma (JOAG) features found in Malaysia.

Methods: A cross sectional study. Confirmed JOAG patients above 18 years old were recruited from 4 tertiary hospitals in Peninsular Malaysia. Secondary and congenital glaucoma patients were excluded from this study. 68 patients were qualified. Risk factors of age, gender, race, family history, age of diagnosis and past medical history was collected. Included are data of visual acuity (LogMAR units), intraocular pressure (IOP), cup: disc ratio (CDR), IOP lowering agents and surgical procedures done.

Results: Of 68 patients, 27 (39.7%) were noted to have positive family history of glaucoma. Majority were male (57.4%). At first presentation the mean vision in worse eye was 0.98(±1,20), with a mean IOP of 21.86mmHg (±12.97) and mean CDR of 0.89(±0.12). Mean medication types used was 2.41(±1.48), where prostaglandin analogues was most used (76.5%) followed by beta-blockers (64.7%), carbonic anhydrase inhibitors (CAI) (58.8%) and lastly alpha-agonists (41.4%). Most patients (85%) underwent surgical intervention, mainly trabeculectomy (95%) and glaucoma drainage device (GDD) only occupied 5% of cases. Mean number of surgeries were 2.13(±1.96), where 10 patients did not need any surgery, 15 subjects required only 1 surgery. Following filtering surgeries, a total of 11 patients (16.18%) did not require to continue IOP lowering agents. Majority underwent trabeculectomy (79.41%), where only 7 (10.29%) underwent GDD.

Conclusions: Majority of JOAG patients in Malaysia were presented late in advanced stage of glaucoma and it was alarming as the patients in young age group.

Sep 09, 2021 (Thu)
(GMT+8) 17:00 - 18:00
Livestream 3

Nasal Tip Port-Wine Stain: A Predictor of Surgical Intervention for Glaucoma in Sturge-Weber Syndrome

First Author: Tun Wang CH'NG
Co-Author(s): Takahiro FUJINO, Rumi KAWASHIMA, Kenji MATSUSHITA, Kohji NISHIDA

Purpose: To report the association between nasal tip involvement of port-wine stains (NTPWS) and surgical intervention for glaucoma in Sturge-Weber syndrome (SWS).

Methods: A retrospective case series of 11 patients with SWS from the Department of Ophthalmology, Osaka University Medical School Hospital, between 1996 and 2018. Photographs and clinical histories of patients in the electronic medical records were reviewed and analyzed. A skin score was applied to evaluate the port-wine stains (PWS) involvement in the distribution of the trigeminal nerve and embryonic facial vasculature in the facial photographs.

Results: The mean follow-up period was 8.2 (±6.4) years; the mean age at the first visit was 2.1 (±3.6) years; age of first treatment is 3.2 (±3.9) years. 80% (n=5) of eyes associated NTPWS require surgical intervention. Whereas, no eye (n=6) requires surgery in patients without NTPWS; 33.3% (n=6) of eyes not associated with NTPWS able to maintain intraocular pressure (IOP) with topical glaucoma medication; 66.7% (n=6) of eyes without NTPWS has no glaucoma. The difference of NTPWS involvement between eyes require surgical intervention for glaucoma with eyes not require surgery was significance (p=0.001).

Conclusions: NTPWS might be a predictor of glaucoma surgery in SWS. Eyes associated with NTPWS have a higher incidence of surgical intervention for glaucoma. Thus, patients with SWS and a NTPWS require close observation and treatment compared to those who do not.

Sep 09, 2021 (Thu)
(GMT+8) 17:00 - 18:00
Livestream 3

Risk of Normal Tension Glaucoma Progression using a Deep Learning-based Retinal Vessel Caliber Analysis: A Prospective Cohort Study

First Author: Timothy P.h. LIN
Co-Author(s): Poemen CHAN, Clement THAM, Tien-yin WONG

Purpose: To prospectively determine the relationship between baseline retinal-vessel calibers computed by a deep-learning system (DLS) and the risk of normal tension glaucoma (NTG) progression.

Methods: Three hundred and ninety NTG eyes were followed up for ≥24 (mean: 34.36±5.88) months. Retinal-vessel calibers (central retinal arteriolar equivalent (CRAE) and venular equivalent (CRVE)) were computed from fundus photographs at baseline using a previously validated DLS. Retinal nerve fiber layer (RNFL) thickness and visual field (VF) were evaluated semiannually. Glaucoma

progression was defined as progressive RNFL thinning on guided progression analysis (GPA) or VF deterioration determined by GPA or visual field index trend-based analysis. Cox proportional-hazards model was used to evaluate the relationship of baseline retinal-vessel calibers to the risk of glaucoma progression.

Results: Sixty-nine NTG eyes (17.69%) developed progressive RNFL thinning and 22 (5.64%) developed VF deterioration. Narrower baseline CRAE (HR per SD decrease (95% CI), 1.34 (1.04-1.73)) and CRVE (1.36 (1.02-1.81)) were associated with progressive RNFL thinning, and narrower baseline CRAE (1.74 (1.15-2.61)) was associated with VF deterioration, after controlling for age, gender, mean ocular perfusion pressure, axial length, standard automated perimetry mean deviation and RNFL thickness. Compared with the model based on previously reported risk factors, the addition of baseline retinal-vessel calibers improved the predictive discrimination of progressive RNFL thinning (C-statistics: CRAE, 0.63 vs. 0.602, P=0.012; CRVE, 0.621 vs. 0.602, P=0.028; CRAE+CRVE, 0.631 vs. 0.602, P=0.042) and VF deterioration (C-statistics: CRAE, 0.779 vs. 0.741, P=0.014; CRAE + CRVE, 0.781 vs. 0.741, P=0.046) in NTG.

Conclusions: DLS-measured baseline narrowing of retinal vessels conferred an increased risk of glaucoma progression in NTG.

Sep 07, 2021 (Tue)
(GMT+8) 17:00 - 18:00
Livestream 1

Patterns of Uveitis in a Tertiary Referral Center in Indonesia: A Retrospective Study

First Author: Gisela Haza ANISSA
Co-Author(s): Rina LA DISTIA NORA, Ratna SITOMPUL

Purpose: Up to a quarter of blindness might be caused by uveitis, especially in developing countries due to infectious etiology. Recognizing uveitis clinical patterns is essential to establish an etiological diagnosis, which varies between regions. This knowledge will help a physician to provide timely management. We aimed to update the epidemiological, clinical, and laboratory characteristics among uveitis patients referred to our clinic, a national tertiary referral center in Indonesia.

Methods: A retrospective descriptive study using medical records data of 299 patients with uveitis in 2 years (2016-2017).

Results: Of 299 patients, 152 were men (152/299, 50.8%) with median age of 36. Most cases were unilateral, and the most frequent anatomic entity was panuveitis (159/299, 53.2%). Infectious etiology was still common, mainly due to toxoplasmosis (96/299, 32.1%) and tuberculosis (59/299, 19.7%). Serological test IgG Toxoplasma and CMV were predominantly reactive in 192/251 (76.5%)

and 228/236 (96.6%) of tested patients despite various final diagnoses. On presentation, 106/299 (35%) were categorized as blind, and ultimately 64/106 (60%) of them were without improvement. In 167/299 (55%) of patients, complications were found, including cataracts (133/299, 44%) and glaucoma (32/299, 10%), overall contributing to 70/106 (66%) of blindness in our series.

Conclusions: Panuveitis and infectious etiology (toxoplasmosis and tuberculosis) were the most common uveitis. They were better distinguished by clinical pattern instead of laboratory results. Knowledge of uveitis pattern in each region, especially clinical features, can help physicians diagnose before performing expensive ancillary tests. Ocular complications were related to severe visual function; thus, well-timed referral in severe cases is essential.

Sep 08, 2021 (Wed) (GMT+8) 18:15 - 19:15 Livestream 3

Acute Non-Granulomatous Anterior Uveitis in SARS COVID-19: A Case Series

First Author: Priyadarshini PARTHASARATHI
Co-Author(s): Suriya DJEAMOURTHY, Hannah PRASANTH, Prem SAI, Dr.sarala SHANKAR

Purpose: To report a case series of acute non-granulomatous anterior uveitis in active COVID-19 patients.

Methods: We present a series of three COVID positive cases of age 7, 31 and 53 years respectively. Among them, one patient had active symptoms of COVID-19 and 2 patients were in recovery phase. All three cases presented to ophthalmology OPD with complaints of redness and pain. One of the cases had bilateral involvement, while the other two had unilateral involvement.

Results: On ocular examination, all three patients had BCVA 6/6 in both eyes. Anterior segment revealed circumcorneal congestion with moderate anterior chamber reaction. Rest of the anterior segment and fundus were within normal limits. Patients were started on topical steroids and improved symptomatically.

Conclusions: Ophthalmic manifestations can develop at any stage of COVID-19 disease, conjunctivitis being the most common feature. Uveitis is a rarely documented manifestation and ophthalmologists should be aware of this manifestation.

Sep 08, 2021 (Wed) (GMT+8) 18:15 - 19:15 Livestream 3

Differential Diagnosis and Treatment of Exogenous Fungal Endophthalmitis and Endogenous Fungal Endophthalmitis

First Author: Luping WANG
Co-Author(s): Kang WANG

Purpose: Fungal endophthalmitis (FE) is a sight-threatening infection requiring early appropriate therapy. Here we reported cases of endogenous fungal endophthalmitis (ENFE) and exogenous fungal endophthalmitis (EXFE), to explore the multi-model imaging characters of FE, and compare the EXFE and ENFE from the aspects of clinical

manifestations and management.

Methods: This is a retrospective analysis of 2 cases (EXFE and ENFE). The EXFE patient was a 52-year-old man who accepted phacoemulsification and intraocular lens implantation of the left eye. We found Fusarium solani in samples of anterior chamber, and the diagnosis of EXFE was confirmed. The ENFE patient was a 29-year-old female, who was diagnosed with uveitis, macular edema, BRAO and BRVO in the left eye. Candida was found in samples of anterior chamber and the ENFE diagnosis was confirmed. The ultra-widefield color image, OCT and autofluorescence were applied in the follow up.

Results: We removed intraocular lens and performed vitrectomy for the EXFE patient with 0.1% amphotericin B eye drops combined voriconazole oral administration for the control of inflammation. The exudates were absorbed gradually, and the vision increased from from light perception to 0.08. For the ENFE patient, we performed 10ug liposomal amphotericin B intravitreal injection. The ultra-widefield image, OCT and autofluorescence showed lesions decreased in number, scope and depth.

Conclusions: Fusarium endophthalmitis is very rare post-cataract surgery. ENFE in healthy subjects is unusual as well. The ophthalmologists should raise vigilance, identify pathogens early and choose reasonable anti-fungal drugs to control the infection and improve visual acuity.

Neuro-Ophthalmology

Sep 07, 2021 (Tue)
(GMT+8) 17:00 - 18:00
Livestream 3

Affordable 3D-Printed Frenzel Goggles for Improved Nystagmus Detection

First Author: Michael Ying Kit MAK
Co-Author(s): Yejun HONG

Purpose: Frenzel goggles have been an essential tool for evaluation of involuntary eye movements. However, modern day versions of Frenzel goggles have major disadvantages including weight, size, and cost. Our design utilizes 3D printing to develop an affordable and customizable pair of Frenzel goggles.

Methods: Proof of concept study. Two biconvex lenses of a focal length of 50mm were purchased from a scientific distributer (Ajax Scientifics©). Using Autodesk Fusion 360® we designed and 3D-printed a casing in the shape of snow goggles that could encase the two lenses. A Velcro strap was used to keep the goggles on our tester's head. Lighting was provided via two detachable LED button lights, attached to lateral internal walls of the goggles.

Results: Our 3D printed goggles were used to assess visual stability in the absence of visual fixation in patients with nystagmus by neuro-ophthalmologists. Overall, this model cost approximately $31.60CAD along with the printing, LED light units, Velcro strap, and two biconvex lenses. The focal length of lenses and the face-sealing design of the

goggles eliminated visual fixation target, and the attached lights appropriately illuminated patient's eyes for observation. Its adjustable strap allowed accommodation of various head sizes, including pediatric patients.

Conclusions: Our 3D printed Frenzel goggles were able to improve patient comfort, provide clear magnified view of the eyes while eliminating visual fixation, and were significantly more affordable than traditional Frenzel goggles.

New Approaches To Patient Management And Dealing With Unmet Need In The Era Of Covid-19

Sep 10, 2021 (Fri) (GMT+8) 17:00 - 18:00 Livestream 3

A Prospective Study on COVID-19 Associated Orbital Mucormycosis

First Author: Farzad PAKDEL
Co-Author(s): Kazem AHMADIKIA, Rozita JAFARI, Sadegh KHODAVAISY, Mohammadreza SALEHI, Azin TABARI

Purpose: We faced a surge in incidence of mucormycosis in the COVID-19 pandemic. We aim to report clinical features, contributing factors and outcome among patients with COVID-19-associated mucormycosis (CAM).

Methods: This was a prospective multicenter study on patients with biopsy proven sinu-orbital mucormycosis among patients with RT-PCR confirmed COVID-19 from April 2020 to September 2020 during the COVID-19 pandemic. Demographics, time interval between COVID-19 disease and mucormycosis, underlying systemic diseases, clinical features, course of disease and outcome were collected and analyzed.

Results: Fifteen patients with COVID-19 and rhino-orbital mucormycosis were included. Mean age of patients was 51.73±14.72 years. Sixty-six percent of patients were male. The mean interval time between COVID-19 disease and mucormycosis was seven days (range: 1-37 days). Most patients had advanced mucormycosis at admission. The most common presentation was orbital apex syndrome (73%). Eight (53%) patients had cavernous sinus thrombosis. Among patients 13 (86%) had diabetes mellitus, seven (46.6 %) had received intravenous dexamethasone. Seven (47%) patients died from mucormycosis. Six (40%) received combined anti-fungal therapy and five patients (33%) underwent orbital exenteration. None of patients that received combined anti-fungal therapy died.

Conclusions: Findings of this study showed that clinicians should be cautious about mucormycosis during the first two weeks after COVID 19 in high-risk patients. CAM may be more advanced and aggressive course. Poor control of diabetes mellitus and corticosteroid therapy and severe pulmonary involvement during COVID-19 seem important underlying predisposing factors.

Sep 10, 2021 (Fri)
(GMT+8) 17:00 - 18:00
Livestream 3

An Algorithmic Approach to Decode Unhappy Patients Post Refractive Surgery with Regression, Glare and Asthenopic Symptoms in the COVID-19 Era

First Author: Anuj SATIJA
Co-Author(s): Pooja KHAMAR, Sumitha MUTHU, Pooja SARBAJNA

Purpose: To report a step-wise evaluation of post-refractive surgery patients presenting with myopic, hyperopic shift or glare and delineate the role played by vergence/accommodative anomalies in the causation of the same due to increased near activities in the COVID-19 era.

Methods: 56 eyes of 28 patients presenting with myopic, hyperopic shift or glare after refractive surgery between June 2019 to December 2020 underwent topography, aberrometry and detailed orthoptic evaluation. Vision therapy (VT) exercises were initiated after diagnosis of vergence or accommodative anomalies.

Results: 35% of the eyes showed post-operative myopic shift with a mean (SD) of -2.25D, 16.7% hyperopic shift with mean (SD) of 1.75D, 68.3% had associated astigmatism with mean (SD) of -1.5D while 20% eyes had only glare. Detailed evaluation revealed true regression in 2 eyes, convergence insufficiency (ci) in 24 eyes, accommodative excess (ae) and insufficiency (ai) in 6 eyes each, divergence insufficiency (di) and fusional vergence dysfunction (fvd) in 4 eyes each and non-specific vergence and accommodative (nsva) anomalies in 10 eyes. Myopic shift was associated significantly with ae and ci, hyperopic shift with ai ($p<0.05$ for all), nsva and glare with ci. Incidence of NSVA has increased 26% in the COVID lockdown. After 21 days of VT, mean residual refraction significantly reduced to 0.35D.

Conclusions: Binocular vergence accommodative issues contribute to a majority of patients presenting with post-refractive surgery dissatisfaction. NSVA has significantly increased in the COVID-19 pandemic due to increased screen time and near work. Meticulous evaluation and VT exercises is thus gained importance.

Sep 10, 2021 (Fri)
(GMT+8) 17:00 - 18:00
Livestream 3

Enhancing Innate Immunity in Ocular Surface Possibly Halts SARS-CoV-2 Entry and Transmission through Ocular Portals: A Human Globe Study

First Author: Pooja KHAMAR
Co-Author(s): Arkasubhra GHOSH, Rohit SHETTY

Purpose: SARS-CoV-2, the pathogen of the severe acute respiratory syndrome, uses a set of host proteins on mucosal epithelium for cellular entry, intracellular amplification and modulation of host immune response. Since the ocular surface is covered by mucosal epithelium, it is important to understand if it can serve as an entry point or reservoir for the virus. The purpose of the study was to study the ACE2, TMPRSS2, CTSL and antiviral interferon expression across ocular tissues and identify potential therapeutics to prevent transmission.

Methods: This study was conducted after ethics committee approval. Donor human globes of control (n=5), COVID-19 infected (n=5) and COVID-19 recovered subjects (n=2) were microdissected to isolate 17 different locations/layers in the eye. Gene expression and immunofluorescence was used to study the distribution of ACE2, TMPRSS2, CTSL and antiviral interferon expression across these different ocular tissues from human globes. Trehalose eye drops were instilled in a cohort of uninfected subjects to study the therapeutic effect on these receptors.

Results: Corneal and conjunctival epithelium had the highest levels of pro-viral host factors such as ACE2R, CTSL, etc, further indicating that autophagy is an important aspect of successful viral transduction. The prophylactic use of trehalose eye drops reduced ACE2R and enhanced MxA expression indicating antiviral immunity in ocular surface and nasolacrimal ducts.

Conclusions: Presence of pro-viral host factors in the ocular tissue increases the risk of infection. Pharmacological induction of interferon mediated antiviral response with trehalose can possibly protect the ocular surface and nasolacrimal duct from respiratory viral infections.

Sep 10, 2021 (Fri) (GMT+8) 17:00 - 18:00 Livestream 3

High Risk Factors and Demographic Profiling of Keratoconus Patients who have Progressed during the COVID-19 Pandemic

First Author: Sriram ANNAVAJJHALA
Co-Author(s): Gairik KUNDU

Purpose: To identify and analyze the high risk factors and demographic factors influencing the progression of keratoconus during the coronavirus disease 19 (COVID-19) pandemic.

Methods: 200 patients of keratoconus with at least one stable visit prior to the COVID-19 pandemic but progressed during the pandemic and 50 patients of keratoconus which continued to remain stable during the pandemic were included. Progression based on maximal keratometry (K max) was defined as change in K max of 1D between 2 visits within 6 months duration. Demographic data and clinical details were obtained from assessments on the day of listing, and subsequent review on the day of documentation of progression and stability through a detailed questionnaire. The questionnaire included presence of eye-rubbing, duration of indoor activity and computer use, usage of topical lubricants and immunomodulator, hormonal disturbances, hours of mask use and use of hand sanitizers along with serum Immunoglobulin E (IgE), vitamin D (Vit D) and B12 levels.

Results: Out of the various parameters listed when we compared progressors versus stable, we found serum IgE, systemic allergy, Vit D and B12, use of mask >4hrs, and usage of lubricants/immunomodulators which were statistically significantly ($p<0.001$) altered in those who progressed. Among the progressive cases 45% showed serum level of IgE>100IU, 44% had Vit D<20ng/ml, 20% had Vit B12<215ng/ml along with an increased tendency of mask wear >4hours and eye rubbing, decreased lubricant use.

Conclusions: This study demonstrates the importance of risk stratification and profiling patients which could impact disease progression such as in keratoconus.

Ocular Imaging

Sep 08, 2021 (Wed) (GMT+8) 17:00 - 18:00 Venue: Livestream 3

A Multi-Regression Framework to Improve the Diagnostic Ability of Optical Coherence TomographyRetinal Biomarkers to Discriminate Mild Cognitive Impairment and Alzheimer's Disease

First Author: Jacqueline CHUA
Co-Author(s): Christopher Li-Hsian CHEN, Chi LI, Leopold SCHMETTERER, Tien-Yin WONG

Purpose: The diagnostic performance of optical coherence tomography (OCT) to detect Alzheimer›s disease(AD) and mild cognitive impairment (MCI) remains limited. We assessed whether compensating the peripapillary retinal nerve fiber layer (pRNFL) thickness for multiple demographic and anatomical factors as well as the combination of macular layers improves the detection of MCI and AD.

Methods: This cross-sectional study of 62 AD (n=92 eyes), 108 MCI (n=158 eyes), and 55 cognitively normal control (n=86 eyes) participants. Macular ganglion cell complex (mGCC) thickness was extracted. pRNFL measurement was compensated for several ocular factors. Thickness measurements and their corresponding areas under the receiver operating characteristic curves (AUCs) were compared between the groups. The main outcome measure was OCT thickness measurements.

Results: Participants with MCI/AD showed significantly thinner measured and compensated pRNFL, mGCC, and altered retinal vessel density ($p<0.05$). Compensated RNF Loutperformed measured RNFL for discrimination of MCI/AD (AUC=0.74 vs 0.69; $p=0.026$). Combining macular layers and compensated pRNFL parameters provided the best detection of MCI/AD (AUC=0.80 vs0.69; $p<0.001$).

Conclusions: Accounting for interindividual variations of ocular anatomical features inpRNFL measurements and incorporating macular information may improve the identification of high-risk individuals with early cognitive impairment.

Sep 08, 2021 (Wed) (GMT+8) 17:00 - 18:00 Livestream 3

Automated Ultrasonic Assessment of Gaze-Induced Deformation of Posterior Staphyloma in Highly Myopic Eyes by Means of Radius of Curvature

First Author: Kazuyo ITO
Co-Author(s): Theresa H. LYE, Ronald H. SILVERMAN, Quan HOANG, Jonathan MAMOU

Purpose: We used ultrasound images to determine if the stress and strain of eye movements result in gaze-induced deformation of posterior staphyloma in highly myopic (HM) eyes.

Methods: A prospective imaging study was performed on 101 HM eyes (axial length range: 27.0 to 39.3 mm) of 52 patients with a clinical diagnosis of posterior staphyloma. 10 MHz B-scan ultrasound images oriented along the visual axis were acquired while subjects fixated in 5 directions (primary, nasal, temporal, down and up gaze). An algorithm was used to assess the local radius of curvature (K in mm-1) in the vitreoretinal boundary. One static frame for each scan direction was chosen to calculate the average and standard deviation (std) of K.

Results: Overall, we found significant gaze-induced posterior eye shape changes among the different gazes when grouped together ($p < 0.001$). Specifically, among the vertical scans, the average K in upgaze was 0.019 mm greater than in primary gaze ($p < 0.001$). The average K in upgaze was 0.021 mm greater than in downgaze ($p < 0.001$). Std of K in upgaze was 0.081 mm greater than in primary gaze ($p < 0.001$). Also, std of K in upgaze was 0.058 mm greater than in downgaze ($p < 0.001$). There were no significant gaze-induced posterior eye shape changes with horizontal eye movements (all $p > 0.05$).

Conclusions: Significant gaze-induced staphyloma deformation was confirmed by ultrasound B-scan-based assessment, which is consistent with studies suggesting the association of environmental factors with myopia development and progression.

Sep 08, 2021 (Wed) (GMT+8) 17:00 - 18:00 Livestream 3

Foveal Avascular Zone Segmentation in Optical Coherence Tomography Angiography Images using a Deep Learning Approach

First Author: Reza MIRSHAHI
Co-Author(s): Pasha ANVARI, Khalil GHASEMI FALAVARJANI, Masood NASERIPOUR, Hamid RIAZI-ESFAHANI, Mahsa SARDARINIA

Purpose: To introduce a new deep learning (DL) model for segmentation of the fovea avascular zone (FAZ) in en face optical coherence tomography angiography (OCTA).

Methods: FAZ borders were delineated in inner retinal slab of 3x3 enface OCTA images of 131 eyes of 88 diabetic patients and 32 eyes of 18 healthy subjects. To train a deep convolutional neural network (CNN) model, 126 enface OCTA images (104 eyes with diabetic retinopathy and 22 normal eyes) were used as training/validation dataset. Then, the accuracy of the model was evaluated using a dataset consisting of OCTA images of 10 normal eyes and 27 eyes with diabetic retinopathy. The CNN model was based on Detectron2, an open-source modular object detection library. In addition, automated FAZ measurements were conducted using the device's built-in software.

Results: The mean dice similarity coefficient of the DL model was 0.94±0.04 in testing dataset. There was excellent agreement between automated, DL model and manual measurements of FAZ in healthy subjects (95% limit of agreement [LoA] of -0.005 to 0.026 mm2 between automated and manual

measurement and 0.000 to 0.009 mm2 between DL and manual FAZ area). In diabetic eyes, the agreement between DL and manual measurements was excellent (95% LoA of -0.063 to 0.095), however, there was a poor agreement between the automated and manual method (95% LoA of -0.186 to 0.331).

Conclusions: The DL model showed an excellent accuracy in detection of FAZ border in enfaces OCTA images of both diabetic patients and healthy subjects. The DL outperformed the automated measurements.

Sep 08, 2021 (Wed) (GMT+8) 17:00 - 18:00 Livestream 3

Impact of Tear Film Optics on Repeatability of Pentacam® AXL Wave Hybrid Topographer and Aberrometer with Normal versus Abnormal Optical Scatter Index

First Author: Divya TRIVEDI
Co-Author(s): Sneha GUPTA, Gairik KUNDU

Purpose: To assess impact of tear film optics on repeatability of on Pentacam®AXL Wave in eyes with normal vs abnormal optical scatter index (OSI) and to compare it with repeatability of iTrace™ in abnormal OSI.

Methods: 30 normal and 70 post-refractive surgery eyes underwent scans on Optical Quality Analysis System (OQAS) to assess OSI, then 3 consecutive scans on Pentacam®AXL Wave & iTrace™. Mean keratometry (Km), thinnest corneal thickness (TCT), total and corneal aberration were studied. Within-subject standard deviation (Sw), test–retest repeatability (TRT), coefficient of variation (COV) were analyzed to assess repeatability.

Results: Arm 1: No significant difference (p-0.32) between repeatability of normal and post-refractive patients. Sw for Km was 0.2, COV 0.1-0.5. Sw for TCT was 9.16, COV 0.2-3.3. Sw for HOA 0.024, COV 20.4-33.6. Arm 2: Normal and post-refractive surgery patients were divided: group 1 OSI>1; group 2 OSI<1. Group 1 Sw for Km was 0.23, COV 0.2-0.4, Sw for TCT was 9.23, COV 0.4-3.5, Sw for HOA was 0.028, COV 20.9-32.3. In patients with OSI>1, Km, TCT and HOA, COV was 0.1-0.9, 0.4-4.2 and 19.8-39.4. Arm 3 assessed effect of tear-film on repeatability of iTrace™ with OSI>1 and OSI<1. In patients with OSI>1, Km, TCT, HOA COV was 0.5-1.6, 0.7-5.3, 18.8-42.4.

Conclusions: Pentacam® AXL Wave had better repeatability in patients with poor tear film as compared to iTrace™. Tear film optics impacts repeatability of an instrument, hence it is important to assess tear film prior to imaging patients.

Sep 08, 2021 (Wed) (GMT+8) 17:00 - 18:00 Livestream 3

Oral Fluorescein Angiography using Broadline Imaging Technology for Retinal Disease

First Author: Sangeet MITTAL
Co-Author(s): Kanwaljeet MADAN

Purpose: To analyze the efficacy and limitations of use of oral fluorescein angiography using broadline imaging

technology in various retinal disorders including diabetic retinopathy, vascular occlusions, age related macular degeneration, central serous chorioretinopathy, etc.

Methods: 445 patients underwent oral fluorescein angiography in which dye was given orally to the patients. The dose was 25 mg/kg body weight. The dye obtained from ampules was dissolved in 30 ml of sugar free orange juice and the patient was asked to take it at once. This was followed by 30 ml of juice without the dye to change the taste of mouth. The angiogram was obtained using widefield fundus camera based on broadline imaging technology. Angiograms were taken at regular intervals (every minute for first 5 minutes, followed by every 2 minutes for 5-10 minutes and then every 5 minutes for 30 minutes.

Results: Good quality images were obtained in 424/445 (95.3%) patients. Complications included mild allergic rash in 4 (0.9%), vomiting in 1 (0.2%) and nausea in 1 (0.2%) patients. None of the patients had vasovagal syncope or severe anaphylaxis. Presence of cataract impaired the quality of images. Good quality angiograms were also not obtained in patients who underwent the procedure within one hour of taking their meal.

Conclusions: Oral FFA being less invasive is a safer alternative to intravenous FFA in several indications. It can also be considered in patients who had history of nausea or vomiting during a previous procedure. It also has advantages over OCT angiography.

Sep 08, 2021 (Wed) (GMT+8) 17:00 - 18:00 Livestream 3

Precision and Accuracy of Anterior Segment Analysis with a New SD-OCT/ Placido Tomographer in Cataract Patients

First Author: Jinhai HUANG
Co-Author(s): Min CHEN, Qinmei WANG, Jinjin YU

Purpose: To assess the precision of a new spectral-domain optical coherence tomographer (SD-OCT)/Placido topographer (MS-39, CSO, Florence, Italy) and its comparison with swept-source OCT (SS-OCT) biometer (Argos, Movu Inc., Komaki, Japan) in cataract patients.

Methods: 53 right eyes from 53 patients were examined by two experienced operators three times using both devices randomly. Employing the within-subject standard deviation (Sw), test-retest variability (TRT), coefficient of variation (CoV), and intraclass correlation coefficient (ICC) to evaluate intraoperator repeatability and interoperator reproducibility; the double-angle plots to analyze astigmatism; Bland–Altman plots and 95% limits of agreement (LoA) to verify the agreement between devices.

Results: The SD-OCT/Placido tomographer showed high precision, with CoVs ≤ 0.44%, ICCs ≥ 0.945 for all parameters; TRTs ≤ 4.21 μm for central corneal thickness (CCT), ≤ 0.03 mm for anterior chamber depth (ACD) and aqueous depth (AQD), and ≤ 0.25 D for mean keratometry (Km), J0, and J45. The inter-device differences in Km, J0, and J45 were statistically insignificant, whereas the remaining were statistically but not clinically

significant. The 95% LoA of CCT, ACD, AQD, Km, J0 and J45 were -3.70 to 15.25 µm, -0.06 to 0.04 mm, -0.06 to 0.04 mm, -0.28 to 0.35 D, -0.27 to 0.26 D, -0.27 to 0.21 D, respectively. The double-angle plot confirmed the high agreement in astigmatism.

Conclusions: For CCT, ACD, AQD, Km, and astigmatism measurements in cataractous patients, the new SD-OCT/Placido tomographer has excellent precision and high agreement with the Argos SS-OCT biometer, and can be used interchangeably.

A Multi-Regression Framework to Improve the Diagnostic Ability of Optical Coherence Tomography Retinal Biomarkers to Discriminate Mild Cognitive Impairment and Alzheimer's Disease

First Author: Jacqueline CHUA
Co-Author(s): Christopher Li-hsian CHEN, Chi LI, Leopold SCHMETTERER, Tien-Yin WONG

Purpose: The diagnostic performance of optical coherence tomography (OCT) to detect Alzheimer›s disease (AD) and mild cognitive impairment (MCI) remains limited. We assessed whether compensating the peripapillary retinal nerve fiber layer (pRNFL) thickness for multiple demographic and anatomical factors as well as the combination of macular layers improves the detection of MCI and AD.

Methods: This cross-sectional study of 62 AD (n=92 eyes), 108 MCI (n=158 eyes), and 55 cognitively normal control (n=86 eyes) participants. Macular ganglion cell complex (mGCC) thickness was extracted. pRNFL measurement was compensated for several ocular factors. Thickness measurements and their corresponding areas under the receiver operating characteristic curves (AUCs) were compared between the groups. The main outcome measure was OCT thickness measurements.

Results: Participants with MCI/AD showed significantly thinner measured and compensated pRNFL, mGCC, and altered retinal vessel density ($p<0.05$). Compensated RNFL outperformed measured RNFL for discrimination of MCI/AD (AUC=0.74 vs 0.69; $p=0.026$). Combining macular layers and compensated pRNFL parameters provided the best detection of MCI/AD (AUC=0.80 vs 0.69; $p<0.001$).

Conclusions: Accounting for interindividual variations of ocular anatomical features in pRNFL measurements and incorporating macular information may improve the identification of high-risk individuals with early cognitive impairment.

Comparison of Multicolor fundus Imaging and Optos Widefield Imaging in Tractional Retinal Detachment

First Author: Santosh GOPIKRISHNA GADDE
Co-Author(s): Chaitra JAYADEV, Nikitha REDDY, Akhila SRIDHARAN, Ram SNEHITH

Purpose: To compare multicolor imaging (MCI) of the retina with Optos color fundus photography (OCFP) for the evaluation and extent of preretinal membranes in diabetic tractional retinal detachments (TRD).

Methods: Thirty eyes with diabetic TRD and preretinal membranes at the macula were imaged using the MCI feature of Heidelberg Spectralis Optical Coherence Tomography and color photo using Optos Daytona ultra-widefield color fundus camera in this retrospective study. Two investigators independently graded and determined the agreeability between the two modalities with respect to the extent of the TRD and preretinal membranes on OCT.

Results: Multicolor imaging provided better visualization of the attachments and traction points of the posterior hyaloid face and preretinal membranes and is comparable to the SD-OCT B-scan images. The inter-rater agreeability rates, using OCFP had a κ value of 0.37, while MCI had a κ value of 0.46, which is a better agreement than OCFP. When comparing images of different wavelengths, grading using IR had a poor agreement (-0.04±0.04) while GR (0.46±0.32) and BR (0.53±0.19) had a moderate agreement. The composite MCI and GR images also had a comparatively higher Intra Class Coefficient when compared to the OCFP (0.25, [-0.09 to 0.55]) and IR (-0.03 [-0.39 to 0.34]) images, thus confirming better visibility and delineation of preretinal membranes on GR and BR images.

Conclusions: Multicolor imaging is more sensitive for determining the extent of TRDs and for the detection of secondary membranes compared to OCFP, thus aiding in better surgical planning.

Smaller Corneal White to White and Posterior Elevation

First Author: Sailie SHIRODKAR
Co-Author(s): Mathew FRANCIS

Purpose: To understand the influence of corneal white to white (WTW) on tomographic parameters and its role in keratoconus diagnosis.

Methods: 636 normal pediatric eyes of 636 subjects (5 to 18 years) were analyzed with respect to corneal tomographic parameters and WTW calculated from Pentacam Scheimpflug images. WTW was calculated in horizontal and vertical meridian thrice by three different experienced ophthalmologists to ensure repeatable and reliable readings. Statistical associations were made using correlation coefficient.

Results: Intraclass correlation coefficient >0.95 was observed between WTW values calculated by different raters. Horizontal WTW was found to be greater than or equal to vertical WTW in 99.53% of eyes. Significant positive correlation ($p<0.001$) was observed in K1 ($r=0.5$), K2 ($r=0.44$) and Kmean ($r=0.5$) at the posterior surface with horizontal WTW. Significant negative correlation ($p<0.001$) was observed in BAD-D ($r=-0.33$), Db (deviation of back elevation difference map) ($r=-0.41$), keratometry Kmax ($r=-0.37$), Kmean front ($r=-0.39$) and with horizontal WTW. Similar correlation was noted with respect to vertical WTW. Correlation of WTW was found to be stronger in posterior surface elevation markers in comparison to the rest.

Conclusions: Lower WTW correlated strongly with increased corneal parameters especially

on the posterior surface, which could drive false positive diagnosis. WTW could be a critical factor in keratoconus diagnosis.

Use of Deep Learning Network and Wide-Field Corneal Endothelial Mapping in Analysis of Descemet's Membrane Endothelial Keratoplasty Grafts

First Author: Kai Yuan TEY
Co-Author(s): Marcus ANG, Victoria Grace DIMACALI, Michael Julien Alexandre GIRARD, Satish PANDA

Purpose: We aim to explore the use of deep learning network (DLN) in assisting in segmenting endothelial cells. In addition, we also explore the possible role of wide-field corneal endothelial mapping in eyes that had Descemet membrane's endothelial keratoplasty (DMEK).

Methods: Two different sets of 50 specular microscopy images of eyes with varying condition, from normal to severely diseased, were chosen: first dataset was used to assist in training of DLN (supervised learning with an Unet network), and second dataset, which was segmented by DLN, and was compared to the manually segmented copies using dice coefficient. Another 20 DMEK eyes were scanned. Peripheral was compared with central regions of DMEK grafts using a modified specular microscopy technique. The mean endothelial cell density (ECD), coefficient of variation (CV) and hexagonality index (HEX) were compared using independent t-test.

Results: DLN was able to replicate segmentation that is comparable to manual segmentation (dice coefficient = 0.85). In addition, we detected differences in ECD, CV and Hex when comparing the peripheral to central regions of DMEK grafts, e.g. mean difference of superior ECD was -18.2 cell/mm2, superior CV was -0.67 µm2, and superior Hex was -7.8%.

Conclusions: Our study demonstrated that DLN may be deployed to help automatically segment and analyze specular microscopy images. Our study also suggests that there may be a role for wide-field corneal endothelial mapping to further examine the differences in morphological characteristics between peripheral and central regions of DMEK grafts.

Ocular Oncology And Pathology

Sep 09, 2021 (Thu) (GMT+8) 20:45 - 21:45 Livestream 3

Bilateral Conjunctival Plasma Cell Granuloma in a Young Female: A Rare Case

First Author: Shyam Sundar DAS MOHAPATRA

Purpose: To describe a case of bilateral plasma cell granuloma of conjunctiva in a young female.

Methods: A 9 year old female reported with bilateral vascularised subconjunctival mass for 2 months. Initially, she was diagnosed as reactive lymphoid hyperplasia, started on steroid therapy. After 1 month, no response was noted. Incision biopsy was done from right eye and histopathological examination (HPE) revealed chronic non-caseating granuloma. Relevant systemic investigations were found to be negative. After 2 weeks, she developed bilateral granulomatous anterior uveitis and

was started on anti-tubercular treatment and oral steroid. After 2 months, she returned with relapsing polychondritis. She was started on systemic steroid and immunosuppressant. IgG4 related disease was suspected, but serum IgG4 was found to be normal. Same treatment was continued. After 6 months, as no improvement was noted, excision biopsy from left eye was done and came out as plasma cell granuloma on HPE. Topical, oral immunomodulators were started. After 6 months, right eye shown no improvement with no recurrence in left eye. Excision biopsy from right eye again shown plasma cell granuloma. Plasma cell dyscrasias ruled out. Topical, systemic immunomodulators continued for 1 year.

Results: No recurrence was noted in both eyes after 2 years of follow up.

Conclusions: Plasma cell granuloma of conjunctiva is a rare disease entity. It can present as an isolated finding without any systemic involvement and may not be amenable to topical or systemic immunomodulators therapy. Complete excision is the treatment of choice and no recurrence occurs after complete excision.

Sep 09, 2021 (Thu) (GMT+8) 20:45 - 21:45 Livestream 3

Clinical Characteristics of Patients Presenting with Uveal Melanoma Metastasis: A Multicenter, International Study

First Author: Gaurav GARG
Co-Author(s): Paul FINGER

Purpose: To analyze the ocular and systemic findings from patients presenting with uveal melanoma metastasis.

Methods: It is an international, multicenter, internet-enabled, registry-based retrospective data analysis. Patients were diagnosed between 2001 to 2011. Data included: primary tumor dimensions, extrascleral extension, ciliary body involvement, AJCC-TNM staging, characteristics of metastases.

Results: Of 3610 patients with uveal melanoma, 69 (1.9%; 95% CI, 1.5-2.4) presented with clinical metastasis (Stage IV). These melanomas originated in the iris, ciliary body and choroid in 4%, 16%, and 80% of eyes, respectively. Utilizing 8th edition AJCC, 8 (11%), 20 (29%), 24 (35%), and 17 (25%) belonged to AJCC T-categories T1-T4. Risk of synchronous metastases increased from 0.7% (T1) to 1.5% (T2), 2.6% (T3) and 7.9% (T4). Regional lymph node metastases (N1a) were detected in 9 (13%) patients of whom 6 (67%) had extrascleral extension. Stage of systemic metastases (known for 40 (59%) Stage-IV patients) revealed 14 (35%), 25 (63%), and 1 (2%) had small (M1a), medium-sized (M1b) and large-sized (M1c) metastases, respectively. Location of metastases in Stage IV patients were liver (91%), lung (16%), bone (9%), brain (6%), subcutaneous tissue (4%), and others (5%). Multiple sites of metastases were noted in 24%. Compared with the 98.1% of patients who did not present with metastases, those with synchronous metastases had larger intraocular tumors, more frequent extrascleral extension, ciliary body involvement and thus a higher AJCC T-category.

Conclusions: Though higher AJCC T-stage was associated with risk for metastases at diagnosis, even small T1 tumors were Stage IV

at initial presentation. The liver was the most common site of metastases; however, frequent multiorgan involvement supports initial whole-body staging.

Seventeen patients died during the study period. The overall survival outcome at 1, 3 years and 5 years were 80%, 60%, and 55% respectively. Ethnicity was significantly associated with mortality following the exenteration ($p<0.001$). The only predictive factor identified on multivariate analysis was the indigenous ethnic group (adjusted hazard ratio=90.048, $p<0.05$).

Conclusions: This study demonstrated good survival post-OE, except for presentations with metastasis. It also highlighted the importance of screening for recurrences within the first 5 years, which carried a high mortality rate. Further research is needed to identify the causes for the higher mortality among non-Malay patients, with emphasis on the indigenous and Indian ethnicity.

Sep 09, 2021 (Thu) (GMT+8) 20:45 - 21:45 Livestream 3

Clinicopathological Characteristics and Predictive Factors Associated with Survival Outcomes after Orbital Exenteration in a Multi-Ethnic Society

First Author: Dhashani SIVARATNAM

Purpose: Orbital exenteration (OE) is a destructive surgery primarily performed for malignant tumors. This study aims to describe the clinicopathological characteristics and predictive factors associated with survival outcomes after OE in Serdang Hospital, which is the leading oculoplastic referral centre for Malaysia.

Methods: Medical records from January 2008 till April 2021 were reviewed. Efforts was made to obtain the details from the referring hospital, next of kin or National Registration Department in event of missing data. Kaplan Meier survival analysis was used to determine overall survival among the respondents.

Results: A total of 44 patients was included in this study. The most common indication for OE was squamous cell carcinoma (SCC), followed by basal cell carcinoma and malignant melanoma. The mean age of the patients was 60 ± 17.2 years. Most patients healed post-OE by secondary intention, only 20 (45%) patients required radiotherapy.

Sep 09, 2021 (Thu) (GMT+8) 20:45 - 21:45 Livestream 3

Is Eye Salvage Possible in Advanced Group E Retinoblastoma?

First Author: Harika REGANI

Purpose: Outcomes of neoadjuvant intravenous chemotherapy (nIVC) in retinoblastoma (RB) group E eyes with clinical high-risk factors (CHRF) and factors predicting treatment failure.

Methods: Retrospective interventional consecutive case series of treatment-naive group E RB with CHRF [buphthalmos, neovascularization of iris (NVI), neovascular

glaucoma (NVG), depository anterior chamber seeds, sterile orbital inflammation] managed by primary nIVC. Outcome measures were life, eye and vision salvage.

Results: Among the 85 eyes of 79 patients managed by primary nIVC and focal consolidation, eye salvage was possible in 46 (52%). Secondary enucleation was necessary in 39 (45%), of which 6 (15%) showed histopathological risk factors and needed adjuvant chemotherapy. Possible risk factors for enucleation were not statistically significant. At a mean follow-up of 26+18 months, none had systemic metastasis and 19 (22%) had visual potential.

Conclusions: nIVC with appropriate focal consolidation can help eye salvage in about half of advanced Group E retinoblastoma with CHRF, which are otherwise considered standard indications for primary enucleation.

Sep 09, 2021 (Thu) (GMT+8) 20:45 - 21:45 Livestream 3

Targeted Chemotherapy in Retinoblastoma: A Step Forward from Patient Survival to Globe Survival

First Author: Masood NASERIPOUR
Co-Author(s): Sayyed Amirpooya ALEMZADEH, Fateme AZIMI, Mohsen BAHMANI KASHKOULI, Reza MIRSHAHI, Ahad SEDAGHAT

Purpose: The current study intends to determine the patient and globe survival before and after the introduction of the new treatment modalities of retinoblastoma (Rb) in a developing country.

Methods: Medical records of 350 patients (516 eyes) with retinoblastoma referred to a tertiary referral center for Rb in Tehran, Iran were reviewed. In order to compare patient and globe survival before and after the availability of the new treatment modalities including intra-arterial and intravitreal chemotherapy, the patients were divided into group 1 (2001-2007) and group 2 (2008-2018) based on calendar period of diagnosis.

Results: Two-hundred-twenty-three eyes of 149 patients and 293 eyes of 201 patients were categorized into groups 1 and 2, respectively. Overall, 49.6% of eyes with retinoblastoma underwent enucleation. Primary enucleation was significantly lower in group 2 (34.8%) than group 1 (50.74%) ($P < 0.001$). In addition, globe survival improved significantly in Group D (16.7% in group 1 vs. 66.1% in group 2, $P<0.001$) and E (1.3% in group 1 vs. 23.3% in group 2, $P<0.001$) according to International Classification of Retinoblastoma (ICRB) during the two timelines. In enucleated eyes, despite the increased rate of prelaminar involvement in group 2 (13.1% vs. 2.2% in group 1, $P=0.003$), the rate of high-risk histopathologic findings was similar between the two groups.

Conclusions: The application of new targeted treatment modalities has been associated with significantly improved globe survival in Rb patients. However, it should be noted that with the availability of these novel treatment options, the decision for on-time enucleation should not be deferred.

Ophthalmic Epidemiology And Prevention Of Blindness

Sep 10, 2021 (Fri) (GMT+8) 17:00 - 18:00 Livestream 3

A National Study of Self-Inflicted Firearm-Associated Ocular Injuries

First Author: Yash SHAH
Co-Author(s): Neelakshi BHAGAT, Ibraheem SHAIKH, Aditya UPPULURI

Purpose: The incidence of mental health disorders and suicide has been rising in the US over the past decades. Self-inflicted gunshot wounds have especially high rates of complications and death. We sought to understand the epidemiology and outcomes of ocular injuries due to intentional self-harming firearm injuries.

Methods: 2808 patients from the National Trauma Data Bank (NTDB) from 2007 to 2014 with any ocular injury secondary to an intentional firearm injury were identified using ICD-9 codes. We collected information on patient demographics, type of ocular injury, type of firearm, location of injury, health insurance status, disposition at discharge, outcomes, and surgical repair.

Results: Most patients were male (88.1%), white (81.7%), at home (75.0%), used a handgun (61.4%), and admitted to the ICU (62.1%). Open globe injuries were seen in 22% of the cases and orbital floor fractures in 48%. Nearly one-third cases had brain hemorrhage and 901 patients (32.1%) died during hospitalization. Primary enucleation were performed in 8.8% eyes. Secondary analyses showed those who died were older (65+ vs <18, OR=1.90), uninsured (OR=1.78), used a handgun over a shotgun (OR=2.25), had intracranial hemorrhage (OR=1.87), and admitted to the ICU (OR=1.78).

Conclusions: Most intentional firearm-associated ocular injuries are severe, causing OGIs in one-fourth of cases and nearly 10% undergo primary enucleation. These injuries are more commonly seen in young, white males due to handguns. Older age (>65 years), no medical insurance, handgun use, ICU admission and intracranial hemorrhage were associated with death. This study highlights the epidemiology of ocular trauma secondary to self-inflicted firearm injury.

Sep 10, 2021 (Fri) (GMT+8) 17:00 - 18:00 Livestream 3

Alcohol Consumption and Age-Related Macular Degeneration: A Systematic Review and Dose–Response Meta-Analysis

First Author: Jingjing ZHANG
Co-Author(s): Jun HAMADA, Yangyang LIU, Toshihiko MATSUO, Toshiharu MITSUHASHI, Takashi YORIFUJI

Purpose: To perform a systematic review on the association between alcohol consumption and risk of age-related macular degeneration (AMD) using a meta-analytical approach.

Methods: Systematic literature research was conducted according to the Preferred Reporting Items for Systematic Review and

Meta-Analyses guidelines. Both categorical and dose–response meta-analysis was performed separately for early and late AMD. A fixed-effect model was used to calculate pooled effect estimates with 95% confidence interval (CI).

Results: Seven studies were included in the analysis with 4,566 and 440 cases of early and late AMD, respectively. Compared to the nondrinkers or occasional drinkers, the pooled effect estimates for early AMD with moderate (1.19, 95% CI [1.03–1.37]) and heavy (1.24, [1.10–1.39]) alcohol consumption, but not light (0.95, [0.90–1.06]) alcohol consumption, were statistically significant. However, the pooled effect estimates for late AMD with light (1.03, [0.79–1.33]), moderate (1.13, [0.83–1.55]), and heavy (0.98, [0.63–1.53]) alcohol consumption were found to be insignificant. A linear dose–response relationship was established ($P < 0.05$) between alcohol consumption and risk of early AMD, and the pooled effect estimate for an increase in alcohol consumption of 10 g/day was 1.14 (1.08–1.21).

Conclusions: Moderate and heavy alcohol consumption could increase the risk of early AMD, but not late AMD, with a linear dose–response relationship.

Sep 10, 2021 (Fri) (GMT+8) 17:00 - 18:00 Livestream 3

Effects of a Community-Based Health Education Intervention on Eye Health Literacy of Adults in Vietnam

First Author: Prakash PAUDEL
Co-Author(s): Tim FRICKE, Suit May HO, Vilas KOVAI, Thomas NADUVILATH, Nguyen VIET GIAP

Purpose: The purpose of this study was to assess the effects of a community-based eye health education intervention on the eye health literacy in an adult Vietnamese population.

Methods: Four hundred households from two districts of Ba Ria-Vung Tau province were selected by multistage systematic random sampling. A pretested questionnaire was administered at baseline and re-administered, after an eye health education intervention in two of the four communes. The other two communes acted as controls. The intervention included eye health education through community presentation, brochures, posters and loudspeaker. Fisher's exact test and logistic regression were used for statistical analysis.

Results: A total of 400 adults (mean age: 51.5 ± 14.5 years; range, 30–90 years) participated in the baseline survey and the repeat survey. Participants in the intervention group showed significantly greater awareness and knowledge of red eye preventive measures (odds ratio range 2.1 to 4.1, $p = 0.03$ to 0.001) compared to control group. Participants in the intervention group were more than twice as likely to have heard of cataract (OR 2.3, $p = 0.008$), and more than three times as likely to be aware of cataract surgery (OR 3.1, $p = 0.003$) and know that the cataract blindness is reversible (OR 3.3, $p = 0.002$) than the control group. Multiple logistic regression showed that location, education, and eyeglasses ownership were the major factors associated with disease awareness.

Conclusions: The eye health education intervention successfully increased awareness

and knowledge of red eye and cataract in the intervention community.

Sep 10, 2021 (Fri)
(GMT+8) 17:00 - 18:00
Livestream 3

The Association of Tme Outdoors and Patterns of Light Exposure with Myopia in Children: Implications for Prevention

First Author: Mijie LI
Co-Author(s): Lanca CARLA, Charumathi SABANAYAGAM, Seang-mei SAW, Chuen-seng TAN, Fabian YAP

Purpose: To evaluate the association of reported time outdoors and light exposure patterns with myopia among children aged 9 years from the Growing Up in Singapore Towards healthy Outcomes (GUSTO) birth cohort.

Methods: We assessed reported time outdoors [minutes/day(min/day)], light exposure patterns and outdoor activities of children aged 9 years (n=483) with a questionnaire, the FitSight watch and a 7-day activity diary. Light levels, the duration, timing and frequency of light exposure were assessed. Cycloplegic spherical equivalent (SE), myopia (SE≤-0.5D) and axial length (AL) of paired eyes were analyzed using Generalized Estimating Equations.

Results: In this study, 483 (966 eyes) multi-ethnic children (50.0% boys; 59.8% Chinese; 42.2% myopic) were included. Reported time outdoors (mean±SD) was 100±93 min/day and average light levels were 458±228 lux. Of the total duration children spent at light levels ≥1000 lux (37±19 min/day), 76% were spent below 5000 lux. Peak light exposure occurred at mid-day. Children had 1.7±1.0 light exposure episodes/day. Common outdoor activities were walks, neighbourhood play and swimming. Greater reported time outdoors was associated with lower odds of myopia (odds ratio [95% confidence interval]=0.82 [0.70, 0.95] per hour increase; P=0.009). Light levels, timing and frequency of light exposures were not associated with myopia, SE or AL (Ps>0.05).

Conclusions: Reported time outdoors, light levels, and light exposure episodes were low among Singaporean children aged 9 years. Reported time outdoors was protective against myopia, but not light levels or specific light measures. A multi-pronged approach to increase time outdoors is recommended in the combat against the myopia epidemic.

Orbital And Oculoplastic Surgery

Sep 07, 2021 (Tue)
(GMT+8) 17:00 - 18:00
Livestream 1

Phenotypic Classification and Disease Activity in Thyroid Eye Disease

First Author: Anmaria DEVASSY
Co-Author(s): Marian PAULY, Shebin SALIM

Purpose: To classify thyroid eye disease (TED) patients according to their phenotypes based on clinical and radiologic features and assess the disease activity.

Methods: This was an observational cross-sectional study involving 20 patients

diagnosed with TED who presented to the oculoplasty clinic of a tertiary eye care center from 1st December 2020 to 31st March 2021. Clinical features of patients were analyzed by proper history taking and complete ocular examination. Orbital imaging was done using CT and findings were recorded with emphasis on extraocular muscle thickness, retroorbital fat expansion and apical crowding. Disease activity was assessed using Clinical Activity Score (CAS). Based on the data, patients were classified into different phenotypes, their prevalence and relation with CAS score were assessed.

Results: Patients were grouped into six classic phenotypes. Prevalence of phenotypes: congestive (15%), white eye expansion (20%), hydraulic apex (15%), white eye apex (10%), cicatricial active (25%), cicatricial passive (15%). CAS score was < 3 in white eye expansion, white eye apex, cicatricial active and cicatricial passive phenotypes. CAS score was > 3 in congestive and hydraulic apex phenotypes.

Conclusions: CAS score is unreliable in determining disease activity in white eye expansion and cicatricial active phenotypes where overt inflammatory signs and symptoms are absent despite active inflammation. As no exact correspondence exists between CAS and disease phase, phenotypic classification requires emphasis and research in clinical scenario. Phenotypic classification can address heterogeneity of TED and contribute to tailored therapy.

Sep 09, 2021 (Thu) (GMT+8) 20:45 - 21:45 Livestream 3

Changes in Tear Film Parameters after Botulinum Toxin A Injection in Facial Dystonia

First Author: Bhavya GOKANI
Co-Author(s): Ankit AHIR, Isha AGARWALLA, Sakshi MISHRA, Mohit GARG

Purpose: To analyze the change in tear film parameters in patients of facial dystonia before and after one month of taking botulinum toxin A injections.

Methods: It was a prospective hospital based, descriptive analytical study (consecutive case series) where 30 eyes from patients of facial dystonia ready to take botulinum toxin A injection were taken. The parameters of tear film namely Schirmers test, tear break up time, tear meniscus height and Ocular Surface Disease Index score (OSDI) were measured before and after one month of taking botulinum toxin A injections. The study was carried out for 12 months.

Results: Tear Film Parameters OSDI - Mean ± standard deviation of pre and post values - 33.80 ± 16.39 and 15.73 ± 8.00 respectively and the highly significantly (P<0.001) decreased value. Tear meniscus height: Mean ± standard deviation of pre and post values (mm), 0.32 ± 0.02 and the comparison, not statistically significant (P<0.157). Schirmer's test: The mean ± standard deviation of pre and post values, 14.58 ± 4.78 and 17.03 ± 4.40, respectively and the highly significant

(P<0.001) increased value. Tear break up time: The mean ± standard deviation of pre and post values were 6.30 ± 1.32 and 7.39 ± 1.00 respectively and the highly significant (P<0.001) increased value.

Conclusions: Botulinum toxin A injections ameliorate and improve tear film parameters in patients of facial dystonia.

Sep 09, 2021 (Thu) (GMT+8) 20:45 - 21:45 Livestream 3

Could Collagen Cross-Linking Treatment be a New Approach to Treatment in Dermatochalasis Patients?

First Author: Ali Mert KOCER
Co-Author(s): Muzaffer CAYDERE, Emine SEN

Purpose: To evaluate the effect of collagen cross-linking (CCL) treatment on excised skin samples of patients undergoing upper eyelid blepharoplasty.

Methods: This prospective, cross-sectional study examined 74 excised eyelid skin from 37 dermatochalasis patients. Following an upper eyelid blepharoplasty surgery, CCL treatment with riboflavin was applied. Both treated (right eyelid) and untreated eyelid specimen (left eyelid) sections were stained with hematoxylin-eosin and Masson's trichrome and investigated by the same experienced pathologist. The sections were evaluated for the following parameters: collagen status (parallel, irregular, and fractured), depth of stromal collagen bed, the distance between collagen, the diameter of collagen, and length of collagen.

Results: As compared to the treated eyelid group, the non-treated eyelid group had less depth of stromal collagen bed but this difference was not statistically significant (p = 0.752). Although the increased distance between collagen fibrils, the greater diameter of collagen, and the longer length of collagen were determined in the non-treated eyelid group, there was no statistically significant difference between study groups (p > 0.05 for all). There was no difference in collagen status between the study groups (p = 0.552), but the structure of the treated eyelid collagen fibrils was more parallel in 48% of the participants than in the untreated ones.

Conclusions: Although the absence of significant differences between study groups, the results of this study are promising for further research, so the effect of CCL therapy on the eyelid is an interesting subject for the treatment of non-severe or inadequately surgically corrected dermatochalasis.

Sep 09, 2021 (Thu) (GMT+8) 20:45 - 21:45 Venue: Livestream 3

Metalic Intra orbital foreign body injuries: clinical characteristics and outcomes of 28 patients.

First Author: Jayanta DAS

Purpose: To describe the clinical characteristics and outcomes of orbital injuries with retained metallic foreign bodies

Methods: We enrolled 28 intraorbital metallic foreign body injuries reported at the tertiary eye Institute of Nort East India between January 2002 to December 2019. The age range of the patients was from 5 yrs to 57 yrs,

twenty were male and seven were female

Results: In the present series, the air gun or country-made pallet was responsible for 10 individuals, a bomb blast in nine, grenade blast in four and five were industrial injury, most of them are a young adult. Evisceration was done in two cases, due to painful blind eye after six months in one case and in another case after three years following primary injury. A case was with double globe perforation with retained pellet in orbit, and this to our knowledge is the first case in which 20 /40 vision has been recovered

Conclusions: Precise and meticulous evaluation along with quantitative CT is extremely helpful for proper diagnosis and management. A high index of suspicion is a key point to avoid misdiagnosis.

Sep 09, 2021 (Thu) (GMT+8) 20:45 - 21:45 Livestream 3

Periorbital Necrotizing Fasciitis in Non-COVID and COVID Era

First Author: Mukti MITRA
Co-Author(s): Rahman ANISUR, Golam HAIDER

Purpose: Necrotizing fasciitis is a severe, devastating infection of the subcutaneous tissues and superficial fascia with secondary necrosis of the overlying skin. It is usually rare in peroiorbital region due to its excellent blood supply, but associated with high mortality in comparison to the other parts of the body.

Methods: We have reviewed 21 cases of necrotizing fasciitis in the last 6 years to find out the cause, predisposing conditions, progression, triggering factors and outcome of management. Among them 10 cases were found in Mach 2020 to February 2021 in COVID pandemic. In COVID era all the patients were COVID positive.

Results: No causative organism was found except one case with acinetobacter, one was dead immediately after hospitallisation duo to toxic shock and uncontrolled diabetes. Triggering stimuli was found in 14 cases (uncontrolled diabetes, insect bite, hypersensitivity reactions, and electric shock). Age range was 3- 70 years (16 males and 5 females). After controlling infection, surgical debridement was done to remove devitalized tissues. Later on skin graft was done. Surgical outcome was satisfactory in the all the cases. COVID positive cases had been treated conservatively in COVID unit having no other causative factors except uncontrolled diabetes with its complications.

Conclusions: A significant number of necrotizing fasciitis were found in COVID pandemic. Immunocompromisation may play a role. But more studies are required to correlate this. It is important to diagnose necrotizing fasciitis at an early stage to initiate treatment. This can reduce the mortality and morbidity associated with this condition.

Sep 09, 2021 (Thu)
(GMT+8) 20:45 - 21:45
Livestream 3

Unparalleled COVID Associated Mucormycosis: Ocular Presentations in a Tertiary Care Centre

First Author: Usha SINGH
Co-Author(s): Khushdeep ABHAYPAL, Kshitij DONIMATH, Urmila KUMARI, Sameeksha TADEPALLI

Purpose: There is paucity of information on patients with rhino-orbito-cerebral mucormycosis (ROCM) associated with COVID-19 infection. We report the demographic, clinical presentations and management of this rare disease.

Methods: We prospectively analyzed the clinical data of all cases presenting to the tertiary care centre between 21st to 26th May 2021. Review of clinical and management data of patients suspected to have mucormycosis was analyzed.

Results: There were 51 patients, with average age of 50 years presenting within 30 days of COVID-19 illness. In 33, COVID report by RT-PCR was positive and negative in 12. Prior to presentation, 19 were treated with steroids, and supplemental O2 in 16 (48%). Forty-five (88%) were diabetic. Common symptoms were periocular edema (30), ptosis (28), proptosis (23), vision loss (19), facial pain (17), restriction of motility (19), total ophthalmoplegia (28) and CRAO (9). Black eschar was seen in 17 (33%). Imaging revealed gross involvement of the orbit in 47 (92%). Bilateral orbital masses in 4 and CNS in 3. Para nasal sinuses were involved in all cases. All were treated with liposomal amphotericin B followed by drug posaconazole. Twenty-five had undergone surgical debridement. Three had expired post-surgery

Conclusions: There has been an unparalleled upsurge of CAM cases in the history of mucormycosis at our institute, during the second wave of COVID-19 in India. Ocular presentations were varied with progressive spread. Consistent risk factors in ROCM were diabetes mellitus and indiscriminate use of steroids for the management of mild to moderate cases of COVID-19.

Pediatric Ophthalmology And Strabismus

Sep 10, 2021 (Fri)
(GMT+8) 17:00 - 18:00
Livestream 3

40 Years of Global Retinoblastoma Epidemiology: A Systematic Review and Meta- Analysis of Associations with Socioeconomic and Healthcare Factors

First Author: Wai Chak CHOY
Co-Author(s): Wai Kit CHU, Calvin PANG, Suhan Emily WONG, Jason YAM

Purpose: To (1) investigate the global retinoblastoma epidemiology throughout the years 1980–2020 and (2) investigate the associations between prognosis and socioeconomic and healthcare (SEH) factors, (3) model the global survival disparity, (4) evaluate systemic differences in survival-predicting SEH factors.

Methods: 288 articles from 5 databases were analysed and pooled with mixed-effect models, with further subgroup analysis by income

level. Predictors are analysed for associations with key outcomes. 16 survival-predicting factors were chosen to predict global survival disparity with random forest model and cluster countries.

Results: The sample covered 23,579 patients from 76 regions from 1980-2020. Late stage globe salvage increased significantly from 2000-2010 to 2010-2020 (p=0.025). The pooled estimate in 2010-2020 for late presentation percentage, survival (OS), globe salvage (GS) and late-stage globe salvage (LS) were 72.8%, 87.7%, 46.8% and 40.4% respectively. OS, GS and LS showed consistent positive relationships with income levels. OS was associated with economic disparity (p<0.01) and health accessibility (p=0.028). GS was associated with doctor density (p=0.041). Both GS and LS were associated with GNI per capita (p<0.01).

Conclusions: Despite improvement in survival and outcome in retinoblastoma treatment over the years with advancement in globe salvage technology, the global survival gap has narrowed substantially but persisted between income levels. Discrepancy were not explained by income level alone, but together with healthcare accessibility and health workers density among other major factors associated with outcome. It is important to identify transferrable policies within country clusters and identify potential targets for intervention including regional collaboration, telemedicine, and low-cost intelligent remote screening.

Sep 10, 2021 (Fri) (GMT+8) 17:00 - 18:00 Livestream 3

Anterior Chamber Morphology in Chinese Children: A Population-Based Study

First Author: Pui Sum Christine HO
Co-Author(s): Chi Lik AU, Jason YAM

Purpose: To study the distribution of anterior chamber parameters and their association with demographic factors in Hong Kong children.

Methods: This is a population-based study on children who participated in the Hong Kong Children Eye Study. Anterior chamber biomechanics were measured using swept source optical coherence tomography (CASIA, SS-1000), and distributions of temporal and nasal trabecular iris angle measured at 500μm (TIA500), anterior chamber depth (ACD), central corneal thickness (CCT) were analyzed using SPSS software. Gender, weight, height, age data were collected, and their associations with anterior chamber parameters were assessed by univariate and multivariate analysis.

Results: 1117 children with mean age of 7.7±1.06 years were analyzed, with a male to female ratio of 1.23:1. 868 right eye and 910 left eye data were analyzed, independent t-test showed no significant difference between their nasal and temporal TIA500. For right eye parameters, mean temporal TIA500, nasal TIA500, ACD values were 53.57±10.92°, 51.81±10.38°, 3.20±0.23mm respectively. Independent-sample t-test showed significantly larger temporal TIA500 than nasal TIA500 (p<0.05). In univariate analysis, mean nasal TIA500 and ACD were

associated with age, height, weight and CCT. Significantly higher mean nasal TIA500 and ACD values were observed in males compared to females ($p<0.05$), with no significant gender differences in mean temporal TIA500. In multivariate analysis, narrow nasal TIA500 was significantly associated with age and gender ($p<0.05$), shallow ACD was significantly associated with height, age and gender ($p<0.05$).

Conclusions: Results of the study are helpful for understanding distribution of anterior chamber parameters, and their associations with Hong Kong children's weight, height and age.

Sep 10, 2021 (Fri) (GMT+8) 17:00 - 18:00 Livestream 3

Ocular and Systemic Manifestations in Pediatric Multisystem Inflammatory Syndrome Associated with COVID-19

First Author: Yu-yen CHEN

Purpose: The study aimed to achieve a better understanding on the epidemiological and clinical characteristics of multisystem inflammatory syndrome in children (MIS-C) following coronavirus disease 2019 (COVID-19).

Methods: We searched PubMed and Embase between December 2019 to March 2021 and included only peer-reviewed clinical studies or case series. The proportion of patients who had conjunctivitis, systemic symptoms/signs (s/s), Kawasaki disease, and exposure history to suspected/confirmed COVID-19 cases were obtained. Moreover, positive rates of the nasopharyngeal real-time reverse transcriptase polymerase chain reaction (RT-PCR) and serum antibody for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) were recorded.

Results: Overall, 32 studies with 1458 patients were included in the pooled analysis. Around half of the patients had conjunctivitis. The five most common systemic manifestations were fever (96.4%), gastrointestinal s/s (76.7%), shock (61.5%), rash (57.1%), and neurological s/s (36.8%). Almost one-third presented complete Kawasaki disease and about half had exposure history to COVID-19 cases. The positivity of the serology (82.2%) was higher than that of the nasopharyngeal RT-PCR (37.7%).

Conclusions: MIS-C associated with COVID-19 leads to several features similar to Kawasaki disease. Epidemiological and laboratory findings suggest that post-infective immune dysregulation may play a predominant role. Further studies are crucial to elucidate the underlying pathogenesis.

Sep 10, 2021 (Fri) (GMT+8) 17:00 - 18:00 Livestream 3

Retropupillary Iris Claw Lenses versus Gore-Tex Assisted Scleral Fixated Intraocular Lenses in Children with Large Lens Subluxations

First Author: Tanvi GAONKER
Co-Author(s): Shweta DHIMAN, Kirti JAI SINGH, Dr KAMLESH, Anju RASTOGI

Purpose: To compare the functional outcomes of retropupillary iris claw lenses (RPIC-IOL)

and scleral fixated intraocular lenses (SFIOL) in children with large lens subluxation.

Methods: A randomized comparative study was conducted in 60 eyes of patients between 6-18 years of age having >7 clock hour lens subluxation. They were equally divided into group A (RPIC-IOL implantation) and group B (Gore-Tex sutured SFIOL implantation). Primary outcome was improvement in best corrected visual acuity (BCVA) at 1.5 years. Secondary outcomes were assessment of IOL tilt, mean change in astigmatism at 1.5 years and median operating time. All surgeries were performed by the same surgeon.

Results: The difference in the mean pre- and post-operative BCVA in either group was not statistically significant. Mean improvement in BCVA in group A was 0.44 ± 0.45 logMAR and group B was 0.28 ± 0.41 logMAR, (p=0.3). Significant IOL tilt was seen in 4 eyes in group A (13.33%) and 5 eyes in group B (16.66%) (p= 0.120). Mean change in astigmatism was 4.38 ± 5.9D in group A and 4.91 ± 4.4D in group B (p= 0.299). The median operating time was 40 minutes in group A and 90 minutes in group B (p<0.001). No significant posterior segment complications were seen in either technique.

Conclusions: Our study shows that both procedures have comparable visual outcomes. RPIC-IOL implantation was relatively quick and comparatively easier. Hence it may be preferred in cases with high risk of retinal detachment.

Sep 07, 2021 (Tue)
(GMT+8) 17:00 - 18:00
Livestream 3

Epigenetic Changes Demonstrate Unique Wound Healing Signatures Induced by LASIK and SMILE

First Author: Sriram ANNAVAJJHALA
Co-Author(s): Arkasubhra GHOSH, Pooja KHAMAR

Purpose: To study the epigenetic changes and outcomes in SMILE and LASIK and their effects on long-term extracellular matrix remodeling.

Methods: A total of 20 human donor globes were used, 16 globes were used for both groups SMILE and LASIK with n=8 in each group. 4 globes were used as control. The operated globes were incubated at 370C in Dulbecco›s Modified Eagle›s medium (DMEM) for 3 days as well as 2 weeks. Stromal DNA was extracted and hybridized to an array containing 850000 cytosine phosphate guanine (CpG) methylation sites derived from the human genome. Differentially methylated sites were identified by CpG-level, p-values using false disc ratio (FDR) <0.05. The analysis was done using Rn Beads which stores DNA methylation level as beta values. Gene ontology (GO) analyses were performed to identify significant genes at the regulatory sites.

Results: A number of hypo and hyper methylated CpG sites were observed and identified by array in both surgeries.

Differential methylation was found to be more at 2 weeks in both surgeries. GO analysis found major histocompatibility complex (MHC) proteins, T-cell receptor (TCR) and immunological pathways alterations. Genes exhibiting differences between the surgeries were isolated.

Conclusions: To our knowledge this is the first global study demonstrating epigenetic changes post refractive surgery which will help us in identifying novel pathways to decode and prevent ectasia in future.

Sep 07, 2021 (Tue)
17:00 - 18:00
Livestream 3

Novel Simulation of Accommodation: A Predictive Tool for Central Optical Power

First Author: Annmarie HIPSLEY
Co-Author(s): Daniel GOLDBERG, James O'FLANAGAN, Laurent SABATIER, Griffin THOMAS

Purpose: To evaluate presbyopia treatments utilizing a finite element model (FEM) translated into a finite element model animation (FEMA). This animation incorporates key anatomical structures involved in accommodation including the sclera, ciliary muscles, crystalline lens, lens capsule, zonules, and choroid.

Methods: A 3D model of the eye was constructed using meshing and FEM analysis was performed using advanced multi-physics simulation technology on representative 3D models of ocular structures. The FEM was translated into a FEMA to show three dimensional dynamic movements of accommodation using a proprietary method and Autodesk Maya. Simulations of laser scleral microporation (LSM) therapy were performed in the virtual presbyopic eye. Intraocular lenses (IOLs) were virtually implanted in the FEM. The simulation predictability was compared to reported outcomes using each modality.

Results: Sensitivity analysis of the differences in accommodation between the "young/healthy" and "old/presbyopic" eye identified the age-related changes that contribute most to symptoms of presbyopia. The FEMA demonstrated the dynamic movements of the ciliary muscle, zonules, lens, sclera, choroid, and vitreous during accommodation. Successful treatment simulations were performed using IOL implantation and LSM therapy in a virtual presbyopic eye. Translation of these treatment simulations into the FEMA demonstrate the mechanism of action for LSM therapy and the behavior of IOLs after implantation. Results may provide insight for future accommodating IOL development.

Conclusions: The FEM was successfully translated into the FEMA. Virtual surgical and therapeutic simulations of IOL implantation and LSM therapy provide novel insight into their effectiveness to treat presbyopia. Our models provide insight to new technology applications in presbyopia.

Sep 07, 2021 (Tue)
17:00 - 18:00
Livestream 3

Unplanned Reoperation of EVO Implantable Collamer Lens in 10,258 Eyes: Incidence, Causes, and Outcomes

First Author: Ruoyan WEI
Co-Author(s): Meiyan LI, Peijun YAO, Xingtao ZHOU

Purpose: To evaluate the incidence, causes, and outcomes of unplanned reoperation (UR) following implantation of the EVO implantable collamer lens (ICL).

Methods: The retrospective study included 10,596 eyes undergoing consecutive ICL implantations. Preoperative refractive and anterior segment measurements of eyes with and without UR were compared. For eyes with UR, visual and biometric outcomes were obtained before and after the UR.

Results: The incidence of UR was 0.23% (24/10596). Twelve eyes underwent UR (10 with realignment, 2 with exchange) due to TICL misalignment. The preoperative cylinder was greater in these eyes than TICL-implanted eyes without UR (p=0.001). The most common initial symptoms were blurred vision (7/9) and double vision (2/9), and the median onset was 1 day. After realignment, uncorrected distance visual acuity improved and residual cylinder decreased from -1.75±0.48D to -0.86±0.60D (p=0.01). Ten eyes underwent UR (3 with vertical rotation, 7 with exchange) due to excessive vault and there was a greater difference between ICL/TICL size and white-to-white (size-WTW) in these eyes than eyes without UR (p<0.001). After vertical rotation and exchange with smaller ICLs, vault decreased from 853.3±130.5μm to 425.0±149.1μm, and from 1098.6±63.1μm to 615.7±139.6μm, respectively (p<0.05).

Conclusions: The incidence of UR after ICL implantation is low. TICL misalignment and excessive vault are the two main causes. Implant exchange may be performed for TICL misalignment or excessive vault. Additionally, realignment of TICL and vertical rotation of ICL are less invasive and readily available methods for misalignment and excessive vault, respectively.

Retina 1 (Medical - Diabetes)

Sep 09, 2021 (Thu)
(GMT+8) 17:00 - 18:00
Livestream 3

Calculation of Intraocular Lens Power and to Determine the Relationship between Ocular Biometry and Severity of Diabetic Retinopathy in Patients with Type II Diabetes Mellitus

First Author: Neha ADLAKHA

Purpose: To calculate the intraocular lens power and to determine the relationship between ocular biometry and severity of diabetic retinopathy in patients with type II diabetes mellitus.

Methods: The study group included 150 type II diabetic subjects with diabetic retinopathy (DR). The control group consisted 150

type II diabetic subjects having no DR. Axial length, corneal power and anterior chamber depth were measured using LenStar. Diabetic retinopathy and diabetic macular edema (DME) were classified according to International DR Classification. Crystalline lens power was calculated using Barrett Universal II formula. AL to corneal radius ratio (AL/CR ratio) was calculated. Chi-square test was used for categorical variables.

Results: In multivariate logistic models adjusting for age, sex, glycosylated hemoglobin, duration of diabetes, mean age of patients in the study group was 62.45 ± 4.85 years whereas in control group was 63.37 ± 7.29 years. Of the eyes with DR, 117, 76, 69 and 38 had mild NPDR, moderate NPDR, severe NPDR and PDR respectively. The difference in the mean duration of diabetes mellitus and glycosylated hemoglobin in both study and control groups was found to be statistically significant. A progressive decrease in the mean axial length and anterior chamber depth was observed with increasing severity of DR and difference was statistically significant. There was a progressive increase in intraocular lens power with increasing severity of diabetic retinopathy and difference was found to be statistically significant.

Conclusions: In persons with diabetes mellitus, globe elongation plays quite an important role in protective effects against DR, with contribution from intraocular lens power and other refractive components.

Sep 09, 2021 (Thu)
(GMT+8) 17:00 - 18:00
Livestream 3

Exploring Angiopoetin-2 Signaling in Vascular Stability in Patients with Diabetic Macular Edema Receiving Faricimab in Phase 2 and Phase 3 Trials

First Author: Nawat WATANACHAI
Co-Author(s): Karl CSAKY, Rose EDMONDS, Zdenka HASKOVA, Peter WESTENSKOW, Jeffrey WILLIS

Purpose: Angiopoetin (Ang)-2 and vascular endothelial growth factor (VEGF)-A are key drivers of vascular instability. Faricimab, a bispecific Ang-2/VEGF-A neutralizing antibody, improved best-corrected visual acuity and offered durable responses up to every 16 weeks versus intravitreal anti-VEGF injections in Phase 2/3 clinical trials of patients with diabetic macular edema (DME). To explore the impact of Ang-2/VEGF-A inhibition by faricimab on vascular stability (VS) using clinical and preclinical data.

Methods: Sustained retinal stability ([SRS] occurrence and <10% worsening of central subfield thickness [CST] ≤325 µm to week [W] 24) and inflammatory biomarker (ICAM-1) levels in aqueous humor were assessed in BOULEVARD (NCT02699450). VS (change in CST from baseline, absence of DME [CST <325 µm] or intraretinal fluid [IRF] in year 1 [Y1]) was assessed in YOSEMITE/RHINE (NCT03622580/ NCT03622593). In a spontaneous CNV mouse model, effects of anti-Ang-2, anti-VEGF-A, both, or none/immunoglobulin G (control) on VS (neovascular leakage, subretinal inflammatory-cell infiltration, and fibrosis) were assessed.

Results: In BOULEVARD, >50% of patients receiving faricimab 1.5 mg, 6.0 mg and ranibizumab achieved SRS at W8, W16 and W20, respectively. ICAM-1 levels increased with ranibizmab and decreased with both faricimab doses. In YOSEMITE/RHINE, mean Y1 CST change consistently favored faricimab. More patients achieved absence of DME and IRF with faricimab versus aflibercept. Clinical study results were supported by preclinical data showing that Ang-2 blockade significantly reduced vascular leakage/neovascularization, inflammation, and fibrosis.

Conclusions: Preclinical and clinical data suggest that Ang-2 inhibition with faricimab improves VS and results in greater anatomic improvement and potential for improved durability compared with anti-VEGF injections in patients with DME.

Sep 09, 2021 (Thu) (GMT+8) 17:00 - 18:00 Livestream 3

Faricimab in Diabetic Macular Edema: One-Year Results from the Phase 3 YOSEMITE and RHINE Trials

First Author: Xiaodong SUN
Co-Author(s): Karen BASU, Zdenka HASKOVA, Jane IVES, David SILVERMAN, Ramin TADAYONI

Purpose: To evaluate the efficacy, safety, and durability of faricimab, a bispecific antibody designed for intraocular use that targets angiopoietin-2 and vascular endothelial growth factor-A, in treating patients with diabetic macular edema (DME).

Methods: YOSEMITE (NCT03622580, N = 940) and RHINE (NCT03622593, N = 951) are randomized, double-masked, active comparator–controlled, 100-week trials of faricimab in DME. Patients were randomized 1:1:1 to faricimab 6.0 mg 8-weekly (Q8W) after 6 initial 4-weekly (Q4W) doses, faricimab 6.0 mg per personalized treatment interval (PTI) after 4 initial Q4W doses, or aflibercept 2.0 mg Q8W after 5 initial Q4W doses.

Results: The primary endpoint was met; mean 1-year best-corrected visual acuity (BCVA) gains with faricimab Q8W (YOSEMITE 10.7; RHINE 11.8 letters) or faricimab PTI (11.6; 10.8 letters) were noninferior to aflibercept Q8W (10.9; 10.3 letters). In treatment-naïve patients, 1-year BCVA gains were consistent with the intent-to-treat population and no faricimab arm showed superiority to aflibercept. Mean change in CST consistently favored faricimab; absence of protocol-defined DME (CST < 325 µm) and absence of intraretinal fluid over 1 year were achieved by more faricimab-treated than aflibercept-treated patients. At Week 52, >50% of the faricimab PTI arm achieved Q16W dosing and >70% achieved ≥Q12W dosing. Faricimab was well tolerated; no cases of vasculitis or occlusive retinitis were reported.

Conclusions: Faricimab Q8W or dosed per PTI offered noninferior vision gains versus aflibercept Q8W, while demonstrating improvements in anatomic endpoints and the potential for extended (up to Q16W) dosing at 1 year.

Retina 2 (Medical – Other)

Sep 06, 2021 (Mon) (GMT+8) 20:45 - 21:45 Livestream 3

Faricimab in Neovascular Age-Related Macular Degeneration: 1-Year Results from the Phase 3 TENAYA and LUCERNE Trials

First Author: Hideki KOIZUMI
Co-Author(s): Karen BASU, Frank HOLZ, Hugh LIN, Carlos QUEZADA RUIZ, Tien-yin WONG

Purpose: To assess efficacy, safety, and durability of faricimab, a bispecific angiopoietin-2 (Ang-2) / vascular endothelial growth factor (VEGF)-A antibody, in patients with neovascular age-related macular degeneration (nAMD).

Methods: TENAYA (NCT03823287, N=671) and LUCERNE (NCT03823300, N=658) are randomized, double-masked, active comparator–controlled, 112-week, phase 3 trials of faricimab in nAMD. Patients were randomized 1:1 to faricimab 6.0 mg up to every 16 weeks (Q16W), based on disease activity at weeks 20 and 24, or aflibercept 2.0 mg 8-weekly (Q8W).

Results: Both trials met their primary endpoint with consistent results across both trials; mean change in best corrected visual acuity from baseline averaged over weeks 40, 44, and 48 with faricimab up to Q16W (TENAYA +5.8; LUCERNE +6.6 ETDRS letters) was noninferior to aflibercept Q8W (+5.1; +6.6 ETDRS letters). 79.7% and 77.8% of patients in TENAYA and LUCERNE, respectively, were on ≥Q12W dosing intervals at week 48, with 45.7% and 44.9% of patients on Q16W dosing interval. Reductions in central subfield thickness (CST) from baseline averaged over weeks 40, 44, and 48 with faricimab up to Q16W (TENAYA −136.8 µm; LUCERNE −137.1 µm) were comparable with aflibercept Q8W (−129.4 µm; −130.8 µm). Faricimab was well tolerated; no cases of vasculitis or occlusive retinitis were reported.

Conclusions: Faricimab up to Q16W demonstrated noninferior vision gains versus aflibercept Q8W in patients with nAMD, with ~80% of patients on ≥Q12W and ~45% on Q16W fixed dosing intervals at week 48. Reductions in CST were meaningful. Faricimab was well tolerated.

Sep 06, 2021 (Mon) (GMT+8) 20:45 - 21:45 Livestream 3

Lipoprotein A as a Risk Factor for Polypoidal Choroidal Vasculopathy and Age-Related Macular Degeneration

First Author: Xinyuan ZHANG
Co-Author(s): Rui XIE

Purpose: Lipoprotein A [LP(a)] is a low-density lipoprotein variant containing apolipoprotein(B). Genetic and epidemiological studies have identified LP(a) as a risk factor for atherosclerosis and related diseases. The aim of this study was critically to evaluate the association of LP(a) in the pathogenesis of polypoidal choroidal vasculopathy (PCV) and wet age-related macular degeneration (wAMD).

Methods: This cross-sectional study consists of 88 patients with PCV and 54 subjects with wAMD. 88 age- and sex- matched normal subjects were enrolled as control. Serum level of lipid profile [LP(a), triglyceride (TG), total cholesterol (TC), high and low-density lipoprotein (HDL-C and LDL-C)] were estimated. Analysis of variance, the ANOVA test and multivariable regression analysis were performed to investigate the association of PCV and wAMD with systemic parameters.

Results: The plasma level of LP(a) was significantly higher in patients with PCV (P=0.001) and wAMD (P=0.014) than in that of controls. It was also found that higher level of LP(a) in patients with PCV than that in patients with wAMD, but there was no statistically significance. Multivariable logistic regression analysis showed that there was an association between plasma LP(a) level and PCV (OR=1.034; 95% confidence interval (CI), 1.011-1.058, P=0.004), and wAMD (OR=1.026; 95% CI, 1.001-1.051, P=0.04).

Conclusions: LP(a) is an independent risk factor for both PCV and AMD.

Sep 06, 2021 (Mon) (GMT+8) 20:45 - 21:45 Livestream 3

Penetration of Topical Levofloxacin 1.5% Compared to Moxifloxacin 0.5% into Aqueous and Vitreous: Preliminary Result

First Author: Norashikin MASLAN
Co-Author(s): Mae-lynn catherine BASTION, Wan Haslina HALIM, Norshamsiah MD DIN, Mushawiahti MUSTAPHA

Purpose: To compare the penetration of topical levofloxacin 1.5% and topical moxifloxacin hydrochloride 0.5% into aqueous and vitreous humor after instillation in human eyes.

Methods: A prospective, randomized trial of eyes undergoing vitrectomy surgery which fulfilled the study criteria was conducted. There were two intervention arms. Group 1 received topical levofloxacin 1.5%. Group 2 received topical moxifloxacin hydrochloride 0.5%. One drop of the assigned medication was instilled q6h 3 days prior to surgery to the eye planned for operation. Subjects were further randomized into subgroups that specified the time (1-,2-,4- and 6 hours) between the last drop and the sample obtained via aqueous tap and vitreous biopsy on the day of surgery. Assays were performed using high performance liquid chromatography.

Results: Fifty-four eyes of 54 patients were included. Levofloxacin concentration was significantly higher than moxifloxacin in aqueous for all subgroups (1hr (p=0.022), 2hr (p=0.0046), 4hr (p=0.04), 6hr (p=0.003)). For vitreous, there was significantly higher level of levofloxacin in the 1hr and 6hr subgroup (1h (p=0.045), 2hr (p=0.184), 4hr (p=0.173), 6hr (p=0.013). There was no significant difference between each hour of levofloxacin in aqueous, ANOVA test F(3,23)=0.864, p=0.474 compared to vitreous, F(3,23)=1.365, p=0.278.

Conclusions: There is significantly greater penetration of topical levofloxacin 1.5% than moxifloxacin 0.5% into the aqueous at all time points and vitreous at 1 hour and 6 hours after

instillation. The concentration of levofloxacin is similar in both aqueous and vitreous up to 6 hours after the last topical instillation.

Sep 06, 2021 (Mon) (GMT+8) 20:45 - 21:45 Livestream 3

Quantitative Vascular Outgrowth and Anatomic and Refractive Outcomes of Eyes Treated with Bevacizumab in Posterior Zone I

First Author: Sadik BAYRAMOGLU

Purpose: To report the anatomic and refractive outcomes and retinal vascular progress in eyes with posterior zone I retinopathy of prematurity (ROP) treated with intravitreal bevacizumab (IVB).

Methods: Pre-treatment wide-angle photographs of 117 eyes initially treated with IVB and whose pre-treatment vascularization was noted as zone I on patient charts were analyzed with the Image J program. Thirty-eight eyes of 21 babies with the length of shortest retinal vascularization (LSRV) were smaller than optic disc fovea distance were defined as posterior zone I. The extend of retinal vascularization is determined by calculating the LSRV/ Disc diameter (DD) ratio.

Results: In all eyes, favorable anatomical outcomes were obtained, except for two eyes of one infant, whose follow-up was interrupted after primary treatment. The mean follow-up was 13 ± 10 months. Additional IVB, laser, and vitrectomy treatments were performed in 12 of 23 eyes from 13 babies whose 60th postmenstrual week follow-up was completed. The mean age at final photography was 8.9 ± 8.4 months. The pretreatment and final LSRV/DD ratios were 2.80 ± 0.80 and 8.10 ± 2.66, respectively ($p < 0.001$). The length of pre-treatment and final temporal retinal vascularization/DD ratios were 5.60 ± 1.80 and 9.54 ± 2.34, respectively ($p < 0.001$). The mean spherical equivalent of 17 eyes was -4.57 diopters, at a mean age of 23.53 months.

Conclusions: A favorable outcome was achieved in almost all bevacizumab-treated eyes, but additional treatments were required. Significant progression of retinal vascularization was detected with primary IVB treatment.

Sep 06, 2021 (Mon) (GMT+8) 20:45 - 21:45 Livestream 3

Role of Dual Inhibition of Ang-2 and VEGF-A in Patients with Macular Edema Due to Branch or Central/Hemiretinal Retinal Vein Occlusion: Rationale and Design of the Faricimab Phase 3 BALATON and COMINO Trials

First Author: Yih-shiou HWANG
Co-Author(s): Abreu FRANCIS, Zdenka HASKOVA, Lars-olof HATTENBACH, Nitin JAIN, Hugh LIN

Purpose: Dual inhibition of angiopoietin (Ang)-2 and vascular endothelial growth factor A (VEGF-A) with faricimab offers excellent visual acuity (VA) gains with strong durability in patients with diabetic macular edema. We will investigate the effects of faricimab on VA and durability in patients with macular edema due to retinal vein occlusion (RVO).

Methods: BALATON (NCT04740905; n=570; branch RVO) and COMINO (NCT04740931; n=750; central/hemiretinal RVO) are phase 3, multicenter, randomized, double-masked, active comparator-controlled studies comparing faricimab with aflibercept in anti-VEGF treatment-naïve patients with branch or central/hemiretinal RVO. Both studies will compare 6x monthly injections of faricimab 6.0 mg with aflibercept 2.0 mg. Patients will continue to faricimab 6.0 mg administered in up to 16-weekly intervals using a personalized treatment interval (PTI) dosing regimen (Week 24─72). PTI adjustments are based on changes in central subfield thickness (CST) and best-corrected VA (BCVA).

Results: The primary endpoint is noninferiority of faricimab versus aflibercept in mean change from baseline in BCVA (Week 24). Secondary endpoints (Week 24): mean change from baseline in BCVA, CST, and NEI VFQ-25 composite score; proportion of patients gaining/avoiding loss of ≥15, ≥10, ≥5, or >0 letters. Secondary endpoints (Week 72): same endpoints as Week 24, plus, durability of treatment and number of study drug injections received (Week 24-72). Ocular/non-ocular adverse events, faricimab plasma concentration over time, and anti-drug antibody development will be assessed.

Conclusions: BALATON and COMINO will evaluate whether dual inhibition of Ang-2 and VEGF-A with faricimab improves outcomes beyond anti-VEGF monotherapy in patients with RVO and whether treatment can be personalized.

Sep 06, 2021 (Mon) (GMT+8) 20:45 - 21:45 Livestream 3

The Archway Phase 3 Trial of the Port Delivery System with Ranibizumab for Neovascular Age-Related Macular Degeneration: Data Update and Key Surgical Pearls

First Author: Andrew CHANG
Co-Author(s): Giulio BARTESELLI, Derrick KAUFMAN, Sneha MAKADIA, Varun MALHOTRA, Merce MORRAL

Purpose: The port delivery system (PDS) is an investigational drug delivery system designed for continuous intravitreal ranibizumab release through a surgically implanted, refillable ocular implant. The phase 3 Archway trial (NCT03677934) evaluated safety and efficacy of PDS for neurovasulcar age-related macular degeneration (nAMD) treatment.

Methods: Archway evaluated noninferiority (NI) and equivalence of PDS with ranibizumab 100 mg/mL with fixed 24-week (W) refill-exchanges (PDS Q24W; n = 248) versus intravitreal ranibizumab 0.5 mg injections every 4W (monthly ranibizumab; n = 167) on the primary endpoint of best-corrected visual acuity (BCVA) change from baseline averaged over W36/40 (NI margin, –4.5 letters; equivalence margin, ±4.5 letters). The September 2020 data cut extended results through ≥ 48W of follow-up.

Results: PDS Q24W was noninferior to monthly ranibizumab at W44/48, with a difference (95% CI) of –0.2 (–1.8, +1.3) letters between arms (equivalence not tested). Over 90% of PDS Q24W patients did not receive supplemental treatment before each

refill-exchange procedure. PDS procedures were generally well tolerated and the ocular safety profile was generally unchanged from the primary analysis. Systemic safety findings were comparable across arms. The implant insertion procedure has 7 major steps: peritomy, implant preparation, scleral dissection, pars plana laser ablation, pars plana incision, implant insertion, and conjunctival and Tenon's capsule closure.

Conclusions: BCVA results for the average of W44/48 were consistent with the primary analysis, with PDS Q24W noninferior to monthly ranibizumab. The PDS was generally well tolerated, with a favorable benefit-risk profile. With a view to supporting optimal patient outcomes, PDS procedures have evolved based on trial learnings.

Sep 06, 2021 (Mon) (GMT+8) 20:45 - 21:45 Livestream 3

The Associations between Non-Steroidal Anti-Inflammatory Drugs and Age-Related Macular Degeneration: A Ten-Year Retrospective Matched Cohort Study

First Author: Yi-ting HSIEH
Co-Author(s): Tsung-mu YANG

Purpose: To analyze the associations between regular use of aspirin or non-aspirin non-steroidal anti-inflammatory drugs (NA-NSAIDs) and the development of age-related macular degeneration (AMD).

Methods: The aspirin cohort recruited 44,166 regular users of aspirin and 140,476 matched non-regular users of aspirin, and the NA-NSAIDs cohort recruited 74,639 regular users of NA-NSAIDs and 240,078 matched non-regular users of NA-NSAIDs by using database from a tertiary center in Taiwan between 2008 and 2017. Common inclusion criteria included: aged ≥ 40 years, no AMD at baseline, no regular use of other anti-inflammatory drugs during the follow-up period, and visiting for 6 months or longer. Non-regular users were matched to the regular users on age, sex and visiting date, with a ratio of 1-4 to 1. Hazard ratios (HR) for the development of all AMD and neovascular AMD were measured with stratified multivariate Cox regression models in both cohorts.

Results: Regular use of aspirin was associated with decreased risk of all AMD in the primary cohort, people with cardiovascular diseases and those without cardiovascular diseases (HR=0.725 (P<0.001), 0.636 (P<0.001), 0.769 (P=0.027), respectively), and decreased risk of neovascular AMD (HR=0.523 (P=0.001), 0.275 (P=0.006), 0.404 (P=0.015), respectively). Regular use of NA-NSAIDs was associated with decreased risk of all AMD (HR=0.822, P<0.001) and neovascular AMD (HR=0.640, P=0.006) in people without arthritis, but not in those with arthritis.

Conclusions: Regular use of aspirin or NA-NSAIDs had protective effects on all AMD and neovascular AMD. The protective effect of NA-NSAIDs was only observed in people without arthritis.

Sep 06, 2021 (Mon)
(GMT+8) 20:45 - 21:45
Livestream 3

The Retinal Vascular Growth Rate in Babies with Retinopathy of Prematurity Could Indicate Treatment Need

First Author: Tapas PADHI
Co-Author(s): Taraprasad DAS, Subhadra JALALI

Purpose: To analyze the weekly rate of retinal vascular growth in treatment naïve babies with various stages of retinopathy of prematurity (ROP) and validate if this could be a predictor of treatment need.

Methods: Retrospective review of medical charts and retinal images of babies with various stages of ROP. The images were enhanced with red-green image enhancement software. Using the length of the horizontal disc diameter (DD) of each eye, the vessel growth was measured from the disc margin up to the vessel tip in fixed quadrants. The rate of vessel growth was the ratio of vessel length to the number of weeks it took to reach this length. The babies studied were divided into treatment warranting ROP (Group 1), spontaneously regressed (Group 2), and no-ROP (Group 3) for analysis. The 'no-ROP' group acted as normal control. Group 1 was further subdivided into 1A (threshold ROP), IB (aggressive posterior ROP), 1C (hybrid ROP), and ID (high-risk pre threshold ROP).

Results: Out of 436 eyes, Group 1, 2 and 3 had 238,108 and 90 eyes, respectively. The mean rate of vascular outgrowth along with 95% confidence interval (CI) was 0.719 [0.703, 0.740], 0.612 [0.599, 0.638], and 0.490 [0.487,0.520] DD/week, respectively, for babies with no-ROP, spontaneously regressed ROP, and treatment warranting ROP. More than 80% of eyes with a vessel growth rate of 0.54 to 0.57 DD/week or less required treatment.

Conclusions: A rate of weekly retinal vascular growth less than 0.54 DD could be used to determine treatment requirements in babies with ROP.

Sep 07, 2021 (Tue)
(GMT+8) 17:00 - 18:00
Livestream 1

Analysis of Retinol Binding Protein 4 and ABCA4 Gene Variation in Nonneovascular Age-Related Macular Degeneration

First Author: Hung Da CHOU
Co-Author(s): Kuan-jen CHEN, Yih-shiou HWANG, Chi-chun LAI, Wei-chi WU

Purpose: To assess the associations between plasma retinol binding protein 4 (RBP4) levels, age-related macular degeneration (AMD) severity, and ABCA4 genetic profiles.

Methods: A cross-sectional study from April 2018 to June 2019. Plasma RBP4 level and ABCA4 genetic profiling was performed in AMD and healthy controls. Age-Related Eye Disease Study (AREDS) AMD severity scale was determined by fundus photographs.

Results: Subjects with AREDS categories (C) 2, 3, and 4 (n = 12, 21, and 14, respectively) were significantly older than controls (n = 20; all $P < 0.001$). Plasma RBP4 levels were also significantly higher in subjects with AREDS C3 and C4 (mean [SD]: 37.3 [8.8] and 36.1 [7.8] µg/ml, respectively) than in healthy

controls (29.4 [7.1] µg/ml; P = .002 and .01, respectively). Logistic regression analysis showed that patients with a plasma RBP4 level > 35 µg/ml had a higher odds of presenting with severe AMD (AREDS C3/C4) when using controls as a reference (OR = 6.06; 95% CI, 2.0–18.4; P = .001). The unadjusted OR of severe AMD was 1.12 (95% CI, 1.04–1.20; P = .003) per 1-µg/ml increase in RBP4 level. However, the association between RBP4 levels and AMD severity was weakened after adjustment for age (P = .40). Genetic analysis showed RBP4 levels were elevated in subjects with seven ABCA4 variants compared to subjects without these mutations (37.8 [7.7] vs. 32.4 [7.9] µg/ml; P = .026).

Conclusions: This study showed a positive correlation between plasma RBP4 levels and AMD severity. Several mutations in ABCA4 were associated with higher RBP4 levels.

Retina 3 (Surgical)

Sep 07, 2021 (Tue)
(GMT+8) 17:00 - 18:00
Livestream 1

Evaluation of Anterior Segment Optical Coherence Tomography Parameters following Scleral Buckling Surgery in Retinal Detachment

First Author: Alka YADAV
Co-Author(s): Kirti JAI SINGH, Sushil KUMAR, Punita SODHI

Purpose: To evaluate anterior segment optical coherence tomography (ASOCT) parameters and intraocular pressure (IOP) changes following scleral buckling for retinal detachment (RD).

Methods: An observational prospective study of 1 year duration was conducted in 40 eyes of patients in the age group of 18-65 years with rhegmatogenous RD. The ASOCT parameters measured were angle opening distance at 750 µm (AOD 750) and trabecular iris space area at 750 µm (TISA 750) at 3 months postoperatively. IOP was measured using Goldmann applanation tonometer at 3 months postoperatively.

Results: The reduction in the mean postoperative AOD 750 (778.69±262.93 mm) from the mean preoperative AOD 750 (869.08±260.39 mm) was statistically significant (p=0.004). The reduction in the mean postoperative TISA 750 (393±117.24 mm2) from the mean preoperative TISA 750 (428±124.8 mm2) was statistically significant (p =0.025). The rise in the mean postoperative IOP (14.43±3.3 mmHg) from the mean preoperative IOP (11.48±2.2 mmHg) was statistically significant (p <0.001).

Conclusions: Imaging with ASOCT confirms that the application of scleral buckle induces significant narrowing of the anterior chamber angle in the early postoperative period after retinal detachment surgery.

Sep 09, 2021 (Thu)
(GMT+8) 17:00 - 18:00
Livestream 3

Internal Limiting Membrane Peeling in Proliferative Diabetic Retinopathy Patients undergoing Vitrectomy for Fibrovascular Proliferation or Vitreous Hemorrhage

First Author: Billal HOSSAIN
Co-Author(s): Zulfikar HASAN, Kamrul HASAN, Natasha KAZMINA, Syeda SULTANA

Purpose: To describe outcomes of internal limiting membrane peeling in diabetic vitrectomy.

Methods: This prospective, interventional, noncomparative study was done from July 2018 to March 2019. After vitrectomy, when there is traction extending to macula or macular puckering without visible traction, decision of internal limiting membrane was taken. Tamponade was used either silicon oil or sulphar hexa fluoride which was as situation demand. Mean postoperative outcomes were best corrected visual acuity, intraocular pressure, diabetic macular edema for further epiretinal membrane formation. Post operative follow up was at day 1, week 1, 1 month and 3 months.

Results: 27 cases were included in our study. 19 patients (70.37%) were male and 8 (29.63%) were female. Mean age was 48 years (range 28-75 years). 17 patients (62.96%) had vitreous hemorrhage with visible fibrovascular proliferation. 10 patients (37.04%) had plain vitreous hemorrhage. Visual acuity were improved in 25 cases (92.59%). Sillicon oil was used in 13 cases. After completion of 9 months follow up, there was no macular edema (central macular thickness < 250 μ) and no epiretinal membrane or further traction present. Visual acuity was improved in 78% cases. 12% of cases report reduction of vision due to macular thinning.

Conclusions: PPV with internal limiting membrane (ILM) peeling has been reported to reduce retinal edema and improve visual acuity in patients with DME. Performing ILM peeling in conjunction with the usual techniques for addressing a vitreous hemorrhage PPV may offer the benefits of better postoperative visual acuity.

Sep 09, 2021 (Thu)
(GMT+8) 17:00 - 18:00
Venue: Livestream

Limiting Membrane Peeling in Proliferative Diabetic Retinopathy Patients undergoing Vitrectomy for Fibrovascular Proliferation or Vitreous Hemorrhage

First Author: Billal HOSSAIN
Co-Author(s): Zulfikar HASAN, Kamrul HASAN, Natasha KAZMINA, Syeda SULTANA

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follow up was at day 1,week 1, 1 month and 3 months.

Results: 27 cases were included in our study. 19 patients (70.37%) were maleand 8 (29.63%) were female. Mean age was 48 years (range 28-75 years). 17 patients (62.96%) had vitreous hemorrhage with visible fibrovascular proliferation. 10 patients (37.04%) had plain vitreous hemorrhage. Visual acuity were improved in 25 cases (92.59%). Sillicon oil was used in 13 cases. After completion of 9months follow up, there was no macular edema (central macular thickness < 250 μ) and no epiretinal membrane or further traction present. Visual acuity was improved in 78% cases. 12% of cases report reduction of vision due to macular thinning.

Conclusions: PPV with internal limiting membrane (ILM)peeling has been reported to reduce retinal edema and improve visual acuity in patients with DME. Performing ILM peeling in conjunction with the usual techniques for addressing a vitreous hemorrhage PPV may offer the benefits of better postoperative visual acuity.

Sep 09, 2021 (Thu) (GMT+8) 17:00 - 18:00 Livestream 3

The Efficacy of Inverted Internal Limiting Membrane Peeling in Management of Macular Hole Induced Retinal Detachment

First Author: Dang DAT

Purpose: To evaluate the functional and anatomical results of inverted internal limiting memebrane (ILM) peeling in management of macular hole induced retinal detachment.

Methods: A prospective study of 25 eyes with macular hole induced retinal detachment treated by vitrectomy and inverted ILM flap in 2 years 2018- 2020.

Results: Mean age of patients is 59.9 year old (27 to 81). Female is majority with 88% of patients. The mean preoperative best corrected visual acuity (BCVA) is very low 2.36 ± 0.7 logMAR (from ST(+) to counting fingers 0.5 meter). All patients are high myopies with very long mean axial eye of 28.19 ± 2.63mm. The success rate of post operative anatomical results with closed mauclar hole and well retinal reattachment is 96% (24/25 eyes) in the mean time follow-up of 15 ± 6.73 months. The post operative BCVA is 1.402 ± 0.410 logMAR; 100% of eyes have visual acuity improvement after surgery. The 3 lines post operative visual acuity improvement occur in 80% eyes. The highest of post-op BCVA is 20/100.

Conclusions: The vitrectomy with inverted ILM flap technique for macular hole induced retinal detachment has good results with success rate of anatomical results of 96% of eyes and the 3 line visual acuity improvement of 80% of eyes. This technique is first choice in management of macular hole induced retinal detachment.

Sep 09, 2021 (Thu)
(GMT+8) 17:00 - 18:00
Livestream 3

To Evaluate Patient Compliance for Prone Positioning after Vitrectomy Surgery using an Innovative Device

First Author: Ashish AHUJA

Purpose: To investigate the use of an innovative device (post vitrectomy recovery system) that has a sensor embedded in the headrest with data-logging function in real time to measure compliance of patients to maintain face down positioning (FDP) after vitrectomy surgery.

Methods: All surgeries were performed by a single surgeon. Surgeries done included macular hole, retinal detachment with inferior retinal breaks and open globe injury with IOFB with retinal detachment. 13 patients were evaluated but 2 patients had to be excluded as they could not maintain FDP in the post op period due to chest pain and breathlessness during FDP. 11 patients were evaluated in this pilot project, out of which 6 were male and 5 were females with the age group ranging from 28 - 71 years. The duration of prone position maintained varied from 4 days to 12 days.

Results: The average duration of face down positioning was 5.5 hours in the first 24 hours. The adherence was significantly better after MH surgery than after RRD surgery. Out of 11 patients, 5 underwent macular hole surgeries which showed a successful closure of MH in all cases. Out of 5 patients of retinal detachment, 4 cases achieved anatomical success and one case required re surgery in the postoperative period.

Conclusions: To summarize, we observed a good acceptance of our device to measure compliance of patients after vitrectomy surgery to maintain FDP.

Translational And Visual Sciences Research

Sep 08, 2021 (Wed)
(GMT+8) 18:15 - 19:15
Livestream 3

Adaptive Optics Imaging Reveals Photoreceptor Paucity in Congenital Color Vision Deficiency

First Author: Lubhavni DEWAN
Co-Author(s): Radhika TANDON, Pradeep VENKATESH

Purpose: To compare cone photoreceptor parameters in colour deficient and color normal subjects using adaptive optics retinal imaging.

Methods: 30 eyes of 15 color deficient subjects (confirmed on Anomaloscope testing) and 30 eyes of 15 age and sex matched normal trichromats were analyzed using adaptive optics retinal imaging on the Rtx1 (ImagineEyes) flash illuminated fundus camera. 4*4 arc degree images were acquired through dilated pupils with the subjects fixing at the central fixation target. Analysis of 50 micron sampling windows in all four quadrants at 2 degrees from fixation was done using the accompanying software and various parameters were analyzed.

Results: Average cone density over all four quadrants differed significantly between cases (22119.8 + 2747.6) and controls (25014.8 + 1506.3) ($p<0.001$). Cone spacing was significantly higher in cases (7.51 + 0.66) versus controls (7.0 + 0.5) for all four quadrants ($p<0.001$). Cone regularity ($p=0.59$) and cone dispersion ($p=0.29$) were not significantly different between cases and controls, except in the superior quadrant. The most common shape of neighboring cones was hexagonal in both groups (47.2% and 47.6% respectively; $p=0.39$). Within the cases, differences in cone density and spacing from controls were significant for the deuteranomaly group ($p<0.01$) but not for the protanomaly group ($p=0.89$).

Conclusions: Adaptive optics revealed a lower number of cones in a large subset of congenital color vision deficient subjects. Correlation with genotypes of the subclasses of color vision deficiency can yield useful insight into the changes occurring at the cellular level in different categories of congenital color vision deficiencies.

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Association of Single-Nucleotide Polymorphisms in CFH and TNFRSF10A with Chronic Central Serous Chorioretinopathy in Southern Chinese

First Author: Zhen Ji CHEN
Co-Author(s): Haoyu CHEN, Li Jia CHEN, Danny Siu-chun NG, Tsz Kin NG, Calvin PANG

Purpose: Central serous chorioretinopathy (CSCR) is a chorioretinal disease predominantly affecting working-age population. Currently, knowledge about the genetic components of CSCR in Chinese is limited. This study aims to evaluate the association of candidate gene variants with chronic CSCR in southern Chinese.

Methods: This is a case-control genetic association study. Totally 531 unrelated patients with cCSCR and 2383 controls from Hong Kong and Shantou, China, were recruited. Nine single-nucleotide polymorphisms (SNPs) from six genes, namely CFH, ADAMTS9, NR3C2, VIPR2, TNFRSF10A and ARMS2, selected from reported CSCR genetic studies, were genotyped in all participants using TaqMan genotyping assays. Meta-analysis was used to evaluate the association of each SNP with cCSCR in the both Chinese cohorts, and additive model was used to assess the combined effects of different SNPs.

Results: Among the 2914 unrelated Chinese subjects, CFH rs800292 (odds ratio, OR=1.25, P=0.0020), CFH rs1329428 (OR=1.23, P=0.0037), and TNFRSF10A rs13278062 (OR=1.43, P=0.0014) were significantly associated with cCSCR. In contrast, other candidate SNPs had no significant association with cCSCR in the southern Chinese cohorts. Additive analysis revealed that subjects homozygous for the risk alleles of CFH rs800292 and TNFRSF10A rs13278062 had over 3-fold of increased risk of cCSCR as compared with those homozygous for the non-risk alleles.

Conclusions: This study identified three SNPs, CFH rs800292 and rs1329428 and TNFRSF10A rs13278062, associated with cCSCR in southern Chinese, and revealed the additive effect of CFH and TNFRSF10A.

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Fine Resolution Assessment of the Elastic Properties of Myopic Choroidal Stroma in an Animal Model

First Author: Quan HOANG
Co-Author(s): Kazuyo ITO, Liqin JIANG, Jonathan MAMOU, Sally MCFADDEN

Purpose: Myopia progression has been associated with choroidal vascular changes. Using scanning acoustic microscopy (SAM) with 7-µm lateral resolution, we analyzed the dependency of choroidal biomechanical properties in unilaterally-myopic guinea pigs (GP) on region, myopia status and eccentricity from the optic nerve head (ONH) midline.

Methods: Thirteen 1-week-old GPs underwent unilateral form-deprivation-induced myopia for 1 week (-3 to -9.3D). 12-µm thick serial cryosections were obtained either in a vertical (superior/inferior) or horizontal (nasal/temporal) orientation and scanned using a 250-MHz custom-made SAM. Bulk modulus (K) and mass density (ρ) 2-dimensional maps were calculated via a frequency-domain approach and manually-segmented to isolate choroidal stroma. Association between each biomechanical parameter and region, myopia status and ONH eccentricity was assessed with linear regression analysis.

Results: On average, among control eyes, K in the temporal region was greater than nasal (containing the central axis, +448MPa, $p<0.001$). Per 1 mm in increased eccentricity, nasal K increased by 70MPa in control eyes, whereas temporal K decreased by 100MPa in myopic eyes. Among myopic eyes, ρ was 0.03g/cm3 greater in superior vs. nasal regions ($p=0.04$). In the nasal region, ρ was 0.03g/cm3 greater in control vs. myopic eyes ($p<0.01$). Per 1 mm in increased eccentricity, superior ρ increased by 0.01 and nasal ρ by 0.01g/cm3 in control eyes. In myopic eyes, nasal ρ decreased by 0.03g/cm3 and temporal ρ by 0.04g/cm3.

Conclusions: The biomechanical properties of choroidal stroma display myopia-, eccentricity- and regional-dependent differences. Our results support the idea myopia development and progression are associated with microstructural and biomechanical alterations in the choroidal stroma.

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Genotype-Phenotype Correlation and Interaction of 4q25, 15q14 and MIPEP Variants with Myopia in Southern Chinese Population

First Author: Tsz Kin NG
Co-Author(s): Calvin PANG, Lixia SUN, Mingzhi ZHANG, Riping ZHANG, Yuqian ZHENG

Purpose: To determine the association and interaction of genome-wide association study-reported variants for Asian populations with myopia and ocular biometric parameters in southern Chinese population.

Methods: Totally 1,462 unrelated Han Chinese subjects were recruited with complete ophthalmic examinations, including 1,196 myopia and 266 control subjects. A total of 9 variants were selected for TaqMan genotyping. The genetic association, joint additive effect and genotype-phenotype correlation were investigated.

Results: The 4q25 variant rs10034228 (p = 0.002, odds ratio (OR) = 0.56) and MIPEP variant rs9318086 (p = 0.004, OR = 1.62) were found to be significantly associated with myopia as well as different severity of myopia. Moreover, 15q14 variant rs524952 (p = 0.015, OR = 1.49) also showed mild association with myopia and high myopia. However, there was no significant association of CTNND2, VIPR2 and SNTB1 variants with myopia. Joint additive analysis revealed that the subjects carrying 6 risk alleles of the 3 associated variants were 10-fold higher risk predisposed to high myopia. Genotype-phenotype correlation analysis revealed that high myopia subjects carrying 4q25 rs10034228 T allele showed thicker central corneal thickness, whereas high myopia subjects carrying 15q14 rs524952 A allele was associated with longer axial length and larger curvature ratio.

Conclusions: This study revealed significant association of 4q25, 15q14 and MIPEP variants with myopia and different severity of myopia in southern Chinese population, joint additively enhancing 10-fold of risk predisposing to high myopia. The correlation of these associated variants with axial length and corneal parameters suggest their contribution to the refractive status in high myopia subjects.

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Low Vitamin D Receptor Linked to Reduced Endogenous Cross-Linking in Keratoconus

First Author: Prashansa THAKUR
Co-Author(s): Sharon DSOUZA, Jeyabalan NALLATHAMBI, Swaminathan SETHU, Shivapriya SHIVAKUMAR

Purpose: Keratoconus (KC) is associated with reduced collagen cross-linking, inflammation and oxidative stress in cornea. Vitamin D receptor (VDR) is critical in mediating cellular homeostasis and dampening inflammation. Hence, this study aims to determine relationship between VDR and collagen cross-linking (CXL) in KC.

Methods: The cross-sectional study was approved by institutional ethics committee and informed consent were obtained from study subjects. Corneal epithelium from 30 KC patients (Amsler Krumeich grades 1-3) undergoing Topoguided photorefractive keratectomy (T-PRK) or CXL and 10 controls undergoing PRK were obtained. Corneal epithelium from KC patients were demarcated as ectatic and non-ectatic zones. The expression of VDR, lysyl oxidase (LOX), an endogenous cross-linking agent, MMP9 and collagens in corneal epithelial samples were determined using western blotting and/or qPCR. The effect of vitamin D on VDR, LOX, MMP9 and collagens in human corneal epithelial cells (HCE) were used studied in vitro.

Results: The expression VDR, LOX and collagen in KC epithelium was significantly

(P<0.05) lower, MMP9 was higher compared to control. The expression of VDR and LOX in ectatic epithelium of KC was lower compared to matched epithelium from non-ectatic zone. HCE cells exposed to oxidative stress, in vitro, showed significant reduction in expression of VDR and LOX, with elevated levels of MMP9 compared to controls. Vitamin D treatment to HCE cells, in vitro, improved expression of VDR and LOX, and reduced the levels of MMP9.

Conclusions: The findings indicate defect in vitamin D receptor mediated effects in KC epithelium and emphasizes critical role of vitamin D–VDR axis in regulating endogenous collagen cross-linking components. Thus, suggesting VDR activation through vitamin D supplementation could be a novel strategy in management of KC.

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Ocular Surface Immunoprofiling in Keratoconus

First Author: Bhavya GORIMANIPALLI
Co-Author(s): Sharon DSOUZA, Archana PADMANABHAN NAIR, Swaminathan SETHU

Purpose: The role of inflammatory factors in keratoconus (KC) pathogenesis is now apparent. Determining the spectrum of inflammatory and immune factors on the ocular surface of KC patients would improve KC pathobiology knowledgebase and management strategies. Hence, the present study aims at determining ocular surface (OS) immune profile in keratoconus (KC).

Methods: Patients with KC (n=31, 53 eyes) and controls (n=15, 23 eyes) were included in the study. OS immune cells subset (6) proportions (collected by OS wash) were determined by immune cell-specific fluorochrome-conjugated antibody-based immunophenotyping using flow cytometry. Tear fluid collected with Schirmer's strips was used to measure soluble factors (45) by multiplex ELISA.

Results: Significantly (*p<0.05) higher proportion of natural killer (NK) cells and γδT cells along with lower proportions of neutrophils was observed on the OS of KC subjects compared with controls. Significantly increased levels of tear IL-1β, IL-6, IL-17, IFNγ, TNFα, Perforin, MMPs and IgE were also observed in KC.

Conclusions: The current study demonstrates changes in the proportions of specific ocular surface immune cell subsets and secreted factor profile in keratoconus patients. Some of them exhibited changes with increasing grades of KC severity. Thus, furthering the knowledge of KC pathogenesis and potential therapeutic targets.

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Single-Cell RNA-Seq Analysis Maps Early Retinal Development of Mouse and Human Retina

First Author: Xi CHEN
Co-Author(s): Yanling WANG

Purpose: Vision starts with image formation at the retina, which contains diverse neuronal

cell types that extract, process, and relay visual information to higher order processing centers in the brain. Though there has been steady progress in defining retinal cell types, very little is known about early retinal development in mouse and human, which starts well before birth.

Methods: In this study, we performed transcriptomic profiling of developing mouse embryonic and early-born retinae, including embryonic (E) days 14.5, 17.5 and postnatal (P) day 3, which correspond to early, intermediate, and late stages of retinal neurogenesis, respectively. Using single-cell RNA-sequencing (scRNA-seq) and pseudotime analysis, the developmental trajectories of retinogenesis were reconstructed. Also we analyzed human fetal retinae of gestational weeks 8 and 9.

Results: Our analysis revealed transcriptional programs driving differentiation from retinal progenitor cells (RPCs), to fate-deciding RPCs and ciliary marginal zone cells, and then down to three different cell types, which suggested that fate-deciding RPCs might serve as embryonic progenitors in early retinal development. In addition, we also showed that transcriptional differences separated into distinct subtypes and used this information to reconstruct RPC developmental trajectories and cell fate. Our results supported a hierarchical program of differentiation governing cell-type diversity in the developing mouse and human retina.

Conclusions: In summary, our work details comprehensive molecular classification of retinal cells, reconstructs their relationships, and paves the way for future mechanistic studies on the impact of gene regulation upon human retinogenesis.

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Why Multi-Pronged Approach is Required for nAMD: A Multivariate Analysis of Aqueous Humor Biomarkers and Spectral OCT

First Author: Thirumalesh M B

Purpose: Macular fluid (intra and subretinal) secondary to choroidal neovascular membranes (CNVM) may show a variable response in its resolution kinetics following intravitreal anti-VEGF injection. The current study aims to determine the relationship between aqueous humor (AH) soluble factor levels and macular fluid resolution kinetics post anti-VEGF injection in CNVM patients.

Methods: Following a institutional ethics comitte approval, aqueous humor (AH) of nAMD patients (n=36) and controls (n=25). 100 microlitre AH was collected by anterior chamber paracentesis in the study subjects during intravitreal injection in nAMD patients or scheduled cataract surgery in control subjects; soluble related factors in AH were measured by flow cytometry-based multiplex ELISA. SD OCTwas used to study the macular edema volume before injection and at follow up. Measurements were analyzed using machine learning analytics to look for edema resolution kinetics and was correlated with soluble factors in the aqueous humor (AH biomarkers) using the multivariate analysis.

Results: Maular edema resolution kinectics in CNVM correlated inversely to the level of angiogenin (p=0.0003 and R0.005), IL12/23 (p=0.012), CX3CL/fractalkine (p=0.042), CXCL9/MIG (p=0.017), CXCL10/IP10 (p=0.016), sL-selectin (p=0.019), and we also found a negative correlation with IL10 (p=0.005). These parameters indicate that angiogenin and other proangogenic cytokins and interleukins also play a major role in macular edema resolution kinetics in patients of nAMD.

Conclusions: This study illustrates the role of various novel strong proangiogenic cytokines (like angiogenin) which along with VEGF play an important role in the pathogenesis and therapeutic response of CNVMs to anti-VEGF injection.

Applying Big Data,Artificial Intelligence And Telemedicine In Ophthalmology In The Era Of Covid-19

A Deep Learning Model For Amd Classification Based On Volumetric Macular Sd-Oct Scans

First Author: Ling-ping CEN

Purpose: Using three-dimensional convolutional neural network (3D-CNN) algorithm to construct a deep learning model based on volumetric spectral-domain optical coherence tomography (SD-OCT) scans, for age-related macular degeneration (AMD) classification.

Methods: Volumetric macular OCT scans and the corresponding color fundus photographs were collected from patients who visited our hospital between January 2016 and December 2020. According to AMD clinical classification and Age-Related Eye Disease Study, the macular OCT volumes were classified into two classes: the low-risk "Normal, normal aging changes and early AMD" and the high-risk "Intermediate and late AMD", and the 3D-OCT dataset was established. A deep learning model based on 3D-CNN was constructed for the binary AMD classification and its performance was evaluated.

Results: A total of 1027 patients and 1477 eyes were included in this study. The mean age of the patients was 66.5±10.0 years old. There were 615 males (59.9%) and 412 females (40.1%), and the ratio of low-risk eyes/ high-risk eyes was 2.3:1. 1029 eyes (69.7%) were assigned to the training set, 231 eyes (15.6%) to the validation set, and 217 eyes (14.7%) to the test set. The 3D deep learning model showed great performance on the test set, with the accuracy of 0.935, sensitivity of 0.973, specificity of 0.916, F1 score of 0.911, and AUC of 0.9888 (95%CI: 0.9770-1.0000).

Conclusions: This study constructed a deep learning model using 3D-CNN algorithm, for classifying AMD on volumetric OCT scans, and the model demonstrated excellent grading performance.

Changing Paradigms In Ophthalmic Practises Becoming Wiser

First Author: Madhav GOEL
Co-Author(s): Sonu GOEL

Purpose:COVID 19 pandemic has disrupted the ophthalmic practices as compared to other branches being practiced in the medical field worldwide. Analyzing the need and combining modern-day technology has ushered a new era of ophthalmic practices. This has not only provided services at doorsteps but helped patients seeking specilaist opinion in minutes.

Methods: Tele-ophthalmology was used as a mode to diagnose, treat and follow up patients sitting in remote areas of the Indian subcontinent in the periods of lockdown as well as during limited movements video phone calls were used to diagnose allergic disorders, cataract, squint, ptosis, viral conjunctivitis, phacomorhic glaucomas, corneal ulcers. Patients on the first visit were given and taught the use of schirmers staining and corneal ulcer healing and progression was assessed on mobile devices Mucormycosis patients could be detected early and population anxiety could be relieved. 23 corneal users and 1046 patients

were consulted for free and appropriate advice was given.

Results: 23 corneal ulcer patients, 96 Mucormycosis cases, 202 allergic conjunctivitis patients, 8 phacomorhic glaucoma patients, 6 vitreous hemorrhage, 94 floaters, and109 viral conjunctivitis were diagnosed and confirmed on personal visits.

Conclusions: Tele-ophthalmology has proved to be great tool in terms of reducing the patient burden on tertiary care eye centers. An economically viable option bridging the distance gaps and future improvisation may become a standard practice of eye care worldwide .

DEEP Learning-Based Estimation Of Axial Length And Subfoveal Choroidal Thickness From Color Fundus Photographs

First Author: Li DONG
Co-Author(s): Jost JONAS, Wenbin WEI

Purpose: To develop an automated computer-based algorithm to predict axial length and subfoveal choroidal thickness (SFCT) based on color fundus photographs.

Methods: In the population-based Beijing Eye Study 2011, we took fundus photographs and measured SFCT by optical coherence tomography (OCT) and axial length by optical low-coherence reflectometry. Using the fundus photographs, we trained and evaluated a deep learning-based algorithm for the estimation of axial length and SFCT.

Results: The study included 6,394 color fundus images taken from 3,468 participants. The algorithm had a mean absolute error (MAE) for predicting axial length and SFCT of 0.56 mm (95% confidence interval (CI):0.53,0.61) and 49.20 µm (95% CI:45.83,52.54) respectively. Predicted values and measured data showed coefficients of determination of r2=0.59 (95% CI:0.50,0.65) for axial length and r2=0.62 (95% CI: 0.57,0.67) for SFCT. Bland-Altman plots revealed a mean difference in axial length and SFCT of -0.16mm (95% CI:-1.60,1.27mm) and of -4.40 µm (95% CI:-131.8,122.9 µm), respectively. For the prediction of axial length, heat map analysis showed that signals predominantly from overall of the macular region, the foveal region and the extrafoveal region were used in eyes with an axial length of <22mm, 22-26 mm, and >26 mm, respectively. For the prediction of SFCT, the CNN used mostly the central part of the macular region, the fovea or perifovea, independently of the SFCT.

Conclusions: Deep learning-based algorithms may be helpful in estimating axial length and SFCT based on conventional color fundus images. They may be a further step in the semi-automatic assessment of the eye.

Identification of Early Keratoconus Using Artificial Intelligence Techniques

First Author: Ke CAO
Co-Author(s): Paul BAIRD, Srujana SAHEBJADA, Karin VERSPOOR

Purpose: Keratoconus (KC) represents one of the leading causes of corneal transplantation worldwide. Detection of early/subclinical KC would lead to better management to avoid the need for corneal grafts, but the condition is challenging to diagnose for the clinician. We used aspects of artificial intelligence by comparing eight commonly used machine learning algorithms to build models for better differentiating subclinical KC from non-KC subjects.

Methods: The Oculus Pentacam imaging

system was used to obtain corneal parameters on 49 subclinical KC and 39 non-KC eyes, along with the age, gender, spherical equivalent (SE) and axial length (AL). Each combination of the considered parameters was used for every machine learning method applied in the study to build models to identify subclinical KC. The performance of each model was evaluated and compared.

Results: The highest accuracy for subclinical KC versus non-KC discrimination was 0.91, with 0.90 sensitivity and 0.92 specificity using nine parameters and the random forest algorithm. Similar promising performance were obtained by lasso regression (Accuracy, 0.90; Sensitivity, 0.90; Specificity, 0.90), and the logistic regression model (Accuracy, 0.90; Sensitivity, 0.93; Specificity, 0.87).

Conclusions: This study shows machine learning algorithms can be applied to identify subclinical keratoconus from non-keratoconic eyes using parameters collected in a routine clinical eye examination. The models built in the current study could be incorporated into different clinics› decision-making processes, with the ultimate aim to improve the keratoconus diagnosis system and reduce the need for corneal grafts.

Knowledge, Attitudes, and Practices of Telemedicine in Ophthalmology in a Tertiary Hospital: A Cross-Sectional Survey

First Author: Angelica Antoinette VEGA
Co-Author(s): Sherman VALERO

Purpose: The purposes of this study were to describe the perceptions and practices of telemedicine among ophthalmologists in a tertiary hospital; and evaluate knowledge, satisfaction, and perceived patient outcomes in using telemedicine to provide eye care in a time of a global pandemic.

Methods: This was a descriptive, cross-sectional study using a self-administered online survey. Thirty-two (32) ophthalmology consultants and residents-in-training in a single tertiary, private hospital who practiced telemedicine participated in this study. Descriptive statistics were used to summarize the data. Responses to open-ended questions were analyzed thematically.

Results: The respondents were somewhat knowledgeable (75%) and somewhat confident (72%) in using telemedicine. Respondents strongly conveyed their satisfaction with telemedicine outcomes (56%). The majority believed that their patients were satisfied with teleconsultatations (69%). The majority agreed that telemedicine can be effective for select types of care [i.e., chronic condition management (66%), follow-up care (63%), and acute non-emergency care (53%)]. Telemedicine also proved to be a boon during a pandemic due to its convenience (59%) and efficiency (63%). However, it is limited by the imperative need for face-to-face consults (69%) and technological constraints (44%).

Conclusions: Telemedicine was perceived to be a valuable solution during the present pandemic due to its convenience, safety, and ability to provide remote diagnosis and management of urgent and non-urgent cases. Although the current practice of telemedicine still has plenty of room for improvements in the standardization of training, connectivity and technological constraints, and addressing liability concerns, it can serve as an adjunct to face-to-face consultations to provide optimal care for patients.

Ophthalmic Findings in Rhinoorbital Mucormycosis following SARS-CoV-2 Infection

First Author: Rajwinder KAUR

Purpose: To report the cases of rhinoorbital mucormycosis following SARS-CoV-2 infection who presented or referred by ear-nose-throat department.

Methods: It is an institutional, retrospective and interventional study of all patients coming to the department of ophthalmology and referred from the ENT department. They underwent all the examinations which include visual acuity, color vision, pupillary reaction, ocular movements, corneal sensation and fundus examination.

Results: Laboratory examination revealed mucor ophthalmic findings include total ophthalmoplegia and relative afferent pupillary defect. Central artery occlusion in all cases presented with no perception of light. Optical coherence tompgraphy revealed some rare presentation of CRAO.

Conclusions: Rhinoorbital mucormycosis has come in this region as severe vision threatening ophthalmic complications in post-COVID patients.

Smartphone Based Monitoring of Metamorphopsia in Macular Disease: The New Normal?

First Author: Meriam ISLAM
Co-Author(s): Lucas BACHMANN, Livia FAES, Kenny LINEHARD, Dawn SIM

Purpose: To understand the ongoing real word use of the smartphone-based application "Alleye" in monitoring metamorphopsia for patients with macular disease through the Covid-19 pandemic and beyond.

Methods: During the first Covid-19 national lockdown in the United Kingdom in March 2020 245 patients were trained in the use of the smartphone based application Alleye (Oculocare Ltd). We assessed the ongoing engagement with remote monitoring of metamorphopsia as routine hospital appointments were once again in place following the easing and reimposition of restrictions from August 2020-May 2021. We conducted an observational study with a retrospective analysis of data. We observed the number of tests performed per patient per week and the number of Alleye alarms generated over this period.

Results: 11,446 individual tests have been performed by our patient cohort to date. The median number of tests performed per eye was 2 (IQR 3 to 42) and the range was 1-376. 235 eyes of 136 patients did not generate an alarm in this time period. 39 eyes (36 patients) generated a minimum of one Alleye alarm and 48 eyes (32 patients) had 2 or more alarms. We have noted ongoing consistent use of the application by the vast majority (67.7%) of patients.

Conclusions: Ongoing engagement with remote monitoring of macular disease shows promise, despite easing of restrictions in the United Kingdom to varying degrees over the last ten months. Further study as restrictions continue to relax is necessary to understand how Alleye can integrate with our "new normal" in the new post-pandemic digital landscape.

Strategies to Improve Glaucoma Compliance Based on Cross-Sectional Response-Based Data in a Tertiary Healthcare Center

First Author: Khaja MOINUDDIN
Co-Author(s): Dr.v.s GUPTA, Dr.monika KAPUR

Purpose: To elucidate compliance rates among glaucoma patients in a tertiary healthcare center, reasons for non-compliance and response-based solutions to improve compliance in the same cohort.

Methods: A cross-sectional descriptive epidemiological study, information was obtained from 500 patients from 1 January 2014 to 30 June 2014. Patients were intercepted at the entry point where they get their intraocular pressure (IOP) checked, wherein they were asked to fill an exhaustive questionnaire. They were also asked to demonstrate how they instill eyedrops, following which any irregularities were brought to notice and corrected. Finally, they were also asked for any suggestions to improve compliance with medications. Non-compliance rates were determined based on the number of patients who did not instill anti-glaucoma medications as per the prescribed dosage or frequency schedule. Non-compliance rates were then evaluated by the Chi-square test for any association with distributions based on various parameters.

Results: In the case of a positive association, correlation co-efficient was further calculated to know the strength of this association. Positive association was noted in distributions based on age, sex, duration of treatment, social structure and number of medications ($p < 0.05$); but correlation coefficients were very weak ($c < 0.3$). The cost of medications not only had a positive association but also had a very strong correlation coefficient ($c = 0.9188$), proving that cost of medications had a modest bearing on compliance rates.

Conclusions: The study concluded that besides the availability of medications at a reasonable cost, simplification of treatment regimen and interactive health education appear to be the most important factors for improving compliance.

Use of Inverse Finite Element Analysis and Deep Learning for Primary Angle-Closure Glaucoma Diagnosis

First Author: Satish PANDA
Co-Author(s): Tin AUNG, Michael Julien Alexandre GIRARD, Royston K TAN, Tin A. TUN

Purpose: To use the biomechanical properties of the iris obtained from in-vivo biomedical images for primary angle-closure glaucoma (PACG) diagnosis.

Methods: An optical coherence tomography (OCT) machine was used to capture the constriction of the pupil as a series of images. The boundary of the iris was delineated for each image to obtain the temporal deformation pattern of the iris during spontaneous contraction. A finite element (FE) model was constructed using the information from the first image, whereas the other images were used for the extraction of mechanical parameters, such as stiffness and permeability. We loaded the sphincter region of the iris with active stress to initiate active contraction and then used an optimization algorithm to minimize the differences between the true and the FE iris boundary during spontaneous contraction. In this way, we were able to compute the best guessed mechanical properties of the iris tissue. Subsequently, a deep learning model was used to classify the eyes as non-glaucoma or PACG using the biomechanical parameters

of the iris.

Results: We found the iris tissue to be stiffer ($p<0.001$) and less permeable ($p=0.142$) in PACG than the healthy ones. Our model was able to recreate the iris motion accurately with an intersection over union value of 0.82. The diagnostic network provided accuracy of 81% with sensitivity and specificity of 80% and 84%, respectively.

Conclusions: This study revealed that the biomechanical properties of the iris has diagnostic power in PACG and combining biomechanics with structure may provide the best possible diagnosis.

Cataract And Cataract Surgery

A Cost-Effectiveness Analysis of AcrySof IQ Vivity Intraocular Lens from Private Health Fund Perspective in Australia

First Author: Chandra BALA
Co-Author(s): Paul ATHANASIOV, Mukesh DHARIWAL, Amit GUPTA, Jason HOLLAND, Hemant RATHI

Purpose: AcrySof IQ Vivity is the first and only Extended Depth of Focus (EDoF) intraocular lens (IOL) with the wavefront-shaping X-WAVE technology and a clinically proven monofocal visual disturbance profile. This study estimates the cost-effectiveness of AcrySof IQ Vivity IOL vs. standard aspheric monofocal IOL, from a private health fund perspective in Australia.

Methods: A Markov model was developed using the following health states: well, need for spectacles (near/distance/varifocal), severe visual disturbances (glare/haloes/starbursts) – with/without spectacles, and death. Model inputs were sourced from a randomized clinical study (NCT03010254), published literature, and expert opinion. IOL costs (AcrySof IQ Vivity-AU$651, and AcrySof SN60WF-AU$290) were derived from the published prostheses list. A lifetime horizon (30 years) was considered, and cost and health outcomes were discounted at 5% per annum. Model outcomes included incremental cost-effectiveness ratio (ICER) per quality adjusted life year (QALY) gain. Sensitivity and scenario analyses were also conducted.

Results: Bilateral implantation of AcrySof IQ Vivity IOL provided greater vision-related quality of life (QALY gain of 0.16) at an incremental lifetime cost of AU$384 vs. monofocal IOL leading to ICER of AU$2,383/QALY, which is well below the medical technology cost-effectiveness thresholds (range: AU$45,000-AU$75,000) recommended by the Australian authorities. Results were most sensitive to the cost of IOL prosthesis, post-operative spectacle dependence, and disutility due to wearing glasses. The robustness of the results was further confirmed by probabilistic sensitivity analysis and scenario analyses.

Conclusions: AcrySof IQ Vivity IOL is a highly cost-effective treatment strategy with improved vision-related quality of life outcomes for patients undergoing cataract surgery.

A Literature Review of the Clinical Evidence on Nd:YAG Laser Capsulotomy Incidence Post-Cataract Surgery in Eyes Implanted with the Clareon Intraocular Lens

First Author: Jun ZHANG
Co-Author(s): Mukesh DHARIWAL

Purpose: Clinically significant posterior capsular opacification (PCO) is treated by Nd:YAG laser capsulotomy procedure. The purpose of this literature review was to collate and report Nd:YAG incidence post-cataract surgery in patients implanted with Clareon IOL.

Methods: A literature search was conducted using Pubmed, European and American Society for Cataract and Refractive Surgeons congress databases and internal clinical trial database (Jan 2010 to Mar 2021). Incidence of PCO requiring Nd:YAG with Clareon IOL was extracted and reported.

Results: Five clinical trials reporting the incidence of PCO requiring Nd:YAG were identified. In a multi-center (Japan), single-arm study (N=110), at 14 months, Nd:YAG incidence was 0.0%. Among these subjects, 20 eyes were examined at 9 years, and 5.0% underwent Nd:YAG capsulotomy. In an open-label, randomized, multicenter (US and Europe) prospective study (N=398) to evaluate the safety and effectiveness of Clareon, 1.5% of eyes underwent Nd:YAG capsulotomy at 15 months. In a prospective multicenter (US), single-arm safety and performance clinical trial in cataract patients (N=350) with Clareon IOL implantation, 4.6% of eyes underwent Nd:YAG capsulotomy within 12 months. In an ongoing multicenter (UK and Spain), single-arm study assessing the long-term (3-year) safety and effectiveness of the Clareon IOL (N=424), interim analysis at 24 months reported Nd:YAG incidence of 1.7%. While in a prospective observational study (Spain) Nd:YAG incidence for the Clareon group (N=60), was 0.0% at 12 months.

Conclusions: Evidence from clinical studies demonstrates that the Clareon IOL biomaterial and squared edge design provides a protective effect from PCO with low incidence of Nd:YAG capsulotomy being reported.

A Literature Review to Describe Clinical Efficacy of Intraoperative Aberrometer in Challenging Patient Populations versus Standard of Care

First Author: Sun-ming PAN
Co-Author(s): Margaret AINSLIE-GARCIA, Nicole FERKO, Carine C.W. HSIAO

Purpose: Intraoperative aberrometry (IA) provides real-time information during cataract surgery, and addresses several issues related to intraocular lens calculation to reduce prediction error. A literature review was conducted to compare IA with standard preoperative evaluation and planning (PEP) in patients with prior refractive surgery, astigmatism, or atypical axial length (AL).

Methods: Medline and Google Scholar were searched from 1 Jan 2004 to 31 Jul 2020. Comparative studies published in English (randomized, non-randomized, meta-analyses) in patient populations of interest were included. Prediction error, postoperative astigmatism, and proportion of patients ±0.5 diopters (D) of the refractive target were extracted.

Results: The search revealed studies across patients with prior refractive surgery (n=5 studies), pre-existing astigmatism (n=7), short (n=1) and long AL (n=1). In post-refractive populations, IA was reported to provide similar (n=1), numerical (n=2) or statistically

significant improvements (p<0.05, n=2) in prediction error and proportion ±0.5D versus PEP with various formulas. All studies in patients with astigmatism that reported a p-value found significantly lower spherical equivalent (n=2) and residual astigmatism in IA compared with PEP (n=2), while three studies reported lower values in IA eyes (p-value not reported). In long eyes (>25.0mm), IA showed significantly lower mean numerical error (MNE) versus common formulas including Barrett-Universal-II and Hill-RBF and was comparable to AL-OPT Holladay-1. In short eyes (<22.1mm), IA had the lowest MNE of 4 common formulas but only achieved statistical significance versus Haigis.

Conclusions: IA appears to offer several advantages in accuracy and astigmatism-related outcomes, and may be an asset in addressing patient expectations for good postoperative visual outcomes in challenging populations.

A Prospective, Comparative Study of the Whole Range of Vision Outcomes between a Trifocal IOL and an Extended Depth of Focus IOL (PanOptix IOL and Tecnis Symfony IOL) in a Chinese Population

First Author: Guangbin ZHANG

Purpose: To compare the whole range of visual outcomes, spectacle independence, and visual disturbances of PanOptix IOLs (TIOL group) versus Symfony IOLs (EDOF group) in a Chinese population.

Methods: 37 subjects who underwent cataract surgery were assigned to TIOL group (18 with 36 eyes) and EDOF group (19 with 38 eyes). Binocular uncorrected (UDVA) and corrected (CDVA) distance visual acuities (5m), uncorrected intermediate (UIVA, 60cm) and near (UNVA, 40cm) visual acuities, distance-corrected intermediate (DCIVA, 60cm) and near (DCNVA, 40cm) visual acuities, defocus curve, modulation transfer function (MTF), spectacle independence and Chinese validated QUVID questionnaire were evaluated 3 months postoperatively. The standardized logarithm of the minimum angle of resolution (logMAR) charts was used for visual acuity (VA) measurement at 5 m, 80 cm, and 40 cm. VA at 60 cm was tested using the 80 cm chart and was then converted.

Results: Post-operative 3 month UCDVA, BCDVA, UCIVA-60cm, BDCIVA-60cm, and MTF were not significantly different between groups (both $P > 0.05$). TIOL group achieved significantly better UNVA-40cm (0.11±0.13 Vs 0.22±0.08) and DCNVA-40cm (0.08±0.08 Vs 0.22±0.08), higher proportion of patients reporting never using spectacles for near vision than EDOF group ((83.33% Vs 47.37%) (both $P < 0.05$). QUVID questionnaire showed incidence of severe starbursts, halos, and glare were comparable in 2 groups 3 months after surgery ($P > 0.05$).

Conclusions: Compared to EDOF IOL, PanOptix IOL achieve better near-vision and higher spectacle independence, which resulted in superior whole range of visual outcomes with comparable visual quality in a Chinese population.

A Study on Glaucoma-Related Adverse Events following Congenital Cataract Surgery

First Author: Qiuxiang TANG
Co-Author(s): Xia LI

Purpose: To investigate the incidence of glaucoma-related adverse events following

congenital cataract surgery.

Methods: Children who underwent surgery for congenital cataract at the age of 5 years or younger between January 2010 to January 2020 in our hospital were retrospectively reviewed. Outcome measures included the incidence of glaucoma-related adverse events, time and associated risk factors.

Results: 138 patients (271 eyes) were included. The average surgery age was 11 months,and the mean follow-up time was 23.3 months. The operation method was cataract extraction combined with posterior circular capsulorhexis combined with anterior vitrectomy. Eight patients (12 eyes, 4.4%) had development of glaucoma-related adverse events, two patients (4 eyes) of which (1.3%) were diagnosed as suspected glaucoma, and the operation age were 4 months and 13 months respectively, the occurrence time was 40 months and 72 months respectively after cataract surgery. 8 eyes (3%) were diagnosed with glaucoma, and the operation age were 4, 4, 6, 6, 6, 6,7 and 12 months respectively, and the occurrence time was 3 to 7 years after the operation. The rest 130 patients (259 eyes) who did not develop glaucoma-related adverse events had cataract surgery at 3 to 24 months (11 months on average).

Conclusions: Glaucoma-related adverse events occurred after congenital cataract surgery. As glaucoma-related adverse events usually occurred several years after the operation, long-time follow-up is needed.

Advantages of a 3D Heads-up Digital System versus Standard Surgical Microscopes during Anterior

First Author: Valeri KOLESNITCHENKO
Co-Author(s): Jyotsna MARAM, William WILEY, Lu YIN

Purpose: To present a laboratory modeling evaluation of a digital visualization system (NGENUITY® 3D Visualization System) mounted on three analog surgical microscopes, to compare total magnification, depth of field, and depth resolution.

Methods: A theoretical assessment of system performance for a 3D heads-up digital visualization system was compared with the standard oculars for three analog surgical scopes. For the comparisons between the systems, the NGENUITY® camera aperture was set at 30% of its full diameter; the surgeon would be 1.2m from the headsup display, and the surgical scopes would be set up per the manufacturer's instructions. Using the equipment specifications, the total magnification, depth of field, and depth resolution were calculated for each system. Total magnification was calculated purely as a function of system parameters. Depth of field and depth resolution incorporated other visual parameters (eg, distance of the physician from the heads-up display).

Results: The 3D heads-up system provided 26–48% higher total magnification than the surgical microscope oculars. Setting the camera aperture at 30%, NGENUITY provided up to 5-fold greater instantaneous depth of field than the total depth of field through the surgical scope oculars. Depth of field decreased at shorter viewing distances. NGENUITY provided 11–42% better depth resolution than the surgical scope oculars, at the maximal system-specific total magnification.

Conclusions: An ocular-free, heads-up system has the potential to improve ergonomics, surgeon comfort and facilitate collaboration and teaching in the operating room. In this theoretical study, NGENUITY improved total magnification, depth of field, and stereoscopic depth resolution versus standard surgical scope oculars.

Analysis of Visual Outcome and the Intraoperative and Postoperative Complications in Patients with Pseudoexfoliaition undergoing Manual Small Incision Cataract Surgery

First Author: Aditi GHOSH
Co-Author(s): Dr.Shivakumar CHANDRASEKARAN

Purpose: To study distribution of pseudoexfoliation, its sequelae, and outcomes of manual small incision cataract surgery (MSICS) in these cases in terms of final visual outcomes, intraoperative and early-postoperative complications.

Methods: A prospective observational study of 152 patients for 1 year period having cataract (cortical, nuclear, sub capsular and capsular cataract) with pseudoexfoliation on the basis of slit lamp examination before and after pupillary dilatation and posted for manual small incision cataract surgery. Detailed history with examination of UCVA, BCVA, slit lamp biomicroscopy, IOP, fundus examination, keratometry, A scan biometry, specular microscopy was done. All patients underwent surgery by the same senior surgeon. Preoperative, intraoperative and postoperative complications were recorded. The patients were followed up on postoperative day 1, 1st month and 3rd month.

Results: Majority of cases were in between 60 -80 years. There was a statistically significant improvement in the mean LogMAR visual acuity during each postoperative visits compared to preoperative visual acuity with $p<0.0001$. Five patients had zonular dialysis of 3-4 clock hours and CTR was used in all 5 cases and 1 had PCR. 3 had vitreous loss and underwent vitrectomy intraoperatively. On postoperative day striate keratopathy, Descemets folds, epithelial edema, irregular pupil, decentered IOL, iritis, superior iridectomy, primary PCO, pre existing CRVO and macular edema were noted.

Conclusions: Our study shows that in experienced hands with MSICS, with a slightly higher incidence of intraoperative and postoperative complications than in non-PXF eyes, good outcomes can be obtained in terms of visual recovery and postoperative outcomes.

Bilateral Progressive Anterior and Posterior Lenticonus: Significance and Management with Toric IOL

First Author: Vivek SINGH
Co-Author(s): Rakhi KUSUMESH, Vidya Bhushan KUMAR

Purpose: We aimed to highlight the importance of detection of lenticonus in otherwise asymptomatic patients for early diagnosis and management of Alport syndrome and addressing the challenges in performing clear lens extraction with toric intraocular lens (IOL) to eliminate irregular astigmatism for better visual rehabilitation.

Methods: We report a case of an 18 year old female presented as progressive decrease in vision for one year, unaware of hearing loss and kidney disease. We found that she was having bilateral anterior and posterior lenticonus with moderate sensorineural hearing loss and proteinuria without any family history. We did a clear lens extraction with toric IOL placement.

Results: Patient was managed sucessfully with clear lens extraction with toric IOL implantation.

Conclusions: Alport syndrome is a rare genetic disorder, characterized by progressive renal failure, hearing loss, and ocular abnormalities like anterior lenticonus, corneal opacities, cataract, temporal retinal thinning

and fleck retinopathies. Early detection of lenticonus in otherwise asymptomatic patients helps in early diagnosis and management of Alport syndrome and can be managed sucessfully by performing clear lens extraction with toric IOL.

Changes of the Tear Film Lipid Layer Thickness after Cataract Surgery in Patients with Diabetes Mellitus

First Author: Keke ZHANG

Purpose: To evaluate changes in the tear film lipid layer thickness (LLT) in cataract patients with diabetes mellitus (DM) after cataract surgery.

Methods: LLT and partial blinks rates measured with the LipiView interferometer, tear break-up time (TBUT) and Schirmer's tests, and dry eye symptoms evaluated with the Ocular Surface Disease Index (OSDI) questionnaire were conducted before and one month after cataract surgery.

Results: Finally, 38 age-related cataract (ARC) and 31 diabetic cataract (DC) patients were available for analysis. No significant difference in preoperative LLT and partial blink rates was found between ARC and DC groups. However, preoperative TBUT and Schirmer's test results were significantly lower in DC group. DC group showed a higher preoperative OSDI score with no significant difference than ARC group. In DC group, LLT was significantly thinner in cases with DM over 10 years ($p<0.001$). One month after surgery, LLT of DC group was significantly thinner than at baseline ($p=0.002$). While in ARC group, LLT had no significant difference before and after cataract surgery ($p=0.078$). Compared to baseline data, there was no statistically significant difference between the two groups in the partial blink rates, TBUT and Schirmer's test results after cataract surgery. OSDI scores were significantly higher after surgery than at baseline in both groups and significantly associated with LLT either before or after cataract surgery.

Conclusions: The tear film LLT is correlated with the duration of DM and becomes significantly thinner one month after cataract surgery, leading to the aggravation of dry eye symptoms.

Clear Cornea after 4 Decades of Sputnik IOL Implantation

First Author: Chetan CHHIKARA
Co-Author(s): Rajendra Singh CHAUHAN

Purpose: A case of Sputnik IOL in a 65-year-old male who had a history of trauma to his right eye 38 years back while cutting wood and was diagnosed with an Intraocular foreign body in the anterior chamber, which was surgically removed. After 6 months, the patient developed a traumatic cataract for which he underwent cataract surgery with Sputnik IOL implantation. 6 months after surgery, the patient's best-corrected distance visual acuity was 20/30 in the right eye.

Methods: The patient was on regular follow-up and presented with a complaint of diminution of vision in the left eye for which he underwent (OS) cataract surgery in 2010. Presently in March 2021 patient had a complaint of diminution of vision in the (OD) with BCVA Counting finger at 3 meters and on examination, the patient was diagnosed with Posterior Capsular Opacification in the right eye.

Results: B-Scan was within normal limits in the right eye and the patient underwent (OD) Nd: YAG capsulotomy & appropriate treatment was advised. On review after 2 weeks, BCVA in the right eye was 20/40.

Fundus was normal and endothelial cell count was 1798 cells/mm2.

Conclusions: The Sputnik is now considered obsolete & may pose a surgical challenge for today's ophthalmologist. We report this case for its rarity because the cornea is healthy in the eye that had undergone implantation of a Sputnik IOL approximately four decades ago. As the Sputnik IOL is obsolete nowadays management of such cases may be difficult.

Clinical Efficacy of Congenital Cataract Surgery in Premature and Low Birth Weight Infants

First Author: Yiyue JIA

Purpose: To evaluate the safety and effectiveness of congenital cataract surgery in premature and low birthweight infants.

Methods: We performed a retrospective review of premature and low birth weight infants who underwent surgery for congenital cataract. Nine cases (15 eyes) of premature infants with gestational age from 27 weeks to 35 weeks ,and 12 cases (21 eyes) low birth weight infants with a birth weight of 1.1 kg to2.4 kg. All cases used phacoemulsification and posterior continuous curvilinear capsulorhexis, combined with anterior vitrectomy. Eleven children (18 eyes) underwent primary intraocular lens implantation, three children(6 eyes) underwent secondary intraocular lens implantation. Visual acuity, eye condition and complications after cataract surgery were collected.

Results: The average actual age of preterm infants at surgery was 12.21 months(corrected age 10.44months), and the average weight of low birth weight infants was 7.57 kg. Parents of all children feedback that the postoperative visual acuity is clearer than before surgery. The visual axis of 21 eyes became clear after operation, and posterior capsule opacification in 2 children(3eyes) underwent the secondary surgery. No high intraocular pressure was found. Pupil deformation developed in 8 children (12eyes).Post-iris adhesions was present in 3 children(3eyes).

Conclusions: Congenital cataract surgery in premature and low birth weight infants is effective and relatively safe. Complications of pupillary changes and post-iris adhesions are more common. The complication rate is acceptable.

Clinical Evaluation of a New Hydrophobic Acrylic Intraocular Lens (Clareon) in Malaysia

First Author: Eve Lyn CHONG
Co-Author(s): Fook Meng CHEONG, Mun Wai LEE, Robert Kim Chuan YEO

Purpose: This study presents our initial experience and clinical outcomes with the Clareon (CNA0T0) monofocal intraocular lens in a routine cohort of cataract patients in Malaysia.

Methods: This study was a retrospective review of patients who underwent uneventful cataract surgery with implantation of the Clareon IOL. The primary endpoints were uncorrected distance visual acuity (UCDA), best-corrected distance visual acuity (BCDA) and proportion of patients achieving UCDA of Snellen acuity of 6/9 or better at 1 month. The secondary endpoints include refractive outcome and predictability, refractive stability, contrast sensitivity measured under photopic conditions at 1 month, wound stretch and surgically induced astigmatism (SIA). Visual Function Index-14(VF-14) Quality of Life questionnaire was carried out by telephone

interview at 1 month for patients who had bilateral Clareon implants.

Results: A total of 125 eyes underwent phacoemulsification with implantation of Clareon. The mean preoperative logMAR UCDA was 0.77+0.67 which improved to 0.18+0.17 one month postoperatively. All eyes had BCDA better than 0.3 and 93.8% had BCDA better than 0.18. The mean BCDA at 3 months was 0.05+0.06 and logMAR 0.18 or better. Refractive stability revealed no statistically significant changes in spherical equivalent (SE) from up to 3 months postoperatively (p=0.364). SIA was not significant in this study. In addition, 20 patients who had bilateral Clareon implants scored a mean VF-14 score of 95.2+6.29. Ten patients achieved a score of 100.

Conclusions: This initial experience with the Clareon IOL in this local cohort of patients in Malaysia showed excellent visual outcomes, refractive stability and predictability as well as safety.

Clinical Outcome of PanOptix Trifocal IOL Implantation in Chinese Elder Cataract Patients Aged 60-79 Years Old

First Author: Chi XIAO

Purpose: To evaluate the visual performance after implantation of a diffractive trifocal IOL (AcrySof IQ PanOptix, Alcon) in Chinese elder cataract patients aged 60-79 years.

Methods: A retrospective case series study. Cataract patients aged 60-79 that underwent cataract phacoemulsification extraction combined with AcrySof IQ PanOptix IOLs implantation from July 2020 to January 2021 have been included. Pre-op baseline data and 3 months post-op clinical data of all subjects were recorded. Post-op binocular uncorrected (UDVA) and best-corrected (BCDVA) distance visual acuities (5m), uncorrected intermediate (UIVA, 60cm) and near (UNVA, 40cm) visual acuities, distance-corrected intermediate (DCIVA, 60cm) and near (DCNVA, 40cm) visual acuities, total intraocular aberration, total intraocular high order aberration, modulation transfer function (MTF), Strehl ratio, VF-14 visual function questionnaire, spectacle independence were evaluated. The standardized logarithm of the minimum angle of resolution (logMAR) charts was used for VA measurement.

Results: 39 patients with 45 eyes, including 10 males (11eyes) and 29 females (34 eyes), aged 69.93±8.50 years have been analyzed. Post-op 3 months UDVA, UIVA and UNVA have significantly improved compared with pre-op visual acuity (0.08±0.11 Vs 0.77±0.26; 0.03±0.18 Vs 0.72±0.21; 0.15±0.22 Vs 0.62±0.18, all $p < 0.05$). Total intraocular aberration, coma and trefoil significantly decreased, while MTF and Strehl ratio increased post-operatively. Spectacle independence was reported in all of the patients.

Conclusions: PanOptix IOL provides good far, intermediate and near visual acuity in elder (aged 60-79 years) Chinese cataract patients.

Comparative Evaluation of Longitudinal U/S Pulse, Burst, Ozil & Ozil-IP Mode of Phacoemulsification

First Author: Sunita MANJHU
Co-Author(s): Dr Mrs Kiran BHANOT, Dr Nawab Zishan FAROOQUI, Pooja KOTHARI

Purpose: To compare the efficacy of longitudinal u/s pulse, burst, continuous Ozil & Ozil-IP mode of phacoemulsification.

Methods: A randomized controlled hospital-

based prospective study of 240 gd4 dense nucleus, 60 each in 4 groups of longitudinal u/s pulse, burst, continuous ozil & ozil-ip. Parameters studied were CDE, u/s time, EFU & post-operative ECC & BCVA.

Results: Mean CDE was significantly lower ($p<0.001$) in longitudinal u/s burst mode (10.29±4.2) vs pulse mode (17.81±3.24), Ozil-IP (18.17±6.96) continuous Ozil (22.37±5.36). UST was significantly lower in longitudinal u/s burst (18.19±3.19) vs ozil-1p (72.07±16.79), longitudinal u/s pulse (78.36±20.74), Ozil (80.23±19.89). Post-operatively there was no significant change in ECC & BCVA in all 4 groups.

Conclusions: Though intra-operative CDE & UST is significantly lower in longitudinal burst mode compared to Ozil-IP, Ozil & u/s pulse mode, however it does not affect the post-operative visual recovery emphasizing the relevance of technique in phacoemulsification.

Comparing Intraoperative Aberrometry with Conventional Preoperative Planning: An Economic Analysis in Japan

First Author: Carine C.w. HSIAO
Co-Author(s): Margaret AINSLIE-GARCIA, Hang CHENG

Purpose: The goal of this study was to assess the economic impact of intraocular lens (IOL) selection with intraoperative aberrometry (IOA) in cataract surgery in comparison to conventional preoperative planning in Japan.

Methods: A literature review was conducted to identify relevant studies published in peer-reviewed journals that reported clinical and refractive outcomes of IOA vs conventional planning for IOL power selection. The economic impact analysis was performed in Excel to evaluate the financial impact of IOA usage. The input of cost data was sourced from published literature or clinic charge to the patient.

Results: Nine studies reported less APE (absolute prediction error) (0.5 D or less) for eyes with IOA than those with preoperative evaluation. A large retrospective database with 32,189 eyes showed 6% significant reduction in APE (81.9% vs 75.9%, $P<0.0001$). Improved refractive outcomes not only provide a better quality of vision but also reduce the risk of enhancement surgery (e.g. laser surgery, lens exchange, or lens rotation) to correct the refractive error. On average, enhancement surgery can cost around JPY ¥200,000 to JPY ¥250,000 in Japan. Based on our evaluation, it may lead to JPY ¥13,000 financial savings per patient.

Conclusions: IOA improves patient refractive outcomes and proves to be a very cost-effective technology in our economic assessment conducted for Japanese patients.

Comparison of Postoperative Intraocular Lens Shift between Two Different Design of IOLs

First Author: Takeshi TESHIGAWARA
Co-Author(s): Akira MEGURO, Nobuhisa MIZUKI

Purpose: To compare postoperative intraocular lens (IOLs) shift between two different designs of IOLs, singe C-loop acrylic IOLs (SN60WF: IQ) in the bag and optic captured plate-haptic IOLs (FB313 MF15: FEMTIS). Correlation between the shift and preoperative biometric variables was investigated.

Methods: 69 eyes were studied. Anterior chamber depth (ACD), lens thickness (LT), and axial length (AL) were measured preoperatively. IQ was placed in the capsular

bag, and FEMTIS was placed in the optic capture using the reversed optic capture technique. At one day, one week, and one month postoperatively, IOL position and ACD were measured using optical coherence tomography. The postoperative shift in both IOLs was compared. The correlation of all variables was analyzed.

Results: One month postoperation, while IQ showed a major forward shift, FEMTIS demonstrated a minor backward shift, the difference was significant. The shift in IQ was more remarkable between one day and one week postoperatively than one week and one month postoperatively. In IQ, the degree of forwarding shift presented a significant positive correlation with preoperative ACD and AL, but not with LT. In FEMTIS, there was no significant correlation between the IOL shift and each variable.

Conclusions: FEMTIS was significantly more stable than IQ postoperatively. The influence of the postoperative forward shift of IQ on postoperative refraction cannot be overlooked. The influence was more remarkable in deeper ACD and longer AL preoperatively. The optic capture placement can be more suitable than in-the-bag placement to improve the prediction of postoperative refraction.

Comparison of Visual Outcomes and Complications of Phacoemulsification with Intraocular Lens Implantation between Nanophthalmos and Normal Eyes

First Author: Saksakul ENGCHUAN
Co-Author(s): Oraorn THONGINNETRA

Purpose: To compare visual outcomes and complications of phacoemulsification with intraocular lens (IOLs) implantation between nanophthalmos and normal eyes.

Methods: Medical records of patients with nanophthalmos and normal control eyes who underwent phacoemulsification with IOLs implantation in an ophthalmology training center between 2014 and 2020 were reviewed. Two subgroups were categorized according to the following criteria: nanophthalmos with axial length (AL) < 20 mm. and control eyes with AL ≥ 21 and ≤ 26.5 mm. Subjects with secondary ocular disease and a history of prior intraocular surgery were excluded. Subgroup characteristics and complications were recorded.

Results: Sixteen nanophthalmos of 12 patients and 50 normal control eyes were enrolled. Mean baseline characteristics of nanophthalmos are as follows: AL 18.17 ± 1.59 mm., anterior chamber depth 2.46 ± 0.83 mm. Thebest-corrected visual acuity (BCVA) 1.43 ± 0.76 logMAR and intra-ocular pressure 13.94 ± 3.3 mmHg. Mean post-operative BCVA improved statistically from baseline by 0.78 logMAR (p-value 0.001) in nanophthalmos, with no statistical difference (p-value 0.439) from normal eyes. The higher mean difference of post-operative and target spherical equivalent was observed in nanophthalmos compared to control eyes (2.56 D vs 0.47 D, p-value 0.012). Six nanophthalmos (37.5%) experienced post-operative complications which were corneal edema, iris injury, uveal effusion and post-operative inflammation compared to 3 eyes (6%) in the control group (p-value 0.05).

Conclusions: Although lower visual outcomes and higher post-operative complications were found in nanophthalmos than in control eyes, the significant visual improvement after cataract surgery was shown in nanophthalmos.

Comparison of the Safety and Efficacy of Cataract Surgery Performed with the Low Energy Femtosecond Laser versus Conventional Phacoemulsification

First Author: A-yong YU
Co-Author(s): Yong WANG, Kai-jing ZHOU, Yusen HUANG

Purpose: To compare the safety and efficacy of cataract surgery performed with the low energy FEMTO LDV Z8 laser compared with conventional phacoemulsification in Chinese patients.

Methods: This prospective, multicenter, interventional, randomized control clinical trial included patients who underwent either femtosecond laser-assisted cataract surgery (FLACS), or conventional phacoemulsification (CP), followed by IOL implantation, between January 2019 and April 2020 at 3 clinical centers in China. Primary endpoint included a comparison of the endothelial cell loss (ECL) at 3 months between the two treatment groups and assessment if FLACS is non-inferior to CP. Secondary endpoints included comparison of cumulative dissipated energy (CDE), change in central corneal thickness (CCT) from baseline, post-operative uncorrected and corrected distance visual acuities (UDVA and CDVA) in the two groups.

Results: At 3 months, the FLACS group showed lower ECL compared with the CP group, however, the difference was not statistically significant throughout the follow-up. Mean CDE was also lower in the FLACS group (4.1 vs 4.5 percent-seconds; p=0.51); and the increase in CCT was significantly lower in the FLACS group compared to the CP group on Day 7 (4.9 vs. 9.2 µm; p=0.04). Postoperatively, mean UDVA and CDVA were comparable between the two groups. No intraoperative complications occurred.

Conclusions: The efficacy of FLACS performed with the low-energy FEMTO LDV Z8 laser was found to be non-inferior to CP. No complications were reported in both groups. FLACS group demonstrated a trend towards reduced CDE, lower ECL, and a statistically significant smaller increase in CCT compared to the CP group.

Conquering Iris Complications in Cataract Surgery

First Author: Jose Timothy Martin CHUA
Co-Author(s): Bryan Vincent MESINA, Karen REYES

Purpose: This video collection will show the different techniques in doing phacoemulsification for patients with non-dilating or inadequately dilating pupils, with iris prolapse, with intraoperative floppy iris syndrome (IFIS), and who develop intraoperative pupil constriction. The best eye surgeon is the most prepared one. Thus, all ophthalmologists need to be aware that such complications can arise even for supposedly routine cataract surgeries. The pathophysiology of such complications will be briefly discussed to give a better understanding of why the iris behaves this way. This video conference shall effectively arm the ophthalmologist to manage such cases.

Methods: In this video presentation, 3 surgeries will be used to highlight techniques used to complete phacoemulsification with minimal complications. The first patient is a diabetic with poorly constricting pupils. A pupil expander, the Malyugin Ring, is used. The second patient is a poorly dilating patient where no additional devices are used. The third patient is a Tamsolusin user with IFIS. The proper technique was used to complete successful phacoemulsification. Additionally, the following strategies are showcased: Pre-operative drops, Viscodilation/

Viscomydriasis, pupil stretch, low fluidics.

Results: All three surgeries were successful in their outcomes. Each cataract was carefully taken out using the appropriate phacoemulsification technique. Appropriate intraocular lenses were placed and post-op management was also successful in providing good vision for each patient.

Conclusions: Small-pupil cataract surgeries and pathologic pupils are very difficult phacoemulsification surgeries even for experienced ophthalmologists. There must be discipline in assessment and surgical prowess. With adequate knowledge in the pathophysiology and best practices, these difficult phacoemulsification cases can be effectively handled.

Effect of IOL Biomaterial on Posterior Capsule Opacification: Long-Term Real-World Clinical Practice Evidence from Large Population-Based Studies

First Author: Li ZHAOHUI
Co-Author(s): Hang CHENG

Purpose: Posterior capsular opacification (PCO) involves lens epithelial cell proliferation and capsular fibrosis, resulting in visual obstruction. Nd:YAG laser capsulotomy treats PCO but leads to additional healthcare resource utilization. Longitudinal real world evidence (RWE) studies can provide long-term outcomes for large cohorts of patients and reflect routine clinical practice.

Methods: The present study is an overview of recently available RWE studies (N=3) on long-term PCO/Nd:YAG outcomes due to different IOLs.

Results: In Finland, a retrospective cohort study in Kotka region (Lindholm 2019) was conducted (2007-2016, N=10,044) and cumulative incidence of Nd:YAG laser posterior capsulotomy was estimated with competing risks survival analysis. Findings showed that AcrySof IOLs were associated with a 38% reduction in Nd:YAG risk compared to Tecnis ZCB00 (P<0.001). In the UK, a retrospective cohort study (Ursell 2018) was conducted using NHS cataract clinics data (2010-2016, N=52,162) and findings showed that 3-years Nd:YAG capsulotomy incidence was significantly lower for single-piece hydrophobic AcrySof IOL vs. other hydrophobic as well as hydrophilic IOLs (p<0.001). A healthcare claims data analysis (Kossack 2017) was conducted in the Bavaria region of Germany to assess impact of different IOLs on PCO (2010-2014, N=3025). Findings indicated statistically significantly lower risk of YAG capsulotomy in hydrophobic vs. hydrophilic IOLs (P<0.0001) up to 4 years post-cataract surgery.

Conclusions: Three robust RWE studies show that hydrophobic IOLs are associated with a significantly lower risk of PCO requiring Nd:YAG capsulotomy vs. hydrophilic IOLs. In two studies, AcrySof IOLs were associated with significantly lower YAG capsulotomy incidence vs. Tecnis ZCB00.

Effect of Pterygium on Corneal Density

First Author: Xinglian TAO

Purpose: To evaluate the effect of pterygium on corneal density.

Methods: The clinical data of 30 patients (36 eyes) who underwent primary, single-headed pterygium surgery in our hospital were collected. The contralateral normal eyes of patients with monocular pterygium served as the control group (22 eyes). The corneal density measured by Pentacam before and 4 weeks after pterygium operation and in the

control group were collected. The effects of pterygium on corneal density and the changes of corneal density before and after operation were analyzed.

Results: In this study, 36 eyes of 30 patients with pterygium were treated with pterygium excision, with an average age of 59.87 ±12.70 years. The average corneal density values of anterior layer, middle layer and posterior layer before operation were 30.65 ±11.13,17.78 ±7.81,12.93 ±3.17 (GSU) respectively; after operation: 28.00 ±11.11,15.40 ±4.63,12.61 ±2.85 (GSU); in the control group: 19.80 ±11.11,13.24 ±2.57,11.35 ±2.11(GSU) respectively. Pterygium can increase the corneal density of the anterior layer and middle layer, and decrease the corneal density after the operation, but it was still higher than that of the control group, and the difference is statistically significant ($P < 0.05$). Pterygium had no significant effect on the corneal density of the posterior layer ($P > 0.05$).

Conclusions: Pterygium can increase the corneal density of the anterior layer and middle layer, and decrease the corneal density after operation, but it is still higher than that of the control group, but has no significant effect on the corneal density of the posterior layer.

Effect on Early Ocular Blood Flow after Cataract Surgery with Different Fluidics System in High Myopia Cases

First Author: Wang JING
Co-Author(s): Zhang JINSONG

Purpose: To investigate the early changes of ocular blood flow in patients with a history of high myopia after different intraocular pressure (IOP) with active-sentry assisted CENTURION Active Fluidics System phacoe mulsification techniques.

Methods: A prospective, randomized and interventional clinical trial. 60 cataract patients with high myopia were enrolled and divided into 2 groups (IOP of 40mmHg, IOP of 70mmHg). All patients had examinations preoperative and 1 day after surgery. Postoperative hemodynamic parameters of OA, CRA and PCA vessels, subfoveal choroidal thickness and macular vessel density were major measurements, and postoperative IOP, BCVA were also examined and recorded in all patients.

Results: There was no significant difference of intraocular pressure and BCVA between the two groups. Hemodynamic parameters variation of OA, CRA and PCA vessels were lower in IOP of 40mmHg group. The subfoveal choroidal thickness and macular vessel density change were also significantly lower in IOP of 40mmHg group.

Conclusions: Active-sentry assisted CENTURION Active Fluidics System phacoemulsification techniques revealed more safety of ocular blood flow and IOP, especially in high myopia cataract patients.

Evaluation of Astigmatic Correction using Vector Analysis after Combined Femtosecond Laser-Assisted Phacoemulsification and Intrastromal Arcuate Keratotomy: 1-Year Outcome

First Author: Su Young MOON
Co-Author(s): Jung Yeob HAN, Jae Young KIM, Hun LEE, Sanghyu NAM, Hungwon TCHAH

Purpose: To evaluate the outcomes of femtosecond laser assisted phacoemulsification and intrastromal arcuate keratotomy in eyes with low to moderate corneal astigmatism.

Methods: This study included patients who underwent combined femtosecond-assisted

phacoemulsification and arcuate keratotomy between January 2017 and February 2020. Keratometric astigmatism was evaluated before, 3 months and 1 year after the surgery. Vector analysis of the astigmatic changes was performed using the Alpins method.

Results: Overall, 100 eyes of 100 patients (37 males and 63 females; mean age, 66.89 ± 10.06 years) were included. The mean preoperative corneal astigmatism was 1.07 ± 0.43 diopters (D). This was reduced to 0.64 ± 0.32 D at 3 months and 0.55 ± 0.30 D at 1 years postoperatively (P < .001). There was no statistically significant difference between postoperative corneal astigmatism over a year (P = .392). And the number of patients under 0.75D of cornea astigmatism gradually increased; 37 (37%) in preoperative evaluation, 54 (54%) after 3months, and 88 (88%) after 1 year.

Conclusions: Combined phacoemulsification with arcuate keratotomy using femtosecond laser appears to be a relatively easy and safe means for management of low to moderate corneal astigmatism in cataract surgery candidates. Misalignment at an individual level can reduce its effectiveness. This issue remains to be elucidated in future studies.

Evaluation of Short-Term Visual Outcome of a Diffractive Trifocal Intraocular Lens in Chinese High Myopic Cataract Patients

First Author: Xu CHEN
Co-Author(s): Adilamu ABULIMITI, Rong XU

Purpose: To evaluate the short-term visual performance after implantation of a diffractive trifocal intraocular lens (AcrySof IQ PanOptix, Alcon) in high myopic cataract patients.

Methods: According to axial length (AL), 74 eyes of 39 patients were divided into two subgroups: subgroup 1（high myopic group，AL≥26.0 mm) and subgroup 2（age-matched control group，AL＜26.0mm). The logarithm of the minimum angle of resolution (logMAR) visual acuity of uncorrected distance (UDVA), intermediate (UIVA) and near (UNVA), defocus curve, postoperatively spherical equivalent (SE), photopic and mesopic contrast sensitivity were evaluated 1 month postoperatively.

Results: 72.98% patients postoperative SE refraction were within ± 0. 5 D of traget refraction in each group. Postoperative SE is -0.25±0.37D in subgroup 1 and -0.10±0.44D in subgroup 2. In both groups, 93.48% and 92.86% patients achieved 0.1 LogMAR for UDVA and UIVA, while 86.96% patients in subgroup 1 and 78.57% patients in subgroup 2 achieved 0.1 LogMAR in UNVA respectively. Each subgroup showed the similar defocus curve in which the best-corrected distance visual acuity reached at a vergence of 0.00 D (far focus) at peak, then dropped slightly at -1.00 D, ascended from -1.50D (intermediate focus) and peaked again at -2.50 D (near focus) similarly. Subgroup 1 showed significantly better visual acuity at +2.00,+1.50,+0.50,0.00, −0.50, and −3.00 diopters compared to subgroup 2 (P < 0.05). Contrast sensitivity value under photopic and mesopic conditions were similar in both subgroups.

Conclusions: PanOptix intraocular lens provides good visual outcome, including a good full range of vision with non-compromised visual quality in high myopic cataract patients at 1 month postoperatively.

Experience with Lucidis 124M EDOF IOLs

First Author: Zia MAZHRY

Purpose: To evaluate the Lucidis 124M EDOF IOL for safety and post-op results in terms of intraoperative behavior, improvement in the quality of vision and postoperative complication.

Methods: A prospective study was planned. 50 eyes 0f 40 patients with the diagnosis of cataract and no other comorbid ocular pathology were included in the study. Lucidis EDOF IOL was implanted during phacoemulsification cataract surgery over a period of 48 months from Nov 2017 to Oct 2019. Patients with intraoperative anterior or posterior capsular rip were excluded from the study. The post-operative assessment was performed on day 1, 1 week, 1 month, 6 months and every year thereon. Quality of life was assessed by interviewing the patients at least 3 months postoperatively.

Results: The minimum follow-up was 6 months and ranged from 6-24 months. All 50 eyes had smooth phaco and intra bag injection of IOLs with disposable injectors supplied by the distributor. Only 15 patients had bilateral implantation. 20 patients had uniocular Lucidis IOL implantation. One patient had refractive rayner bifocal in another eye. 04 patients had monofocal IOL in other eyes. One patient was there with only eye and the rest of the 14 patients were phakic in other eyes with varying degrees of lenticular changes. None of the patients complained of nighttime photopsia and glare. One IOL haptics got stuck into capsule during implantation and needed to be exchanged, thus excluded because of PC rent.

Conclusions: The Lucidis EDOF technology IOL appears a safe, economical and effective option for phaco IOL surgery.

Frequent Complications of Uneventful Phacoemulsification on the First Postoperative Day: To Determine the Necessity of the First-Day Review

First Author: Sieng Teng SEOW
Co-Author(s): Tajunisah IQBAL

Purpose: To establish the type and frequency of complications detected on the first post-operative day and to determine the necessity of the first-day review.

Methods: A retrospective review of 297 patients who underwent routine phacoemulsification cataract surgery by qualified ophthalmologists and trainees from September to December 2020 at our day-care operation theatre. All cases of uncomplicated phacoemulsification were analyzed for the types and frequency of complications on postoperative day one.

Results: Out of 297 cases of routine cataract surgery, 6.7% of cases were excluded due to complications intra-operatively. Out of the remaining 277 cases, a total of 54 cases (19.5%) were found to have complications on day 1 post-operative review. These include raised intraocular pressure (65.5%); epithelial defect (20%); intense inflammation with presence of fibrin (5.45%); retained soft lens matter (3.6%); retained fibers (1.8%) and exposed corneal suture (1.8%). Two patients (0.72%) needed the removal of soft lens matter. Out of 36 cases of raised intraocular pressure, 1 patient required anterior chamber paracentesis for retained viscoelastic, 18patients required topical antiglaucoma, 15 patients needed systemic oral acetazolamide, and 2 patients with pre-existing glaucoma were instructed to continue their anti-glaucoma medications.

Conclusions: Following uneventful phacoemulsification, only 19.5% of patients

were found to have complications on day 1 post-operative review. The most frequent complication was raised intra-ocular pressure which can be detected on the same operation day. Reviewing patients on the same day of surgery can reduce workload and demand on clinician time. It can also reduce significant health care savings without compromising patient safety.

Improvement in Symptom Relief following a Single Dose of PG/HPG-Based Lubricant Eye Drops in Patients with Dry Eye Disease

First Author: Sruthi SRINIVASAN
Co-Author(s): Steve SILVERSTEIN, Joseph TAUBER, Elizabeth YEU

Purpose: To evaluate symptom relief improvement following single dose of SYSTANE® COMPLETE (propylene glycol/hydroxypropyl-guar [PG-HPG]) nano-emulsion lubricant eye drop in dry eye patients.

Methods: Multicenter, open-label, interventional study, 134 adult dry eye patients (subtyped aqueous-deficient, lipid-deficient and mixed dry eye) instilled 1 drop of PG-HPG BID for 28 days. Patient-reported outcome assessment of dry eye symptoms (DES) and soothing profile performed using 0 (no symptoms/eyes feeling good) −10 (worst symptoms/no feeling at all) visual analog scale, 4 time points on Day 1 (baseline, 0 (immediate), 4(±1), and 8(±1) hours post-drop instillation. Ratings categorized 0–5 and 6–10 and analyses of change in scores from baseline Day 1 were performed by dry-eye subtype.

Results: At baseline, 45.5% (61/134) patients (mean age: 59 years) reported baseline DES score 6–10. Of these, 67.2%, 77.0%, and 70.5% reported shift to 0–5 at 0, 4, 8 post-single dose, respectively. Corresponding change from baseline in median (95% CI) DES scores was: −1 (−3,−1), −2 (−3,−2), and −2 (-2,−1). Soothing sensation of 0–5 observed in 82.1%, 81.3%, and 82.1% at 0, 4 and 8 hours post drop with median scores of 3 (0–10), 3.0 (0–10), and 3.5 (0–10) at 0, 4, and 8 hours. Reduction in DES from baseline and good soothing sensation were noted across all subtypes at post-dose time points.

Conclusions: Treatment with a single dose of PG-HPG provided instant relief, improved dry eye symptoms, sustained symptom relief, and soothing sensation (up to 8 hours) across dry-eye subtypes.

Intraocular Lens Placement in the Absence of Capsular Support: Visual Outcomes and Complications in a Tertiary Hospital in Manila, Philippines

First Author: Aramis Jr TORREFRANCA
Co-Author(s): Noel CARINO

Purpose: Surgical correction of aphakia without capsular support remains a challenge. The fast rise in technology has provided rapid developments in techniques in the surgical management of aphakia worldwide but locally, we have limited data on the outcomes of these different techniques following intraocular lens implantation without capsular support. This study aimed to determine visual outcomes and complications associated with different techniques of intraocular lens implantation in the absence of capsular support.

Methods: The medical records of all patients who underwent surgical aphakia correction via intraocular lens implantation were retrospectively reviewed in a single center.

Results: A total of 207 patients were included in the study, the mean age of 60 with 49%

were males and 51% were females. Loss of capsular support was most frequently caused by intraoperative complications (70%), followed by Marfan Syndrome and trauma. Retropupillary fixation iris clawed intraocular lens was frequently used (45%), followed by transscleral-sutured intraocular lens, and anterior chamber intraocular lens. Significant differences in the average optic diameter were found among patients based on the IOL type (p-value<0.001). Across all patients, logMAR values decreased as they progressed farther from the pre-operative day, with the significant decrease starting at 1 month. The presence of a pre-operative risk factor was associated with post-operative complications, particularly dense cataracts (p-value = 0.0088). Regardless of IOL type, the most frequent postoperative complication was an increase in IOP.

Conclusions: As in any surgery, complications are unavoidable and cause distress to the surgeon and patient. Knowledge of the outcomes maximizes the chances of optimal surgical and visual outcomes.

Intraoperative Findings on Ocular Blunt Trauma: Vitreous Humor Accumulation in Conjunctiva Mimicking Lens Luxation

First Author: Putri UNIVERSADE

Purpose: To demonstrate interesting clinical presentation and intraoperative findings.

Methods: A 64 year old female patient presented with a red-eye and sudden decrease of vision of the left eye. The patient was accidentally hit a pipe 1 week before admission. Initially, the patient was admitted to a secondary hospital. Several eye drops medication was given and she was advised for bed rest due to the active hyphema. The history of the right eye was struck by paddy. She was then referred to the tertiary hospital for further management. A light perception was still positive on the left eye. Hand movement with a good projection illumination on the right eye. OTS score was 3. Soft palpation that showed decreased IOP on the left eye. Slit-lamp examination revealed conjunctival hyperemia, scleral thinning, coagulated hyphema, iridodialysis, eccentric pupil, and undetected lens. Fundus reflex was decreased. The left eyeball exploration revealed scleral laceration and suspected a lens luxation detained by conjunctiva.

Results: After the anterior chamber incision was made, the protruding conjunctiva was deflated. It turns out that it was not the lens but was the vitreous humor. Then, the laceration was sutured. On the post-operation follow-up, ocular ultrasonography did not reveal any lens material at the segment posterior either.

Conclusions: In any trauma cases, what we see may not necessarily what we suspected. Therefore, we must stay alert and prepare for everything for patient safety.

Iris Claw Intraocular Lens: Anterior Chamber or Retropupillary Implantation? A Systematic Review and Meta-Analysis

First Author: I Chia LIANG
Co-Author(s): Yun-hsiang CHANG

Purpose: To review the published literature on visual acuity results and complications of the anterior chamber and retropupillary iris-claw intraocular lens (AC and RP ICIOL) implantation in the absence of capsular and/or zonular support.

Methods: Peer-reviewed studies were collected from PubMed, Scopus, Cochrane Central Register of Controlled Trials, and ClinicalTrials.gov. The primary outcome was the standardized mean differences (SMDs)

of pre- and post-operative corrected distant visual acuity (CDVA). The secondary outcome was the SMDs of pre- and post-operative intraocular pressure (IOP), endothelial cell counts (ECC), and the odds ratios (ORs) of post-operative IOP elevation and cystoid macular edema (CME).

Results: Six studies were relevant and included 255 and 261 eyes in the AC ICIOL and RP ICIOL groups, respectively. The quantitative analysis showed no significant differences in CDVA (SMD: 0.164, 95% confidence interval [CI]: −0.171 to 0.500), ECC (SMD: −0.011, 95% CI: −0.195 to 0.173), and IOP elevation events (OR: 0.788, 95% CI: 0.454 to 1.368) between the two groups. Greater IOP reduction was observed in the RP ICIOL group (SMD: 0.119, 95%CI: 0.023 to 0.490), and a relative reduction in the incidence of CME following RP ICIOL (OR:2.315, 95% CI: 0.950 to 5.637) was also noted.

Conclusions: AC and RP ICIOL seem to have equivalent visual outcomes. RP ICIOL resulted in greater IOP reduction and may perform slightly better with lesser CME. Large prospective studies are needed to confirm the long-term outcomes and complication profiles of the two techniques.

Management of Postoperative Endophthalmitis after Cataract Operation in the Modern Era: Clinical Characteristics and Long-term Visual Outcome

First Author: Lawrence IU
Co-Author(s): Michelle FAN, Mary HO, Chun Yue Andrew MAK, Alvin YOUNG

Purpose: To investigate the clinical characteristics and long-term visual outcome of postoperative endophthalmitis after cataract operation, and to determine factors that predict the visual outcome.

Methods: A retrospective cohort study was performed to review all cases of acute postoperative endophthalmitis after cataract operation managed in a tertiary hospital in Hong Kong from January 2010 to January 2021.

Results: Out of 41,411 cataract operations, a total of 22 eyes from 22 patients developed acute postoperative endophthalmitis. The incidence was 0.053%. At presentation, visual acuity (VA) was hand-movement or worse in 72.7% (range 20/60 to light-perception). Bacterial culture of intraocular fluid was positive in 77.3% of eyes and the most common causative organisms were Staphylococcus (40.9%), Streptococcus (13.6%) and Enterococcus (13.6%). Nineteen patients received vitrectomies (86.4%), of which 12 were performed immediately within 24 hours of presentation (54.5%). The mean final VA was 0.95 ± 0.95 logMAR units (Snellen equivalent ≈ 20/180, range 20/16 to no-light-perception). Five eyes had a good final VA ≥ 20/30 (22.7%) and 6 eyes had poor final VA < 20/400 (27.2%). Overall, 3 eyes developed rhegmatogenous retinal detachment after vitrectomy (15.8%). Multivariate linear regression analysis showed that the risk factors significantly associated with poorer final VA were infection by Streptococcus (P = 0.005) and development of retinal detachment (P = 0.008). Immediate vitrectomy within 24 hours of presentation was not associated with final VA (P = 0.635).

Conclusions: Retinal detachment is not uncommon after vitrectomy for postoperative endophthalmitis. Streptococcal infection and development of retinal detachment were significantly associated with poor visual outcomes.

Management of Refractive Surprise after Phacoemulsification

First Author: Diah RIFASANTI
Co-Author(s): Nina HANDAYANI

Purpose: To report successful management of refractive surprise after phacoemulsification

Methods: This case report describes the case of a man with an unsatisfactory visual outcome following an uneventful phacoemulsification and intraocular lens (IOL) implantation surgery for the left eye. Visual acuity of the left eye was 20/20 with correction of spherical lens +8.25 D. Anterior segment examination revealed a normal anterior chamber with IOL on its position.

Results: This patient was diagnosed with pseudophakic eye with refractive surprise. Biometry examination noted the axial length were 29,01 mm (right eye) and 29,37 mm (left eye) with IOL estimation of +5.00 D (right eye), +4,8 D (left eye). We repeated biometry examination after surgery, the results of axial length were 23,34 mm (right eye) and 23,96 mm (left eye). The patient underwent IOL explantation and implantation with another foldable IOL of +21.0 D. On follow-up, he had an uncorrected visual acuity of 20/20. This case highlighted the possibility of post-operative refractive surprise due to the possibility of human error.

Conclusions: This case report showed that selection and implantation of correct IOL are complex processes that need careful preparation and examination to get the best result after cataract surgery. Lens-based procedures such as IOL exchange is an effective method to correct refractive surprise.

Management of Traumatic Lens Subluxation with Secondary Glaucoma

First Author: Kurrotul AINI
Co-Author(s): T.Budi SULISTYA

Purpose: To report successful management of traumatic lens subluxation with secondary glaucoma.

Methods: A case report of a patient from an ophthalmology outpatient eye clinic. Diagnosis was based on history taking, physical examination and ophthalmology examination.

Results: A 50-year-old male came to the ophthalmology clinic outpatient and complained about blurry and halo vision from his right eye since 3 months ago after a woodblock hit his right eye. He complained about the clouded vision of the right eye for the last 1 month. The visual acuity of the right eye was 6/38 and there was a subluxation lens to the anterior chamber one quadrant. The intraocular pressure was 38 mmhg, the fundus examination showed a glaucomatous optic disc appearance. The visual acuity for the left eye was 6/6. The patient was treated with phacoemulsification along with intraocular lens and capsular tension ring (CTR) implantation in the right eye. There was visual acuity improvement after surgery from 6/38 to 6/6 with best-corrected visual acuity (BCVA) on the right eye, and intraocular pressure reduced from 38 mmhg to 18 mmhg.

Conclusions: Phacoemulsification with intraocular lens and CTR implant can give good results in cases of lens subluxation with secondary glaucoma.

Multi-Country Registry Assessment of Real-World Visual Performance and Patient Satisfaction Outcomes of a Novel Non-Diffractive Presbyopia-Correcting IOL

First Author: Gerard SUTTON
Co-Author(s): Lily CHANG, Chris HODGE, Caridad PEREZ-VIVES

Purpose: To report real world visual and patient satisfaction outcomes with the non-diffractive design, AcrySof IQ Vivity™ (DFT015) and AcrySof IQ Vivity™ Toric IOL (DFT315, DFT415, and DFT515).

Methods: After a minimum of 3 months follow-up per local practice standards, subjects bilaterally implanted with AcrySof IQ Vivity™(DFT015) or AcrySof IQ Vivity® Toric IOL (DFT315, DFT415, and DFT515) underwent visual acuity assessments at distance, intermediate (66 cm) and near (40 cm). Subject satisfaction was collected via validated questionnaires. This is the first interim analysis.

Results: To date, 129 subjects aged 66.6±10.25 years were enrolled. Binocular mean±SD UCDVA was 0.009±0.088 logMAR, UCIVA was 0.094±0.118 logMAR, and UCNVA was 0.255±0.157 logMAR. Binocular mean±SD BCDVA was -0.030±0.077 logMAR, DCIVA was 0.075±0.116 logMAR, and DCNVA was 0.251±0.143 logMAR. At study entry, the average manifest refraction (MRSE) was -0.146±0.387 D in the first eyes and -0.167±0.321 D in the second eyes. Initial patient satisfaction with sight was high, with 94% reporting "Satisfied". Further, 74.8% of patients reported no difficulty with sight during everyday life and 72.6% reported no difficulty engaging in activities or hobbies of interest. There were no unanticipated AEs.

Conclusions: In this real-world assessment of patients bilaterally implanted with AcrySof IQ Vivity and/or AcrySof IQ Vivity Toric Extended Vision IOLs, we have observed very good distance, intermediate, and near visual acuity outcomes and high percentages of visual satisfaction. Enrollment continues.

Phacoemulsification in a Patient with Deep Brain Stimulator Implanted

First Author: Michelle FAN
Co-Author(s): Lawrence IU, Callie KO

Purpose: Deep brain stimulator (DBS) is used for the treatment of advanced Parkinson's disease. Any heat directed to patients' bodies or electric current generated could be transmitted to the DBS in the brain and is potentially fatal. We hereby present a case of uneventful cataract operation using phacoemulsification in a patient with DBS implanted.

Methods: A case report.

Results: An 84-year-old man had nucleus sclerosis requiring a cataract operation. He had Parkinson's disease with DBS implanted 6 years ago for dyskinesia control. The electrodes of DBS were implanted intracranially in the subthalamic nucleus. The electrodes are connected to a neurostimulator device (NSD) through an insulated lead. Both the NSD and lead are placed subcutaneously below the clavicles. Electric current and heat generated by any medical devices could be conducted through the lead to the intracranial electrodes resulting in brain injury. Therefore, diathermy, power ultrasound energy such as lithotripsy, and MRI should be avoided. Although phacoemulsification generated ultrasound energy and heat inside the eye, the heat dissipates quickly by continuous irrigation system. Temperature rise is minimal

and is not high enough to affect the insulated lead of DBS. Hence phacoemulsification is considered to be a safe procedure. However, diathermy should be avoided. Clear corneal incision without opening up conjunctiva avoiding cauterization is the way of choice. Phacoemulsification was carried out uneventfully under local anesthesia with DBS switching on. The postoperative course was uneventful.

Conclusions: Phacoemulsification is considered to be safe in patients with DBS implanted. Precautions are required to minimize heat generated and the use of cautery should be avoided.

Post-Market Clinical Study of the Clareon Autonome in an Indian Population

First Author: Jeewan TITIYAL
Co-Author(s): Samar BASAK, Ramamurthy DANDAPANI, Umang MATHUR, Naren SHETTY

Purpose: To describe the interim clinical outcomes 1-month postoperatively, and IOL delivery performance of Clareon AutonoMe in an Indian population.

Methods: The prospective, multicenter, single-arm study enrolled 151 eyes implanted with a Clareon intraocular lens using the AutonoMe delivery device (Alcon). Subjects were adult Indians with no ocular pathology other than cataract & pre-op corneal astigmatism of < 1.00D. Primary outcome measures were monocular BCDVA, UCDVA, MRSE at 1 month, the presence of IOL glistenings, all safety endpoints and surgeon questionnaire for AutonoMe delivery device at 1 month.

Results: At 1-month(Interim analysis in a 12-month study), in the first eye, mean monocular BCDVA was 0.008 ± 0.1137 logMAR and mean monocular UCDVA was 0.1 ± 0.1494 logMAR. Similarly, in the second eye, monocular mean BCDVA was 0.014 ± 0.1041 logMAR and mean monocular UCDVA was 0.083 ± 0.1550 logMAR. All the eyes were within 1D of the refractive target at 1 month. 100% of surgeons reported "Very Easy or Easy" for the insertion of AutonoMe into the incision site and "very controllable or controllable" during the IOL delivery. Grade 0 glistening and no surface haze were observed for all patients at 1 month.

Conclusions: In an Indian population, the visual performance of the Clareon IOL showed optimal VA at 1 month and high surgeon satisfaction for the AutonoMe delivery device. The mean MRSE was ≤0.25D, indicating that the surgeons optimized A-constant was well determined.

Post-Operative Astigmatism in Small Incision Cataract Surgery Done by Final Year Residents

First Author: Sanjay THAKUR
Co-Author(s): Pratiroop GANGOPADHYAY, Avik SARKAR

Purpose: To assess the post-operative astigmatism in small incision cataract surgery (SICS) done by final year residents.

Methods: 212 eyes of SICS by done by final year residents were studied. Keratometry and refraction was done preoperatively and 6 weeks post SICS. Surgically induced astigmatism (SIA) was calculated using SIA calculator Version 1.1.

Results: Among 212 eyes, 3 had no SIA. SIA was between 0.25-1 D in 110 eyes; 1.25-2 D in 51 eyes and between 2.25-3 D in 39 eyes. 9 eyes had a SIA >3 D. The average

SIA was 1.28±0.85 D. Major intra-operative complications were seen in 19 eyes (8.96%). Posterior capsular rupture was seen in 4 eyes (1.89%). Overall, 205 eyes (96.7%) had a post-operative BCVA between 6/6-6/12.

Conclusions: This study indicates that SICS done by final year residents gives acceptable astigmatism.

Post-Operative YAG Capsulotomy Rates with Two Trifocal Intraocular Lenses: Review of Evidence

First Author: Liuyang LIUYANG
Co-Author(s): Hang CHENG

Purpose: To conduct a review of available evidence on post-operative YAG capsulotomy rates with two trifocal intra-ocular lenses (IOL).

Methods: European Society of Cataract & Refractive Surgeons (ESCRS) congress database was queried using trifocal IOL specific search terms to identify relevant presentations (e-posters, videos and webcasts) from 2015-2019, reporting on post-operative YAG capsulotomy rates of two leading trifocal IOLs (PanOptix and AT LISA).

Results: During the search period, 3 comparative studies were identified that reported Nd:YAG capsulotomy rates for PanOptix vs. AT LISA. In a matched cohort study from Czech Republic (N=56 each PanOptix and AT LISA eyes), YAG capsulotomy rate was reported at 19.6% for AT LISA tri at 19.27 months and 3.5% for PanOptix at 26.5 months. In a matched prospective comparative study from Czech Republic (N=200 each PanOptix and AT LISA eyes), YAG capsulotomy rate was reported at 6% for AT LISA tri and 0.5% for PanOptix at 6 months. In a matched prospective cohort study from Netherlands (N=28 each PanOptix and AT Lisa eyes), reported YAG capsulotomy rates were at 10.7% for AT LISA tri and 14.3% for PanOptix at 12 months (P=0.11). Presented evidence from other non-comparative studies also favored PanOptix with reportedly lower Nd:YAG capsulotomy rates observed with PanOptix (studies duration: 3-9 months) compared to AT LISA tri (study duration: 3-24 months).

Conclusions: Published evidence indicates surgeons can experience favorable YAG capsulotomy outcomes with PanOptix trifocal IOLs compared to AT LISA trifocal IOLs, both at short and long-term post-operative follow-up periods.

Preferred Practice Patterns in Aphakia Management in India: A Survey

First Author: Dr.Aditya KELKAR
Co-Author(s): Jai KELKAR

Purpose: To assess different approaches in the management of aphakia in Indian ophthalmologists via an online survey.

Methods: A survey–monkey-based online questionnaire was fielded to Indian ophthalmologists in accordance with the CHERRIES guidelines. We recorded participants' demographics, practice settings, and preferred surgical options including type of IOL preferred when encountering a case of aphakia with and without adequate capsular support. Differences between anterior segment (AS) surgeons and vitreoretinal (VR) surgeons as well as differences between surgeons with more or less than 10 years of surgical experience were evaluated using analytic statistics.

Results: Of the 481 surgeons who responded to the survey, 369 (77%) were AS surgeons

and the remaining 112 (23%) were VR surgeons and represented all regions of India. When encountering PCR during surgery, a 3-piece IOL in the ciliary sulcus was most preferred (n=275, 57%) when there was adequate capsular support while a retrofixated iris-claw IOL (n=91, 19%) was the commonest choice in eyes without adequate capsular support. With the associated nucleus drop, 85% of surgeons preferred to refer the patient to a VR surgeon and left the eye aphakic. Multivariable logistic regression showed that VR surgeons were more than 6 times more likely to prefer an SFIOL (OR=6.5, 95%CI=3.4 to 12.5, p<0.001) and surgeons with >10 years' experience were also twice more likely to prefer an SFIOL (OR=2.4, 95%CI=1.2 to 4.9, p=0.02).

Conclusions: The choice of IOL in absence of capsular support differs between AS and VR surgeons and is also influenced by the surgeon's experience.

Primary Calcification of a Hydrophobic IOL: Laboratory Analysis

First Author: Henal JAVERI
Co-Author(s): Harsha BHATTACHARJEE, Suklengmung BURAGOHAIN

Purpose: To describe the primary calcification of an acrylic hydrophobic intraocular lens (IOL) and the changes in its surface characteristics using scanning electron microscopy (SEM), energy dense spectroscopy (EDS) and microscopic analysis.

Methods: A middle-aged male with posterior IOL dislocation underwent IOL explantation. The explanted IOL was cut into two halves, one part fixated with 4% buffered formaldehyde, rinsed, stained with Alizarin red solution and examined using light and diffraction microscopy (Axiocam MRC, Zeius). The other half was sent for laboratory analysis employing SEM and EDS.

Results: The IOL optic was hazy with non-homogenous granularities that were confirmed to contain calcium using Alizarin red stain and EDS. Surface degeneration along with clumps of millet-seed like deposits over the surface was noted on SEM.

Conclusions: Hydrophobic IOLs are the most frequently used IOLs at present. Primary calcification of such IOLs is almost not found reported in literature. Knowledge of the surface topography might help in broadening the understanding of the calcification process to be able to develop strategies to prevent it in the future.

Research on Prediction of Effective Lens Position and Refractive Status after Cataract Surgery by Anterior Segment Analysis System

First Author: Chen LI
Co-Author(s): Peirong LU

Purpose: The objectives of this study were to predict ELP before cataract surgery using Sirius system and to evaluate the factors influencing the change of ELP and the influence of prediction error (PE) of ELP on postoperative refractive status.

Methods: Retrospective analysis was done on 103 patients (103 eyes) with cataract. Ocular biometric measurement was conducted with Sirius and LS900 and Predicted Lens Position was calculated by Sirius. 3 months after the surgery, the Scheimpflug images collected by Sirius were used to manually measure the ELP. Pearson's correction analysis and linear regression analysis were used to determine the correction between lens positions and other parameters.

Results: When ELPPLP, hyperopia drift was likely to occur. RE was different between ELPPLP group. The younger the patients, the more likely ELP would be smaller than PLP. The smaller the PLP, the more likely ELP would be greater than PLP and the more likely hyperopia drift would occur. The longer the AL, the more likely ELP would be greater than PLP and the more likely hyperopia drift would occur after the surgery. Correction analysis showed ELP was positively correlated with PLP, ACD, AL and ACD+1/2LT. A prediction formula ELP=0.485*（ACD+LT/2）+0.461*PLP was obtained by linear regression analysis.

Conclusions: The results of this study showed that factors such as age, PLP, AL and LT all had an influence on ELP PE and RE. The new regression formula provided a theoretical basis for the clinical prediction of ELP and RE.

Results of Binocular Implantation of the Small-Aperture Intraocular Lens

First Author: Magda RAU

Purpose: To evaluate optical and functional outcomes and patients satisfaction after binocular implantation of a small-aperture IOL, IC8.

Methods: In a prospective case study from September 2018-January 2019 a series of 20 patients, presenting for cataract surgery, were implanted bilaterally with a single-piece hydrophobic, acrylic IOL with a centrally located opaque annular mask measuring 3.23 mm in total diameter with a 1.36 mm central aperture. The visual acuity for distance, intermediate and near vision was evaluated. The quality of vision, glare, halos and the personal satisfaction of the patients was assessed with a validated questionnaire.

Results: Three months after the implantation the mean UCVA for distance was 0.78, binocular 0.87; for intermediate monocular 0.73, binocular 0.76; for near vision monocular 0.54, binocular 0.62. The mean refraction was -0.25D. None of the patients needed glasses for working on PC. 76% were able to read a newspaper without glasses. The questionnaire showed that 30% of the patients were very satisfied and 70% satisfied with the achieved results. Nobody complained about halos and glares.

Conclusions: Early optical and functional results from patients implanted bilateral with this novel IOL shows that the small-aperture IOL, IC8, implanted bilaterally provides an excellent visual acuity for distance, intermediate and very good near vision. All patients were satisfied with the achieved results.

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Retrospective Study of the Effect of Phacoemulsification Cataract Surgery on Corneal Endothelial Cell Density and Central Corneal Thickness of 110 Cases of Cambodian Population from 1 June to 1 August 2020

First Author: David CHANTHAN
Co-Author(s): Ponndara ITH, Meng NGY

Purpose: The aim of this study is to examine the effect of phacoemulsification cataract surgery on corneal endothelial cell density and central corneal thickness.

Methods: This study is designed as a retrospective study conducted over two months, from 1 June to 1 August 2020. Cambodian populations aged over 40 with senile cataracts underwent phacoemulsification. The change in the corneal endothelial cell count or density and central corneal thickness were measured by

the specular microscope. The number will be compared preoperatively, at one week and three weeks post-operatively. Participants' demographic data, related ocular information, corneal endothelial cells density and corneal thickness were recorded and analyzed by SPSS version 25.0 for Mac.

Results: Among 110 patients included in the study, there were 79 women (71.80%) and 31 men (28.20%), ranging from 40 to 80 years old. The changes in average corneal thickness pre- and postoperative were 1.99% ($p<0.05$). Endothelial cell density also significantly decreased postoperatively by 5.488% ($p<0.05$). In addition, the coefficient of variation also changed by increasing 9.301% ($p<0.05$), corresponding with the decline in the percentage of hexagonal cells of 5.35% ($p<0.05$).

Conclusions: Phacoemulsification could result in significant corneal endothelial damage, despite healthy cornea and without previous surgical history and no corneal abnormalities before surgery. This is particularly important in patients with a borderline reservoir of endothelial cells, and harder nucleus density.

Spontaneously Late Dislocated Capsular Bag-Intraocular Lens Complex: A Pathological and Immunohistochemistry Study

First Author: Suklengmung BURAGOHAIN
Co-Author(s): Harsha BHATTACHARJEE, Kasturi BHATTACHARJEE, Dipankar DAS

Purpose: The aims of this study were to evaluate the morphology, histopathology, and immunohistochemistry properties of spontaneously late dislocated capsular bag-intraocular lens (CB-IOL) complex and also to study the various etiologies and possible pathogenesis of the event.

Methods: It was a retrospective observational case series in which surgically explanted intact specimens of spontaneously late dislocated CB-IOL complex were studied. The demographics, duration of pseudophakia, IOL design/material, and specimen measurements were noted. Fresh specimens were photographed, and computer software was used for measurements. After processing, a detailed microscopic examination was carried out for three different sections of each specimen with hematoxylin and eosin (H and E), Masson's-trichrome, and immunohistochemistry stain for vimentin. The Mann–Whitney U-test was used for the statistical analysis.

Results: Among the 12 specimens, the mean CB and capsulorhexis opening size were 8.32 ± 0.8 mm and 3.62 ± 0.61 mm respectively. The average CB-IOL complex size of our study was significantly lower than the studies reported in the literature ($P \leq 0.001$). All (n = 12, 100%) were acrylic IOLs with 11 (91.67%) having single-piece design. All specimens on H and E stain showed extensive subepithelial fibrosis while Masson's trichrome staining showed that none had any pseudoexfoliation material. The circumferential sphincter-like fibrous tissue arrangement was seen in all specimens. Immunohistochemical expression of vimentin suggested the mesenchymal metaplasia of epithelial A-cells.

Conclusions: Significant fibrotic contraction of the CB and phimosis of capsulorhexis may cause a progressive zonular tear. This is probably the most important aetiology of spontaneous late dislocation of the CB-IOL complex.

Surgical Outcomes of Congenital Cataract with Persistent Fetal Vasculature

First Author: Min LV
Co-Author(s): Xia LI, Cao XI

Purpose: To evaluate the surgical outcomes and its factors of congenital cataract with persistent fetal vasculature (PFV).

Methods: We retrospectively analyzed 17 children (17 eyes) with congenital cataract and PFV underwent surgery in our hospital from 1 January 2010 to 31 August 2020. The general condition, surgical technique, visual acuity, and complications were reviewed.

Results: Mean age at surgery of 17 children (8 males and 9 females) was 37 (6-144) months. Seventeen eyes with PFV were divided into anterior PFV 4 eyes, posterior PFV 2 eyes and combined PFV 11 eyes. Cataract extraction combined with posterior capsulectomy and anterior vitrectomy was performed in 14 eyes, 13 eyes combined with primary intraocular lens (IOL) implantation while 1 eye combined with secondary IOL implantation. 2 eyes underwent cataract extraction combined with IOL implantation and 1 eye combined with gas injection. All eyes had no intraoperative complication. The postoperative visual acuity improved in all children. The postoperative complications included posterior synechia (1 eye), posterior capsular opacity (2 eyes) and secondary glaucoma (1 eye). Posterior capsular opacity and secondary glaucoma were occurred in the eyes with posterior PFV.

Conclusions: Surgical intervention is an effective treatment for congenital cataract complicated with PFV.

The Outcome of Toric Intraocular Lens Implantation in Cataract Patients Post Pterygium Excision

First Author: Ahmad Fauzi NADHIRAH
Co-Author(s): Ahmad AKHTARALI, Aidila Jesmin JABBARI, Khairidzan MOHD KAMAL

Purpose: To evaluate the accuracy of toric intraocular lens (IOL) implantation in cataract patients with corneal astigmatism post pterygium surgery.

Methods: This is a retrospective case series recruiting twenty-seven eyes implanted with Zeiss toric IOL (AT-TORBI 709). Preoperative cornea regularity and symmetry pattern was assured from placido-disc topography (Zeiss Atlas 9000) examination. Three preoperative corneal astigmatism value was measured with IOLMaster 700, Zeiss Atlas 9000 and refractometer (Topcon TRK-2P); which was then calculated and interpreted as integrated K value. The postoperative refractive astigmatism prediction error was calculated by vector analysis derived from Barrett toric calculator to predict the required toric IOL cylinder power. The value was compared with the manifest astigmatic refractive outcome in patients implanted with toric IOLs to determine both mean absolute error and centroid error.

Results: The spherical equivalent recorded for the postoperative refraction is +0.50 ± 1.00D with logMAR of 0.0 to 0.05. The mean for preoperative and postoperative astigmatism is 1.37 ± 0.98D and 0.42 ± 2.5D respectively ($p < 0.001$). The mean absolute error in predicted residual astigmatism is 0.37 ± 0.16D and centroid error of 0.03 ± 0.47D @ 179. The postoperative refractive astigmatism resulted within 0.25D to -0.75D is 96%, with 44.0% achieved less than -0.25D and 81.0% obtained less than -0.50D.

Conclusions: In selected cases, toric IOL implantation could be an effective option in correcting corneal astigmatism in post pterygium patients undergoing cataract surgery.

The Prevalence of Cataract and Surgery in Urban and Rural Chinese Populations over 50 Years Old: A Systematic Review and Meta-Analysis

First Author: Yifan DU
Co-Author(s): Ningli WANG

Purpose: To summarize the data of epidemiological studies on cataract prevalence over 50 years old in urban and rural areas of China from 2000 to 2020, and to analyze the prevalence of cataract and operation rate in China by meta-analysis.

Methods: By searching PubMed, EMBASE, web of science, Wanfang Data and CNKI, Chinese and English literatures, data on the prevalence of cataract in China were retrieved, and the relevant characteristic data were extracted. Then, Stata v15SE software was used for meta-analysis and heterogeneity test. According to the results of heterogeneity, the corresponding effect models were selected to combine the extracted data.

Results: A total of 20 studies were included in this study, with a total of 111434 cases. Meta analysis showed heterogeneity. According to the random effect model, the overall prevalence of cataract in Chinese people over 50 years old was 27.45%, that in rural was 28.79%, and that in urban was 26.66%. The overall coverage rate of cataract surgery was 9.19%.

Conclusions: The prevalence of cataract in China is at a high level, and there is still room for improvement in surgical coverage, so it is very important to promote cataract screening and prevention.

Two-Stage Capsulorhexis or Double Rhexis in Phaco Surgery for White Intumescent Cataracts

First Author: Ashraful Huq RIDOY
Co-Author(s): Niaz ABDUR RAHMAN, Mahziba CHOWDHURY, Mehraj CHOWDHURY, Ava HOSSAIN, Rashedul HASAN

Purpose: To compare the intraoperative safety for white intumescent cataract by performing two techniques of capsulorhexis: 1) traditional one-stage continuous curvilinear capsulorhexis and 2) two-stage continuous curvilinear capsulorhexis or double rhexis.

Methods: This prospective comparative randomized study included two groups, the group-1 (21 eyes) received traditional one-stage continuous curvilinear capsulorhexis with 5-5.5 mm diameter, and the group-2 (44 eyes) received a deliberately small around 2-2.5 mm continuous curvilinear capsulorhexis that was secondarily enlarged to 5-5.5 mm, called a two-stage continuous curvilinear capsulorhexis or double rhexis. All patients of intumescent white cataracts with cortex liquefaction were selected.

Results: With the one-stage technique, in 66.66% (14 eyes) capsulorhexis was completed; among them, eccentric in location were 57.14% (08 eyes). Argentinean flag sign occurred in 14.28% (03 eyes), discontinuity of capsulorhexis for radial extension in 19.05% (04 eyes) and posterior capsule tear in 4.76% (01 eyes) of cases occurred. With the two-stage or double rhexis technique, in 100% (44 eyes) capsulorhexis was completed; among them eccentric in location was 18.18% (08 eyes). No Argentinean flag sign, discontinuity of capsulorhexis for radial extension or posterior

capsular tear occurred.

Conclusions: Two-stage continuous curvilinear capsulorhexis or double rhexis helps to prevent unexpected radial tears of the lens capsule from high intra-lenticular pressure, sudden radial extension of the capsulorhexis and other intraoperative complications. It provides a safe way to perform capsulorhexis in phaco surgery in cases of white intumescent cataracts.

Zepto Capsulorhexis during Triple Procedure Keratoplasty in Small Non-Dilating Pupil

First Author: Bhupesh SINGH
Co-Author(s): Sudhank BHARTI, Neha BHARTI

Purpose: To demonstrate precision pulse technique (Zepto) in an open-sky procedure and to evaluate its use during triple procedure keratoplasty in small non-dilating pupils.

Methods: This single-center retrospective case series study included 10 eyes (from 10 patients) with corneal opacity and poorly dilated pupils who were scheduled to undergo a triple procedure. The main outcome measures were capsulotomy performance of the PPC device and intraoperative complications. Secondary outcome measures included postoperative best-corrected visual acuity (BCVA), intraocular pressure (IOP), and other postoperative complications.

Results: Zepto capsulorhexis was found safe and effective in all cases. IOL was placed in the bag in all cases. No intraoperative or postoperative complication was seen.

Conclusions: The Zepto device facilitates the creation of a smooth, round, and appropriately sized anterior capsulotomy in open-sky surgeries, in presence of small non-dilating pupils.

Cornea, External Eye Diseases And Eye Banking

12-year Analysis of Incidence, Microbiological Profiles and In Vitro Antimicrobial Susceptibility of Infectious Keratitis: The Nottingham Infectious Keratitis Study

First Author: Charlotte HO
Co-Author(s): Jessica CAIRNS, Harminder Singh DUA, Dalia G SAID, Darren Shu Jeng TING

Purpose: To examine the incidence, causative microorganisms and in vitro antimicrobial susceptibility and resistance profiles of infectious keratitis (IK) in Nottingham, UK.

Methods: A retrospective study of all patients who were diagnosed with IK and underwent corneal scraping between July 2007 and October 2019 (a 12-year period) at a UK tertiary referral center. Relevant data, including demographic factors, microbiological profiles and in vitro antibiotic susceptibility of IK, were analyzed.

Results: The estimated incidence of IK was 34.7 per100 000 people/year. Of the 1333 corneal scrapes, 502 (37.7%) were culture-positive and 572 causative microorganisms were identified. Sixty (4.5%) cases were of polymicrobial origin (caused by ≥2 different microorganisms). Gram-positive bacteria (308, 53.8%) were most commonly isolated, followed by Gram-negative bacteria (223, 39.0%), acanthamoeba (24, 4.2%) and fungi (17, 3.0%). Pseudomonas aeruginosa (135, 23.6%) was the single most common organism isolated. There was a significant increase in Moraxella spp ($p<0.001$) and a significant decrease in Klebsiella spp ($p=0.004$) over time. The in vitro susceptibilities of Gram-positive and Gram-negative bacteria to cephalosporin,

fluoroquinolone and aminoglycoside were 100.0% and 81.3%, 91.9% and 98.1%, and 95.2% and 98.3%, respectively. An increase in resistance against penicillin was observed in Gram-positive (from 3.5% to 12.7%; p=0.005) and Gram-negative bacteria (from 52.6% to 65.4%; p=0.22).

Conclusions: IK represents a relatively common and persistent burden in the UK and the reported incidence is likely underestimated. Current broad-spectrum antimicrobial treatment provides a good coverage for IK, although challenged by some level of antimicrobial resistance and polymicrobial infection.

A Conjunctival Fibroepithelial Polyp: A Rare Case

First Author: Neha ADLAKHA

Purpose: To present a rare case of conjunvtival fibroepithelial polyp in a 68 year old female.

Methods: Here we report a case of 68 year old female who presented with a painless subconjunctival mass on temporal aspect of left eye. There was a history of trauma 15 days back. Best corrected visual acuity in both eyes was 20/60. The mass was excised under local anesthesia and the underlying sclera was treated with cryotherapy.

Results: Histopathological examination showed polypoidal tissue covered with stratified squamous epithelium showing acanthosis suggestive of fibroepithelial polyp.

Conclusions: Postoperatively, topical antibiotic and topical steroid drops were prescribed. No complications were noted during follow up. No further treatment was advised and there was no recurrence during follow-up.

A Next Generation Crosslinking Calculator for Titration of Ultraviolet Energy in Thin Keratoconic Cornea: NXT UVA Calculator

First Author: Reshma RANADE
Co-Author(s): Abhijit SINHA ROY

Purpose: To evaluate performance of NXT (new generation CxL for thin cornea) ultraviolet (UV-A) calculator to aid customizing fluence to particular corneal thickness for cross linking (CXL) in thinner corneas.

Methods: A prospective longitudinal study of 50 eyes of 50 patients with progressive keratoconus and mean thinnest corneal thickness (TCT) 400 µm were included. Corneal tomography, epithelial mapping (CSO MS39 ASOCT) and specular microscopy was done preoperatively and postoperatively. Mean corneal thickness after de-epithelialization was entered into custom-built web based calculator, which gave us customized fluence time based on chosen UV power (https://jscalc.io/calc/VmanUJD6yQ13VQQ6). NXT provided fluence times for UV power of 9 and 3 mW/cm2, which is commonly used for accelerated protocol. Patients were assessed at 1 week, 1, 3, 6 and 12 months postoperatively for safety and efficacy.

Results: Postoperatively no patient had loss of lines compared to pre-operative BCVA, no significant haze was noted on densitometry using Pentacam HR (p=0.14). Stability was established at 6 months. Preoperatively, the keratometry (KMax) was 60D+/-1.2 D. Post operatively, it was 59.5D+/-0.5D.Flat and

Steep K values were stable with no evidence of progression. There was a demarcation line seen at 3 months in 64% patients at a depth of 295±71 µm. Cell density on specular microscopy was unchanged postoperatively (p=0.83). All patients were fitted with contact lenses at the end of 3 months and achieved a visual acuity of 20/20 or better.

Conclusions: NXT calculator is a promising modality, wherein by titrating the energy fluence, CXL can be done safely, with no additional tools, in thin corneas without corneal scarring.

A Prospective Study on the Impact of Hydroxypropyl Guar, Borate and Hyaluronate Matrix on Protecting the Ocular Surface in Glaucoma Patients with Dry Eye Disease: A 3-Month Interim Analysis

First Author: Christopher LEUNG
Co-Author(s): Poemen CHAN, Vivian Sm CHIU, Wing Ki Gilda LAI

Purpose: Dry eye disease is prevalent among glaucoma patients. This study aims to investigate the impact of topical application of a lubricant containing hydroxypropyl guar, borate and hyaluronate matrix for treatment of dry eye disease in patients with glaucoma who were taking at least one form of topical intraocular pressure (IOP) lowering medications.

Methods: In this prospective study, changes in symptoms and signs of dry eye before and after topical application of preservative free Systane Ultra Hydration 6 times/day were evaluated in 33 glaucoma patients with dry eye disease. All patients had an Ocular Surface Disease Index (OSDI) between 21 to 80 at the eligibility-confirmation visit. OSDI (primary outcome measure) was measured at baseline, 3 months, and 6 months. Changes in corneal staining score, tear break-up time, and the result on Schirmer's test were measured at baseline and 6 months.

Results: At the baseline, the mean (SD) visual field MD was -10.0 (7.5) dB, the corneal staining score was 2.82 (1.19); the tear break-up time was 4.86s (3.86s), and the Schirmer's test result was 10.3mm (7.8mm). The OSDI was 48.8 (14.3) at the screening visit and 50.1 (17.1) at the eligibility-confirmation visit. The OSDI decreased to 42.2 (19.7) at 3 months (P=0.005, paired t-test).

Conclusions: Topical application of hydroxypropyl guar, borate and hyaluronate matrix relieved dry eye symptoms in glaucoma patients taking IOP-lowering medications.

A Tale of Six Cases of Infectious Keratitis and/or Corneal Perforation Associated with Vitamin A Deficiency

First Author: Mohammad DASTJERDI

Purpose: To report cases of vitamin A deficiency who presented primarily with infectious keratitis and/or corneal perforation.

Methods: A retrospective case series of 6 patients who presented with unilateral infectious keratitis and/or corneal perforation with no known risk factors. In further evaluation, they turned out to be vitamin A deficient. They did not show other ocular surface signs of vitamin A deficiency like conjunctival or corneal keratinization or xerosis on presentation.

Results: Two patients were known to have hepatitis C but were asymptomatic. The 3rd patient was diagnosed with hepatitis C after he presented with a corneal ulcer. All 3 patients

had abnormal liver function tests and their vitamin A levels were below the normal range. The 4th patient was a nursing home resident who was found to be vitamin A deficient due to refusing to eat food in the nursing home. The other 2 patients were with chronic alcoholism, abnormal liver function tests, and low vitamin A levels.

Conclusions: These cases indicate that vitamin A deficiency should be considered in patients with infectious keratitis and/or corneal perforation without known ocular risk factors.

Acute Corneal Graft Rejection Complicated by Fungal Keratitis: Non-Steroidal Approach with Successful Outcomes

First Author: Shankari SOTHIRACHAGAN
Co-Author(s): Jemaima CHE HAMZAH, Wan Haslina HALIM, Meng YONG

Purpose: To highlight the importance of other immunomodulatory therapy in acute graft rejection.

Methods: A case report.

Results: A 53-year-old farmer with underlying diabetes mellitus, presented with a whitish lesion in his right eye for three days. His right eye was pseudophakic with a history of re-penetrating keratoplasty (PK) done in 2017 for fungal keratitis. The initial PK was done for a fungal ulcer as well in 2012. His presenting visual acuity was 6/36 (baseline 6/18). There was a 2x2mm elevated corneal ulcer with fluffy edges on the temporal edge of the graft with a broken suture. It was associated with grade-3 anterior chamber cells and hypopyon. The lesion was proven to be a fungal ulcer with a culture of corneal scraping that grew Candida parapsilosis. He was treated with oral and topical 1% voriconazole, topical amphotericin B 0.15% and levofloxacin 0.5%. The condition initially worsened and vision deteriorated, but then responded well to intracameral and intrastromal voriconazole. His corneal graft, however, started to show signs of rejection with increased keratic precipitates and corneal oedema from the side of the lesion to the graft centre. Topical cyclosporin 0.5% and nepafenac 0.1% were added to counter for acute graft rejection. The graft rejection was halted and subsequently resolved, without adding any form of steroid therapy. Subsequently, his vision improved to his baseline with a peripheral scarred healed lesion from the ulcer, and a centrally clear graft.

Conclusions: In cases of early acute graft rejection with fungal keratitis, topical immunomodulators besides steroids can be considered to avoid the risk of steroid aggravated infection.

Age Differences in Ocular Demodicosis: Demodex Profiles and Clinical Manifestations

First Author: Jing LI
Co-Author(s): Lingyi LIANG

Purpose: Demodex infestation is highly age-dependent. Intriguingly, our previous studies that focused on children and young adult patients suggested that the clinical features of young patients were different from those studies enrolling mainly elderly patients. Whether age plays a role between young and elderly patients with ocular demodicosis remains unclear.

Methods: This prospective comparative study included 91 patients younger than 35 years and 92 older than 45 years with ocular demodicosis. Demodex mite count, symptoms,

tear film, and ocular changes were compared between the two groups. Risk factors of meibomian gland loss (MGL) and corneal changes were analyzed in the two groups.

Results: Demodex counts were comparable between the two groups. Young patients had higher D. brevis counts and overall percentage of D. brevis, while elderly patients had more D. folliculorum (all P<0.05). Irritation and blurred vision were more common in young patients, while eye fatigue and photophobia were more common in elderly patients (both P<0.05). Meibomian gland dysfunction was the most common sign in both groups but MGL was significantly more severe in young patients. More prevalent corneal changes and more eyelash disorders were found in young patients (both P<0.05). Female sex, a higher D. brevis percentage, lid margin anomalies, and MGL were associated with corneal change, while a higher D. brevis percentage and lid margin anomalies were related to MGL in young patients.

Conclusions: Young patients with ocular demodicosis tend to have more D. brevis infestation, more MGL, and more corneal involvement.

Analysis of Microbiologic Test Results Related to Donor Corneas

First Author: Byung Yi KO

Purpose: This study aimed to analyze the identified bacteria related to donor corneas in microbiologic tests and their clinical significance.

Methods: A retrospective review was made on medical records of 94 patients (114 eyes) who underwent keratoplasty and received microbiologic tests concerning donor corneas from October 2008 to December 2020 at the author's affiliated university hospital. During keratoplasty, we conducted microbiologic test for bacteria and fungi with corneoscleral rim of donor cornea and preservation fluid Optisol-GS. We analyzed the antibiotic susceptibility of bacterial isolates from culture.

Results: Microbiologic tests revealed bacteria from domestic donor corneas, but no isolates from imported corneas. No fungus was detected. Gram-negative bacilli were detected from the donor corneoscleral rim in 3 eyes (2.6%) and 2 cases of Acinetobacter baumanii/hemolyticus and 1 case of Pseudomonas aeruginosa were identified in bacterial culture. There was one case (0.9%) in which Acinetobacter baumanii/hemolyticus was identified from donor corneal preservation fluid with no bacteria from the donor corneoscleral rim. In antibiotics susceptibility test of isolated bacteria, they have multi-drug resistance except for colistin. In all cases where bacteria were detected, there was no keratitis or endophthalmitis after corneal transplantation.

Conclusions: Although it is rare, bacteria could be detected from donor corneas or preservation fluid used in corneal transplantation, therefore caution should be made in all processes dealing with donated corneas. Empirical antibiotics that have sufficient antimicrobial activity to suppress multi-resistant bacteria should be selected in corneal transplantation.

Antifungal Susceptibility Testing in Fungal Keratitis in Tertiary Care Centre in North India

First Author: Murugesan VANATHI
Co-Author(s): Nishat HUSSAIN, Ravinder NAIK, Radhika TANDON

Purpose: To evaluate the antifungal

susceptibility testing (AFST) for natamycin (NAT), amphotericin B (AMB), voriconazole (VCZ), fluconazole(FCZ), itraconazole(ICZ), posaconazole(PCZ), caspofungin(C) & micafungin(M) in fungal keratitis.

Methods: Prospective longitudinal study of AFST in 50 culture-positive fungal keratitis (>12years) in 3 groups (group A: healed, group B: delayed healing, group C: chronic keratitis>3 weeks). Details noted included grade of keratitis, healing time, treatment success and AFST (E-test).

Results: In 50 eyes [mean age 40.28±16.7 years], fungi isolated included Aspergillus spp 19(38%), Fusarium spp 15(30%), Acremonium spp 10(20%), Curvularia 3(6%), Mucor spp + Rhizopus spp 1 (2%), Alternaria 1(2%) and Penicillium 1(2%). Epithelial & stromal healing time was 13.5±2.28 &16.09±2.24 (group A) & 19.58±1.61 & 24.65±3.98 (group B) respectively. Minimum inhibitory concentration (MIC) values on AFST for the 15 Fusarium keratitis showed susceptibility to N-14, A-6, V-10 P-12; 15 Aspergillus flavus were susceptible to N-8, A-7, V-14, P-13; the 3 Aspergillus niger keratitis were susceptible to N-1, A-3 & azoles-3; Aspergillus fumigatus in 1 eye was susceptible to all; 10 Acremonium keratitis were susceptible to Nat-9, AMB-3, VCZ-5 & PCZ-7; all 3 cases of Curvularia were susceptible to NAT & AMB while 2 were susceptible to azoles. Alternaria keratitis (1) was susceptible to azoles. Mucor/Rhizopus(1) was susceptible to NAT, AMB & PCZ while Penicillum (i) was susceptible to NAT and azoles. MIC range of PCZ was 0.047 – 1.5 µg/ml.

Conclusions: Good susceptibility to posaconazole suggests that topical posaconazole therapy may be considered in common corneal pathogenic fungi causing keratitis.

Antimicrobial Resistance Trends in Bacterial Keratitis over 7 Years in Sydney, Australia

First Author: Maria CABRERA-AGUAS
Co-Author(s): Pauline KHOO, Stephanie WATSON

Purpose: Bacterial keratitis is a sight-threatening emergency needing a prompt and appropriate antibiotic therapy. Antibiotic resistance (AMR) surveillance programs are available for systemic conditions in Australia but not for ocular infections. This study aimed to report the microbiology and AMR trends in Sydney, Australia over seven years.

Methods: A retrospective case series of patients with bacterial keratitis at Sydney Eye Hospital from 1 January 2012 to 31 December 2018 was conducted. Matrix-assisted laser desorption ionization-time of flight (MALDI-TOF) mass spectrometry identified organisms. The Calibrated Dichotomous Susceptibility method determined antibiotic susceptibilities for cefalotin, chloramphenicol, ciprofloxacin, and gentamicin were reported.

Results: 965/1258 (77%) were Gram-positive, and 293/1258 (23%) were Gram-negative isolates. The most common Gram-positive organisms were coagulase-negative staphylococci (CoNS) 578/1258 (45.9%), Staphylococcus aureus (n=146/1258) 11.6%; and Corynebacterium spp. (n= 49/1258) 3.9%. The most common Gram-negative was Pseudomonas aeruginosa (n=159/1258) 12.6%. Methicillin-resistance was detected in 9% of Staphylococcus aureus (13/146). Resistance to ciprofloxacin was reported in 46% and gentamicin 31% of MRSA isolates. Methicillin-resistance in CoNS was reported in 19% of isolates, chloramphenicol 12%, and ciprofloxacin 8%. For methicillin-sensitive Staphylococcus aureus (MSSA) 5% were resistant to ciprofloxacin, and 10%

to chloramphenicol. For Corynebacterium spp., 31% of isolates were resistant to chloramphenicol, and 11% to ciprofloxacin.

Conclusions: Coagulase-negative staphylococci were the most common causing organism with one-fifth resistant to cefalotin. There was high resistance to ciprofloxacin for MRSA, but low for CoNS, MSSA, and Corynebacterium spp. A bacterial keratitis surveillance program is needed across Australia to provide evidence-based empiric treatment strategies.

Assessment of Tolerability and Ocular Comfort following Propylene Glycol/ Hydroxypropyl-Guar Based Lubricant Eye Drop Use

First Author: Sruthi SRINIVASAN
Co-Author(s): Manoj VENKITESHWAR

Purpose: To evaluate tolerability drop profile and improvement in ocular discomfort after SYSTANE® COMPLETE (propylene glycol/ hydroxypropyl-guar [PG-HPG]) nano-emulsion lubricant eye drops use in dry eye disease (DED).

Methods: DED patients (aqueous-deficient (ADE), lipid-deficient (EDE) and mixed dry eye (MDE) were included in phase IV, multicenter, open-label, single-arm, interventional study. Patients received 1 drop of PG/HPG, twice daily for 28 days. Tolerability scores (burning, stinging, blurry vision and foreign body sensation (FBS)) were assessed on Day 1, immediately following first dose and were assessed on a 0–10 scale (0=no symptoms; 10=worst symptoms). Change from baseline in global ocular discomfort visual analogue scale (OD-VAS) score (0 to 100) at Day 14 was assessed.

Results: Of 134 patients treated (59 years, female 75.4%; ADE [n=41]; EDE [n=44]; MDE [n=49]), >92% reported tolerability scores in 0–5 category (burning 97%; stinging 96.3%; blur 92.5% and FBS score 94.8%) after drop instillation at Day 1. The proportion of patients reporting 0–5, for burning, stinging, blurring and FBS lessened, 90.2%–100% in ADE, 93.2%–95.5% in EDE, and 91.8%–98% in MDE, respectively. Overall, mean (range) OD-VAS score decreased from 46.7 (25–67.8) at baseline to 29.3 (10.5–47.0) at Day 14 (−17.3 from baseline). Subtype analysis showed change from baseline in OD-VAS of −22.0 (−65–21) for ADE, −17.6 (−59–61) for EDE, and −13.1 (−78–45) for MDE at Day 14.

Conclusions: PG/HPG lubricant in nano-sized droplets provided effective symptomatic relief in in all dry eye subtypes and was well tolerated.

Association between Keratoconus and the Risk of Chronic Kidney Disease

First Author: Yuh-shin CHANG

Co-Author(s): Ren-long JAN, Ming-cheng TAI, Sung-huei TSENG

Purpose: To investigate the risk of chronic kidney disease (CKD) in patients with keratoconus (KCN).

Methods: This retrospective, nationwide, matched-cohort study included 4,609 new-onset KCN patients recruited between 2004 and 2011 from the Taiwan National Health Insurance Research Database. The age- , sex- , and comorbidity-matched control group included 27,654 non-KCN patients, selected from the Taiwan Longitudinal Health Insurance Database, 2000. Information about each patient was collected and tracked from the index date until December 2013. The incidence and risk of CKD were compared between the two groups. The adjusted hazard

ratios (HRs) for CKD were calculated with Cox proportional hazard regression analysis. Kaplan–Meier analysis was used to calculate the cumulative CKD incidence rate.

Results: In total, 29 male KCN patients and 90 controls developed CKD during the follow-up period. The incidence rate of CKD was 1.92 times (95% confidence interval [CI] = 1.26–2.91; P = 0.0023) higher in male KCN patients than in controls. After adjusting for potential confounders, including hypertension, hyperlipidaemia, and diabetes mellitus, male KCN patients and male patients ≥ 40 years were 1.75 times (adjusted HR = 1.75, 95% [CI] = 1.14–2.68, P < 0.05), and 19.83 times (adjusted HR = 19.83, 95% CI = 8.75–44.97) more likely to develop CKD respectively.

Conclusions: We found that male KCN patients, particularly male patients ≥ 40 years of age have an increased risk of CKD. Therefore, it is recommended that male KCN patients should be aware of CKD.

Aurokeratoprosthesis: Our Experiences

First Author: Anitha VENUGOPAL
Co-Author(s): Meenakshi RAVINDRAN

Purpose: To study the clinical and visual outcomes of Auro keratoprosthesis, a low-cost model of Boston K pro.

Methods: A retrospective review of twenty eyes of nineteen patients with bilateral corneal blindness but with wet ocular surface underwent Aurokeratoprosthesis. The primary outcomes were clinical, visual. The secondary outcomes were a demographic pattern, complications associated with Auro keratoprosthesis.

Results: The visual acuity was 20/200 in nine patients, the most common indication was multiple failed grafts, the follow-up period was 28.9months. Retro prosthetic membrane, amongst which 2 eyes were treated with Yag Membranotomy. In 2 eyes pars plana removal of the membrane was done and 1 eye was observed. 5 eyes developed graft infections. The most common was fungal (Aspergillus terreus) followed by bacterial (Pseudomonas). 3 eyes developed graft melt managed by AMG (Amniotic Membrane Graft), buccal mucosal graft, and lamellar corneal grafts depending upon the depth and area of melt. 2 cases developed spontaneous hypotony with choroidal detachment managed conservatively with oral steroids.3 eyes developed glaucoma, one eye endophthalmitis, eight eyes optic extrusion, and three eyes sterile vitritis.

Conclusions: Auro keratoprosthesis can replace the Boston K pro, in developing countries as a viable option for patients with end-stage corneal diseases especially for those from low socio-economic status.

Benefits and Risks of Orthokeratology Treatment: A Systematic Review and Meta-Analysis

First Author: Lauren SARTOR
Co-Author(s): Damien S. HUNTER, Chameen SAMARAWICKRAMA, Mai Linh VO

Purpose: To assess the risks and benefits associated with orthokeratology (ortho-K) treatment compared with other methods of myopia control.

Methods: A systematic search was conducted using Pubmed and Embase, including all studies in databases until February 2020. Studies including patients >5 years of age with myopia (-0.75 to -6.00D), reported on risks, visual and ocular biometric effects of ortho-K were included. Interventional, retrospective and hospital audit studies were also included to maximize available data.

Results: 49 papers were included in this systematic review and meta-analysis, consisting of 18 randomized controlled trials and 31 non-randomized studies, including 6 hospital audits. The quality of included data was variable and selection bias coupled with discontinuation effects likely skewed the results towards a relative benefit for ortho-K. The rate of axial elongation was lower in participants undergoing orthokeratology treatment compared to other treatment modalities (MD -0.17 mm, 95% CI -0.22 to -0.11). The rate of change in axial length rebounded rapidly after ortho-K discontinuation compared to participants which continued treatment (MD 0.10 mm, 95% CI 0.06 to 0.14). Participants wearing ortho-K lenses were 7 times more likely to experience an adverse event compared to alternative treatments (OR 7.36, 95% CI 3.22 to 16.85).

Conclusions: Ortho-K arrests myopia progression while in use. However, upon cessation of treatment, there is a rapid rebound in axial length growth, meaning that discontinuation comes with the high risk of significant myopia progression. This lifelong dependence on ortho-K coupled with the manifold increase in adverse events, make it a second-line therapy for myopia control.

Challenge in Diagnosis and Management of Unilateral Subacute and Multi-Resistant Gonococcal Keratoconjunctivitis

First Author: Nur Aisyah RAHMAWATI
Co-Author(s): Rina LA DISTIA NORA, Simon Yosonegoro LIEM, Yulia Rosa SAHARMAN

Purpose: Gonococcal conjunctivitis typically manifests as bilateral and hyperacute conjunctivitis with rapid progression, leading to marginal corneal melting and further into perforation. We present an unusual case of unilateral subacute gonococcal keratoconjunctivitis with corneal perforation and culture-proven resistance to multiple antibiotics.

Methods: A case report.

Results: A 45-year-old male came with a history of redness and moderate purulent ocular discharge in the left eye three weeks before admission. His general physician prescribed antibiotic eye ointment, and the corneal melt and infiltrate ensued, thus referred to our clinic. We observed velvety papillary reaction in the inferior part of the bulbar conjunctiva and purulent discharge in the external urethra. We treated him with ceftriaxone intravenously, azithromycin oral, levofloxacin and gentamycin eyedrops. After three days of intravenous ceftriaxone and topical antibiotics, the conjunctiva was still red, and corneal infiltrate was still apparent. The microbiology culture of conjunctival swab grew Neisseria gonorrhoea and showed resistance to the ceftriaxone but sensitive to azithromycin, levofloxacin, cefixime, spectinomycin; thus we switched the antibiotic to cefixime. After five days, we found a negative smear and improved clinical outcomes.

Conclusions: Gonococcal keratoconjunctivitis can occur unilaterally and lingering inflammation. A velvety papillary reaction of the conjunctiva with purulent discharge should prompt the physician to mind possible sexually transmitted disease. This clinical ophthalmological judgment must be supported with microbial examination since inadequate antibiotic treatment is known to induce resistant strain. Clinicians should always consider Neisseria gonorrhoea, and possibly a drug-resistant one, as a potential etiology in purulent velvety papillary keratoconjunctivitis, especially in atypical clinical presentation.

Characterization of the Surface Properties of a Novel Daily Disposable, Silicone Hydrogel Contact Lens

First Author: Lakshman SUBBARAMAN
Co-Author(s): Ethan LEVEILLEE, Bob TUCKER

Purpose: Novel surface modified silicone hydrogel (SiHy) material, verofilcon A, recently developed incorporating surface science advancements resulting in a lens material with "SmartSurface" technology. Study was conducted to characterize the aqueous film stability on these lenses evaluating water break up time (WBUT) using an in vitro model.

Methods: To determine the WBUT on contact lenses under fully hydrated conditions, the iDDrop method was employed. After overnight lens soaking in PBS to eliminate the influence of packaging solution additives, the iDDrop instrument trough was filled with phosphate-buffered saline solution and the lens sample was submerged on its lens mount. Lens was then raised out of the fluid at a controlled rate. High-resolution videos of the fluid thinning on the lens surface were then recorded. WBUT was defined as time of the first break when the fluid thickness reaches zero once out of the fluid. Each lens was submerged between recordings to ensure the lens was fully rewetted. Each experimental group had 10 lenses, and three measurements per lens were conducted, resulting in 30 total measurements.

Results: Average WBUT on verofilcon A was 30±6 seconds, whereas on etafilcon A, somofilcon A and stenfilcon A WBUT was found to be 7±3 sec, 6±3.5 sec and 5±2.6 sec respectively. Based upon Student's t-test, WBUT of verofilcon A was statistically higher than the other lenses ($p<0.05$).

Conclusions: Surface modification techniques can create novel, ultra-soft surface gels on silicone hydrogel core materials. The surface modification process improved aqueous film stability on verofilcon A contact lenses as demonstrated with a longer WBUT.

Clinical Characteristics and Microbiological Profile of Corneal Ulcer in Northeast India

First Author: Krati GUPTA
Co-Author(s): Balmukund AGARWAL, Kalyan DAS, Saurabh DESHMUKH, Jnanankar MEDHI

Purpose: To study the clinical characteristics and microbiological profile of corneal ulcer.

Methods: 110 patients visiting the OPD presenting with corneal ulcer meeting the inclusion criteria were included in the study. All the demographic data along with detailed evaluation of the ulcer was entered as per the study proforma. The patients were followed up to 6 months.

Results: Data was analyzed for statistical significance based on age, sex, locality, history, place and mode of trauma, occupation, duration of presentation, history of previous medication, ocular/systemic co-morbidities, presenting symptoms, presenting visual acuity, location of the ulcer, slit lamp findings, species isolated in culture, correlation between mode of trauma and organism isolated in culture, correlation between occupation and organism isolated in culture and management.

Conclusions: Young male farmers were the most commonly affected. Microbiological evaluation helps in definitive diagnosis of ulcers.

Clinical Comparison of Verofilcon A and Etafilcon A Daily Disposable Contact Lenses

First Author: Lakshman SUBBARAMAN
Co-Author(s): Bradley GIEDD, Jason MILLER

Purpose: To compare the subjective performances of verofilcon A daily disposable silicone hydrogel contact lenses, which have a core with 51% and a surface with >80% water content, with etafilcon A hydrogel contact lenses, which have a 58% water content.

Methods: In this prospective, multicenter study, successful wearers of spherical soft contact lenses for distance correction were randomized to wear verofilcon A or etafilcon A lenses for 8 (-1/+2) days. After washout, subjects were dispensed the alternative lenses. Exploratory endpoints included subjective overall lens preference (5-point scale [strongly or somewhat prefer lens 1; no preference; strongly or somewhat prefer lens 2]) and subjective ratings (10-point scale) of end-of-day (EOD) vision, overall handling, insertion comfort, EOD comfort, lens handling at insertion, overall comfort, overall quality of vision, vision throughout the day, and lens handling at removal.

Results: Ninety-two subjects were enrolled, with 46 each initially randomized to verofilcon A and etafilcon A lenses and subsequently crossed over to the other lens type. Of these subjects, 68 (73.9%) preferred/strongly preferred verofilcon A lenses, whereas 21 (22.9%) preferred/strongly preferred etafilcon A lenses ($p < 0.0001$). Mean ± SD ratings of EOD vision, overall handling, insertion comfort, EOD comfort, lens handling at insertion, overall comfort, overall quality of vision, vision throughout the day, and lens handling at removal were all significantly higher for verofilcon A than for etafilcon A lenses.

Conclusions: Verofilcon A lenses performed better than etafilcon A lenses with respect to overall preference and other subjective endpoints evaluated in this study.

Clinical Evaluation of NS Endo-Inserter in Descemet's Stripping Automated Endothelial Keratoplasty for Non-Fuchs Bullous Keratoplasty

First Author: Hideaki YOKOGAWA
Co-Author(s): Akira KOBAYASHI, Natuko MORI, Tsubasa NISHINO, Kazuhisa SUGIYAMA

Purpose: To report clinical outcomes of Descemet's Stripping Automated Endothelial Keratoplasty (DSAEK) using a newly developed donor inserter (NS Endo-Inserter, NSI for short hereafter, HOYA Co.,Ltd.) in cases with non-Fuchs bullous keratopathy.

Methods: Consecutive 44 eyes of 44 patients (mean age, 74 years) with non-Fuchs bullous keratopathy were treated with DSAEK using NSI. In cases that were followed longer than 6 months, postoperative central donor endothelial cell densities (ECDs) were compared to preoperative values along with postoperative best-corrected visual acuity (BCVA). In addition, ECD outcomes with NSI were compared to those achieved with the pull-through technique using Busin and sheets glides.

Results: Indications for surgery were repeated corneal transplant (15 eyes), post-glaucoma surgery edema (10 eyes), endothelial dysfunction associated with argon laser iridotomy (6 eyes), post-cataract surgery edema (4 eyes), and others (9 eyes); there were no cases with Fuchs dystrophy. In all cases, the donor graft was easily loaded into the NSI followed by successful donor insertion into the anterior chamber using BSS flow or pull-through. Mean BCVA improved from 0.10 decimal preop to 0.25 decimal postop ($p<0.01$, $n=34$). No differences were found in 6-month postoperative ECD between current NSI cases

(1792 ± 640 cells/mm2, 33.6 ± 24.0% loss, n=34) and previous consecutive Busin cases (1698 ± 659 cells/mm2, 38.8 ± 24.4% loss, n=34, non-Fuchs) (p=0.49, 0.40).

Conclusions: In cases with non-Fuchs bullous keratopathy, NSI enabled easy endothelial graft delivery with stable anterior chamber. Protection of endothelium with NSI might be comparable or better than that achieved with the conventional technique.

Clinical Performance of a New Daily Disposable Spherical Contact Lens

First Author: Stacie CUMMINGS
Co-Author(s): Bradley GIEDD, Christopher PEARSON

Purpose: To evaluate the clinical performance of a new daily disposable contact lens (verofilcon A), including its distance visual acuity (VA), subjective acceptance and lens fit characteristics.

Methods: In this US multisite study, 69 subjects wore the new verofilcon A contact lenses, which were provided at a power of -1.00 D to -6.00 D in 0.25 D increments. Lens performance was assessed in a subject-masked, randomized, parallel-group safety and efficacy study with bilateral lens wear for 3 months (-2/+5 days). Subjective ratings were recorded at the follow-up visits on a 10 point continuous scale with extreme anchors (1= poor/difficult to 10 = excellent/easy). Lens fit characteristics were recorded by determining centration and overall fit.

Results: At 3 months, >95% of the eyes wearing verofilcon A contact lenses had distance VA of 20/20 or better. Subjective overall comfort was very good, with a mean overall comfort rating of 9.5. Overall handling (9.2) and vision (9.4) were also rated highly. Lens fit/movement was assessed as optimal in 89.9% of subjects and never rated as unacceptably tight or loose, and lens centration was assessed as optimal in 95.7% of subjects.

Conclusions: The unique material features, advanced surface technology, and optimal lens fitting characteristics of the new verofilcon A lenses contribute to a high level of satisfaction by lens wearers in visual acuity, comfort and ease of handling.

Comparative Efficacy and Safety of Ocular Lubricants Containing Hydroxypropyl Guar

First Author: Richard KARA
Co-Author(s): Margaret AINSLIE-GARCIA, Nicole FERKO, Elizabeth PERSAUD, Sruthi SRINIVASAN

Purpose: Artificial tears (ATs) are often the first line of treatment for dry eye disease, but an array of ingredients makes it challenging for patients and clinicians to select a product that best meets their needs. A literature review was completed to determine the comparative efficacy and safety of artificial tears containing hydroxypropyl guar (HPG).

Methods: MEDLINE and Embase were searched for the period 1 Jan 2004 to 8 Aug 2019. The clinicaltrials.gov database was also reviewed. Search terms included “Hydroxypropyl guar” as well as “ocular lubricant” or “artificial tear”. No language restrictions were applied to search criteria. Clinical studies that compared HPG-containing ATs and another AT were included. Clinical (ocular staining, tear break-up time [TBUT]), safety (adverse events [AEs]), or patient-reported outcomes (PROs) were extracted.

Results: Thirty studies compared HPG-containing drops with a variety of other ingredient types. HPG drops significantly improved ocular staining in 5/15 comparisons.

HPG provided an advantage over carboxy methylcellulose (CMC) for ocular staining in 2/5 comparisons, but was statistically outperformed in 1 comparison. No comparator demonstrated a statistical advantage over HPG drops for TBUT. AEs were comparable across all artificial tears, with no serious safety issues identified. Assessments of PROs were extremely diverse, with over 15 surveys, scales, or questions used for measurement across 20 studies.

Conclusions: Artificial tears containing HPG may offer advantages in the objective clinical signs of dry eye versus a variety of comparators, with similar safety. Future studies should consider consistency in comparators and PRO measures.

Comparative Evaluation of Autologous Serum and Artificial Tears in Persistent Epithelial Defects

First Author: Gaurav SINGH
Co-Author(s): Jawahar GOYAL, Priyanka GOLHAIT, Usha RAINA

Purpose: To compare the outcomes of autologous serum 50% eyedrops and artificial tears in persistent corneal epithelial defects (PEDs) more than two weeks duration.

Methods: Prospective comparative study was conducted wherein 32eyes with PEDs were randomly divided into two equal groups. Group A received autologous serum 50% eyedrops and group B received artificial tears for a minimum of 4 weeks. Patients were evaluated for change in BCVA, size of the defect, depth of defect on AS-OCT, corneal sensations, number of days required for complete healing, improvement in subjective symptoms. Success was defined as complete epithelialization of the defect while failure was defined as no objective improvement or worsening of lesion or need for surgical intervention.

Results: The success rate of group A by the end of 4 weeks was 81.25% and group B was 37.5%. The days required for complete healing were significantly lesser in group A compared to group B (p-value=0.015) with significant improvement in BCVA (p-value=0.029) and earlier resolution of subjective symptoms.

Conclusions: Though the eventual outcome was comparable, artificial tears had a significantly longer and static course of recovery compared to autologous serum. Thus autologous serum should be considered as an adjuvant in the treatment of PEDs with earlier initiation of therapy for early recovery and resolution.

Comparison of Efficacy and Safety of Topical Tacrolimus and Cyclosporine as Treatment for Vernal Keratoconjunctivitis: A Systematic Review and Meta-Analysis

First Author: Theresia KANIA

Purpose: To evaluate the efficacy and safety of topical tacrolimus (TAC) and cyclosporine (CsA) as a treatment for VKC.

Methods: The literature search was conducted using five online databases (PubMed, ScienceDirect, SCOPUS, Cochrane Library, and Google Scholar). Primary outcomes were efficacy of treatment measured by changes in total subjective symptoms score (TSSS) and total objective signs score (TOSS) after treatment. Secondary outcomes reviewed are adverse reactions which affected the safety of both drugs.

Results: Five randomized clinical trials

(RCTs) (n=215 eyes), with 110 eyes in TAC group and 105 eyes in CsA group, that evaluated efficacy in VKC treatment were selected according to the set criteria. The pooled results showed that TSSS of the patients was lower in the TAC group, but it was not statistically significant (SMD −0.28, 95% CI −0.73 to 0.17; p=0.22). Similarly, TOSS was lower in the TAC group, but it was also not statistically significant (SMD −0.58, 95% CI −1.37 to 0.20; p=0.15). TSSS and TOSS increased as early as one week after treatment was discontinued. There was no serious ocular or systemic adverse event; however, more patients in the CsA group suffered persistent burning and pain during instilling compared to the TAC group.

Conclusions: Both TAC and CsA have advantages in the treatment of VKC. However, TAC results in greater improvement in symptoms and signs compared to CsA, although not statistically more significant. In terms of safety, despite not causing any serious adverse effects, TAC also leads to fewer side-effects compared to CsA.

Corneal Edema Caused by the Dislocated Dexamethasone Intravitreal Implantation in the Anterior Chamber: A Rare Case Report

First Author: Ming-hwei TSAI

Purpose: To report a case with severe corneal edema resulted from the dexamethasone intravitreal implantation that migrated into the anterior chamber.

Methods: A case report and literature review.

Results: The 58-year-old male is a case of diabetes mellitus with macula edema. He received a pars plana vitrectomy to treat his rhegmatogenous retinal detachment and implantation of anterior chamber intraocular lens due to complicated cataract surgery in his left eye. After the treatment, the retina remained well attached, but the macula edema got worse (Figure 1) and showed poor response to multiple intravitreal injections of anti-VEGF. The intravitreal injection of Ozurdex® was performed to treat the persistent macula edema. The best visual acuity was 60/200 and the intraocular pressure was 13 mmHg before injection of Ozurdex®. Two weeks later, the patient had blurred vision (10/200) in the affected eye. A floating Ozurdex® implant was found in the anterior segment (Figure 2 & Figure3) and the cornea revealed bullous keratopathy and severe Descemet's folds. The intraocular pressure was 12mmHg. An operation was done immediately to relocate the implant via grasping forceps and spatula. Two weeks postoperative, the cornea edema improved with best visual acuity to 12/20 and intraocular pressure 16 mmHg, and no second dislocation was found in the following 3 months.

Conclusions: The anterior migration of dexamethasone intravitreal implantation is a rare condition but still occurs in patients with risk factors.

Corneal Metallic Foreign Body: Suboptimal Ocular Protection Association and Outcome after Management

First Author: Namrata SHREE
Co-Author(s): Rajneel BHATTACHARJEE

Purpose: To determine the role of suboptimal ocular protection in the incidence of corneal foreign body and outcome after management.

Methods: Retrospective review of 124 consecutive presentations of metallic corneal

foreign body to the eye emergency department of our hospital.

Results: The majority of the patients (99%) were male with a mean age of 30 ± 15 years (range 15-45 years). The most common mode of injury was grinding (90%). Nearly half (45%) of patients were wearing "safety eye wear" at the time of injury. Combination of 26-gauge needle and NS wash was the commonest method employed for removal of foreign body. Overall, 89% (n =110) cases healed with corneal scar at the site of corneal foreign body and 2 cases developed bacterial keratitis.

Conclusions: Metallic corneal foreign bodies are common presentations to the emergency department and may be related to inadequate implementation of occupational safety measures. Usually heals with minimal scarring and rarely leads to keratitis.

Corneal Perforation due to Gonococcal Infection

First Author: Hartawan PUTRA
Co-Author(s): Rosy ALDINA

Purpose: This study reports a rare case of corneal perforation due to infection of Neisseria gonorrhoeae.

Methods: Diagnosis was made based on history taking, ophthalmology examination and microbiology test results.

Results: A 22-year-old male came to emergency department complaining of redness and eyelid swelling on the left eye for 1 week prior to visit, accompanied by severe mucopurulent discharge and blurred vision. Visual acuity was 20/20 on the right eye and light perception bad projection on the left eye. The anterior segment on the left eye showed conjunctival injection, severe mucopurulent discharge, central corneal epithelial-stromal defect and stromal infiltrate with microperforation, while the right eye was normal. Gram stains from the purulent discharge of the left eye showed gram-negative diplococci. The patient was admitted and received systemic ceftriaxone and topical moxifloxacine. Larger epithelial defects and vitreous prolapse were found on the second day. Evisceration was planned but the patient refused. The patient was discharged and lost to follow-ups.

Conclusions: Ocular infection of Neisseria gonorrhoeae is rare. Rapid progressive damage may still occur despite adequate treatment of antibiotics. There should not be a delay in treatment of suspicious cases of purulent conjunctivitis.

Corneal Topographic Changes in Siblings of Patients with Keratoconus

First Author: Shruti MOHAN
Co-Author(s): Josephine Christy SUSAI

Purpose: To evaluate the corneal topographic, tomographic and pachymetric parameters in siblings of patients with keratoconus.

Methods: 90 probands and 96 siblings of patients with keratoconus were examined using Pentacam HR in a cross-sectional study. Proband data was used for comparison.

Results: A total of 25 siblings (26.04%) showed topographic evidence of keratoconus. Of these, 10 were suspects and 15 had definite keratoconus. 12 eyes showed evidence of clinical keratoconus. Another 25 eyes were suspicious or had topographic evidence of keratoconus as per Topographic Keratoconus Classification (TKC). Kmax (maximum keratometry) was >47.2D in 37 eyes. 43 eyes had corneal pachymetry <487 microns,

of which 27 eyes did not have keratoconus. BAD_D (Belin Ambrosio Deviation Display) was >1.54 in 46 eyes and >2.38 in 43 eyes. ART max (Ambrosio Relational Thickness - maximum) was <339 in 39 eyes and <235 in 28 eyes. RPI avg (Relative progression Index-average) was >1.15 in 39 eyes and >1.35 in 28 eyes. ISV (Index Surface Variance) was >37 in 22 eyes. IVA (Index of Vertical Asymmetry) was >0.28 in 26 eyes.

Conclusions: The prevalence of clinical and subclinical keratoconus was 9.38% and 16.67% respectively, much higher than in the general population (0.05%). Many others had abnormal topographic values. Screening such persons is vital as they are at high risk for ectasia following kerato-refractive surgery.

Determining the Learning Curve in Corneal Surgery using a Microsurgical Wet Laboratory

First Author: Amir TAHER
Co-Author(s): Joanne Chow CHOW, Damien S. HUNTER, Min Sung KWON, Chameen SAMARAWICK-RAMA

Purpose: A major barrier to the uptake of new lamellar techniques in corneal surgery is the steep learning curve. We aimed to study the learning curve of a novel lamellar technique in order to help define the role of a wet laboratories in corneal surgery.

Methods: A microsurgical wet laboratory was established using pig eyes to simulate the human cornea. Three novice surgeons and an experienced corneal surgeon performed an anterior cornea lamellar dissection and the duration of each procedure was recorded. Tissue was processed using standard histological techniques and the thickness of the dissection determined microscopically. The number of attempts to complete the experiment, defined as three successful dissections with mean thickness below 100µm, was recorded.

Results: Trainees reached the endpoint of the study in 21, 26 and 36 attempts (mean: 28 attempts) whilst the corneal surgeon completed the experiment in 12 attempts ($p = 0.07$). Mean dissection thickness decreased over time for all participants. The mean dissection time for trainees was 10.6 ± 4.2 minutes compared to the corneal surgeon with a mean of 8.2 ± 3.1 minutes ($p < 0.001$). In the final five dissections, trainees reached comparability with the corneal surgeon across all measurements.

Conclusions: We propose a new model for surgical training that targets ophthalmic microsurgery. Trainees demonstrated the capacity to learn the microsurgical technique on ex vivo tissue with demonstrable improvement in all measurements. Wet-lab dissections could provide a valuable training tool for trainees prior to training with patients.

Ectoparasitic Infestations of the Eye: A Case Series

First Author: Shagufa JAMAL
Co-Author(s): Suchitra DASH, Epsita GANTAYAT, Prangya PANDA

Purpose: To present 5 cases of ocular ectoparasitic infestations, caused by 3 different arthropods presenting to the out-patient department of a tertiary health care center in eastern India.

Methods: A case series (descriptive study).

Results: All five patients were from rural areas with age ranging from 12 years to 80 years. Most were occupied in farming and livestock-related activities. The complaints were non-specific like itching, watering and

mild redness. The ectoparasites were noticed on slit-lamp examination. They were removed from the eye and collected using appropriate methods. Then they were sent for confirmation of identity immediately to the microbiology department. There were three cases infected with larvae of Oestrus ovis, one case with a tick of family Ixodidae and one case with lice or phthiriasis palpebrarum.

Conclusions: Ectoparasitic infestations though uncommon, are more prevalent in tropical and developing countries with poor sanitary conditions. The symptoms overlap with that of more common conditions like blepharitis, conjunctivitis, eyelid mass etc. Therefore, ectoparasitic infestations should be taken into the differential diagnosis of the above-mentioned conditions. A careful ophthalmic examination is required to avoid misdiagnosis and delay in treatment as some can invade the globe and cause temporary or permanent loss of vision.

Efficacy and Biocompatibility Evaluation of Artificial Corneal Transplantation in Rabbit Model

First Author: Su Young MOON
Co-Author(s): Jung Yeob HAN, Jae Young KIM, Hun LEE, Sanghyu NAM, Hungwon TCHAH

Purpose: In this study, artificial corneal transplantation consisting of core and skirt integral structure was performed using SPF rabbit (New Zealand White rabbit). The two different structures of skirts were evaluated: sponge and beads form. This efficacy test was to observe corneal neovascularization and opacity around the core, and to examine the biocompatibility of the porous skirt and the stability according to cell proliferation with surrounding tissues.

Methods: In 46 eyes of rabbits, the corneal incision of a semicircle was made after a limbal peritomy and the intralamellar pocket for the insertion of the artificial cornea was made; 34 sponge form and 12 bead forms. After removal of the posterior lamella disc of 3 mm, the artificial cornea was inserted. The visual axis was obtained using the same trephine 2 weeks later. Photos were taken and histological analysis was performed with H&E (Hematoxylin and Eosin) staining and Masson's trichrome staining to confirm the biocompatibility of the skirt and the degree of cell proliferation with surrounding tissues.

Results: Three of 34 rabbits in sponge form skirt and ten of 12 rabbits in bead form were found to maintain the light permeability of the core until 12 weeks after the surgery.

Conclusions: This study confirmed that the rabbits transplanted with the artificial cornea secured corneal neovascularization and opacity around the core and the biocompatibility of the porous skirt and the histological stability according to cell proliferation with surrounding tissues. Skirt with beads form was more stable biocompatibility.

Efficacy of Umbilical Cord Blood Serum and Peripheral Blood Serum Eye Drops as Therapy in Ocular Surface Diseases

First Author: Cecilia ANGGGRAINI
Co-Author(s): Made SUSIYANTI

Purpose: Serum eye drops are indicated for patients with severe ocular surface diseases that have failed to respond to standard treatment. Allogenic peripheral blood autologous serum (PBS) is contraindicated in patients with severe bacterial infection, acute autoimmune disease, phlebotomy, and low general circulation. Repeated patient blood draw causes discomfort too. Recently, the efficacy of umbilical cord blood serum

(UCB-S) as a topical eye drop in the treatment of ocular surface disease is still unknown.

Methods: PubMed, Cochrane Library, Google Scholar, Science Direct, and MEDLINE were used to find articles comparing UCB-S to PBS in the treatment of ocular surface disease. There were no restrictions on the number of subjects or the year of publication, and this review includes only longitudinal human studies.

Results: According to ten eligible studies, UCB-S significantly reduced ocular surface disease symptoms when compared to the PBS group, as measured by questionnaire, conjunctival fluorescein staining score, re-epithelization, conjunctival impression cytology, and corneal sensitivity. The UCB-S group was superior in decreasing epithelial defects compared to the PBS-group. The umbilical cord blood serum group was superior to the PBS group in terms of TBUT improvement.

Conclusions: Umbilical cord blood serum is more effective at restoring the stability of the ocular surface and tear film due to interleukin and growth factors concentration in the ocular surface drive ocular surface diseases. However, window period of infection, as well as the possibility of transmission, should be considered.

Efficacy of a Novel Five-Flash Intense Pulsed Light Therapy Technique in Patients with Meibomian Gland Dysfunction: A Randomized Controlled Trial

First Author: Samira HASSANZADEH
Co-Author(s): Siamak ZAREI-GHANAVATI

Purpose: To assess the efficacy of a five-flash intense pulsed light (IPL) technique in patients with meibomian gland dysfunction (MGD).

Methods: In a randomized controlled trial, 100 symptomatic MGD patients were enrolled. The treatment group underwent three sessions of a five-flash IPL therapy. For all participants, eyelid warming, lid hygiene and lubricant therapy were prescribed. Ocular surface parameters were compared for control and treatment groups.

Results: Ocular Surface Disease Index (OSDI), non-invasive keratograph tear break up time (NIKBUT), fluorescein TBUT, MG expressibility, meibum quality and tear osmolarity were improved at follow up visits in both groups ($p<0.05$). On day 75, NIKBUT was significantly higher in the IPL group ($p=0.045$). The IPL treatment effect was not statistically significant ($p>0.05$), except for bulbar and limbal hyperemia ($p=0.017$ and $p=0.018$). In both groups, younger patients showed more improvement in NIKBUT ($p=0.024$, $r=-0.32$;$p<0.001$, $r=-0.52$).

Conclusions: Both IPL therapy combined with conventional home-based therapy, and home care alone are effective for patients with MGD. IPL may have an additional role in the improvement of ocular hyperemia.

Efficient Capture of Real-World Data for Dry Eye: The Save Sight Dry Eye Registry Pilot Data

First Author: Pauline KHOO
Co-Author(s): David MINGO, Saaeha RAUZ, Fiona STAPLETON, Stephanie WATSON

Purpose: The Save Sight Dry Eye Registry (SSDER) is the world's first web-based multinational, interdisciplinary registry able to collect high-quality data from patients in clinical settings. We report the characteristics of dry eye (DE) patients at their baseline visit.

Methods: The SSDER collected data from clinics in Australia, Spain and United Kingdom. Patient demographics, medical history, index visit characteristics and Ocular Surface Disease Index responses (OSDI) were recorded. Primary outcomes were the baseline demographic data and DE diagnosis and secondary outcomes visual acuity in logMAR letters, tear break up time (TBUT), and OSDI score.

Results: At the time of data analysis, there were 28 clinicians from 21 practices registered to use the registry. Data entry was performed in under 2 minutes for all visits. The registry produced a 'real-time' graphical output of the patient's treatment journey. 121 eyes from 61 patients (89% female) were included. The mean±SD age was 59.8±15.4 years (range 24-86). 51% of eyes had evaporative DE, 45% mixed DED and 3% had aqueous deficient DE. The median visual acuity and TBUT were 83 (IQR 75-85) logMAR letters and 4 (IQR 1-7) seconds, respectively. 77% of patients completed the OSDI, the median score was 24 (IQR 10-40).

Conclusions: The SSDER is an easy-to-use tool able to facilitate the collection of large amounts of data for DE from real-world clinical settings. The data collected will allow the comparative analysis of existing DE treatments, assessment of patient outcomes as well as longitudinal data for improved understanding of DE natural history.

Endothelial Keratoplasty: Trick or Treat?

First Author: Mohammad DASTJERDI

Purpose: To review the potential damages of air/gas to the corneal endothelial cells and explore alternative options.

Methods: Review of published articles about air/gas toxicity and other potential damages to the endothelial cells as well as exploring the mechanisms in which air/gas bubbles can promote donor graft adherence and the possible alternative measures.

Results: A large air-fill bubble in the anterior chamber can help to hold the graft in place by 3 different mechanisms of sequestration, floatation force, and surface tension. Besides the direct toxicity and trauma, the air/gas bubble may prevent all the essential nutrients to reach the endothelial cells for proper pump functioning. Injection of warm (37℃) solution prior to or immediately after insertion of the lamellar graft (temperature reversal), and applying carboxymethylcellulose 5% with/without dextran on the corneal epithelial surface near the conclusion of surgery is suggested as alternative measures.

Conclusions: This review shows the possible need for adopting fewer tricks, more treat alternative measures to enhance the endothelial cell function and promote graft adherence.

Epithelium Basement Membrane Regeneration and Corneal Stromal Fibrosis in Rabbit's Corneal Penetrating Injury

First Author: Yuqing LUO
Co-Author(s): Jingjing CHEN, Xia LI, Na MENG, Jinling WU, Luxing XU

Purpose: To evaluate the relationship between epithelium basement membrane (EBM) regeneration and corneal stromal fibrosis during the wound healing after rabbit's corneal penetrating injury.

Methods: Thirty-six New Zealand white rabbits were included in this study.The right eyes were ablated with 2.0mm trephine as penetrating injury models, and the left eyes

were selected as control groups. The corneas at the ablated zone were examined at 1, 2, 3 weeks and 1, 2, 3 months after modeling. Corneal stromal fibrosis was evaluated by haze levels using silt-lamp. Myofibroblast appearance was observed by transmission electron microscope (TEM) and α-smooth actin (α-SMA) mRNA relative expression levels were assessed with quantitative real-time polymerase chain reaction (qt-PCR). While EBM regeneration and its ultrastructure appearance were detected by TEM.

Results: After modeling, mild corneal haze was found at 1 week, and gradually developed into dense haze at 1 month, but it faded at 3 months. At the ablated zone, myofibroblasts were firstly observed at 2 weeks and populated at 3 weeks, but they decreased at 3 months. Myofibroblasts marker α-SMA was highly expressed at 1 week. Defective EBM was firstly detected at 3 weeks after modeling, restructured gradually and restored totally with normal ultrastructures regeneration at 3 months.

Conclusions: In the rabbit model, with the destruction of EBM, corneal penetrating injury results in corneal stromal fibrosis (haze). The corneal haze can be reduced by the regeneration of EBM with normal ultrastructures at the ablated zone.

Goretex in Ocular Surface Disorders: A Novel Approach

First Author: Anitha VENUGOPAL
Co-Author(s): Aditya GHORPADE

Purpose: To retrospectively, evaluate the efficiency of GoreTex, e PFTE (multiporous expanded polytetrafluoroethylene)in the prevention of recurrence of symblepharon and recurrent pterygium, a major challenge in the ocular surface reconstruction procedures.

Methods: A total of 15 eyes of 14 patients with recurrent pterygium and symblepharon following chemical injury with restricted motility were included in the study. All eyes underwent either symblepharon lysis or recurrent pterygium excision followed by Goretex and amniotic membrane graft with or without SLET. The main outcomes were Indications, the recurrence rate of symblepharon or pterygium, and secondary outcomes such as demographic profile and visual acuity after using Goretex are studied.

Results: The mean follow-up was 30.4 months. All eyes except two achieved stable ocular surface after surgery without recurrence of either symblepharon or pterygium. 10 eyes underwent Goretex with AMG after symblepharon lysis among which one eye developed recurrence with pyogenic granuloma as the complication, five eyes underwent Goretex with AMG after recurrent pterygium excision, among which one eye had recurrence within one month of surgery. Extraocular motility and Visual acuity improved in most patients.

Conclusions: In the future, Goretex would be a novel technique to prevent the recurrence of symblepharon and recurrent pterygium, a major challenge in patients with chemical injury.

Hurler Syndrome: A Case Report

First Author: Umme Salma AKBAR
Co-Author(s): Shams NOMAN

Purpose: To report a case of Hurler syndrome.

Methods: A 9-year-old female came to Chittagong eye infirmary and training complex with complaints of gradual painless dimness of vision in both eyes for 2 years. On general examination, she was of short stature with

coarse facial features, a prominent forehead, depressed nasal bridge and stiffness of joints. Upon ocular examination, her BCVA was 6/36 in both eyes. Slit-lamp microscopic examination revealed corneal clouding in both eyes. Pupils of both eyes were round, regular and reacting. Lens was clear in both eyes and fundus evaluation could not be done. She was diagnosed as a case of Hurler syndrome. She has an elder sister suffering from the same condition. She was advised regular follow-up every 6 months and counseling was done regarding the poor visual outcomes. She was then referred to a pediatrician for further management of her general health.

Results: Early diagnosis, genetic counseling and regular follow-up with recent modalities of treatment can decrease mortality significantly and the child may grow normally.

Conclusions: Hurler syndrome is a rare autosomal lysosomal storage disorder. The mainstay of treatment is hematopoietic stem cell transplantation and enzyme replacement therapy.

Impact of Dry Eye Disease on Patients' Quality of Life

First Author: Richard KARA
Co-Author(s): Margaret AINSLIE-GARCIA, Nicole FERKO, Elizabeth PERSAUD, Sruthi SRINIVASAN

Purpose: The prevalence of dry eye disease (DED) is increasing, due to environmental triggers, the aging population, and the increasing use of digital displays. DED is a chronic, progressive, and symptomatic condition, but its impact is largely underrecognized. A literature review was conducted to understand the impact of DED on patient quality of life (QOL).

Methods: MEDLINE was searched for the period 1 Jan 2004 to 5 Jul 2019. Search terms included DED and QOL, humanistic burden, and utility. Reference lists from relevant articles were also scanned. No language restrictions were applied to search criteria. Non-interventional studies reporting the quantitative or qualitative impact of DED on QOL were retained.

Results: The search returned 15 relevant articles. Three main themes emerged including decreased quality of vision, activity restriction, and symptom-related pain. Tear film instability can cause blurry vision which can reduce visual function, correlated with QOL. Patients with DED were three times more likely to report difficulties in activities than those without DED. DED was associated with a 12-34% impairment in daily activities and 11-35% impairment in productivity, and was found to be significantly higher with severe DED. Seven articles reported a correlation between the severity of DED and impaired QOL or activities. One study reported moderate DED had similar QOL to angina, while severe DED had QOL similar to disabling hip fracture.

Conclusions: The area of dry eye and MGD is one of the growing research and development, and is much needed to understand the serious impact of DED on patient QOL.

Impact of Keratoconus on Quality of Life: A Save Sight Keratoconus Registry Study

First Author: Himal KANDEL
Co-Author(s): Stephanie WATSON

Purpose: To evaluate the quality-of-life (QoL) impact of keratoconus using the impact of vision impairment (IVI) questionnaire.

Methods: A cross-sectional study was conducted utilizing the prospective, web-based

Save Sight Keratoconus Registry data. Rasch analysis was conducted on the IVI data using the Andrich rating scale model. The univariate analysis included the Welch t-test, one-way ANOVA, and Tukey's adjusted HSD test.

Results: The IVI questionnaire was completed by 336 patients (31.5% female) with keratoconus. The mean (SD) age of the participants was 28.02 (10.8) years. The IVI scales (Overall; Visual Function, VF; Emotional, EM) had ordered and evenly spaced response categories, variance explained by the measure > 50%, person separation index > 2.0, infit and outfit mean-square 0.70 to 1.30, and no differential item functioning. In a group-wise analysis, the severe keratoconus cases had lower mean. Overall, VF and EM scores followed by moderate and mild keratoconus cases (Tukey adjusted HSD; all p <0.05). Patients with visual acuity worse than 6/60 had the worst IVI scores followed by the patients with visual acuity <6/12 and >=6/60, and 6/12 or better, respectively (all pairwise p <0.05). The patients with corneal collagen cross-linking had better IVI scores (Overall, 1.96 vs 1.58 logits; VF, 2.37 vs 1.96 logits; and EM, 1.99 vs 1.64 logits), however, the differences were not statistically significant (all p >0.05).

Conclusions: The IVI questionnaire was a psychometrically robust QoL measure. The QoL scores were lower in patients who had more severe keratoconus, had worse visual acuity, and had no history of corneal cross-linking.

Isolated Congenital Corneal Anesthesia: A Case Series

First Author: Avani SONI
Co-Author(s): Anitha VENUGOPAL

Purpose: To report the various clinical presentations of congenital corneal anesthesia.

Methods: Medical records of children diagnosed with congenital corneal anesthesia, between January 2017 and June 2019 in a tertiary eye care center, were retrospectively reviewed. The demographic patterns, morphological features, clinical presentations, and systemic associations were noted.

Results: Total 16 eyes of 8 patients (6 Females) with a mean follow-up of 60 months were included. The median age of presentation was 8.5 years. All cases had bilateral involvement and generalized pain sensitivity was present in all. The spectrum of presentations ranged from conjunctival hyperemia in 8 eyes and fungal corneal ulcer with hypopyon in 2 eyes, a perforated ulcer in one eye, and recurrent corneal epithelial erosions in two eyes. The fungal ulcers resolved within 15 days of presentation. A tectonic graft was done for corneal perforation. The graft developed persistent epithelial defects with stromal lysis leading to a graft melt, for which a lamellar Keratoplasty was done along with tarsorrhaphy. Two patients had associated congenital ptosis. Systemic associations were Hirschsprung's disease, congenital anorectal atresia, mental retardation associated due to hypoxic-ischemic encephalopathy in few children along with delayed developmental milestones in all 8 cases. A peculiar finding, found incidentally in all patients was maxillary hypoplasia and a beaked nose. 5 eyes lost vision due to a leukomatous opacity.

Conclusions: Early suspicion of corneal anesthesia in a non-healing ulcer, recognition of morphological features, and doing prophylactic tarsorrhaphy will prevent the

long-term sequelae of congenital corneal anesthesia and restoration of useful vision in these children.

Lineage Tracing of Gli1 Progenitor Cells in Corneal Stroma to Study Injury Induced Corneal Fibrosis

First Author: Wenjia CAI
Co-Author(s): Yizhi LIU, Yingfeng ZHENG

Purpose: The corneal fibrosis process is triggered when the cornea is injured, which may ultimately lead to scarring and vision loss. Gli1+ mesenchymal stem cells (MSC) were found to reside at the perivascular area, and have the ability of self-renewal and tissue fibrosis repair of heart, lung, liver, kidney, and spinal cord. After inhibiting Gli1+ cells, tissue fibrosis is reduced and functional repair occurs. This study explores whether there are Gli1+MSCs in the limbal stroma, and studies the role of Gli1+MSCs in repairing corneal injuries through lineage tracing.

Methods: Human corneal limbus were stained and cryosectioned, as well as Gli1-nLacZ mouse cornea for immunofluorescence staining to detect the presence of Gli1+ cells. TdTomato+ cells separated from Gli-CreERT2;tdTomato mice cornea were sorted by flow cytometry and cultured in vitro to explore the biological characteristics of Gli1+ MSCs. Finally, lineage tracing experiments of corneal injury were performed using Gli-CreERT2;tdTomato mice.

Results: We observed Gli1+ cells at the perivascular area of both human and Gli1-nLacZ mice corneal limbus. FACS sorted tdTomato positive cells express similar biological characteristics of MSCs. In the lineage tracing study, we observed self-renewal Gli1+ cells in the corneal stroma in homeostasis. However, from one day to one year after corneal injury, Gli1+ cells were significantly activated both in situ and moved from the corneal limbus. The area of corneal fibrosis and vascularization coincided with the area of Gli1+ cells proliferation.

Conclusions: Gli1 progenitor cells reside in corneal stroma and have a role in corneal fibrosis repair.

Mixed Forms of Descemet Membrane Detachment in a Case of Ocular Acid Burn

First Author: Sohini MANDAL
Co-Author(s): Prafulla MAHARANA

Purpose: To report a case of a mixed form of Descemet membrane detachment in a case of ocular acid burn.

Methods: A 54-year-old male was referred to our hospital 30 days after an accidental chemical injury in his right eye with a toilet cleaner. Slit-lamp examination revealed corneal epithelial defect involving 3 clock hours inferiorly and 12 clock hours of limbal ischemia along with diffuse corneal stromal edema. Additionally, Descemet membrane detachment (DMD) with pre-Descemet sterile exudate collection of 2mm was noted in the inferior half of the cornea. ASOCT confirmed a mixed form of DMD, an anterior hyperreflective band representing the PDL and a posterior undulating band representing the DM.

Results: The patient was treated with 0.5% moxifloxacin four times a day, 2% homatropine eye drops four times daily, preservative-free lubricants 2 hourly, and oral 2000 mg vitamin C per day. Right eye amniotic membrane transplantation (AMT) with symblepharon ring was done under local anesthesia. The epithelial defect resolved at

one week follow up and the height of exudates gradually decreased with the persistence of DMD and corneal edema.

Conclusions: Most of the reports of DMD in chemical injury have been described following alkali injury. Deeper ocular penetration following an acid injury is considered rare in view of the coagulative necrosis induced by acids. However, this case suggests that a severe form of acid injury can also cause damage to the deeper structures of the eye and a DMD.

Multilayered Autologous Tenon Patch Graft and Amniotic Membrane Transplant in a Moderate-Sized Corneal Perforation in COVID-19 Pandemic Era

First Author: Arijeet ROY
Co-Author(s): Rituparna GHOSH, Dr Sangeeta KALITA, Sheesham SINGH

Purpose: To establish the indications, techniques, results and applicability of tenon patch graft in the management of corneal perforations, particularly 3mm to 4mm size, with minimal complications rate, in the times of COVID-19 pandemic, where there is unavailability of donor cornea for keratoplasty.

Methods: After proper informed consent, a case had been selected of perforated corneal ulcer at a tertiary care eye hospital. Best-corrected visual acuity, clinical course, pre-operative patient profile, type of surgery and its outcome were recorded.

Results: In this era of pandemic, we could save an eye with corneal perforation by tenon patch graft and in follow-up, we can provide visual rehabilitation with keratoplasty later whenever donor cornea is available.

Conclusions: During COVID-19 pandemic, due to the unavailability of donor cornea, augmented tenon patch graft with amniotic membrane transplant, bandage contact lens and cyanoacrylate glue are good alternatives to therapeutic penetrating keratoplasty for corneal perforation of up to 3 to 4 mm size. It serves as a temporary procedure for stabilizing the wound, help it in healing, keep the anterior chamber formed without any associated significant toxicity.

Ocular Manifestations in Borderline Lepromatous Type of Multibacillary Leprosy

First Author: Tifani WARDANI
Co-Author(s): Ovi SOFIA

Purpose: To report a rare case of ocular manifestations in borderline lepromatous type of multibacillary leprosy patient.

Methods: A 28-year-old woman presented to the infection and immunology ophthalmology department complaining of blurred vision on her right eye for 1 week prior to visit, accompanied with redness. She was diagnosed with Morbus Hansen of multibacillary type from the dermatovenereology department. The diagnosis was made based on history taking, general examination, ophthalmology examination, slit skin smear examination using Ziehl Nielsen's staining method with 1000x magnification and histopathological examination.

Results: On initial presentation, general examination showed multiple irregular hyperpigmentation patches on her face and all over her body. The best-corrected visual acuity was 6/6 on both eyes. Ophthalmology examination showed pericorneal injection of the conjunctiva, multiple corneal stromal infiltrates in the form of nummular, varying diameter, punctate erosion spread throughout the cornea and decrease of corneal sensibility

in both eyes. She was diagnosed with nummular keratitis due to Morbus Hansen of multibacillary type. The patient was given Multi-Drug Therapy (MDT) from the dermatovenereology department and topical steroid and artificial tears from the ophthalmology department.

Conclusions: Nummular keratitis is one of the ocular manifestations in lepromatous type of multibacillary leprosy. Treatment that can be given are Multi-Drug Therapy (MDT), topical steroid and artificial tears for ocular manifestations.

Ocular Surface Squamous Neoplasia (OSSN): A Rare Initial Presentation Prior to Diagnosis of Systemic Malignancy

First Author: Felicia YUEN CHENG
Co-Author(s): Rohanah ALIAS, Nor Akmal BAHARI, Sujaya SINGH, Lai YIN PENG

Purpose: To report a rare case of a 74-year-old gentleman, presented with OSSN prior to diagnosis of chronic lymphocytic leukemia (CLL).

Methods: The clinical presentation, histopathological-findings and surgical outcome are described.

Results: This 74-year-old gentleman with underlying diabetes, hypertension and ischemic heart disease. He complained of right eye rapid growing lesion for a year. He had no blurry vision, eye redness or eye discharge and no trauma history. The vision acuities of both of his eyes were 6/9. On right eye slit-lamp-examination, a gelatinous interpalpebral lesion was seen with feeder vessels from 6-to-12o'clock, measuring 17x13mm, cornea clear, anterior chamber deep, quiet with nuclear sclerosis. Otherwise, unremarkable posterior segment. The left eye examination was normal. Right eye histopathological-examination reported a conjunctival mass measuring30x10mm in diameter, papillary structure, fibrovascular core and focal keratin pearls formation with a clear margin which was consistent with conjunctival intraepithelial neoplasm (CIN). The patient was given 3 cycles of topical mitomycin 0.5% QID right eye/week with a week of drug holiday in between cycles. A similar mass was found on his left eye 3 months later and a biopsy revealed CIN (clear margin). He was given a similar topical regime. At the same time, the patient was under the medical team for epigastric pain and was noted to have pancytopenia. Bone marrow biopsy showed CLL with autoimmune hemolytic anemia. There was no recurrence of OSSN noted in both eyes.

Conclusions: As it is not common to have conjunctival tumor as the initial manifestation of systemic cancer, we should be aware of the possibility of primary cancer. Thus, a systemic examination should be considered to rule out the existence of systemic cancer.

Ocular and Lymphocutaneous Sporotrichosis

First Author: Hing TIAK
Co-Author(s): Prof Prof.Dr Mimiwati BINTI ZAHARI, Han Nie CH'NG

Purpose: Sporotrichosis is a subcutaneous mycosis caused by Sporothrix schenckii. The cutaneous form represents the commonest form, while the extracutaneous form with ocular presentation is less prevalent. Here we report a case of ocular sporotrichosis with successful antifungal treatment.

Methods: A case report.

Results: A 70-year-old housewife complained

of conjunctival hyperemia of the left eye for one month, associated with nodules over the left periorbital, and cheek region. She had no history of trauma but reported that her cat died from skin disease recently. Ophthalmic examination showed bilateral visual acuity was 6/15. Biomicroscopy revealed left eyelid was edematous, conjunctival hyperemia with granulomatous lesions in the bulbar conjunctiva, and serous discharge in the fornix. The cornea was transparent, and no anterior chamber inflammatory reaction. Dermatologic examination revealed multiple erythematous, granulomatous nodules over the left periorbital extending to the left malar region with ipsilateral preauricular and submandibular lymphadenopathy. No ulceration or abscess formation. Histopathologic study and culture of conjunctival secretions were performed, and although both were reported negative for Sporothrix schenckii, presumed diagnosis of left ocular sporotrichosis with lymphocutaneous sporotrichosis was made according to the clinical presentation and epidemiologic finding. Treatment with 400mg per day of oral itraconazole was given for three months, with topical dexamethasone, and topical fluconazole 0.2% on slow tapering dose over six weeks. The patient showed a favorable therapeutic response.

Conclusions: Ocular sporotrichosis can mimic other granulomatous conjunctivitis, which is challenging to the ophthalmologist. Diagnostic suspicion with a detailed history is imperative in the management to reduce the risk of morbidity.

One Cornea Two Recipients: Killing Two Birds with One Stone

First Author: Reena KAUR
Co-Author(s): Marium AHMAD, Sujaya SINGH

Purpose: The concept of 'split-cornea' transplantation in which full-thickness donor corneas were divided into anterior and posterior lamellae is a surgical strategy which allows selective replacement of the diseased corneal tissue by a single donor. This is becoming increasingly popular and is a small step towards the solution of the everlasting shortage of cornea donor tissue in Malaysia and our institution. The existing shortage of local donor corneas in our institution prompted us to attempt the use of one donor cornea for two transplantation procedures; Descemet Stripping Endothelial Keratoplasty (DSEK) in a case of a pseudophakic bullous keratopathy (PBK) with underlying Fuchs endothelial dystrophy (FED) and lamellar patch graft in a case of limbal dermoid.

Methods: A case report.

Results: The donor cornea was divided into anterior and posterior lamellar manually. The anterior corneal button was used as a patch graft for anterior lamellar keratoplasty in a 6-year-old patient with limbal dermoid and the posterior lamellar keratoplasty was used for a DSEK procedure in a 68-year-old patient with corneal decompensation. Both patients showed an improved visual outcome with no complications throughout their 1-year post-operative period. Final refraction in the case of DSEK was plano /-1.00 DC x 100 with best-corrected visual acuity 6/21 and in the case of patch graft was +2.75 DS /-3.75 DC x 155 with best-corrected visual acuity 6/15.

Conclusions: The use of one donor corneal tissue by multiple recipients is an efficient and safe way to overcome the shortage in donor corneas.

Optimization of Storage and Transportation Conditions of Cultured Corneal Endothelial Cells for Cell-Replacement Therapy: Functional Evaluation using a Rabbit Model of Bullous Keratopathy

First Author: Hon Shing ONG
Co-Author(s): Heng-pei ANG, Jodhbir MEHTA, Gary PEH, Stephen WAHLIG

Purpose: To evaluate if cultured human corneal endothelial cells (HCEnCs) can be preserved in hypothermic conditions to facilitate storage and transportation.

Methods: HCEnCs were exposed to various temperatures (4˚C, 23˚C, and 37˚C) in both adherent and suspension storage models. Optimal storage media and maximal storage duration was selected through evaluation of post-storage viability with calcein AM and Annexin V/PI-based assays. Cellular morphology was assessed with phase-contrast microscopy throughout the preservation process. Following storage and subsequent recovery at 37˚C, cell phenotype was assessed with immunofluorescence, determination of gene and protein expression, and proliferative capacity analysis. Functionality was assessed using a rabbit model of bullous keratopathy.

Results: Endothelial-SFM was determined to be superior to Optisol-GS as a storage medium for cultured primary HCEnCs at both 4˚C and 23˚C. Cell viability was preserved up to 8 days in adherent storage, although cellular morphology became grossly abnormal after 4 days at 4˚C or 23˚C. These morphological changes were reversed with recovery at 37˚C. In suspension storage, HCEnCs demonstrated optimal survival at 4˚C compared to 23˚C. Characterization of post-storage cells demonstrated preserved proliferative capacity and expression of endothelial markers such as Na+/K+ ATPase, ZO-1, CD166, and cell surface Prdx6 comparable to controls at 37˚C. Post-storage, these cells were also able to maintain corneal endothelium function in our rabbit model.

Conclusions: Following exposure to hypothermic conditions, HCEnCs maintained their viability in-vitro and functionality in-vivo. As HCEnCs cellular therapies emerge as promising clinical therapies, this method of preservation is critical for transportation of functional HCEnCs from the laboratory to the surgeon.

Outcome of Timely Air Tamponade in Descemet Membrane Detachment after Clear Corneal Incision Phaco Surgery

First Author: Ashraful Huq RIDOY
Co-Author(s): Md AMIRUZZAMAN, Mahziba CHOWDHURY, Ava HOSSAIN, Ashfia Farhin HUQ, Nayeemul HUQ

Purpose: To evaluate the outcome of timely air tamponade treatment in Descemet membrane detachment after clear corneal incision Phaco surgery.

Methods: A retrospective study was performed of 9 cases of central corneal DMD with vision 6/60 or worse following Clear corneal incision Phaco surgery. All cases were reported within 3 months of phaco surgery. Pneumatic tamponade was given with room Air with suturing of the main incision with 10/0 nylon monofilament. Slit-lamp examination, Vision, and AS-OCT were recorded on day 7, day 14 and day 30 of the last air tamponade procedure.

Results: 6 cases (66.66%) DM fully re-attached and patient gained 6/9 or better vision after 7 days of single air tamponade procedure. 2 cases (22.22%) DM fully re-attached and patient gain 6/9 or better vision after 7 days of second air tamponade procedure of one week

apart. 1 case (11.11%) which was reported after 2 months of phaco surgery, did not gain DM attachment and vision was 6/60 or worse. All cases were managed with topical steroid, antibiotic and Sodium Chloride 5% eye drops along with the air tamponade procedure.

Conclusions: DMD after clear corneal incision phaco surgery can be managed well with better visual outcome with simple air tamponade if reported within 6-8 weeks. So early post-operative follow-up for all patients was needed and also early intervention was needed as soon as DMD was noticed.

Patch Graft for Perforated Corneal Ulcers

First Author: Aditya GHORPADE

Purpose: To evaluate the outcomes of patch graft performed for therapeutic and tectonic purposes in eyes with perforated corneal ulcers.

Methods: This retrospective study included 28 eyes of 28 patients, treated with corneal patch graft for the perforated corneal ulcers. The evaluation was based on demography, etiology, postoperative visual acuity, complications and recurrence of infection.

Results: Out of 28 patients, 13 (40%) cases were following infectious corneal ulcers with growth on Blood agar/SDA. One case was positive for rheumatoid factor and one case was secondary to rosacea. In three cases, free hand fashioned corneal graft was used. Rest were circular; either full or partial thickness. Immediate post-operative period showed peripheral anterior synechiae in 5 cases (18%). The anatomical success was achieved in 27 cases (96.42 %). One case showed recurrence for which regraft was done.

Conclusions: Patch graft provides a definitive approach in the treatment of perforated corneal ulcers and provides a stop-gap measure for optical keratoplasty.

Patient and Practitioner Satisfaction with a Water Gradient Daily Disposable Contact Lens in Asia

First Author: Tim GRANT
Co-Author(s): Bena PAK, Colette PAKINSON

Purpose: A satisfaction survey to soft contact lens wearers and practitioners in Australia, China, Hong Kong, Korea, New Zealand, Singapore and Taiwan to determine acceptability of a water gradient daily disposable contact lens (WGDD).

Methods: Satisfaction outcome surveys were completed by soft contact lens wearers and practitioners. Demographic information, pre-survey lens brand, dryness/discomfort and lens wear experience were collected from patients. Participants were fit with WGDD and provided 1 week supply. Lens wearing experience with the WGDD lens was collected at a follow-up office visit. Practitioners completed a satisfaction survey before and after the fitting period.

Results: A total of 1120 patient and 107 practitioner surveys were collected. The average age of the patients was 33 years with 75% female. All patients were contact lens wearers 64% wearing DD lenses and 52% of patients reported dryness and/or discomfort with their lenses. At 1 week follow-up, the percentage who agreed or strongly agreed with survey statements indicated a high level of satisfaction with WGDD: 83% agreed or strongly agreed lenses were comfortable all day, 79% agreed vision was clear at the end of day and 9 out of 10 patients preferred WGDD to their habitual lenses. After fitting WGDD, 96% of practitioners agreed the lens was easy

to fit, 90% likely/very likely to recommend WGDD to colleagues, 86% agreed WGDD technology is extraordinary and results in excellent clinical performance.

Conclusions: The survey obtained a large, geographically diverse sample regarding the acceptance of WGDD contact lenses. Patients and practitioners indicated a high level of satisfaction with the new water gradient daily disposable lens.

Prevalence of Dry Eye Prior to Cataract Surgery in a Tertiary Level Eye Hospital in Bangladesh

First Author: Mahziba CHOWDHURY
Co-Author(s): Mahbubur Rahman CHOWDHURY, Mehraj CHOWDHURY, Sharah RAHMAN, Rokhsanda REHNUMA, Ashraful Huq RIDOY

Purpose: To determine the prevalence and severity of dry eye in patients prior to cataract surgery at a tertiary level institute in Bangladesh.

Methods: Prospective, observational, study of 66 patients, 132 eyes of which 63.6% (42 patients) were male and 36.4% (24 patients) were female of at least 50 years of age who were scheduled to undergo cataract surgery. The prevalence of dry eye was evaluated using tear break-up time (TBUT), corneal staining with fluorescein, Schirmer's-I test and OSDI.

Results: In a preliminary analysis of 24 patients, 36% of patients reported dryness and foreign body sensation. The average TBUT was 11.8 ± 5.8 seconds, with 60.6% of eyes (80 eyes) having a TBUT of 10 seconds or less. 19.7% of eyes (26 eyes) had central cornea staining with fluorescein dye. 45.5% of eyes (60 eyes) had a Schirmer's score of 10 or less. The mean OSDI score was 29.2.

Conclusions: The prevalence of dry eye in patients scheduled to undergo cataract surgery is higher than generally expected. Increased awareness of dry eye symptoms in patients and proper assessment of dry eyes before cataract surgery may reduce the severity of dry eye symptoms induced or worsened by cataract surgery.

Profile of Microbial Keratitis

First Author: James LIM
Co-Author(s): Ng SOK LIN, Ngio YI CHEN, Ong ZHUAN

Purpose: To study the demographic characteristics, predisposing factors, the latest trend of causative organisms and to analyze the prognostic factors of visual outcome in microbial keratitis.

Methods: A retrospective study of patients with microbial keratitis which required hospitalization between January 2018 and December 2020.

Results: A total of 75 eyes of 74 patients were studied. The male to female ratio was 13.8:1. Seventy percent of patients were within the productive age group(20-59 years old) with the mean of 48 years old and 51.4% of them were laborers. Corneal foreign body (42,56%) was the most common predisposing factor and associated with good visual outcomes ($P<0.005$). Other significant predictors for the final visual outcome were presenting visual acuity, size of ulcer, duration of hospitalization and duration of resolution. The mean duration of hospitalization was 7days. Corneal scrapings were done in all cases where 44 eyes (59%) were found to be positive for growth. Ten eyes (13.3%) which ended up with evisceration yield a positive result. Gram negative bacteria were the most prevalent causative organism of infective keratitis in local/this region. Pseudomonas sp

(20,26.7%) being the most common bacterial isolates, was associated with poor visual outcomes and a high rate of evisceration. Patients who developed complications such as cornea melting (9,12%), cornea perforation (11,14.7%) and endophthalmitis (7,9.3%) were associated with poor visual outcomes. Likewise, patients who required therapeutic interventions such as corneal gluing, tarsorrhaphy and penetrating keratoplasty generally had poor visual outcomes ($P<0.05$).

Conclusions: Microbial keratitis is a major cause of ocular morbidity globally. Understanding the demographic and epidemiological characteristics of microbial keratitis of the region is important in the initial prompt treatment and may eventually improve the visual outcome.

Radial Keratoneuritis in Acanthamoeba Keratitis

First Author: Po Yen LEE
Co-Author(s): Li-yi CHIU, Shiuhliang HSU, Chang-ping LIN

Purpose: A case report.

Methods: A 15-year-old woman, who had a 10-day history of pain, redness, and blurred vision in her both eyes presented to the emergency clinic. The visual acuity was 20/200 in the right eye and 20/100 in the left eye. She was an orthokeratology contact lens wearer who had rinsed her lens with tap water on a regular basis. Slit-lamp biomicroscopy revealed radial keratoneuritis in both eyes. According to the result of anterior segment optical coherence tomography, horizontal scan at the 8-o'clock position disclosed putative keratoneuritis as a highly reflective band running obliquely in the corneal stroma.

Results: Corneal scraping was performed, and samples that underwent KOH staining showed multiple double-walled cyst structures consistent with Acanthamoeba. The inpatient treatment included 0.02% polyhexamethylene biguanide, chlorhexidine, 1% Voriconazole, topica steroid (0.1% Flumethasone), and oral Itraconazole. The corneal infection was successfully controlled and the best-corrected visual acuity recovered to 25/20 in her both eyes. The infection did not recur during the 6-month follow-up period.

Conclusions: Bilateral Acanthamoeba keratitis is an infectious complication of contact lens wear. With laboratory confirmation, vision often can be restored with medical treatment. Therefore, early diagnosis is important and combination treatment is recommended, tailored to the depth of the lesions.

Recurrent Corneal Graft Melting in Ocular Graft-versus-Host-Disease

First Author: Allie LEE
Co-Author(s): Wai Lung SO

Purpose: To describe the course, management and outcomes of recurrent corneal graft melting in patients with ocular graft-versus-host-disease.

Methods: A retrospective chart review of two cases of recurrent corneal graft melting in ocular graft-versus-host disease.

Results: Two patients with ocular graft-versus-host-disease following bone marrow transplantation presented with progressive melting of existing penetrating keratoplasty. Corneal patch graft was performed but shortly afterwards the melting recurred. In addition to intensive topical lubrication, hematologists were also engaged in optimizing systemic immunosuppressants. The melting finally stopped and the corneal lesions healed with

scarring.

Conclusions: Recurrent corneal graft melting in patients with ocular graft-versus-host-disease is a rare but potentially sight-threatening condition.

Screening of Genetic Variants among Fuchs' Endothelial Corneal Dystrophy Subjects in Malaysia Using Infinium Global Screening Array

First Author: Ker Hsin NG
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Purpose: A case-control observational study was conducted to determine the genetic variations of different loci in Fuchs' Endothelial Corneal Dystrophy (FECD) in a tertiary care setting in Malaysia.

Methods: 12 FECD subjects that were matched with 12 controls were recruited to analyze the genetic variants using Infinium Global Screening Array (GSA)-24 v1.0 BeadChip with Illumina iScan high-throughput system. Genomic DNA was extracted from peripheral blood sample of each subject followed by DNA quantification and qualification. A series of tests were performed using Infinium GSA based on a protocol. Illumina GenomeStudio 2.0 Data Analysis and PLINK version 1.9 softwares were used for data analysis of the genetic variants and for performing association tests to determine the distribution of obtained variants among the cases and controls.

Results: A significant novel genetic variant, rs11626651 was discovered which is suggestive of association with FECD ($p < 5 \times 10^{-6}$). It is a variant of LOC105370676, also known as LINC02320 gene, a long intergenic non-protein coding RNA, at chromosome 14. Candidate genes that were previously found in various populations such as COL8A2, ZEB1/TCF8, TCF4 and SLC4A11 were not significantly associated with FECD subjects.

Conclusions: To the best of our knowledge, this is the first initial report from Malaysia on screening genetic variants among FECD subjects using Infinium GSA. This variant could be a plausible role in the development of FECD, at least in Malaysia. Identification of additional genetic risk factors adds to our understanding of FECD which may offer important tools in new treatments in the future.

Sequential Post-Operative Corneal Oedema with Bilateral Silent Herpetic Keratitis

First Author: Shankari SOTHIRACHAGAN
Co-Author(s): Jemaima CHE HAMZAH, Wan Haslina HALIM, Meng YONG

Purpose: To reiterate the atypical presentations of HSV keratitis.

Methods: A case report.

Results: A 76-year-old lady underwent uneventful cataract surgeries for her right eye in 2016 and left eye in 2019. Her right eye suffered post-operative corneal oedema with persistent epithelial defect and was treated empirically as herpetic keratitis. She responded to anti-viral treatment well and subsequently achieved 6/9 vision. Endothelial cell counts for her both eyes were more than 2000 cells/mm2 each. Her left eye experienced the delayed onset of a similar post-operative corneal oedema six weeks after the uneventful cataract surgery. Her left eye presented with a painless reduction in vision (6/60) without red-eye. There was a paracentral epithelial defect with surrounding loose epithelium and generalised stromal oedema with Descemet striae. There

was, however, no evidence of reduced corneal sensation, dendritic ulcer, stromal infiltrate, endothelitis or anterior chamber activity, and IOP was normal. She was treated empirically for herpetic keratitis in view of her previous similar right eye problem which responded to anti-viral treatment. The diagnosis was later confirmed by a positive corneal epithelial viral culture that revealed HSV type-1. Corneal debridement on unhealthy loose epithelium was performed, and bandage contact lens was applied. Oral acyclovir was started and topical dexamethasone 0.1% was added once the epithelial defect had healed. Her condition improved and recovered with 6/9 vision.

Conclusions: HSV can latently infect patients' eyes bilaterally although the manifestation of the disease is commonly unilateral. Post-operative corneal oedema in an uneventful surgery with no underlying corneal degeneration can be caused by HSV without classical signs of herpetic keratitis.

Successfully Treated Ocular Sporotrichosis in a Tertiary Hospital in Malaysia: A Case Series

First Author: Nuratiqah Binti ABIDIN
Co-Author(s): Maya Sapira HANAPI, Adil Bin HUSSEIN, T NORINA, Sakinah Binti ZAKARIA

Purpose: To present nine cases of ocular sporotrichosis caused by Sporothrix schenkii.

Methods: A case series.

Results: We reported nine cases of granulomatous conjunctivitis successfully treated as Ocular Sporotrichosis. All of these patients presented with granulomatous conjunctivitis involving fornix, tarsal or bulbar conjunctiva. Three of the patients had bilateral eye involvement while the rest had unilateral eye involvement. Most of the patients had a history of contact with stray cats while two patients were scratched by cats. Two of the patients had skin involvement at the knee and preauricular area respectively and were referred to the dermatology team. All of them underwent conjunctival biopsy and the fungal culture yielded Sporothrix schenckii. All of the patients were successfully treated with oral Itraconazole 200mg twice daily for three to six months duration together with topical fluconazole. None of them developed recurrence of ocular sporotrichosis post-treatment.

Conclusions: Although ocular sporotrichosis is rarely reported in Malaysia and most of the cases reported originated from Brazil and Peru, a high index of suspicion is needed especially in patients who presented with granulomatous conjunctivitis and had contact with cats. Early initiation of systemic antifungal therapy may lead to complete resolution of lesion.

Surgical Management of a Filipino Patient with a Small Pupil, Intumescent, Total White Cataract, Fuch's Endothelial Dystropy and Runaway Rhexis

First Author: Jose Timothy Martin CHUA
Co-Author(s): Paolo Nico ROGELIO, Reginald TAN

Purpose: The purpose of this surgical video is to demonstrate the preoperative, intraoperative and postoperative management of a complex phacoemulsification surgical case. The ophthalmologist-in-training must be familiar with how patients with multiple cataract and corneal challenges can be addressed as part of his or her arsenal. The lecture will also teach ophthalmologists surgical techniques such as viscodilation, soft-shell technique, Continuous Curvilinear Capsulorhexis (CCC) runaway rhexis rescue, and small pupil cataract surgery.

Methods: The patient is a 46-year-old diabetic

female with Fuch's Endothelial Dystrophy who also presented with small pupil, intumescent, total white cataract. Preoperative planning included a full five-point eye exam, biometry with a target of 0.5-0.65 D postoperative refraction and ocular ultrasound. Intraoperative strategies included viscodilation, low phaco machine settings, soft-shell technique, CCC runaway rhexis rescue and pot-hole method of phacoemulsification.

Results: The surgery was successful. The entire cataract was safely removed and the preferred intraocular lens was placed in the bag. The patient had a drastic improvement in vision acuity from "no hand movement with good light projection" to 20/25 in Snellen Chart notation 1-day post-op.

Conclusions: Cataract surgery can prove difficult in patients with Fuch's endothelial dystrophy. Added complexities such as having a small pupil and an intumescent total white cataract can intimidate even the most veteran eye surgeon. With proper technique and adequate skill, even a resident ophthalmologist-in-training can successfully manage such cases as showcased.

TGF-3 Reduces Extracellular Matrix Fibrosis in Three-dimensional Culture of Keratocytes Mediated by TGF-3 1,2

First Author: Jinling WU
Co-Author(s): Xia LI, Yuqing LUO

Purpose: To evaluate the effect of adding TGF-β3 to the “wounded area” on fibrosis during corneal stromal wound healing in the three-dimensional culture mediated by the temporal and spatial dynamic distribution of TGF-β1,2 constructed by transwell combined with dialysis bag.

Methods: The Pellet was established by bovine corneal keratocytes, combined with the upper and lower chambers of transwell to control the dynamic distribution of TGF-β1,2, to construct an in vitro three-dimensional culture model of corneal stromal wound healing. In the upper chambers of the experimental group, 0.25 ng/ml and 0.5 ng/ml TGF-β3 were added. The cell activity was detected by Calcein-AM/PI. The stromal fibrosis was observed by qRT-PCR and IF. TEM was used to observe collagen fibers.

Results: Pellets still grow after being cultured in transwell when adding TGF-β. Calcein-AM/PI staining showed that the death rate of cells in Pellets gradually increased with the prolonged cultured time. QRT-PCR and IF showed that the expressions of α-SMA, FN and COL IIIof 0.5T3 and 0.25T3 upper chamber group were lower than that of the upper chamber control group. The expression of COL I, LUM and KERA in 0.25T3 and 0.5T3 upper chamber group were higher than that of the upper chamber control group. TEM showed that collagen fibers of the 0.5T3 upper chamber group arranged more neatly, and the diameters were more uniform than that of the 0.25T3 upper chamber group.

Conclusions: TGF-β3 reduces the fibrosis of upper chamber in three-dimensional culture of keratocyte mediated by the temporal and spatial distribution of TGF-β1,2.

The Comparative Effectiveness of Corneal Cross-Linking in Children and Adults: A Save Sight Keratoconus Registry Study

First Author: Stephanie WATSON
Co-Author(s): Marco ABBONDANZA, Francisco ARNALICH-MONTIEL, Vincent DAIEN, Himal KANDEL

Purpose: To report the outcomes of eyes undergoing corneal cross-linking (CXL) for

keratoconus in children vs adults performed in 28 centers across Australia, New Zealand, Italy, France, Spain and Italy.

Methods: Data from routine clinical practice was captured through the Save Sight Keratoconus Registry. 890 eyes (724 patients; mean age ± SD, 26.4 ±10.6 years; female 31.2%) with epithelium-off CXL for keratoconus had follow-up data at one year. Outcomes were compared using mixed-effects regression models adjusted for sex, visual acuity(VA), keratometry, pachymetry, CXL protocol, riboflavin solution, doctor, practice, and eye laterality.

Results: For children and adults, CXL was most commonly performed with an accelerated protocol with 3mW/cm2 [41 (55.4%) eyes vs 499 (61.2%), respectively] and isotonic riboflavin used [48 (64.9%) eyes vs 458 (56.1%), respectively]. Mean changes (95% CI) in outcomes were slightly better for children than for adults in VA [3.30 (-3.04, 9.64) vs 3.13 (-2.51, 8.77) logMAR letters respectively], Kmax [-1.3(-2, -0.7) vs -1.2(-1.4,-0.9) D respectively], K2 [-1(-1.9,-0.2) vs -0.8(-1,-0.6) D respectively], and minimum corneal thickness [-13(-18.5,-7.5) vs -17.7(-20,-15.3) µm respectively]. However, none were statistically significant (crude and adjusted; all p>0.05). The frequency of adverse events was low in both groups at one-year (children: clinically significant haze 5, scarring 1; adults: clinically significant haze 29, scarring 15, microbial keratitis 2). Clinically significant haze was more common in children than adults (6.8% vs 3.6% respectively; adjusted p=0.04).

Conclusions: This real-world observational study found that the corneal CXL similarly improved visual and keratometry outcomes in both children and adults.

The Impact of Sealing the Upper Mask Edge on Ocular Surface Stability and Dry Eye Symptomatology

First Author: Sridevi NAIR
Co-Author(s): Manpreet KAUR, Jeewan TITIYAL

Purpose: To study impact of sealing upper mask edge on the ocular surface stability among N95 mask users.

Methods: Prospective interventional cohort study (pre-post study) enrolled 40 healthcare workers (40 eyes) regularly using N95 masks at the workplace. Pre-intervention visual acuity, quality (using ray tracing aberrometry), ocular surface stability and subjective dry eye score were assessed at the end of an 8-hour shift; the subjects used an N95 face mask without sealing the upper mask edge. Taping the upper edge of N95 mask to the nasal bridge was performed in all subjects, and post-taping assessment of the ocular surface was performed after an 8-hour shift. Primary outcome measures were changes in ocular surface stability and symptoms. Secondary outcomes were visual acuity and quality.

Results: Mean age of the cohort was 25.5 ± 3.8 years. Post-intervention, tear break-up time improved from 7.3 ± 3.7 to 8.5 ± 4.3s (p<0.001), tear-film lipid layer thickness improved from 44.7 ± 15.2 to 55.9 ± 17.2 µm (p<0.001) and tear meniscus height increased from 175.3 39.7 µm to 188.4 ±44.6 µm (p=0.01). Symptom improvement (questionnaire based) was reported by 70% of the subjects. There was no significant difference in visual acuity (p=0.18), higher order aberrations (p=0.33), Strehl ratio (p=0.21) or Schirmer I score (p=0.60) after taping the mask edge.

Conclusions: Sealing the upper mask edge leads to better ocular surface stability with 70% of N-95 mask users reporting an

improvement in their dry eye symptoms.

The Ocular Surface Safety of Topical Levofloxacin 1.5% versus Topical Moxifloxacin 0.5%

First Author: Solehah JEFFREY
Co-Author(s): Mae-lynn catherine BASTION, Wan Haslina HALIM, Norshamsiah MD DIN, Mushawiahti MUSTAPHA

Purpose: This is a prospective single blinded clinical trial comparing the clinical safety of levofloxacin 1.5% against moxifloxacin 0.5% on the corneal surface after topical administration in patients who received intravitreal injections.

Methods: Study subjects were randomly divided into 2 groups which received either topical Levofloxacin 1.5% or topical Moxifloxacin 0.5% of 4 hourly duration for two weeks, followed by 6 hourly for the following 2 weeks. Parameters studied at baseline and follow-up are tear break-up time (TBUT), cornea and conjunctival surface sign (CCSS)' Schirmer's test, average non-invasive tear break-up time (NITBUT), bulbar redness, and tear meniscus height (TMH).

Results: A total of 116 subjects were analyzed. 58 received Levofloxacin 1.5% while 58 received Moxifloxacin 0.5%. There was no difference between both groups for CCSS, TBUT, NITBUT and TMH at baseline and at follow-up, and there was no within-group difference after 4 weeks of application of either eyedrop. Schirmer's test shows improvement after the application of topical Levofloxacin 1.5%. There was no significant difference in both groups at baseline between levofloxacin group and moxifloxacin group for redness analysis. There was a significant reduction in the redness score after application of topical levofloxacin group as well as in the topical moxifloxacin group.

Conclusions: This study demonstrates topical levofloxacin 1.5% is safe for the ocular surface. All ocular parameters showed Levofloxacin 1.5% is comparable to topical moxifloxacin 0.5% after 4 weeks of instillation. Levofloxacin 1.5% showed improved Schirmer test at follow-up, and both antibiotics show improvement in conjunctival hyperaemia post-application.

The Repeatability of Corneal Topography Measurements in Severe Dry Eye Disease

First Author: Soner GUVEN

Purpose: To determine the repeatability of corneal topography measurements in severe dry eye disease (DED). A comparison of corneal topography parameters between severe DED and healthy subjects was a secondary goal of this study.

Methods: Sixty-nine patients with severe DED and 46 healthy subjects were enrolled in the study. All participants underwent repeated corneal topography measurements with Pentacam (Oculus, Germany) within a half-hour time. Only the right eyes of the participants were used in statistical analysis. The repeatability of corneal parameters was assessed with the intraclass correlation coefficient (ICC).

Results: The mean age of dry eye patients and healthy subjects were 40.8±13.2 (17-66) and 39.8±8.2 (18-61) years (p:0.604) respectively. No significant differences were found between severe DED and control groups according to analyzed corneal parameters (p:>0.05). All ICCs were greater than 0.9 in the severe DED group (p:<0.001).

Conclusions: Corneal topography

measurements are highly repeatable in severe DED with Pentacam. This is the first report about this topic. Nonetheless, further studies are needed with different topography devices for validation.

The Sting of a Honey Bee: A Rare Cause of Keratitis

First Author: Ming-hwei TSAI
Co-Author(s): Chia-yi LEE

Purpose: To report a case of keratitis caused by an ocular bee sting.

Methods: A case report and literature review.

Results: A 25-year-old male without previous systemic diseases suffered from an accidental bee sting on his right cornea 4 hours ago before visiting our outpatient department. The initial BCVA of his right eye was 20/33. Slit-lamp examination revealed right conjunctival congestion and chemosis with cornea infiltration with a bee sting on it. There was no anterior chamber reaction noted. The bee sting was removed and topical levofloxacin eyedrop and triamcinolone ointment were prescribed. However, he revisited our outpatient department the next day. Cornea infiltration increased and hypopyon was also noted with anterior chamber cell 2+. Thus he was admitted to our wards for intensive treatment. Topical antibiotics with vancomycin 50mg/ml and amikacin 50mg/ml with topical 0.3% atropine and rinderon were prescribed. Oral prednisolone 5mg twice a day was also prescribed. His condition was better after medication control with hypopyon disappeared and infiltration decreased. After 3 months of outpatient department follow-up, despite corneal scar, his right eye BCVA improved to 20/20.

Conclusions: We reported a young patient presented with a corneal bee sting. Removal of corneal bee sting is suggested for all cases, and they should be monitored for complications induced by toxins.

Therapeutic Benefits of Blinking Exercises in Dry Eye Disease

First Author: Andy KIM
Co-Author(s): Jennifer CRAIG, Jason LEE, Alex MUNTZ, Michael WANG

Purpose: Blinking frequency and completeness are reduced during digital screen exposure, compromising meibum secretion and distribution, causing tear film instability and leading to dry eye disease (DED). This study evaluates the benefits of blinking exercises in modifying blink patterns and improving clinical signs and symptoms of DED.

Methods: Fifty-four participants with DED were recruited, and given instructions to perform a ten-second cycle of blinking exercises every 20 minutes during waking hours for four weeks. Symptoms and blinking patterns, as well as tear film and ocular surface parameters, were assessed at baseline and on day 28 and compared.

Results: Forty-one participants completed the study, reporting an average of 26 daily blinking exercise cycles. The 5-item Dry Eye Questionnaire (DEQ-5) and Ocular Surface Disease Index (OSDI) symptom scores improved from 11±4 to 7±3 ($p<0.001$) and 36±18 to 22±17 ($p<0.001$) respectively. Non-invasive tear film break-up time improved from 6.5±2.4 to 8.1±4.8 seconds ($p<0.04$) and lipid layer quality improved by one grade on the Guillon scale ($p=0.04$). The proportion of incomplete blinks decreased from 54±36 to 34±29 percent ($p<0.001$). There was no significant change in the tear meniscus height or tear film lipid layer thickness as measured

by the LipiView.

Conclusions: Blinking exercises can modify poor blink patterns and improve dry eye symptomology, with modest changes in objective measures of tear film quality. Recommending such blink exercise routines may improve blink habits in patients and bear protective effects against the impact of digital devices on tear film quality and the onset and evolution of DED.

Therapeutic Efficacy of Lipid and Non-Lipid Eye Drops for Dry Eye Disease Management

First Author: Alex MÜNTZ
Co-Author(s): Jennifer CRAIG, Wolffsohn JAMES, Lyndon JONES, Michael WANG, Mark WILLCOX

Purpose: To evaluate the six-month therapeutic efficacy of a lipid and a non-lipid based artificial tear supplement for the management of dry eye disease (DED).

Methods: Ninety-nine participants (64% females; aged 44±16 years) with DED were enrolled in a prospective, multicentre, double-masked, parallel-group, randomized controlled trial, and self-administered either a lipid-based (Systane® Complete) or a non-lipid-based (Systane® Ultra) drop four times daily for six months. Symptoms and tear film and ocular surface parameters were assessed monthly against global consensus diagnostic criteria. Patient compliance was determined by returned bottle weight.

Results: Significant improvements were noted, in both study groups, in symptoms after one month (all $p<0.05$), lid wiper epitheliopathy after two months ($p\leq0.01$), and non-invasive tear film breakup time (NIBUT) and ocular surface staining after four months ($p<0.05$). By six months, one in five participants no longer met the diagnostic criteria for DED. By one month, 70% of participants had responded favorably to their allocated treatment (with an improvement of >4s in NIBUT and/or ≥4.5 points in OSDI from baseline), with a mean improvement in OSDI symptomology score of 16.6 ± 12.8 points, and 4.5 ± 5.6 s in NIBUT.

Conclusions: Lipid and non-lipid based tear supplements offer rapid symptomatic relief after one month of regular, daily use. Further profound, structural improvements in tear film and ocular surface integrity become apparent after continued use for several months, suggesting that patient compliance with regular, repeated application may help restore tear film and ocular surface homeostasis, to achieve a therapeutic, rather than solely palliative effect.

To Determine Whether Clinical Signs of Infectious Pythium Keratitis can be Used to Differentiate the Causative Organism from a Clinical Picture

First Author: Sujata DAS
Co-Author(s): Rakhi DCRUZ

Purpose: To determine whether clinical signs of infectious Pythium keratitis (PK) can be used to differentiate the causative organism from a clinical picture.

Methods: We selected a few senior cornea consultants-28 and cornea fellows-18, who gave written consent to complete a photographic survey via google platform of clinical slit-lamp pictures of PK. Corneal photography was performed using a standard protocol on initial presentation. A total of thirty photographs of eyes with culture-proven Pythium and fungal keratitis were selected from EMR. The proforma required an opinion to differentiate cases of Pythium keratitis from other aetiologies.

Results: The participants were able to accurately distinguish pythium from fungal etiology 52% (95% confidence interval, 47% to 57%) of the time. The consultant group was able to differentiate the etiologies in 52% (95%CI, 44% to 58%) of photographs, whereas the fellow group was successful in 53% (95% CI, 46% to 61%) of cases. The two clinical groups (consultants and fellows) had a slightly different success rate in distinguishing bacterial from fungal keratitis, but the difference was not statistically significant(p=0.5%). The clinical sign most commonly used by the majority of participants in identifying the pythium pictures were tentacles and peripheral guttering.

Conclusions: PK is often misdiagnosed as typical mycotic keratitis, because of its morphological similarity. The use of antifungal medications in these cases results in treatment failure, and late surgical interventions have poor anatomical outcomes. Unfortunately, clinicians in this study were not accurate in cases of uncommon organisms, henceforth highlight the need for more awareness regarding pythium keratitis manifestations.

Toxic Epidermal Necrolysis: Ocular Manifestations

First Author: Pushkar BHADANI
Co-Author(s): Rituparna GHOSH, Mitesh JAIN, Arijeet ROY, Sheesham SINGH

Purpose: To report a case of toxic epidermal necrolysis (TEN) due to weedicide exposure and its ocular features.

Methods: A 45 year old female presented with painful skin lesions along with redness, watering, discharge, severe grittiness in both eyes since 8 days after exposure to some weedicide in both eyes and accidental oral consumption (minute quantity). Ocular examination (both eyes) revealed hemorrhagic crusting of eye lid, conjunctival congestion (palpebral and bulbar), conjunctival pseudomembrane, fluorescein stain positive lesions over conjunctiva and cornea. Systemic symptoms included hemorrhagic crusting of lips, multiple erosion over hard palate, difficulty in swallowing, symmetric bilateral multiple erythematous macules present all over the body sparing soles, genital mucosa involved. Pseudomembrane removed; sent for culture and sensitivity.

Results: Clinical features suggestive of TEN as >30% cutaneous involvement with predominant ocular features suggestive of high ocular morbidity.

Conclusions: Aggressive ocular emergency management is main motive in conjunction to cutaneous management. Mucous membrane grafting for forniceal reconstruction can be planned for chronic disease. Corneal rehabilitation can be done by superficial keratectomy for keratinization, lamellar corneal grafting for superficial scarring, amniotic membrane grafting, limbal stem cell transplantation, and keratoprosthesis implantation in end-stage disease.

Treatment Failure due to Non-compliance with Multi Drugs in Fungal Corneal Ulcer

First Author: Rokhsanda REHNUMA
Co-Author(s): Mahfuza AKTER, Mujtahid Mohammad HOSSAIN, Syeed KADIR, Shafiul MOSTAFIZ, Md QUADER

Purpose: To assess the non-compliance with multi drugs for the treatment failure of fungal corneal ulcer.

Methods: This prospective observational study was conducted over 100 fungal corneal

ulcer patients attending cornea outpatient department for one year. Patients who met the selection criteria were enrolled in the study. They underwent detail ocular and systemic examination as well as relevant investigations. They were followed up on day 7, day 15, 1 month and 2 months from the date of enrollment. Visual acuity, size of ulcer, grade of opacity, level of hypopyon and compliance of drug (measured by MMAS-8)- all these data were recorded in a pre-designed data collection sheet and were analyzed.

Results: Out of 100 corneal ulcer patients, 47 were found as treatment failure. On bivariate analysis, patients' educational status, place of residence, type of trauma and patients' compliance were found as potential risk factors for treatment failure. From the respondents, frequency and multi drugs were noted as the main causes for non-compliance. The status of compliance of the patients was found ¬statistically individual determinant for the outcome of the medical treatment. Patients with lower compliance had 4.4 times more chance to be failed [OR:4.4,95% CI 1.4-13.2, p=0.008] after medical treatment than medium compliance patients.

Conclusions: Non-compliance is an important factor for the causation of treatment failure in corneal ulcer. To enhance compliance, the focus should be on reduction of dose frequency, avoidance of multi drugs, patients' knowledge and understanding of the disease.

Use of Lifitegrast 5% Ophthalmic Solution for the Treatment Dry Eye Disease in Patients with Bilateral Pterygia

First Author: Randal PHAM
Co-Author(s): Isabel NGUYEN, Aarin PHAM-HOANG, John SHEPPARD, Burton WORRELL

Purpose: To evaluate the use of lifitegrast in the treatment of dry eye disease in patients with bilateral pterygia.

Methods: We analyzed 34 eyes from 17 Vietnamese American patients with dry eye disease (DED) and bilateral pterygia. One eye was randomized to a non-reusable vial of 5% lifitegrast ophthalmic solution and the contralateral eye to recappable non-preserved artificial tears (RNPAT). Patients were followed every 2 weeks for 84 days. The patient reported symptoms at 84 days were assessed using McNemar's test. Slit-lamp photographs using conjunctival and corneal staining were used to assess for DED. Pterygium photographs without staining were used to assess its severity. Photographs were graded on a 5-point scale and compared between groups using Wilcoxon signed ranked test at baseline, between 12-84 days, and between 56-84 days.

Results: Symptoms including dryness, grittiness, and eye fatigue improved in both groups over 84 days without significant difference. Eyes treated with RNPAT were significantly improved from baseline to 12-84 days using fluorescein staining. Lissamine staining revealed that eyes treated with lifitegrast were superior to RNPAT at 12-84 days. Both were effective in improving pterygium severity when compared from baseline to 12-84 days and 56-84 days. Lifitegrast was significantly superior to RNPAT for improving pterygium gradings between 12-84 days but not at 56-84 days.

Conclusions: We did not observe a significant difference in symptoms between the two groups, but lifitegrast and RNPAT effectively reduced clinical signs of DED and pterygium, with lifitegrast superior over 84 days.

Evolving Academia, Research, Teaching and Education in Ophthalmology in the era of COVID-19

A Case of Retinal Vasculitis That Might be Related to SARS-CoV-2 Vaccine

First Author: Rongle ZHOU
Co-Author(s): Huping SONG

Purpose: To report a case of retinal vasculitis, which might be related to SARS-CoV-2 vaccine.

Methods: A 23-year-old healthy female presented with a temporal visual field defect and blurred vision in her left eye for 1 week. She had no history of rheumatic diseases or infections. Visual acuity of the right eye was HM, her anterior segment was nearly normal, a few vitreous cells vascular sheathing in the peripheral retina was found. Fundus fluorescence angiography(FFA), optical coherence tomography (OCT), CT scan, blood laboratory tests were performed.

Results: After the examinations above, retinal vasculitis was diagnosed. No definite immune disease or infection was found. Through additional history taking, a novel cause was vaccination, the patient got vaccinated 8 weeks ago (SARS-CoV-2 Vaccine, Vero cell, inactive), and she got a fever 4 weeks after vaccination. So her retinal vasculitis might be related to SARS-CoV-2 vaccination. Methylprednisolone was used intravenously for 5 days, and followed by prednisone reduced gradually. Her visual acuity was 20/30, and macular edema disappeared, visual field improved, after treatment.

Conclusions: Vaccination to SARS-CoV-2 might cause retinal vasculitis.

Extraocular Muscle Anatomy Teachings for Ophthalmology Residents on Goat Eyes

First Author: Deepsekhar DAS
Co-Author(s): Sujeeth MODABOYINA, Rajeswari THANGAVEL

Purpose: To demonstrate the possibility as well as the feasibility of extraocular muscle anatomy simulations on goat's eye, for resident teaching in ophthalmology.

Methods: To our ophthalmic surgical wet lab, goat's eyes were procured from a local slaughterhouse. The eyes were then inspected for integrity, clarity, and residual extraocular muscle tissues, and then, the eyes with more than 15 millimeters of extraocular muscles were considered for demonstration. The natural insertions were explored, where a maximum of three recti and a superior oblique seemed like human eyes. Furthermore, to supplement the inferior oblique and the missing recti muscles, residual muscles stumps were harvested from the other eyes to complete the anatomical module. The eyes were then placed within a mannequin head and classical teachings were carried out.

Results: All four recti muscles and the two oblique muscles were successfully simulated on the goat's eye on more than 10 occasions. The tenon's-muscle relation, muscle insertion and their anatomical orientation were reliably taught. In addition, simple surgeries like recession, resection, and plication were also demonstrated to improve the overall understandings of the strabismus subspecialty.

Conclusions: On goat eyes, all the extraocular muscle anatomies can be successfully

simulated on par with human eyes for residents training in ophthalmology.

Impact of the COVID-19 Pandemic on Ophthalmology Training in the Philippines: A Nationwide Cross-Sectional Study among Trainees

First Author: Melissa ORTEZA-SORRA
Co-Author(s): Teresita CASTILLO, Bryan Vincent MESINA, Darby SANTIAGO

Purpose: This study was designed to assess the impact of the COVID-19 pandemic on ophthalmology training in the Philippines from the point of view of ophthalmology residents and fellows across the country.

Methods: This was a national survey study conducted among current ophthalmologists-in-training in the Philippines. An electronic questionnaire was designed and disseminated via SurveyMonkey® to trainees across the country. Descriptive statistics were used to analyze the data.

Results: A total of 158 trainees (138 residents and 20 fellows) were randomly sampled and responses were collected from all ophthalmology institutions across the Philippines. The overall impact of the COVID-19 pandemic on ophthalmology training and trainees' mental health was described as "negative" by the majority at 78.48% and 69.62%, respectively. Interestingly, mixed responses on whether the trainees felt that they achieved the necessary competencies of their respective year levels were received (35.45% "agree," 37.97% "neither agree nor disagree," and 26.58% "disagree"). Most trainees reported a significant decrease of >50% with regards to their clinical activity (67.08%), surgical activity (75.95%), and in-person interaction with their consultants at the clinics (94.30%) and operating room (56.30%). In contrast, the majority of trainees reported a significant increase of >50% in their didactic learning activities (75.32%) which is in agreement with an almost complete shift (99.37%) of didactic activities from in-person settings to online platforms.

Conclusions: Based on the perspective of ophthalmologists-in-training, there is a need for Philippine ophthalmology training programs to re-evaluate requirements and continuously adapt to technology-based training tools in order to preserve the effectiveness of residency and fellowship training.

Implementation of a Research Curriculum for Ophthalmology Residents

First Author: Ana PALIS

Purpose: Residents of a significant number (22%) of residency programs in Latin America participate with little frequency in clinical research, according to a survey conducted in 138 regional programs. This contributes to the scarcity of publications in the region: a retrospective study evaluating scientific production in Latin America from 2006 to 2015, Carrillo Galván et al found a total of 1,510 articles published among 20 countries, compared to 2,253 articles published in the United States in the same period of time. The purpose of this study is to present the authors' experience in incorporating, implementing and developing a research curriculum in a residency training program.

Methods: The authors describe the steps in the implementation of a research program for residents.

Results: The research curriculum was implemented 6 years ago with the development

of 3 research protocols. Today, 68 protocols have been evaluated, with the current development of 40 research studies; 22 studies have been presented in medical congresses and 10 have been published in peer-reviewed journals.

Conclusions: The commitment of the program's leadership and all the departmental members is needed to strengthen research in a residency program, as well as coordination by a faculty member with expertise in clinical research to support residents in methodological issues, and assigning protected time in the curriculum.

Ophthalmology Residency: During and After COVID-19 Pandemic

First Author: Rajneel BHATTACHARJEE

Purpose: To analyze the effects of COVID-19 pandemic on academics of ophthalmology residents, measures taken and future prospects.

Methods: Interview based study over the impact of COVID-19 pandemic on ongoing learning of the ophthalmologists-in-training, analyzing measures to curb the loss and ideas to cope with the after effects.

Results: Statistical analysis with Likert scale and graphical representation revealed interesting results: high pressure working condition, no seminar, reduced OPD and surgical volume.

Conclusions: There are ways to curb the losses like supportive colleagues, didactic teaching programs, virtual reality surgical simulators, etc. Many changes in practice during the pandemic will be accelerated, sustained and will become part of the new normal after the COVID-19 pandemic.

Profile of Ocular Trauma Cases in a Tertiary Care Hospital in Central India during COVID-19 Pandemic

First Author: Riddhi VORA
Co-Author(s): Rekha KHANDELWAL

Purpose: To study the profile of ocular trauma cases presenting at a rural-based tertiary care hospital in Central India.

Methods: A retrospective observational study of ocular trauma patients presenting during the Covid-19 pandemic was done (March 2020 to December 2020). A review of records was done for demographics, cause of injury, nature of injury, place of injury, presenting vision and ocular findings. Trauma was classified according to Birmingham Eye Trauma Terminology System (BETTS) classification and the Ocular Trauma Score (OTS) score was calculated.

Results: There were 23 patients of ocular trauma who reported during the study period. The mean age was 43.43 ± 12.73 years with a male: female ratio of 6.6:1. The common site of trauma was at home setting/farm. Open globe injury was found in 91.3% patients. The most common object causing trauma was metal (43.5%). Visual acuity (VA) < 3/60 on presentation was seen in 86.9% patients. Most of the patients did not visit the hospital after primary repair/care in spite of regular reminders. Only 4 patients (17.3%) reported for first follow-up at one week and later were lost to follow-up.

Conclusions: Ocular trauma was common in young males and in-home settings. The majority of patients had open globe injury with poor VA on presentation but were lost to follow-up after primary care due to the

Covid-19 pandemic. The current pandemic has severely disrupted the close follow-up and rehabilitation of trauma cases and is likely to add to the burden of blindness.

Raspberry Pi System for Streaming and Pictures for Ophthalmologic Teaching and Communications

First Author: Yejun HONG
Co-Author(s): Michael Ying Kit MAK

Purpose: The current limitations of easily sharing images from the ophthalmic slit lamp exam present a challenge in medical education. Our RASPI project addresses this restriction by utilizing an affordable minicomputer and 3D-printed custom camera attachment for capturing high-quality images and videos from the slit lamp to share with ophthalmic learners.

Methods: A proof of concept study. We utilized a Raspberry Pi® (Cambridge, UK) minicomputer and its eight-megapixel camera module. With Autodesk Fusion 360® we designed an adapter and 3D-printed it on an Ultimaker 3® that could mount the Raspberry Pi and its camera to the slit lamp side teaching scope.

Results: Pictures and videos of the anterior segment as well as of the posterior pole were taken with reliable quality. The live video streaming set could also be streamed to a remote laptop. The RASPI could also be installed to a microscope in the wet lab for suturing and procedural demonstrations for resident training. We coded the computer to allow cell phones to be able to remotely control the camera to take pictures, videos as well as stream a live examination to an audience of medical students. The overall apparatus cost $320 (CAD).

Conclusions: RASPI was able to take high-quality photos and videos of ophthalmic pathology during a slit lamp exam. It has the capability to stream online, with patient consent, for medical training. We plan to release the CAD file for the RASPI adapter as well as the assembly instructions as an open-source project for medical education in low-resource settings.

The Impact of COVID-19 on Ophthalmic Practice in Bangladesh: A Cross-Sectional Study

First Author: Khairun NASA
Co-Author(s): Mahziba CHOWDHURY, Mohammad MOSTAFA HOSSAIN, Riffat RASHID, Sharifa MITU, Muhammad MONIRUZZAMAN

Purpose: To assess the interference of patient care due to COVID-19 related restrictions and to formulate the future guidelines.

Methods: This cross-sectional online survey based study was carried out among the ophthalmologists of Bangladesh in the early lock down period (01 April to 30 April) 2020. We circulated a pre-planned questionnaire through social media and email to 150 ophthalmologists in Bangladesh. All online responders are included in this study.

Results: Total 93 ophthalmologists responded to the study. 92.5% ophthalmologist had practiced in the early lockdown period in 2020. Most of the ophthalmologist were seeing the patients with red eye (40.9%), ocular trauma (40.9%), acute infections and inflammations (35.5%), and vision loss (31.2%). 80.6% of responders informed that they wear mask, gloves, and head cap during patient evaluation. 51.6% used personal protection equipment. 55.9% used a breath shield with the slit lamp settings. A detailed history regarding recent fever, cough, travel information, quarantine, COVID-19 test result and other relevant

situation had been taken from the patients by 14% of ophthalmologists. 60.4% maintained hand wash and disinfectant facilities for the patients. 85.7% of ophthalmologists had ensured for wearing the mask to all patients before entering the examination and consultancy room. 86% of ophthalmologists of our study had performed their surgeries for ophthalmic emergency.

Conclusions: Wearing mask is an important tool to prevent transmission of COVID-19 for both patients and ophthalmologists in working place. Maintaining normal ophthalmic practice and surgery are challenging during COVID-19 pandemic. With few precautions and modification of working formulation may overcome these scenarios.

Trends of Publication Delay in International Ophthalmologic Journals during the Period of 2000 to 2020

First Author: Haoyu CHEN
Co-Author(s): Fangyi LING

Purpose: The length of the publication cycle plays a key role in the speed of knowledge dissemination and the evaluation of journals. This study aims to investigate the trends of publication delay of the papers published in international Ophthalmological journals in the past two decades, as well as the correlation between publication delay and impact factor.

Methods: Web Scraper was used to obtain the publication history information of all articles published from 2000 to 2020 on the ophthalmological journals indexed in the 2019 Journal Citation Reports. The time from submission to acceptance, from acceptance to publication, and from submission to publication was calculated if the information is available. The median and interquartile range (IQR) were calculated for each journal in each year.

Results: A total of 83958 articles from 48 ophthalmic journals were included in the study. The time from submission to acceptance decreased from 147 days (IQR: 105-228) in 2000 to 119 days (IQR: 73-190) in 2020. The time from acceptance to publication decreased from 124 days (IQR: 101-141) in 2000 to 32 days (IQR: 13-78) in 2020. And the time from submission to publication decreased from 279 days (IQR;224-367) in 2000 to 164 days (IQR: 107-245) in 2020. There is a correlation between submission to publication or acceptance to publication with 2 -years or 5-years impact factor (r ranged from -0.29 to -0.37, $p<0.05$).

Conclusions: The publication delay of journals in ophthalmology is generally shorter year by year. The ophthalmic journals with higher 2-year or 5-year impact factors had faster publishing speed.

Triangle Sign

First Author: Krati GUPTA
Co-Author(s): Saurabh DESHMUKH

Purpose: The purpose of this study was to define a novel sign in ophthalmology, the Triangle sign, and assess its sensitivity and specificity in differentiating the similar-looking Morgagnian cataract with the resorbed cortex from the inferiorly subluxated lens.

Methods: A total of 118 were included in this study, ten with Morgagnian cataract with resorbed cortex and eight with an inferiorly subluxated cataractous lens. The sensitivity and specificity of this sign in differentiating Morgagnian cataract with resorbed cortex from an inferiorly subluxated lens were assessed.

Results: A statistically significant sensitivity and specificity of >98% was observed with this sign in differentiating these two conditions.

Conclusions: This novel sign of great help in differentiating these two similar conditions, especially for the residents in training.

Glaucoma and glaucoma surgery

A 2-Year Pooled Analysis of the MicroShunt in Patients with Primary Open-Angle Glaucoma

First Author: Juan BATLLE
Co-Author(s): Henny BECKERS, Isabelle RISS, Omar SADRUDDIN

Purpose: The MicroShunt (8.5-mm long, 70-µm lumen) is made from poly(styrene-block-isobutylene-block-styrene) or SIBS, a highly biocompatible material. This analysis assessed the pooled 2-year results of three studies that investigated the safety and effectiveness of the MicroShunt in patients with primary open-angle glaucoma (POAG).

Methods: Three prospective, non-randomized, single-arm studies, conducted across sites in Europe and the Dominican Republic, recruited patients aged ≥18 to ≤85 years with POAG inadequately controlled on maximum tolerated medical therapy and with medicated intraocular pressure (IOP) ≥18 mmHg to ≤35 mmHg (NCT00772330, NCT01563237, NCT02177123). The MicroShunt was implanted ab externo, alone or in combination with cataract surgery, with Mitomycin C (0.2 or 0.4 mg/mL) for 2–3 minutes. Two-year outcomes included reduction in medicated IOP, glaucoma medication use, and adverse events (AEs). Data collected after reoperation were excluded from the analysis.

Results: The MicroShunt was implanted in 125 patients. Mean ± standard deviation (SD) IOP was reduced from 22.5±4.2 mmHg at baseline to 13.8±4.0 at Year 2 (change: –8.9 mmHg). The mean ± SD number of glaucoma medications was reduced from 2.2±1.2 to 0.5±0.9 (72.1% of patients medication-free at Year 2). Common (≥5%) nonserious AEs included investigator-reported increased IOP (24.0%), hypotony (IOP <6 mmHg at any time; 13.6%), keratitis (10.4%), and hyphema (9.6%). No long-term sight-threatening AEs were reported. By Year 2, 12 (9.6%) patients had undergone glaucoma reoperation.

Conclusions: Following MicroShunt implantation in three studies, mean IOP and glaucoma medications were reduced from baseline for up to 2 years.

Ab Interno versus Ab Externo Microcatheter-Assisted Circumferential Trabeculotomyin Treating Patients with Primary Open-Angle Glaucoma

First Author: Huaizhou WANG
Co-Author(s): Ningli WANG

Purpose: To comparethe outcomesofabinterno and abexterno circumferential trabeculotomy in the treatment of POAG.

Methods: A retrospective comparative case series. Primary open-angle glaucoma patients undergoing abinterno (40 patients in Group 1), orabexterno (54 patients in Group 2) circumferential trabeculotomy. Outcomes including intraocular pressure (IOP), glaucoma medications and complications were analyzed. Main outcome measures: IOP, medications and surgical success defined as an IOP of ≤ 21 mmHg and a reduction of IOP ≥ 20% from baseline (criterion A) or IOP ≤ 18 mmHg and a reduction of IOP ≥ 20% from baseline (criterion B) with (qualified success) or

without (complete success) medications.

Results: At 1 year, IOP fell by 37.1% (26.0 to14.8 mmHg) in group 1 and 39.5% (28.5to 15.1mmHg) in group 2. Medications decreased from 3.5 in group 1 and 3.6 in group 2 preoperatively to 0.6 ± 1.0 and 0.3 ± 0.6 postoperatively, respectively. Success rates did not differ significantly between groups based on criterion A (complete and qualified success: 68.7% and 81.9% in group 1, and 75.3% and 90.4% in group 2, respectively) or criterion B (complete and qualified success: 58.2% and 79.3% in group 1, and 69.5% and 88.4% in group 2, respectively).

Conclusions: Ab interno circumferential trabeculotomy achieved comparable outcomes to abexterno trabeculotomy and may be a reasonable surgical option for patients with primary open-angle glaucoma.

Acute Intraocular Pressure Elevation Associated with Blood in Schlemm's Canal after Strabismus Surgery

First Author: Sunee CHANSANGPETCH
Co-Author(s): Kidakarn MEETHONGKAM, Parnchat PUKRUSHPAN, Wisaruta WUTTHAYAKORN

Purpose: To report a case of acute increased intraocular pressure (IOP) associated with blood in Schlemm's canal following strabismus surgery.

Methods: An interventional case report.

Results: A 43-year-old female presented with acquired comitant esotropia. The patient had undergone an uneventful bilateral medial rectus recession and right lateral rectus resection operation under general anesthesia. Routine post-operative follow-up at day 3 detected a marked chemosis at the temporal side of the conjunctiva, an elevated IOP of 30 mmHg, and the presence of blood in Schlemm's canal in the temporal angle of the right eye. Episcleral venous outflow impairment was hypothesized to be the cause of secondary ocular hypertension in this patient. IOP was controlled with anti-glaucoma drops. Conjunctival chemosis, IOP, and blood in Schlemm's canal gradually decreased, and all topical medications were ceased at 11 weeks after the surgery.

Conclusions: An acute IOP elevation can be a complication after strabismus surgery. The presence of blood in Schlemm's canal suggests that the cause is impairment of episcleral venous flow. Although the episode can be transient, this report underlines the importance of IOP examination during the early post-operative period.

Analysis of Intraocular Pressure Changes after Intravitreal Dexamethasone Implant: A Retrospective Study

First Author: Shyam Sundar DAS MOHAPATRA
Co-Author(s): Prafulla SARMA

Purpose: To analyze intraocular pressure (IOP) changes following the use of intravitreal dexamethasone (Ozurdex, 0.7mg) implant.

Methods: Retrospective analysis of case sheets of 50 consecutive patients who had received intravitreal dexamethasone (Ozurdex, 0.7mg) implant was carried out in a tertiary eye care hospital. Total of 50 patients (total 65 eyes), mean age of 62.08 years, were included in this study.

Results: Most common indication for intravitreal dexamethasone (Ozurdex, 0.7mg) implant was diabetic macular edema (DME). Out of the 65 eyes, IOP rise (>21 mmHg) occurred in 29.23% eyes, of which 31.57% eyes had IOP spikes >30 mmHg. In the IOP-rise group, 78.94% and 21.05% had maximum

IOP rise in 4 week and 12 week follow-up respectively; 63.15% were controlled with antiglaucoma medication, of which 66.66% required 2 medications.

Conclusions: Intravitreal dexamethasone (Ozurdex, 0.7mg) can cause rise in IOP. Maximum IOP rise was noted within first 4 weeks of intravitreal dexamethasone (Ozurdex, 0.7mg) implantation. Close follow-up, IOP monitoring and timely intervention is necessary for successful management.

Anterior Choroidal Thickness Increased in Primary Open-Angle Glaucoma and Primary Angle-Closure Disease Eyes Evidenced by Ultrasound Biomicroscopy and SS-OCT

First Author: Song YUNHE
Co-Author(s): Kai GAO

Purpose: To compare the anterior and posterior choroid thickness (ACT and PCT, respectively) in primary open-angle glaucoma (POAG), primary angle-closure disease (PACD), and healthy control subjects.

Methods: A total of 29 POAG patients (56 eyes), 37 PACD patients (64 eyes), and 34 healthy volunteers (68 eyes) were enrolled in this study. Ultrasound biomicroscopy (UBM) was used to measure the ACT at a distance of 4 mm from the root of iris in all participants. ACT and PCT were measured using UBM and swept-source optical coherence tomography (SS- OCT), respectively. A 4-mm distance from the iris root was self-defined as the anterior choroid that well-matched the real anterior choroid.

Results: The mean ACT measured by UBM was 0.45 ± 0.057 mm in POAG eyes, 0.38 ± 0.050 mm in PACD eyes, and 0.30 ± 0.050 mm in healthy eyes. Both the POAG and PACD eyes had a thicker anterior choroid than healthy eyes ($P < 0.01$). Compared to early/moderate-stage eyes of POAG, advanced-stage eyes had similar ACT ($P > 0.05$). PACG eyes had a thinner anterior choroid than PAC/PACS eyes ($P < 0.05$). However, no statistically significant difference was noted for POAG, PACD, and normal control eyes' PCT using SS-OCT ($P > 0.05$).

Conclusions: POAG/PACD eyes had a thicker anterior choroid than the controls. However, there was no significant difference in the PCT among the groups. The anterior choroid might play a role in the pathogenesis of glaucoma, warranting further investigation.

Anterior Choroidal Thickness Increased in Primary Open-Angle Glaucoma and Primary Angle-Closure Disease Eyes Evidenced by Ultrasound Biomicroscopy and SS-OCT

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0.050 mm in PACD eyes, and 0.30 ± 0.050mm in healthy eyes. Both the POAG and PACD eyes had a thicker anterior choroid than healthy eyes (P <0.01). Compared to early/moderate-stage eyes of POAG, advanced-stage eyes had similar ACT (P > 0.05).PACG eyes had a thinner anterior choroid than PAC/PACS eyes (P < 0.05). However, no statistically significant difference was noted for POAG, PACD, and normal control eyes' PCT using SS-OCT (P > 0.05).

Conclusions: POAG/PACD eyes had a thicker anterior choroid than the controls. However, there was no significant difference in the PCT among the groups. The anterior choroid might play a role in the pathogenesis of glaucoma, warranting further investigation.

Association between Daily Niacin Intake and Glaucoma: National Health and Nutrition Examination Survey

First Author: Teerajet TAECHAMEEKIETICHAI
Co-Author(s): Sunee CHANSANGPETCH, Shan LIN

Purpose: To determine the relationship between dietary intake of niacin and glaucoma using the data from 2005 to 2008 National Health and Nutrition Examination Survey (NHANES), a large population-based study in the United States.

Methods: Subjects aged 40 years and older who participated in the dietary intake interview and vision health questionnaire of NHANES were included in the study. Glaucoma diagnosis by self-reported was utilized. Additionally, glaucoma diagnosis by fundus image and Rotterdam criteria was used in subjects with available qualified retinal imaging. Survey logistic regression analyses were used to examine the association between daily niacin consumption and glaucoma.

Results: A total of 5,406 participants were included in the study. There was a significant decrease in the odds of self-reported glaucoma in the third (OR 0.55, 95%Cl 0.41-0.74; p<0.001) and fourth (OR 0.59, 95%Cl 0.36-0.96; p=0.034) quartiles of daily niacin consumption, which equated to 21.01 to 28.22 mg/day and greater than 28.22 mg/day, respectively. A similar trend was found on the fundus image of subjects with niacin intake in the third (OR 0.42, 95%Cl 0.25-0.72; p=0.002) and fourth (OR 0.36, 95%Cl 0.20-0.67; p=0.002) quartiles. After adjusting for covariates, the odds of fundus image remain significantly lower for niacin intake in the third (OR 0.17, 95%Cl 0.08-0.37; p<0.001) and fourth (OR 0.22, 95%Cl 0.10-0.49; p=0.001) quantile levels. For the Rotterdam criteria, there was no significant association between glaucoma and daily niacin consumption.

Conclusions: Greater niacin intake may be associated with a lower chance of developing glaucoma.

Beta-Zone Parapapillary Atrophy and the Standard Automated Perimetry Progression in Perimetrically Normal Eyes of Open-Angle Glaucoma Patients with Unilateral Visual Field Loss

First Author: Xiang FAN
Co-Author(s): Ling-ling WU

Purpose: To explore the progression of standard automated perimetry (SAP) for perimetrically normal eyes of open-angle glaucoma (OAG) and relating factors especially with beta-zone parapapillary atrophy (β-zone PPA).

Methods: OAG patients with unilateral visual field (VF) loss detected by SAP (Octopus, G2 program) were examined with the Heidelberg Retina Tomography (HRT) for β-zone PPA at

baseline. VF was followed for perimetrically normal eyes till it converted to abnormal with repeatable results over 8 years. The progression on SAP between eyes with or without β-zone PPA was compared. Baseline records such as glaucomatous optic neuropathy (GON) rate and parameters on HRT about β-zone PPA, and differences of mean IOP, IOP decrease rate, medications during follow-up between "progression" and "non-progression" were analyzed.

Results: 48 perimetrically normal eyes of 48 patients had a qualifying follow-up. 24 eyes were with β-zone PPA at baseline. 22 eyes developed abnormal SAP after 4 to 90 months, differently between eyes with or without β-zone PPA ($p<0.05$). "Progression" eyes showed greater GON rate, C/D and greater β-zone area at baseline ($p<0.05$), while mean IOP, IOP decrease rate and medications were similar ($p>0.05$).

Conclusions: In perimetrically normal eyes of OAG patients, almost one-half progressed in 8 years on SAP. β-zone PPA especially evaluated by HRT in such eyes at baseline were related to the progression.

Case Series Of Combined Xen Implantation And Phacoemulsification Inchinese Eyes: One-Year Outcomes

First Author: Preethi JEYABAL
Co-Author(s): Marcus ANG, Paul CHEW, Hla Myint HTOON, Katherine LUN, Chelvin SNG

Purpose: The outcome of XEN implantation in Chinese eyes has not been previously reported. The purpose of our study is to evaluate the efficacy and safety of combined cataract surgery and XEN implantation in Chinese eyes with glaucoma.

Methods: We included 31 consecutive Chinese patients who underwent combined phacoemulsification and XEN implantation at our centre. Patients were assessed pre-operatively and post-operatively on days 1 and 7, and months 1, 3, 6 and 12. The intraocular pressure (IOP), glaucoma medication use, Snellen's visual acuity (VA) and complications were assessed at each visit. The Wilcoxon signed rank test for non-parametric data was used for the analysis of IOP and glaucoma medications at baseline versus 12 months after the procedure.

Results: The mean age of the patients was 70±7.9 years and48.4% were male. 12 patients (38.4%) were diagnosed with primary open angle glaucoma and 19 patients(61.3%) were diagnosed with primary angle closure glaucoma. There was a significant decrease in IOP at 12months(12.1±2.6 mmHg) compared with pre-operative medicated(15.6±2.7 mmHg, $p<0.0001$) and unmedicated IOP (22.1±3.6 mmHg, $p<0.001$), as well as a significant reduction in the number of glaucoma medications (1.4±0.6 vs 0.1±0.4, $p<0.0001$). The most common complications were transient hypotony(12.9%) and ptosis(12.9%) and there were no sight-threatening intra-operative or post-operative complications. One patient required additional glaucoma surgery for uncontrolled IOP at 8 months after surgery.

Conclusions: Combined XEN implantation with cataract surgery was effective in lowering IOP and number of glaucoma medications in Chinese eyes for at least 12 months, with a favorable safety profile.

Can We Corroborate Peripapillary RNFL Analysis with Macular GCIPL Analysis? Our 2-Year Experience at a Single-Center Tertiary Healthcare Hospital Using Two OCT Machines

First Author: Shaibaan MULLA
Co-Author(s): Dr.v.s GUPTA, Dr.monika KAPUR

Purpose: To determine whether macular volume and macular GCA measurements in patients are comparable to their RNFL thickness parameters.

Methods: The cross-sectional, observational study was conducted on 1380 eyes with 460 each, into three groups. Group I: patients with healthy eyes. Group II: patients diagnosed with pre-perimetric glaucoma. Group III: patients with diagnosed perimetric glaucoma. After patients were selected on the basis of inclusion and exclusion criteria, baseline standard ophthalmic examination was done by the same operator under the same settings, including SDOCT using both the Spectralis SD-OCT and the Cirrus SD-OCT.

Results: There was a statistically significant difference in the average, superior, inferior RNFL thickness and average, superior, inferior GCIPL thickness between group I and group II ($p<0.001$), between group I and group III ($p<0.001$) and also between group II and group III ($p<0.001$). The statistical significance was also reflected in their AUROCs.

Conclusions: Mean, superior, inferior GCIPL thickness along with macular volume analysis can substantiate RNFL analysis for diagnosis, serial monitoring and follow-up of glaucoma patients and suspects.

Clinical Characteristics of Patients with Glaucoma Depending on Urgency during the COVID-19 Pandemic

First Author: Nur AINI

Purpose: To describe the clinical characteristics and urgency of glaucoma during the COVID-19 pandemic.

Methods: This study was an observational descriptive study using medical records. The number of samples was 2071 patients who visited the eye outpatient clinic from March 2020 to February 2021. The urgency of the patient's visit was assessed by intraocular pressure and pain.

Results: Two thousand and seventy-one patients, 52.4% are male, 47.2% are female, 39% were 41-50 years, 52% patients lived in urban. PACG was the most diagnosis (49%), 547 (26.4%) patients with one eye. Intraocular pressure more than 40mmHg was 13.9%, patient with eye pain complaint was 11.8%.

Conclusions: Intraocular pressure (IOP) and pain in the eye are the urgent patient control to eye outpatient clinic. Another reason to control at the hospital is their urban domicile.

Clinical Features in Prostaglandins Associated Periorbitopathy

First Author: Sunee CHANSANGPETCH
Co-Author(s): Chatchai CHEAWCHANWICHAWET , Tanate CHIRA-ADISAI, Vannakorn PRUKSAKORN

Purpose: To evaluate clinical characteristics of periorbital change in unilateral prostaglandin analogue (PG) users.

Methods: In this cross-sectional study, unilateral PG users who had been using PG for at least 3 months were consecutively

recruited. Four standardized clinical photographs and six periorbital characteristics of participants were evaluated, including (1) ptosis (assessed by marginal to reflex distance (MRD1), (2) enophthalmos (assessed by exophthalmometer), (3) lower lid laxity or tightening (assessed by lid distraction test), the presence of (4) dermatochalasis, (5) visible eyelid vessels, and (6) deep upper lid sulci (DUES). Using standardized photographs, prostaglandin associated periorbitopathy (PAP) was diagnosed independently by 3 experts masked to the history and examination. Paired T-test and McNemar's test were used to compare periorbital characteristics between eyes with PG use and the contralateral eyes among those diagnosed with and without PAP.

Results: The total of 83 patients were recruited. Mean (SD) duration of PG usage of all participants is 18.37 (20.84) months. Fifty patients (60.24%) were diagnosed PAP. Among six periorbital characteristics, MRD1 ($p<0.01$), lower lid laxity ($p<0.01$), and DUES ($p<0.01$) showed significant difference between each eye with unilateral PG use in PAP patients, mean difference (95% CI); MRD1 -0.45 mm (-0.75 to -0.15), lower lid laxity -0.70 mm (-1.10 to -0.31), and proportion of visible DUES 26% (12.15 to 39.85). There were no differences in all periorbital characteristics among patients without PAP.

Conclusions: There was a high proportion of PAP in patients with unilateral PG exposure. Ptosis, lower eyelid laxity and DUES could be significantly detected in PAP patients.

Clinical and Demographic Profile of Patients Less than 40 years of Age Presenting to the Glaucoma Services at a Tertiary Care Eye Hospital in South India

First Author: Aditi PARAB
Co-Author(s): Odayappan ANNAMALAI, Kavitha SRINIVASAN

Purpose: To study the clinical and demographic profile of patients less than 40 years of age presenting to glaucoma services, to know the reasons for referral and prevalence of various clinical types of glaucoma in this age group.

Methods: Patients in the age group of 5 to 39 years, presenting to or referred to the glaucoma clinic at Aravind Eye Hospital, Pondicherry, who were suspected to have glaucoma or who have been newly or previously diagnosed with glaucoma, upon ophthalmological evaluation by senior glaucoma consultants, were invited to participate in the study. After obtaining informed written consent, basic demographic details of the participants like age, gender, address, education, occupation, socioeconomic status assessment along with final diagnosis were entered in the proforma.

Results: The prevalence of glaucoma in the study population (n=384) was found to be 31.3% and the incidence of glaucoma among new patients was found to be 11.9%. Among all glaucomas (n=120), 54 patients had secondary glaucomas, 33 had primary glaucomas and 33 had congenital glaucomas. 65% of all the glaucoma patients were males. All patients with Nevus of Ota and nanophthalmos were females. Juvenile open-angle glaucoma, pigmentary glaucoma, steroid-induced glaucoma, traumatic glaucoma were noted more in males and primary angle-closure suspect in females. Statistically significant association was found between

gender, socioeconomic status and glaucoma.

Conclusions: Secondary glaucomas were more common than primary glaucomas. Among secondary glaucomas, traumatic glaucoma was found to be the most common followed by glaucoma in aphakia and steroid-induced glaucoma.

Comparative Study of Combined Surgery versus Cataract Surgery Alone in the Treatment of Pseudoexfoliation Glaucoma

First Author: Rakhi DCRUZ

Purpose: To compare the efficacy of combined surgery versus cataract surgery alone in pseudoexfoliative glaucoma (XFG) in terms of IOP reduction and surgical outcomes.

Methods: In this retro-prospective comparative study, all patients with XFG who underwent either combined surgery or cataract surgery alone from 2013-2020 were studied. The patients were then categorized into two groups. Group 1 included patients who underwent cataract surgery alone (either phacoemulsification/SICS). [n=93]. Group 2 included patients who underwent combined surgery (phacotrabeculectomy/ SICS+trabeculectomy). [n=139]. Data compared included best-corrected visual acuity (BCVA), intraocular pressure (IOP) changes, and incidence of intra/postoperative complications.

Results: In our study, we found that the mean IOP control was similar following both types of surgical procedures at the end of 3years (14 mmHg(P=0.5) and at the end of 5 years (18mmHg(P=0.9). In our study,93% of the eyes in the cataract surgery group and 90% of the eyes in the combined surgery group achieved an increase in >3 Snellen lines of VA but the VA recovery was faster in group 1. Our study achieved >20% reduction in IOP from the baseline values in both groups. The postoperative IOP profile was similar in both groups at all visits. Around 75% of eyes in the combined surgery group and 82% of eyes in the cataract surgery group achieved adequate IOP control without further addition of any medications. The "combined treatment" group had significantly more postoperative complications than the "cataract alone" group (p=0.0026).

Conclusions: UneventfuI cataract surgery resulted in significant long-term reduction in IOP and glaucoma medication requirements and was comparable with combined surgery in eyes without advanced XFG.

Comparisons of Corneal Biomechanics among Chinese Primary Open-Angle Glaucoma with Normal Tension, Hypertension and Controls

First Author: Yu CAI
Co-Author(s): Bonnie Nga Kwan CHOY, Yahui WEI, Chen XING

Purpose: As we know, normal tension glaucoma (NTG) is defined as glaucomatous optic nerve (GON) damage with normal pressure. The causes that contribute to NTG development remain to be identified. The biomechanical properties may account for increased susceptibility to GON to some extent. In the study, we compared dynamic corneal response parameters (DCRs) among patients with primary open-angle glaucoma (POAG) between NTG, hypertensive glaucoma(HTG) and controls.

Methods: This is a prospective, cross-sectional study, included 229 cases in 73 NTG eyes, 66 HTG eyes, and 90 normal eyes. NTG and HTG groups were defined by diurnal

Goldmann applanation tonometry (GAT).DCR parameters were obtained using Corvis-ST. To compare DCRs among the NTG, HTG and control groups, general linear models adjusted for age, sex, bIOP and axial length (AL) were used.

Results: Compared with the control groups, the NTG group had a shorter time from onset to the highest concavity (HCT) and a higher deformation amplitude ratio of 2 mm (DAR 2mm) and integrated radius (IR). Compared with the HTG group, the NTG group had a higher DAR 2mm and IR. There were no significant differences in all parameters between controls and HTG.

Conclusions: Cornea in NTG is more deformable than HTG and controls. There were no differences between HTG and controls in cornea deformability. It could be more reliable as diurnal GAT was used in NTG and HTG grouping. As cornea deformability is related to that of sclera and lamina cribrosa, we suggest that it might in a way to account for optic nerve damage in NTG despite normal IOP.

Complications and Post-Operative Intervention after XEN45 Gel Stent Implantation in Open Angle Glaucoma: A Systematic Review and Meta-Analysis

First Author: Bryan ANG
Co-Author(s): Bjorn Kaijun BETZLER, Sheng Yang LIM

Purpose: The XEN45 Gel Stent is a sub-conjunctival filtering device that has demonstrated promising efficacy. This meta-analysis quantitatively evaluates reported complications and interventions after XEN45 implantation in the treatment of open-angle glaucoma (OAG).

Methods: Pilot, cohort, observational studies, and randomized controlled trials that included at least 10 patients undergoing ab interno or externo XEN45 surgery, with or without phacoemulsification were deemed eligible for inclusion. A meta-analysis of proportions with random-effect models was performed using the meta routine in R version 3.2.1. Outcomes included the rate of complications and post-operative interventions.

Results: 152 studies were identified on initial literature search and 33 were included in the final analysis. Numerical hypotony was the most common post-operative complication, involving 20% of patients (95%CI: 10-31%). Post-operative gross hyphema occurred in 14% (95%CI: 7-22%) and transient intra-ocular pressure (IOP) spikes (>30mmHg) in 13% (95%CI: 4-27%). Stent exposure occurred in 3% (95%CI: 1-5%). Stent migration occurred in 1% (95%CI: 0-3%). XEN45 revision and/or a second XEN45 implantation was performed in 5% of patients (95%CI: 3-7%). Stent relocation was performed in 4% (95%CI: 1-9%). A second glaucoma procedure was performed in 12% (95%CI: 8-18%). 26% underwent one (95%CI: 17-36%), 13% underwent two (95%CI: 5-24%) while 4% underwent three (95%CI: 2-6%) bleb needling procedures. 35% of patients (95%CI: 29-40%) required at least one needling. The average rate of needling per patient was 0.42 (95%CI: 0.22-0.64).

Conclusions: XEN45 gel stent implantation is safe in the treatment of OAG. However, more than a third of eyes require at least one post-operative bleb needling procedure.

Correlation between Central Corneal Thickness and Radial Peripapillary Capillary Density in Patients with Ocular Hypertension

First Author: Elpida KOLLIA
Co-Author(s): Dimitrios PAPAKONSTANTINOU, Eleni PATSEA

Purpose: To examine any possible correlation between central corneal thickness and radial peripapillary capillary density of the optic nerve head in eyes with ocular hypertension.

Methods: 135 eyes have been examined in this controlled study. OCT-angiography of the optic disc (4.5mm), as well as ultrasound corneal pachymetry, was performed in all cases. Age, medical treatment for ocular hypertension, gender and retinal nerve fiber layer thickness have been evaluated. The main indices of blood flow in the optic disc have also been examined. The eyes with the following conditions were excluded from the study: anti-glaucomatous treatment with more than one pharmaceutical agents, any type of treatment for ocular diseases, dense cataracts, conditions consistent with abnormal macular findings, signs of uveitis, previous complicated cataract surgery, previous vitreo-retinal interventions, previous refractive operations, and SLT procedures. Spearman correlation coefficients have been used to explore the association of two continuous variables.

Results: Higher total PP values were significantly associated with higher CCT values (p=.050). Additionally, total peripapillary (PP), superior-hemi and inferior-hemi values of RPC were significantly positively associated with total peripapillary, superior-hemi and inferior- hemi values of RNFL, indicating that higher RPC density values were significantly associated with higher RNFL values.

Conclusions: There was substantiated a proportional interrelationship between central corneal thickness and radial peripapillary capillary density in eyes consistent with ocular hypertension. It can be concluded that the examined factors constitute two directly related parameters of clinical importance for ocular hypertension.

Cytomegalovirus Uveitic Glaucoma with Moth-Eaten Iris Atrophy: Two Case Reports

First Author: Fu-chin HUANG

Purpose: To report two cases of monocular cytomegalovirus (CMV) uveitic glaucoma in immunocompetent patients with moth-eaten iris changes.

Methods: Case reports.

Results: Case 1 was a 36-year-old man who had a history of recurrent anterior chamber inflammation in his right eye. Diffuse moth-eaten iris changes were noted in the lesion eye. In spite of ganciclovir treatment, poor control of intraocular pressure was noted and filtering surgery had been performed for his intractable glaucoma. Case 2 was a 63-year-old woman who also had a history of recurrent CMV uveitis in her left eye. Her iris showed localized patch of moth-eaten atrophy. She responded well to topical ganciclovir treatment. However, persisted corneal edema and uveitis occurred after the uneventful cataract surgery. Following oral valganciclovir was administered, ocular inflammation finally improved.

Conclusions: We experienced two cases of CMV uveitic glaucoma with apparent moth-eaten iris changes in immunocompetent adults, not all responded well to anti-viral therapies.

Effect of Hemodialysis on Intraocular Pressure and Ocular Perfusion Pressure

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Purpose: To assess the intraocular pressure and ocular perfusion pressure changes in patients undergoing hemodialysis; to correlate the changes in intraocular pressure with systemic (vascular and biochemical) parameters such as blood urea nitrogen, albumin, body weight, systolic and diastolic blood pressure before and after hemodialysis; and to correlate the level of change in intraocular pressure with the cause of end stage renal disease.

Methods: A prospective cohort study including 222 eyes of 111 patients who underwent hemodialysis were evaluated. These patients satisfied inclusion criteria and written consent was obtained. A comprehensive assessment was undertaken including age, gender, occupation, cause for renal failure, intra-ocular pressure and anterior segment evaluation. Then correlation between the blood pressure, intraocular pressure, ocular perfusion pressure, body weight, blood urea nitrogen, creatinine and serum albumin before and after dialysis session were analyzed.

Results: There was significant difference in intraocular pressure and ocular perfusion pressure after hemodialysis, however perfusion pressure continued to be within safe limits. There was positive correlation between ocular perfusion pressure and blood pressure reduction following hemodialysis.

Conclusions: There were no significant correlation between intraocular pressure and ocular perfusion pressure with various blood parameters such as blood urea, creatinine, albumin, body weight before and after hemodialysis. Diabetes and hypertension were found to be the major cause for end stage renal disease however, there was no association with the changes observed following hemodialysis.

Effect of Myopia on the Progression of Normal Tension Glaucoma

First Author: Chunmei HSUEH
Co-Author(s): Jau-der HO

Purpose: To compare the retinal nerve fiber (RNFL) defects and the risk factors of progression in treated normal-tension glaucoma (NTG) between highly myopic and non-highly myopic eyes.

Methods: In this retrospective cohort study, 26 highly myopic glaucoma (HMG, <-6D) eyes of 26 patients and 17 non-highly myopic glaucoma (NHG, >-6D) eyes of 17 patients were studied. Glaucoma progression was determined either by serial visual field data or by change of optic disc/retinal nerve fiber layer (RNFL) defect. The Cox proportional hazards model was used to detect associations between potential risk factors and glaucoma progression.

Results: Among 43 eyes from 43 normal tension glaucoma patients (mean follow-up, 3.36 years), 19 of 26 eyes (73.08%) in the HMG and 8 of 17 eyes (43.06%) in the NHG showed progression. The HMG group was significantly younger (49.31±8.67 years) than the NHG group (60.76±9.16 years). The final temporal-inferior (TI) RNFL thickness (HMG vs NHG 58.12±19.40 vs 83.00±30.53 um; p=0.002) was significantly thinner and the final VF MD (-9.04 ± 3.68 vs -6.59 ± 3.42 um) was worse in HMG group. The multivariate Cox proportional hazards model indicated that worse baseline visual field mean deviation (VF MD) (HR: 0.887, P=0.035) was a risk

factor for myopic normal tension glaucoma progression.

Conclusions: The highly myopic normal tension glaucoma patients were younger and have thinner final temporal inferior RNFL thickness than non- highly myopic NTG patients. In all myopic normal tension glaucoma patients, worse baseline visual field mean deviation was a risk factor for glaucoma progression.

Effectiveness and Safety of Tafluprost for Chinese Patients with Primary Open Angle Glaucoma and Ocular Hypertension: A Post-marketing Phase IV Study

First Author: Xinghuai SUN
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Purpose: To confirm the effectiveness and safety of Tapros@ (0.0015% tafluprost eye drops) in Chinese patients with primary open-angle glaucoma (POAG) and ocular hypertension (OH).

Methods: Patients with POAG and OH were enrolled in this phase IV, multicenter, non-comparative, prospective study between 12/27/2017 and 04/15/2020, and divided into three groups. Patients who were treatment-naïve or untreated within one month (Group A), or with unreached intraocular pressure (IOP) target after previous monotherapy of other prostaglandin analogs (PGAs) (Group B) or non-PGA IOP-lowering drugs (Group C) received tafluprost for three months. The IOP levels and safety profiles were observed.

Results: The baseline IOPs were 22.4±4.7, 21.0±3.5 and 22.5±3.2 mmHg in groups A (n=165), B (n=89) and C (n=31), respectively. IOP significantly reduced at each follow-up compared with baseline level (all P<0.05). The least-square means (Lsmeans) and percentages of final IOP reduction for groups A, B, and C were 4.7 mmHg (19.8%), 1.6 mmHg (6.1%), and 4.6 mmHg (20.3%), respectively. At the last follow-up, 57.0% of participants in group A achieved IOP reduction of ≥20%, while 40.4% in group B and 77.4% in group C achieved IOP reduction of ≥10%. Fifty-eight treatment-related adverse events occurred in 46 participants (15.7%). Regarding the most common one, conjunctival hyperemia (34/293, 11.6%), most patients completely recovered (19/34, 55.9%) or improved (5/34, 14.7%) before the study ended.

Conclusions: For Chinese patients with POAG and OH who were treatment-naïve or untreated within one month, or showed insufficient IOP control with prior monotherapy, tafluprost presented a satisfying treatment effect with tolerable safety.

Efficacy and Tolerance of Netarsudil Latanoprost Fixed Combination (NLFC) in a Switch Study with Glaucoma Medications

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Co-Author(s): Sriram SONTY

Purpose: To study the efficacy and tolerance of Netarsudil Latanoprost Fixed Combination (NLFC) in a switch study in glaucomatous eyes with inadequate IOP control in 24 Pts (24 OD & 24 OS).

Methods: 24 glaucoma patients with 24 OD & 24 OS with poor IOP control are switched to Netarsudil Latanoprost Fixed Combination (NLFC) with 24 weeks (6 months) follow-up was studied. Pre-switch glaucoma. Medications were netarsudil latanoprost and others. IOPs were measured at visit 0 (initial), visit 1 (2 weeks), visit 2 (4 weeks), visit 3 (12 weeks), and visit 4 (24 weeks).

Results: Pre-switch IOPs: Visit 0: 24.6 (12-40) OD 21.9 (10-46) OS; Visit 1: IOPs 20.9 (14-34) OD (P: 0.004) 19.8 (12 -45) OS (P: 0.002); Visit 2: IOPs 21 (12-31) OD (P: 0. 001) 19.6 (12 -40) OS (P: 0.002); Visit 3: IOPs 20.5 (11 -31) OD (P: 0.001) & 19.1 (14 -40) OS (P : 0.003); Visit 4 IOPs 20.5 (11-31) OD (P: 0.001) & 20.1 (12 -40) OS (P: 0.002); Pre-switch hyperemia: 0 (11) 0.5 -1 (9) + 2 (3) + 2 (1); Post-switch hyperemia: 0 (12) +0.5-1 (6) + 2 (4) + 3 (2).

Conclusions: NLFC is better or equal to in 48 eyes with poor IOP control compared to the pre-switch meds.

Efficacy of Rho Kinase Inhibitors in Intraocular Pressure Control in Post Vitrectomized Eyes

First Author: Arino JOHN
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Purpose: To study the efficacy of rho kinase inhibitors in lowering uncontrolled intraocular pressure (IOP) in silicone oil induced secondary glaucoma in post vitrectomized eyes.

Methods: A retrospective cross sectional analysis of 22 patients who had raised IOP after pars plana vitrectomy with silicone oil injection were started on topical rho kinase inhibitor and followed up. IOP was measured using Goldmann applanation tonometry before addition of rho kinase inhibitor and then after 2 weeks, 4 weeks and 3 months.

Results: Rho kinase inhibitors gave good IOP control in 60% of cases. Additional anti glaucoma medications were required in almost 81.5% of cases. But IOP lowered more rapidly than other topical aqueous suppressants. But 11.5% of patients discontinued rho kinase inhibitors due to intolerance despite good IOP control.

Conclusions: ROCK inhibitors are a good choice of topical anti glaucoma medications in silicone oil induced glaucoma. It can be considered as a first line or as an adjuvant in post vitrectomized eyes and proved to have a better IOP control.

Five-Year Incidence of Primary Glaucoma and Related Risk Factors: The Handan Eye Study

First Author: Ye ZHANG
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Purpose: To determine the 5-year incidence of primary glaucoma (primary open-angle glaucoma (POAG) and primary angle-closure glaucoma (PACG)) and its associated risk factors in rural northern China.

Methods: Population-based cohort study. A total of 5184 participants aged 30 years and older without glaucoma in baseline, and were subjected to comprehensive standardized interviews, ophthalmic and systemic examinations at baseline and after a 5-year interval in the Handan Eye Study were enrolled. Incident glaucoma was diagnosed with definite and probable certainty by a consensus panel of five senior glaucoma specialists. Potential risk factors identified at baseline included various sociodemographic, anthropometric, familial, and ocular characteristics of the participants. Univariate and multivariable logistic regression was performed to identify the baseline risk factors that could predict the incident glaucoma.

Results: During the 5-year follow-up, incident primary glaucoma developed in 82 subjects (1.58%; 95% confidence interval [CI], 1.24%-1.92%). Increased age [odds ratio (OR), 1.062;

95% CI, 1.037-1.087; P < 0.001], higher intraocular pressure (IOP) (OR, 1.105; 95% CI, 1.021-1.195; P = 0.017) and a vertical cup disc ratio (VCDR) ≥ 0.60 (OR, 5.301; 95% CI, 3.220-8.727; P < 0.001) were found to be associated with increased risk of incident glaucoma.

Conclusions: We reported the 5-year incidence of primary glaucoma in a rural Chinese population and found that the baseline risk factors including older age, higher IOP, and VCDR ≥ 0.60 could help in identifying those at the highest risk of disease development.

Graft-Free Short Tunnel Flap versus Scleral Patch Graft in the Implantation of Aurolab Aqueous Drainage Implant (AADI)

First Author: Bipul SARKER
Co-Author(s): Ava HOSSAIN

Purpose: To compare the outcomes of the graft-free short tunnel flap (STF) technique with that of the scleral patch graft (SPG) in aurolab aqueous drainage implant (AADI) implantation.

Methods: This was a comparative interventional study of 110 eyes of 100 patients with medically uncontrolled glaucoma, including 60 in the STF group and 50 in the SPG group. Patients were enrolled and assigned randomly to STF or SPG. The outcome measures were tube exposure, intraocular pressure (IOP), the number of glaucoma medications, best-corrected visual acuity, surgical complications, and success rate (defined as IOP >5 mmHg, ≤21 mmHg, and IOP reduction ≥20% from baseline at 2 consecutive visits after 3 months).

Results: The cumulative probability of success during the first year of follow-up was 85% in the STF group and 80% in the SPG group (P = 0.54). The final IOP decreased significantly from baseline and was comparable between both groups (P = 0.55). Postoperative complications developed in 7 patients in the STF group and 8 patients in the SPG group (P = 0.71). Only 3 patients in the SPG group developed tube exposure at 1-year follow-up.

Conclusions: The STF and SPG techniques had a comparable complication rate at the 1-year follow-up. Both techniques were comparable in terms of success rate, postoperative IOP, and glaucoma medications.

Inferonasal Glaucoma Drainage Device Implantation in Steroid-Induced Glaucoma Patient with Failed Trabeculectomy

First Author: Dira ROSTI
Co-Author(s): Aulia ABDUL HAMID, Muhammad EFFENDI

Purpose: To report a case of refractory steroid-induced glaucoma managed by inferonasal implantation of glaucoma drainage device.

Methods: A case report of a patient from the ophthalmology outpatient clinic. The diagnosis was based on history taking, ophthalmology examination and ancillary examination.

Results: A 25-year-old male complained about pain in his right eye for two months, with a history of steroid-induced glaucoma. Trabeculectomy had been performed 3 times in the right eye and twice in the left eye since 2011. Uncorrected visual acuity was 1/300 in the right eye and 6/45 in the left eye. The ophthalmology examination revealed multiple artificial colobomas, flatted bleb and the cup-to-disc ratio was 1.0 in the right eye and 0.9 in the left eye. Optic Nerve Head OCT

revealed thinning of retinal nerve fiber layer in both eyes. Despite using the antiglaucoma medication, intraocular pressure remained 30 mmHg in the right eye and 13 mmHg in the left eye. Implantation of valveless glaucoma drainage device was performed using Virna Glaucoma implant to manage recurrent pain and uncontrolled intraocular pressure. The implant was placed on the inferonasal quadrant because there are post trabeculectomy scars in the superior quadrant. Intraocular pressure fluctuated and the patient was still on antiglaucoma medication for up to 6 weeks postoperatively. In the seventh week following implantation, intraocular pressure was stabilized at 10 mmHg and all antiglaucoma drugs were discontinued.

Conclusions: Glaucoma drainage device can be used either as a primary or a secondary procedure where trabeculectomy has failed. Inferonasal implantation of glaucoma drainage device can be effective to control intraocular pressure in refractory steroid-induced glaucoma.

Intereye Peripapillary Vessel Density Asymmetry in Subjects Presenting Asymmetric Cupping with and without Visual Field Loss

First Author: Hui-chen LIN

Purpose: To characterize intereye peripapillary vessel density (VD) asymmetry in subjects with asymmetric cupping.

Methods: Subjects presenting asymmetric cupping with (asymmetric glaucoma, AG) and without visual field defect (glaucoma suspect, GS), and normal volunteers were enrolled. All subjects underwent comprehensive eye examinations and optical coherence tomography angiography (OCT-A) scan. Areas under the receiver operating characteristic curves (AUROC) and the Youden Index cutoffs were used to determine the best sensitivities and specificities for differentiation between AG and normal subjects.

Results: Data from 30 AG, 42 GS, and 71 normal subjects were used for final analysis. Intereye OCT-A parameters asymmetry including whole image peripapillary vessel density (wiVD), mean and four quadrants radial peripapillary capillary (RPC)VD, retinal nerve fiber layer (RNFL), and ganglion cell complex (GCC) were all significantly higher in AG than those in normal and GS subjects. Macular GCC showed the greatest intereye asymmetry with 8 times asymmetry in AG subjects. Intereye RNFL asymmetry had the highest AUROC for distinguishing AG from normal subjects (0.962), followed by GCC (0.957), wiVD (0.892), and mean RPCVD (0.886). Intereye GCC asymmetry had the best sensitivity (0.964) and specificity (0.972). The cutoff values for identifying AG from normal subjects were intereye wiVD asymmetry 4.3%, RPCVD asymmetry 4.2%, RNFL asymmetry 8.5 μm, and GCC asymmetry 8.0 μm.

Conclusions: Intereye asymmetry of peripapillary VD had a modest ability to differentiate AG from normal subjects. Longitudinal and large-scale studies are needed to determine whether intereye asymmetry of OCT-A measures can provide early detection and progression monitoring of glaucoma.

Intraocular Pressure (IOP) and Optical Coherence Tomography Angiography (OCTA) of Optic Nerve Head (ONH) Perfusion Changes Post Bariatric Surgery

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Purpose: To evaluate the changes in IOP and OCTA changes of the optic nerve head pre and post-bariatric surgery.

Methods: We prospectively recruited obese patients who underwent bariatric surgery in Hospital University Kebangsaan Malaysia (HUKM). We measured IOP prior to surgery and between 6 months to 12 months after surgery. Other ocular and obesity parameters assessed include body-mass index(BMI), neck and waist circumference (NC, WC), waist-hip ratio (WHR) and OCTA changes of the optic nerve head pre and post-surgery.

Results: Twenty-seven patients completed all evaluations. The mean age was 41/6.9 years old. Following surgery the mean IOP decreased significantly from 15.02/1.84 mmHg to 13.15/1.71mmHg, p<0.001. Median BMI decreased from 41.50 (8.20)kg/m2 to 30.40 (8.30)kg/m2, p<0.001 and waist circumference reduced 121.9 (21.59)cm to 99.8 (22.86) cm, p<0.001. The mean neck circumference reduced from 41.4/4.00cm to 36.4 /4.63cm, p<0.001 and the mean WHR was 0.92/0.09 and 0.88/0.07, p=0.009. There is a significant fair positive relationship between preoperative IOP and IOP reduction after bariatric surgery (Pearson r=0.480, p= 0.011). The amount of IOP reduction was also negatively correlated with preoperative neck circumference (Pearson r=-0.437, p=0.023). However, OCTA perfusion and flux index of optic nerve head remained unchanged, p > 0.05.

Conclusions: Significant IOP reduction secondary to weight loss after bariatric surgery can provide additional benefits for obese patients. Even though the effect of bariatric surgery in glaucoma was not assessed in this study, recommendations for weight loss either via surgery or medically can sensibly be offered to obese patients with higher levels of IOP.

Limited External Bleb Revision for Failed Trebeculectomy

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Co-Author(s): Madhuri AKELLA, Manpreet KAUR, Sushmita KAUSHIK, Srishti RAJ, Faisal TT

Purpose: To evaluate efficacy and safety of a novel limited external bleb revision technique in rescuing the failed blebs after primary trabeculectomy surgery.

Methods: A small incision (3-4mm) was made posterior to the bleb about 7-8mm from the limbus, incising conjuinctiva and Tenon's capsule. The adhesions in the subconjunctivo-tenon's space were dissected carefully with blunt dissection to expose the margins of previous scleral flaps. After Mitomycin C application, the edge of the scleral flap was defined and lifted off its bed using minimal dissection till free flow of aqueous was seen. The anterior chamber was filled with normal saline to confirm the egress of fluid through the dissected scleral flap. After confirmation, the conjunctivo-tenon's incision was closed with continous 8-0 vicryl suture. The lifted scleral flap was left unsutured. The patients were prescribed topical steroids and antibiotics for 3-4 weeks in tapering doses.

Results: 44 eyes of 41 patients underwent the procedure. IOP of <21mmHg, without any AGM, was achieved in 65.11% eyes at 6 months, 53.12% at 1 year, 44% at 2 years and

41.17% at 3 years. The probability of bleb survival was 84.1% at 6 month, 76.2% at 1 year, 53% at 2 years, 49.5% at 3 years, 40.6% at 4 years and 30.4% at 5 years of follow up. The mean survival time after revision was 4.16 ± 0.62 years and median was 3.0 ± 0.73 years.

Conclusions: Limited external revision of a failed bled is a viable option before doing another trabeculectomy or tube surgery.

Mixed Mechanism Glaucoma in Trauma

First Author: Mara Sabrina CLEMENTE
Co-Author(s): Cathleen Camille CABRERA

Purpose: To report a case of mixed mechanism glaucoma in trauma.

Methods: A 58-year-old male sought consultation due to sudden blurring of vision and eye pain after sustaining a blunt injury to the left eye (LE). Past ocular history was unremarkable. Visual acuity (VA) was 20/40 in the right eye (RE) and 5/200 in LE. There was a central epithelial defect with diffuse corneal edema in the left eye with an anteriorly dislocated clear lens. Goldmann tonometry (AT) was 26 in LE. Gonioscopy of the RE revealed 360 deg open angles while the LE could not be assessed. Fundoscopy of the RE showed a cup-disc ratio (CDR) of 0.7 but LE had no view. The patient was advised of immediate surgery but refused. 1 month later, the patient's VA worsened to hand movement (HM) in the LE with development of a traumatic cataract. AT was RE 22, LE 30.

Results: Patient underwent an unremarkable intracapsular cataract extraction of the LE. VA of the LE with a +10 D lens was still HM. AT decreased to 12 in the RE & 24 in the LE. Gonioscopy showed closed superior and inferior angles. Fundoscopy showed a CD ratio of 0.9 with concentric neuro-retinal rim thinning.

Conclusions: Mixed mechanism glaucoma is a combination of open- and closed angle glaucoma. In this case, the patient had an undiagnosed POAG. Upon sustaining a blunt injury, the he developed secondary angle-closure possibly aggravating the IOP rise. Minimal case studies and case reports have established a treatment algorithm. Management usually addresses both mechanisms.

Modifications of Techniques in Trabeculectomy: A Secure Way of Successful Glaucoma Filtration Surgery

First Author: Bipul SARKER
Co-Author(s): Ava HOSSAIN

Purpose: The purpose of this study was to describe a modified surgical technique with releasable sutures and evaluate its safety and efficacy in lowering intraocular pressure (IOP) in glaucoma patients.

Methods: This was a randomized-controlled prospective clinical trial that included 100 eyes of 85 patients diagnosed with primary open-angle glaucoma. They were divided into two groups: the trabeculectomy with single suture (group A) and the modified trabeculectomy with releasable sutures (group B) with adjunctive application of mitomycin-C (MMC) in both groups. The main outcome results included the cumulative probability of surgical success, IOP values, complications and the number of antiglaucoma drugs needed.

Results: There was a highly significant reduction in IOP to baseline values in both groups at the last visit at 24 months. Group B achieved a higher success rate with fewer early and late postoperative complications ($P < 0.05$). Shallow anterior chamber and

iridocorneal touch occurred significantly less in group B than in group A. No significant adverse effects were caused by this modified technique with releasable sutures.

Conclusions: Both procedures appear to be equivalent in lowering IOP in the surgical management of glaucoma. But Modified trabeculectomy with releasable sutures could be an efficient, relatively safer technique for a successful trabeculectomy due to fewer early complications related to excessive aqueous outflow than a single suture.

Morphologic Changes in the Lamina Cribrosa upon Intraocular Pressure Lowering in Patients with Normal Tension Glaucoma

First Author: Jeong-ah KIM
Co-Author(s): Michaël J.A. GIRARD, Tae Woo KIM, Eun Ji LEE, Jean Martial MARI, Dong Hwan SON

Purpose: To investigate whether the lamina cribrosa (LC) curve changes in response to intraocular pressure(IOP) reduction following administration of topical ocular hypotensive eyedrops in eyes with normal tension glaucoma (NTG).

Methods: Ninety-three eyes of 93 patients with treatment naive NTG at initial examination and with ≥20% reduction from baseline IOP following administration of topical ocular hypotensive eyedrops were included. Serial horizontal B-scan images of the optic nerve head (ONH) were obtained from each eye using enhanced depth imaging spectral domain optical coherence tomography (OCT) before and 1 year after IOP-lowering treatment. The LC curvature in each eye was assessed by measuring LC curvature index(LCCI) in OCT B-scan images obtained at seven locations spaced equidistantly across the vertical optic discdia meter before and after IOP-lowering treatment. Factors associated with the reduction of LC curvature were determined.

Results: IOP decreased from 15.7 ± 2.5 mmHg at baseline to 11.2 ± 1.7 mmHg after topical glaucoma medication. Compared to baseline, LCCI was reduced after IOP lowering treatment in all seven planes ($P < 0.001$). The magnitude of LCCI reduction was significantly associated with younger age ($P= 0.020$) and greater baseline LCCI ($P < 0.001$).

Conclusions: The LC curvature was reduced after topical ocular hypotensive eyedrops in eyes with treatment naïve NTG. This finding indicates that, in addition to its involvement in high tension glaucoma, LC strain is involved in NTG despite IOP being within the normal range.

Outcomes of Double iStent Inject Implantation in Asian Eyes with Glaucoma: A Case Series

First Author: Rosalynn SIANTAR
Co-Author(s): Bryan ANG, Jeremy HU, Elton TAY, Leonard YIP, Vernon YONG

Purpose: To evaluate the outcomes of double iStent inject (Glaukos Corporation, Laguna Hills, CA) implantation (four-device implantation) in Asian eyes with glaucoma.

Methods: Retrospective case series of Asian eyes which underwent double iStent inject implantation with or without phacoemulsification in a single institution between 2017-2019. Outcome measures included intraocular pressure(IOP), number of glaucoma medications and adverse outcomes. Clinical data were retrieved from the 1-day, 1-week, 1-month, 3-month, 6-month and 12-month timepoints.

Results: 12 eyes (11 patients) with primary

open-angle, normal-tension, angle-recession, chronic angle-closure, steroid-induced and uveitic glaucoma were included. 8 eyes had standalone iStent inject implantation and 4 eyes had iStent inject implantation with phacoemulsification. Majority of subjects were male (7, 63.62%) and Chinese (9, 81.8%). Mean age was 73.5±8.3 years. Pre-operatively, mean IOP was 18.3±4.8 mmHg and mean number of medications was 3.8±1.2. Statistically significant post-operative reduction in mean IOP was observed at post-operative day (POD)1: 6.3±4.5 mmHg (n=12, p<0.001), post-operative week (POW)1: 3.6±5.1 mmHg (n=12, p=0.03), post-operative month (POM)6: 3.3±4.0 mmHg (n=9, p=0.04) and POM12: 1.9±1.5 mmHg (n=9, p=0.03). The mean number of medications was significantly reduced at all timepoints– POD1: 2.1±1.3 (n=12, p<0.001); POW1: 2.1±1.0 (n=12, p<0.001); POM1: 2.0±1.0 (n=12, p<0.001); POM3: 1.6±1.1 (n=11, p<0.001); POM6: 1.9±1.0 (n=9, p<0.001) and POM12: 2.0±1.1 (n=9, p<0.001). Implant obstruction by iris was observed in 2 eyes post-operatively, requiring laser iridoplasty.

Conclusions: Asian eyes with glaucoma which underwent double iStent inject implantation demonstrated a significant reduction in IOP and number of glaucoma medications up to 12 months post-operatively, without the occurrence of any significant adverse event.

Outcomes of MicroShunt Implantation vs Trabeculectomy Based on Visual Field Severity: 1-Year Results from a Randomized, Multicenter Study

First Author: Davinder GROVER
Co-Author(s): Anup KHATANA, Michael STILES

Purpose: The MicroShunt, a controlled ab-externo glaucoma filtration surgery device, drains aqueous humor from the anterior chamber to a sub-Tenon's bleb. This post-hoc analysis reports 1-year outcomes following MicroShunt implantation or trabeculectomy according to visual field (VF) severity at screening (NCT01881425).

Methods: MicroShunt implantation or trabeculectomy was performed in eyes with early (−3.00 to −6.00 dB; n=84 vs 30; EG), moderate (−6.01 to −12.00 dB; n=134 vs 46; MG), advanced (−12.01 to −20.00 dB; n=119 vs 33; AG), or severe (≤−20.01 dB; n=58 vs 22; SG) primary open-angle glaucoma. Intraocular pressure (IOP) measurements after reoperation were censored in this analysis.

Results: Overall mean IOP at screening was 21.1 mmHg. At Year 1, for MicroShunt vs trabeculectomy, mean IOP ± SD (mmHg) was 14.8±4.0 (n=75) vs 12.1±3.9 (n=25; EG), 14.6±4.4 (n=114) vs 10.9±5.2 (n=41; MG), 13.8±4.3 (n=100) vs 9.9±3.7 (n=29; AG), and 13.6±4.6 (n=43) vs 11.5±2.7 (n=18; SG). Mean change in medications/eye was −2.3 vs −2.5 (EG), −2.5 vs −2.7 (MG), −2.6 vs −2.7 (AG), and −2.4 vs −2.7 (SG). Hypotony (IOP <6 mmHg after Month 3) rates were 2.4% vs 6.9% (EG), 5.2% vs 17.4% (MG), 5.9% vs 18.2% (AG), and 13.8% vs 9.1% (SG). Postoperative intervention rates were 39.3% vs 60.0% (EG), 34.3% vs 67.4% (MG), 42.0% vs 69.7% (AG), and 55.2% vs 77.3% (SG), respectively.

Conclusions: In this analysis, IOP and medication reductions were observed following MicroShunt implantation and trabeculectomy, regardless of VF severity, with a mean IOP of ≤14.8 mmHg and ≤12.1 mmHg at Year 1, respectively.

Outcomes of Primary Surgical Interventions in Primary Congenital Glaucoma Patients

First Author: Pukkapol SUVANNACHART
Co-Author(s): Sunee CHANSANGPETCH, Anita MANASSAKORN, Prin ROJANAPONGPUN, Supawan SURUKRATTANASKUL, Visanee TANTISEVI

Purpose: To report overall long-term surgical success of primary congenital glaucoma (PCG) patients in Thailand.

Methods: PCG patients, who underwent one of the following primary operations: trabeculotomy, goniotomy, trabeculectomy, combined trabeculo-trabeculectomy (CTT), and diode transscleral cyclophotocoagulation (TSCPC) between January 1992 and January 2018, were reviewed. Surgical success was defined as IOP between 5 to 21 mmHg with or without antiglaucoma medications. Failure was defined as IOP ≤5 mmHg or ≥21 mmHg for 2 consecutive visits, or when an additional glaucoma surgery was proceeded to control IOP. Comparison of survival curve was analysed using multilevel mixed-effect Weibull model.

Results: A total of 81 eyes from 55 PCG patients were included (number of eyes: 20 trabeculectomy, 15 goniotomy, 16 trabeculectomy, 15 CTT and 15 TSCPC). Median follow-up time was 24 months (interquartile range 9 to 60 months). Overall success rates were 68.8% at 1 year, 63.8% at 3 years, and 53.7% at 5 years. All types of surgery except TSCPC had comparable cumulative success rates at 1 year, ranging from 78.5% to 83.3%. Cumulative success rates of trabeculotomy and CTT were maintained at 3 and 5 years, and were the highest among all surgery types at 5 years (trabeculotomy 80.0%, CTT 79.4%). TSCPC had significantly lower success rate compared to other types of surgery (HR 7.4 to 13.1, all p=0.01). All patients who received primary TSCPC failed the treatment at 48 months.

Conclusions: Primary trabeculotomy and primary CTT demonstrated highest long-term success rates in PCG patients. Primary TSCPC showed significantly worst outcome.

Pattern of Presentation, Management and Outcome of Lens-Induced Glaucoma at a Tertiary Eye Care Center

First Author: Umme Salma AKBAR
Co-Author(s): Rajib HUSAIN, Shams NOMAN, Mohammed QUAMRUL

Purpose: To outline the clinical presentation, management and outcome of lens-induced glaucoma in Chittagong Eye Infirmary and Training Complex, Bangladesh.

Methods: A case series review was done among the patients who visited Chittagong Eye Infirmary and Training Complex, Bangladesh from January 2015 to December 2018. Demographic data, clinical presentations, management and outcome were recorded and analyzed.

Results: 30 phacomorphic cases and 20 phacolytic glaucoma patients were included in our study. The mean age at presentation was 60 years. The female to male ratio was 2:1. The reason for late presentation was the distance which was 60% in phacomorphic glaucoma and 50% in phacolytic glaucoma. The main symptoms were reduced vision followed by ocular pain and redness of the eye. Visual acuity was either HMor just PL in all eyes before surgery. All patients underwent SICS with posterior chamber lens implantation. IOP reduced tremendously upon discharge and vision kept improving up to a month after surgery.

Conclusions: Reduced vision, ocular pain

and redness are the main clinical presentations of lens-induced glaucoma. Cataract surgery proves to be effective in lowering IOP and visual recovery in patients with lens-induced glaucoma.

Profile and Outcomes of Glaucoma Patients Seen in a Tertiary Government Hospital in Davao City in 2017

First Author: Karen Kate QUILAT
Co-Author(s): Luisito GAHOL

Purpose: To describe the demographic, clinical and management outcomes of glaucoma patients that were seen at the Department of Ophthalmology in a tertiary government hospital in Davao City in 2017.

Methods: Medical records of glaucoma patients seen and managed at the glaucoma section of the Department of Ophthalmology in 2017 were reviewed. Diagnosis of glaucoma was based on the International Society of Geographic and Epidemiological Ophthalmology Guidelines, including cases with secondary glaucoma. The demographics, clinical profile, functional severity scoring and initial management of the patients were described.

Results: A total of 196 eyes were included in the study where majority of the cases had mean age of 62.1 ± 13.59 and 56.25% of the cases were predominantly female with no reported family history of glaucoma. 84.6% of the cases were residents of Davao del Sur. These cases presented with eye pain and photophobia (25%) and eye redness (18.75%). Among the primary glaucomas, the top three types were PACG (25%), POAG (23.5%) and PAC (12%), with visual acuity of 1.85 logMAR (counting fingers) more commonly seen among PACG cases. Most common pattern of visual field defect was generalized pattern with GSS stage 4. Medical treatment was the most common initial treatment given and surgical intervention were more commonly seen among PACG and secondary glaucoma cases.

Conclusions: Angle closure types were more common among the primary glaucoma and primary glaucomas were more common than secondary type. Most had severe visual field damage (generalized pattern). Medical treatment was the first line of treatment initiated.

Raised Episcleral Venous Pressure with Radiological Presentation of Cavernous Sinus Thrombosis

First Author: Mithun THULASIDAS
Co-Author(s): Pradeep BALAN, Ajita SASIDHARAN, Shruthi Tara Vasudev SHRUTHI

Purpose: To report a case of secondary glaucoma due to elevated episcleral venous pressure (EVP) with radiological presentation of cavernous sinus thrombosis (CST).

Methods: A 58-year-old woman presented with redness in left eye (LE) associated with mild pain and unilateral headache for six months. She had no history of any systemic illness or trauma. On examination, she was orthophoric in all gaze directions, and the ocular movements were full and free. A mild axial proptosis was noted in LE. Corrected distance visual acuity was 6/6 in the right eye (RE) and 6/9 in LE. Intraocular pressure (IOP) was 14mmHg in RE and 30mmHg in LE with open angles and no blood in Schlemm's canal on gonioscopy. The posterior segment examination was within normal limits. A detailed glaucoma workup revealed a reduced ganglion cell complex thickness, a central corneal thickness of 482 microns, and a less reliable visual field (after repeated testing) in

LE.

Results: Magnetic resonance imaging of brain with orbit and digital subtraction angiography showed reduced enhancement of left cavernous sinus with inflammatory changes at maxillary, ethmoid, and frontal sinuses, suggestive of CST. The patient was started on systemic antibiotics and topical timolol maleate 0.5% twice a day in LE. At 1-week follow-up, IOP reduced to 22mmHg, and headache subsided. However, the dilated episcleral vessels remained the same. Possible differential diagnoses include idiopathic Radius-Maumunee syndrome and low grade carotid-cavernous fistula.

Conclusions: Glaucoma caused by raised EVP represents a rare clinical picture, and the treatment is primarily based on the etiology along with IOP reduction.

Rebound Tonometry Measurements over Extended-Wear Bandage Contact Lenses

First Author: Corrina AZARCON
Co-Author(s): Romeo DELA CRUZ

Purpose: The aim of this study was to assess the validity of rebound tonometry measurements obtained over eyes wearing extended-wear bandage contact lenses with the highest oxygen transmissibility (Dk/t) value of 175 @ -3.00 D.

Methods: A total of 151 normal eyes were included in this prospective pretest-posttest study. A rebound tonometer (iCare PRO) was used to collect three measurements each of the intraocular pressure readings from “naked” eyes (eyes without contact lenses) and the same eyes wearing extended-wear lotrafilcon A bandage contact lenses (Alcon Air Optix Night & Day Aqua Contact Lenses). The mean pre- and post-application values were pooled and compared using the paired t-test.

Results: The application of extended-wear lotrafilcon A contact lenses over normal eyes did not cause a statistically significant change in the intraocular pressure measurements obtained using an iCare PRO tonometer (13.74 + 2.15 mm Hg vs. 13.77 + 2.26 mm Hg, p-value = 0.6506).

Conclusions: iCare PRO rebound tonometry measurements obtained over extended-wear bandage lotrafilcon A contact lenses are acceptable for clinical use.

Recognition of Normal Tension Glaucoma

First Author: Ning FAN
Co-Author(s): Xuyang LIU, Yun WANG

Purpose: It is considered that normal tension glaucoma (NTG) is a subtype of POAG, comprising a special form of glaucomatous neurodegeneration or glaucomatous optic neuropathy (GON) almost exactly the same as that seen in POAG. Actually the disease entity of NTG has been a profound confusion and it is difficult to be accurately conceptualized.

Methods: We analyzed the IOP and its significance to the pathogenesis of POAG and NTG, the phenotypic differences between NTG and POAG, the diseases frequently accompanied with NTG (not POAG), the mechanisms underlying the Bjerrum scotoma, and the correlation between the radial peripapillary capillaries (RPCs) and GON.

Results: NTG is frequently secondary to systemic disorders including migraine, Flammer syndrome, vasospasm, systemic hypotension, obstructive sleep apnea–hypopnea syndrome (OSAHS), trans-lamina cribrosa pressure difference, Alzheimer’s

disease and Parkinson's disease. Vascular dysfunction in the optic nerve head (ONH), induced by compression (elevated IOP) or ischemia, has been considered as a possible mechanism in the pathogenesis of GON. Furthermore, treatments targeting the primary disorders associated NTG appear effective to patients with NTG. Therefore, the diagnosis of NTG may not be made before the other ocular or systemic disorders capable of presenting with GON are ruled out.

Conclusions: NTG is different from POAG and is caused by a number of disorders and affected by IOP-independent risk factors. The concept and diagnostic criteria of NTG should be reconsidered.

Revisiting the Water Drinking Test in Glaucoma

First Author: Karishma SHAH

Purpose: To compare the peak intra ocular pressure (IOP) and rise of IOP from baseline during modified Diurnal tension curve (mDTC) and Water Drinking Test (WDT) achieved during the use of 2 different prostaglandin analogs in 2 eyes of the same patient with symmetrical damage; and thereby analyze the efficacy of both drugs in blunting the IOP spike; and to establish the importance of water drinking test in the present day scenario.

Methods: 31 patients (62 eyes) of bilateral, symmetric primary open-angle glaucoma (POAG) were started on Bimatoprost (0.05%) in the right eye and Latanoprost (0.003%) in the left eye, and followed up after 3 weeks. They were submitted to mDTC, and underwent IOP measurements at 9 am, 11 am, 1 pm, 3 pm and 5 pm. After the last measurement, WDT was performed.

Results: The difference between peak and baseline IOP in each eye and with both mDTC and WDT was compared. The right eye on Bimatoprost showed lesser IOP fluctuations indicating its greater IOP lowering capacity. The WDT showed a definite peak at 30-45 min.

Conclusions: This study corroborated previous reports that demonstrate the clinical applicability of WDT as a useful tool in assessing the status of the eye's outflow facility and determining IOP peaks that would otherwise be missed in routine clinic IOP measurements. The modified office DTC has limitations to determine peak IOP, and is not comparable to the 24-hour diurnal tension curve. But the water drinking test is definitely a good alternative. It is more convenient for both the patient and doctor.

Safety and Efficacy of CO2 Laser-Assisted Sclerectomy Surgery-Based Multi-Pathway Glaucoma Surgery in Refractory Pediatric Glaucoma

First Author: Anyi LIANG
Co-Author(s): Ailing BIAN, Gangwei CHENG, Meifen ZHANG, Yang ZHANG

Purpose: To evaluate the safety and efficacy of CO2 laser-assisted sclerectomy surgery (CLASS)-based multi-pathway glaucoma surgeries in refractory pediatric glaucoma.

Methods: Retrospective, noncomparative, interventional case series. Twenty-two refractory pediatric glaucoma patients (23 eyes) who underwent CLASS-based multi-pathway surgeries were enrolled, including CLASS combined with trabeculectomy, CLASS combined with trabeculotomy, CLASS combined with combined trabeculectomy and trabeculotomy and CLASS combined with ab-externo viscocanlostomy and trabeculotomy.

Complete examinations were performed before and after surgery. Intraocular pressure (IOP) change, complete and qualified success rates (CSR, QSR), best corrected visual acuity (BCVA), number of IOP-lowering eyedrops and adverse events were recorded.

Results: The mean age at surgery was 8.71±6.18 years and the mean follow-up was 19.19±7.19 months. Baseline IOP, number of IOP-lowering eyedrops and logMAR BCVA were 29.92±6.36 mmHg, 3.19±0.66 and 2.99±2.36 respectively. The mean IOP was 12.02±5.12, 12.35±4.51 and 12.81±3.63 mmHg at 6 months, 1 year and 2 years after surgery, which were significantly lower than baseline (all $p<0.01$). The reduction in number of medications was statistically significant at all post-operative timepoints (all $p<0.01$). CSR and QSR were 76.5% and 86.2% respectively at 1 year, and were 76.5% and 80.1% respectively at 2 years. Majority of the early and late-onset complications including shallow anterior chamber, extensive peripheral anterior synechia, scarring of blebs and cataract were mild and reversible.

Conclusions: CLASS-based multi-pathway surgery was safe and effective for the treatment of refractory pediatric glaucoma. It is promising to become one of the mainstays of surgical management for refractory pediatric glaucoma.

Surgical Outcomes of Ahmed Valve Implant following Previous Failed Glaucoma Surgeries in Primary Congenital Glaucoma: A Systematic Review

First Author: Irma SADIKIN
Co-Author(s): Lia AMANDA, Ikke SUMANTRI

Purpose: To investigate clinical outcomes of Ahmed Glaucoma Valve (AGV) implantation used in patients with refractory Primary Congenital Glaucoma (PCG).

Methods: A systematic review was performed using keyword and MeSH terminology to identify published articles on Medline/Pubmed, Cochrane Library (CENTRAL), Clinical Key, Google Scholar, and Hand Searching. The inclusion criteria are PCG patients who underwent AGV implantation after previous failed glaucoma primary surgeries (goniotomy/trabeculotomy/trabeculectomy). The main outcome measure is a reduction in intraocular pressure (IOP). Success rates and adverse events were also collected as secondary outcomes.

Results: A total of 9 studies consisting of 294 eyes were included in this review. The age of the patients ranged from 0.24 to 276 months and the mean follow-up time ranged from 12 months to 72 months. Most studies reported marked IOP reduction, with preoperative IOP (range 26.9-33.4 mmHg) and postoperative IOP (range 9.7-20.8 mmHg). The surgical success rate of IOP control showed in 261 (88.7%) eyes and the cumulative success rate at 1-year ranged from 63% to 97%. The most common postoperative complications were tube-cornea touch in 31 (10.5%) eyes and choroidal effusion 14 (4.7%) eyes.

Conclusions: Ahmed glaucoma valve implantation is an appropriate option in managing advanced PCG patients with previous failed glaucoma surgeries. AGV provides a moderate success rate with a low rate of complications.

Surgical Revision of a Large Symptomatic Overhanging Filtering bleb: A Rare Complication after Trabeculectomy

First Author: Lady SUKMAWIDOWATI
Co-Author(s): Maharani CAHYONO, Denti PUSPASARI, Fifin Luthfia RAHMI

Purpose: To report surgical excision of the overhanging bleb, a rare post-operative complication of trabeculectomy.

Methods: A 68-year-old male presented with a whitish mass on his right eye which grew larger over 7 months with disturbing dysesthesia, epiphora, and lagophthalmos. He had undergone a trabeculectomy to treat primary open-angle glaucoma two years earlier. His visual acuity was 6/15 and his intraocular pressure was maintained on target for a 0.9 cup-to-disc ratio with latanoprost. A cystic, high elevated, avascular bleb sized 7x15 mm was found on the upper conjunctiva of the right eye, extending to all directions, overhanging and adhering to corneal epithelial. The fluorescein test showed no leakage. Surgical revision of the bleb was performed by dissecting it from the underlying corneal surface, revealing mildly vascularized conjunctiva. The corneal stroma was left bare. After the overhanging part was excised with minimal bleeding, the bleb was sutured directly to the limbus with nylon 10-0.

Results: The bleb appeared low elevated, avascular, and neither extension nor leakage was visible. The size was significantly reduced and the patient reported no symptoms. Hypotonia occurred initially but later improved. Corneal erosion was resolved after 1 week. Intraocular pressure remained within low teens without medication and there was no bleb enlargement up until the 6-month follow-up.

Conclusions: Excision with direct suture is one of the safe and effective methods for overhanging bleb surgical revision to alleviate ocular discomfort and visual or cosmetics disturbance, while preserving the bleb function. Consideration should be taken whether the bleb is thin due to previous use of antifibrotic agents.

The Association between Intraocular Pressure and Different Variables of Metabolic Syndrome: A Cross-Sectional Study

First Author: Anujeet PAUL
Co-Author(s): Shravya BALLA, Deepikadevi SN, K SRIKANTH, Mathu Krishnan Vallinayagam VALLINAYAGAM

Purpose: The aim of this study is to determine the association of IOP with metabolic syndrome (MetS) and its variables. Elevated intraocular pressure (IOP) is a well-established risk factor for both the development and progression of glaucoma. Metabolic syndrome and its components have been found to be associated with elevated IOP.

Methods: The study was carried out on 150 participants diagnosed with metabolic syndrome. Serum fasting blood glucose (FBG), blood pressure(BP), triglyceride and High-density lipoprotein (HDL) levels were recorded. Routine ophthalmological examinations including central corneal thickness corrected intra-ocular pressure measured with non-contact tonometer in both eyes were done.

Results: A statistically significant result was obtained between fasting blood glucose, diastolic blood pressure, high density lipoprotein, intraocular pressure and triglycerides (p=0.001). A moderate correlation between intraocular pressure and FBG, Diastolic blood pressure DBP, HDL,

and triglycerides (p=0.001) was obtained. A high correlation was established between intraocular pressure and triglycerides in females.

Conclusions: The components of MetS correlated well with IOP, with a moderate correlation between intraocular pressure and parameters like DBP, FBG, HDL and triglycerides. It is prudent to strongly consider the variables of MetS in the evaluation of glaucoma.

The Daily, Monthly and Annual Cost of Therapy Using Ocular Hypotensive Eye Drops in the Philippines Based on a Quantitative Method

First Author: Corrina AZARCON
Co-Author(s): Nilo Vincent FLORCRUZ

Purpose: This study aims to calculate and compare the cost of using different brands of ocular hypotensive eye drops available in the Philippines.

Methods: Triplicate samples of 21 different brands of locally available ocular hypotensive eye drops were tested in the laboratory. The following parameters were recorded: mass of ten drops, total usable mass, number of drops per bottle, and mass of 200-µL aliquots. The total usable bottle volume, drop volume, and number of drops per milliliter of each sample were calculated from the raw data. The daily, monthly, and annual costs were computed and compared.

Results: Available brands of beta-blockers are the most affordable options for topical glaucoma therapy, with costs ranging from 1,838.13 Php to 8,472.00 PhP per year. Innovator brands of alpha-agonists and carbonic anhydrase inhibitors are the most expensive, with annual costs ranging from 15,282.90 PhP to 25,955.48 PhP. Fixed-combination preparations, with yearly costs ranging from 8,614.00 PhP to 22,200.00 PhP, are generally more cost-effective than individual preparations. The cost of topical anti-glaucoma therapy can amount to up to 3.5% to 66.9% of a minimum-wage earner's annual income depending on the number and combination of drugs being used.

Conclusions: The price range of ocular hypotensive eye drops available in the Philippines is wide. The cost of therapy is an important consideration for patients who acquire medications through out-of-pocket expenditure. Information on the cost of therapy should be available to both patients and physicians.

The Number of Primary Glaucoma Patients in Malaysia in 2010 and 2020

First Author: Jasvinjeet SIDHU
Co-Author(s): Liza Sharmini AHMAD TAJUDIN

Purpose: To estimate the number of people with primary open-angle glaucoma (POAG) and primary angle-closure glaucoma (PACG) among the three major ethnic groups in Malaysia in 2010 and 2020.

Methods: We reviewed data from population-based studies of age and gender-specific prevalence of POAG and PACG that satisfied the International Society for Geographical and Epidemiological Ophthalmology (ISGEO) definition, from various neighbouring countries in Asia. The prevalence obtained were used to derive the estimated number of patients with glaucoma among the Malays, Chinese, and Indians in Malaysia.

Results: There were 192,262 people with glaucoma in 2010, increasing to 286,804 in 2020, and of these 73% were POAG.

The male to female ratio is 1:1, with no gender preponderance. Malays represent approximately 70% of the total POAG in 2010 and 2020, followed by Chinese 25% and Indians 5%. The Chinese represent 55% of the total PACG patients. Generally, there was an increase in trend of the number of POAG and PACG patients with age in all ethnicities. In total, the Malays contribute to the highest number of glaucoma patients in Malaysia, followed by Chinese and Indians.

Conclusions: Glaucoma has increased by two-fold in 10 years, affecting predominantly the Malay population. Efforts should be made to reach out to the population at risk.

The Pitfall for Glaucoma Detection in Macular OCT Imaging: A Case Report

First Author: Fu-chin HUANG

Purpose: To report a case of false negative glaucoma finding using macular OCT imaging due to retinal nerve fiber layer (RNFL) defect with a large angular distance from the fovea.

Methods: A case report.

Results: A 48-year-old man who had a history of POAG (OU) treated with topical prostaglandin for more than 6 years. Intraocular pressures were 15 mmHg in the right eye and 18 mm Hg in the left eye. Visual acuity at presentation was 20/20 in right eye and 16/20 in left eye. Fundus photographs confirmed bilateral superior RNFL defects (OU) which were later documented with the optic nerve head (ONH) and macular imaging analyses by optical coherence tomography (OCT). He had VF defects in the inferior hemifield (OU). However, macular ganglion cell complex (GCC) parameter in OCT showed defect correspondence in right eye and without correspondence in left eye. Defects outside the macular scanning area by OCT contributed to negative GCC findings.

Conclusions: Macular parameters in OCT, despite their high diagnostic ability and advantages over peripapillary RNFL measurements, have limitations that should be considered.

The Role of Trabeculectomy in Advanced Glaucoma

First Author: Saurabh HARAL
Co-Author(s): Dr.v.s GUPTA, Dr.monika KAPUR

Purpose: To elucidate the role of trabeculectomy in advanced glaucoma.

Methods: Only patients with primary open-angle glaucoma were selected. All patients who had cup–disc ratio of 0.9 or a near-total cupping were given a trial of aggressive maximum medical therapy for IOP control for at least 4 weeks. Target IOP was defined as B 12 mm Hg. Patients who showed progression were included in the study. A total of 10 patients were selected. Trabeculectomy was performed using limbal based conjunctival flap. Patients were followed up for a period of 2 years for visual acuity, intraocular pressure, visual fields, slit-lamp biomicroscopy and bleb morphology.

Results: Mean preoperative intraocular pressure on five drugs was 21.7 ± 3.8 mm Hg (range 18–27 mm Hg) on maximum medical therapy. Mean post-operative intraocular pressure was 11 ± 1.78 mm Hg (range 9–13 mm Hg) and 11 ± 1.92 mm Hg (range 9–14 mm Hg) at 1 month and 6 months post-operatively, respectively. Postoperatively, the visual acuity remained stable in 17 patients. It dropped by 1 Snellen line in 2 patients and 2 Snellen lines in 1 patient, respectively, over a period of 6 months and later improved to

6/6P following cataract surgery. There was no defined visual field progression in any of the 20 patients.

Conclusions: Besides being a cost-effective alternative to medical management, trabeculectomy not only provides a better IOP control but also has a high safety profile when performed by an experienced surgeon.

Topiramate-Induced Bilateral Angle-Closure Glaucoma Associated with Myopic Shift: 2 Case Reports

First Author: Ju-chuan CHENG
Co-Author(s): Yi Cheng TING

Purpose: Even though topiramate-induced glaucoma is a well-known entity today, it is still rare. We report the clinical scenario, diagnosis, management, and outcomes of two cases of topiramate-induced glaucoma.

Methods: Case reports.

Results: Case 1: A 29-year-old male who had been taking Topiramate, Ergotamine, Prochlorperazine, and Lorazepam for migraine, developed blurred vision 10 days later. The patient denied myopia and had relatively good vision before. Elevated intraocular pressure(IOP) up to 46mmHg accompanied by myopia -7diopters(D) and acute angle-closure of both eyes. Case 2: A 40-year-old female patient without any known systemic disease before. She did not undergo any ophthalmic surgery recently and she denied myopia before. She had been taking weight-reducing pills recently. She visited our hospital due to sudden onset blurred vision of both eyes and headache. Elevated IOP up to 50mmHg accompanied with myopia -7D and acute angle-closure of both eyes. Topiramate was discontinued immediately in both cases. We administered intravenous mannitol, topical intraocular pressure-lowering eye drops, and cycloplegic eye drops. Resolution of ocular symptoms within 1 week.

Conclusions: Detailed drug history should be obtained in patients young patients presented with bilateral acute angle-closure glaucoma. If topiramate was given to treat migraine, which has similar symptoms as glaucoma such as headache and visual symptoms, symptoms may be attributed to the migraine itself. This could potentially delay the timing of eye specialist referral. Discontinuing topiramate immediately and adding IOP lowering medications with cycloplegic eye drops seems to provide good treatment outcomes with complete resolution of ocular symptoms within 1 week.

Total Visual Loss after an Uneventful Cataract Surgery in a Patient with Chronic Angle Closure Glaucoma

First Author: Fu-chin HUANG

Purpose: To report a case of end-stage chronic angle-closure glaucoma who had a total loss of vision after an uneventful cataract surgery.

Methods: A case report.

Results: A 75-year old female presented with a history of acute glaucoma attack and chronic angle-closure glaucoma for 10 years. The patient ever received laser iridotomy and medical treatment. The intraocular pressures (IOP) were controlled by about 18–20 mmHg (OD). The optic disc showed a cup to disc ratio of 0.90 in the right eye, and OCT examination revealed significant nerve fiber layer thinning before operation. Her vision was progressive worsening to 2/200. She underwent successful phacoemulsification due to borderline IOP control and dense cataract formation. Unexpectedly, she experienced a total loss

of vision post-operation with no identifiable explanation.

Conclusions: Although rare, wipe-out phenomenon after cataract surgery is possible in the setting of advanced glaucomatous optic neuropathy.

Trends in Glaucoma Surgical Procedures: 2016 to 2020

First Author: Di ZHANG
Co-Author(s): Yanan LI, Lingge SUO, Chun ZHANG

Purpose: To evaluate the trends of glaucoma surgical procedures in our eye center from January 2016 to December 2020.

Methods: A retrospective search of all cases diagnosed with "glaucoma" was carried out from the operating room in our eye center. Data were analyzed by calculating the absolute number and proportion of each procedure per year.

Results: From 2016 to 2020, there was an increase in glaucoma surgeries from 506 to 1055 (208.5%). Trabeculectomy, transscleral cyclophotocoagulation (TSCPC), and phacoemulsification combined with goniosynechialysis are the three most common procedures, with a five-year average proportion of 21.76%, 26.35%, and 42.12% respectively. There was no significant change in the number of trabeculectomy per year, but the proportion decreased, 31.82% to 15.17%. The number of Ahmed implantation remained stable during 5 years, with an average of 23 per year. There was an increasing trend in minimally invasive glaucoma surgeries (MIGS), such as trabectome, Schlemm's canal surgery, and Ex-Press implantation. Schlemm's canal surgeries increased from 3 in 2018 to 21 in 2020. The number of TSCPC was relatively stable, increasing before 2017 and then decreasing. The absolute number and proportion of phacoemulsification combined with goniosynechialysis both increased rapidly, from 126 (24.9%) to 677 (64.17%).

Conclusions: Trabeculectomy as a traditional glaucoma surgery, is one of the most performed procedures, with the rate on the decrease. However, the rate of drainage valve implantation and MIGS is increasing. TSCPC is the main way to control intraocular pressure in refractory glaucoma. For patients with cataract, phacoemulsification combined with goniosynechialysis has been widely used in recent years.

Twenty-Four-Hour Blood Pressure and Disease Progression in Primary Angle Closure Glaucoma

First Author: Shaoying TAN
Co-Author(s): Clement THAM

Purpose: To study the influence of 24-hour blood pressure (BP) variability and fluctuation on glaucomatous progression in primary angle-closure glaucoma (PACG) patients.

Methods: Continuous BP was recorded by ambulatory 24-hour blood pressure measurement (ABPM) in PACG patients who had been followed up for over 24 months with at least 5 prior visual fields (VF) tests by Humphrey automated perimetry (HAP). Glaucoma progression was documented with serial changes in the visual field index (VFI). The variability of BP was compared between the progressive and stable groups by Mann-Whitney U Test.

Results: Twenty-nine PACG patients were recruited including six (20.7%) with VF progressive and 23 (79.3%) stable patients. The 24-hour systolic BP (SBP) weighted mean and minimum readings were statistically

significantly lower in progressive group (p = 0.041 and p = 0.005), especially during daytime (p = 0.019 and p = 0.009). Higher hypotensive time index (PTD) and hypotensive load (Leese) were found in progressive group during 24-hour (PTD, p = 0.004; Leese, p = 0.005) and day-time (PTD, p = 0.009; Leese, p = 0.014).

Conclusions: Significantly lower SBP was found in progressive PACG patients. Hypotension, or over-treated hypertension, may be a risk factor for glaucomatous progression in PACG patients.

Yoga Techniques for Control of Intraocular Pressure in Primary Open Angle Glaucoma

First Author: Sanjeev MITTAL
Co-Author(s): Sunita MITTAL, Hemlata UDENIA

Purpose: Medical or surgical lowering of intraocular pressure is the only therapeutic approach for treating primary open-angle glaucoma. Intraocular pressure maintenance is influenced by autonomic activity (sympathetic and parasympathetic). "Yogic pranayama" and "Abdominal breathing" are exercises that can affect autonomic activity by stimulating a wakeful hypometabolic state of parasympathetic dominance. We aimed to assess the effect of yogic pranayama and diaphragmatic breathing on intraocular pressure to determine whether it can be recommended for individuals with established glaucoma in combination with glaucoma medication as an adjuvant therapy

Methods: A prospective, randomized trial done over 90 patients with primary open-angle glaucoma (180 eyes, age: above 40 years) were assigned to either the control group (A) or yogic pranayama and diaphragmatic breathing exercise group (B). In group B, the yogic pranayama and abdominal breathing were practiced daily for 6 months. Group A was treated medically. We measured the intraocular pressure at presentation and subsequently after 1, 3, and 6 months.

Results: Compared with group A, the yogic pranayama and abdominal breathing exercise group had significantly lowered intraocular pressure (right eye: 20.85±3.39 to 14.90±2.86 mm Hg; left eye: 20.30±4.12 to 14.25±3.85 mm Hg; P <0.001).

Conclusions: Yogic pranayama and abdominal breathing exercises can reduce intraocular pressure in patients with primary open-angle glaucoma and can therefore be recommended as an adjuvant therapy.

Intraocular Inflammation, Uveitis and Scleritis

A Case of Choroidal Tuberculoma as the Presenting Sign of Tuberculosis

First Author: Nur SUHAIFI
Co-Author(s): Adil Bin HUSSEIN, Qi NGOO

Purpose: To report a case of presumed choroidal tuberculoma as the presenting sign of tuberculosis and successfully treated with anti-tubercular therapy.

Methods: A case report.

Results: A 37-year-old Malay lady works as a community nurse presented with right eye blurry vision for 1 week. Associated with floaters, eye pain, eye redness and photophobia. She had no contact with tuberculosis patient. She had Bacillus Calmette-Guerin (BCG) vaccination during childhood. Right eye visual acuity was 6/15. There were granulomatous keratic precipitate

with anterior chamber reaction of 3+. Fundus revealed vitritis of 1+, an elevated choroidal lesion about 1 ½ disc diameter over the peripheral superotemporal arcade. There was presence of perivascular sheathing and kryleis plaques. Tuberculin skin test was positive, 15mm. ESR was not raised. Chest radiography was normal. QuantiFERON-TB was not performed. Other infective screening which including toxoplasma, VDRL for syphilis serology, HSV and CMV serology were negative. A diagnosis of presumed ocular TB was made and she was started with anti-tubercular and vitamin B6 and subsequently started on oral corticosteroid. 8 weeks later, the patient's vision improved to 6/6 and showed a good response to the treatment by the shrinking of tuberculoma.

Conclusions: Tuberculosis is an occupational disease among healthcare workers. It is rare that a tuberculoma is presented in a patient without systemic evidence of tuberculosis. The presence of choroidal tubercles is indicative of hematogenous seeding of bacilli. This case showed the importance of screening, surveillance, and prompt initiation of anti-tuberculous therapy especially in high-risk patient populations.

A Case of IgG4 Related Posterior Nodular Scleritis with Secondary Choroidal Osteoma

First Author: Ahmad Syazrin Abdullah AZLAN
Co-Author(s): Haniza HASHIM, Hanizasura-na HASHIM, Nurliza KHALIDDIN, Sangeetha KUGANASAN

Purpose: To be able to identify the less common causes of scleritis, and deliver best treatment to prevent disease complications.

Methods: It is a prospective case report follow-up for over 5 years.

Results: The initial preliminary investigation was unable to produce a specific causative agent however progression of the disease-causing new signs had directed the investigation into uncommon causes and as of this case, it is IgG4 related disease. Though uncommon it is significantly important to be investigated in cases of refractory scleritis.

Conclusions: Choroidal osteoma by itself is a rare condition where its main etiology is still unknown, however it could be a result of a more significant underlying condition that is chronic or with recurrence that is less common. Detecting choroidal osteoma early may not be crucial but identifying the possible causes of the presentation may be beneficial in treating the underlying disease and thus halt the progression of the lesion.

A Case of Uveitis and Optic Neuritis Related to Sjögren's Syndrome

First Author: Chia-min WU

Purpose: To report a case of uveitis and optic neuritis related to Sjögren's syndrome.

Methods: A case report.

Results: This was a 62-year-old woman who had past history of Sjögren's syndrome (without medication), dyslipidemia, uveitis and glaucoma. Besides, she had received cataract surgery bilaterally three years ago. This time she presented with painless blurred vision bilaterally (right eye worse). Corrected visual acuity(CVA) was counting fingers 10 cm (od) and 20/40 (os). Intraocular pressure was within normal limits bilaterally. Fundus exams showed severe vitreous haze od and disc edema (od>os). RAPD was positive in the right eye. Fluorescein angiography showed diffuse disc leakage and vascular leakage. ANA, anti-SSA and anti-SSB antibodies were

positive. Oral presnisolone 20mg/day was prescribed and CVA(od) was improved to 20/50 two weeks later.

Conclusions: This was a case with known history of Sjögren's syndrome diagnosis. However, she didn't receive any immunotherapy for several years because she denied any dry syndrome. Extraglandular ocular manifestations of Sjögren's syndrome such as uveitis and optic neuritis should be kept in mind and they usually showed good responses to corticosteroid and immunotherapies.

A Paradoxical Exposè: Choroidal Tuberculoma as a Manifestation of Tuberculosis – Immune Reconstitution Inflammatory Syndrome (TB-IRIS)

First Author: Wen Khang CHONG
Co-Author(s): Abdul Salim ISMAIL, Karen KHOO KAH LUEN, Azhany YAAKUB

Purpose: To report a case of left eye unilateral choroidal tuberculoma in an HIV-positive patient who has ongoing HAART and anti-tubercular therapies.

Methods: A retrospective case report.

Results: A 34-year-old Siamese male presented with 2 days history of left eye painless blurring of vision, associated with paracentral scotoma. He was recently diagnosed to be positive for human immunodeficiency virus (HIV) and smear-negative pulmonary tuberculosis (TB) about 1 month ago. He was already started on highly active antiretroviral therapy (HAART) and anti-tubercular therapy. Ocular examination of the left eye revealed visual acuity of 6/24. Examination of left eye anterior segment was unremarkable, however, fundus examination showed solitary choroidal mass of approximately 1 and half disc diameter size with surrounding subretinal fluid. The choroidal lesion was located at inferotemporal arcade, about 1 disc diameter away from the optic disc and fovea. Optical Coherent Tomography (OCT) of the lesion revealed elevation of the retinal pigmented epithelial layer with retinal thickening and serous retinal detachment involving the macula. Diagnosis of left eye choroidal tuberculoma was made. He was co-managed with infectious disease and respiratory physicians. HAART and anti-tubercular therapy were on board. At 4 months of treatment, his visual acuity improved (6/9) with resolution of the paracentral scotoma.

Conclusions: Early recognition of ocular manifestation of TB-IRIS and an integrated multidisciplinary approach are the keys to favorable outcomes.

A Rare Case of Orbital Tuberculosis with Intracranial Extension

First Author: Tanvi GAONKER
Co-Author(s): Anju RASTOGI, Ketaki RAJURKAR, Deepthi SINGIRI

Purpose: To present a rare case of orbital tuberculosis with intracranial extension.

Methods: A 12-year-old female presented with a history of protrusion of the right eyeball and swelling around the right eye (RE) for 15 days. The best-corrected visual acuity (BCVA) was 6/6. Left eye ocular examination was normal. Right eye examination showed proptosis with the eye pushed downwards and inwards with mild limitation in abduction. A tender swelling was present in the superotemporal part of the right orbit. Systemic investigations revealed a high ESR and a positive Mantoux test. Chest X-ray was normal. MRI Brain showed a lobulated lesion in the right frontotemporal scalp with erosion of the lateral wall of the

right orbit, extending into the extraconal space and erosion of the skull table extending up to the right basitemporal lobe. FNAC showed necrosis and degenerated pus cells. Stain for acid-fast bacilli was positive, thus indicating a possible tubercular etiology. Considering the higher prevalence of tuberculosis in India, anti-tubercular therapy (ATT) was started for extrapulmonary tuberculosis.

Results: Gradual reduction in the size of the swelling and recovery of ocular movements was noted within two months with complete resolution at the end of six months.

Conclusions: Orbital tuberculosis is a less common form of extrapulmonary tuberculosis. Its intracranial extension is extremely rare and limited information is available about it. It has the potential for serious complications which demand immediate and aggressive action. Thus, a high index of suspicion is required while dealing with an orbital mass in an endemic region.

Alterations in Choriocapillaris Flow Pattern in Patients with Active Presumed Tubercular Serpiginous Like Choroiditis

First Author: Jyotirmay BISWAS

Purpose: To report changes in choriocapillaris flow deficits (CCFD%) in patients diagnosed with active tubercular serpiginous like choroiditis (TB-SLC) using swept source optical coherence tomography angiography (SS-OCTA).

Methods: In this study, patients with active TB-SLC and age-matched healthy controls underwent SS-OCTA. Choriocapillaris slab with 20-micron thickness beneath RPE fit line from the structural OCT with the corresponding angioplex slab was segmented. These images were analyzed using a previously validated image binarization algorithm to calculate flow deficit in CC slab.

Results: Twenty-six patients (34 eyes) with TB-SLC and 34 healthy controls (34 eyes) were included, of which 21 (81%) with TB-SLC and 6 (18 %) of controls were males. There was a statistically significant difference In the CCFD between TB-SLC patients (23.64 ± 2.35%) and controls (33.40 ± 7.43%; p < 0.001). A moderate negative correlation was noted between CCFD and visual acuity at presentation (r= -0.46, P=0.006). Linear regression showed an increase in CCFD to be the independent predictor for reduced visual acuity (RR=0.03, 95% CI: 0.01 to 0.05, p=0.006).

Conclusions: SSOCTA is useful to access the changes in CCFD in patients with TB-SLC patients. As these deficits increase with active cases, the CCFD can be used as a predictor of visual outcome in patients with TB-SLC.

Bilateral Idiopathic Retinal Vasculitis, Aneurysms and Neuroretinitis (IRVAN) Syndrome Presenting as Recurrent Vitreous Hemorrhage in a Child

First Author: Hui Gim KHOR
Co-Author(s): Tajunisah IQBAL, Pooi Wah LOTT, Azida Juana WAN AB KADIR

Purpose: We reported a rare case of idiopathic retinal vasculitis, aneurysms and neuroretinitis (IRVAN) syndrome in a young boy who presented with spontaneous resorption of recurrent vitreous hemorrhage (VH).

Methods: A case report.

Results: A healthy 9-year-old boy, presented with three episodes of recurrent VH over his right eye (OD) which spontaneously resolved within four months period. He

denied any history of trauma. He was born full-term with insignificant antenatal and postnatal history. Visual acuity was counting fingers in the OD, and 6/6 in the left eye (OS). There was no afferent pupillary light reflex. Both eyes' anterior segments and intraocular pressures were normal with no neovascularization. Fundus examination of the OD showed the presence of VH, while the OS's fundus revealed the presence of multiple aneurysmal dilatations of the arterioles over the temporal of the retina but the absence of vitritis, retinitis, choroiditis, hard exudates or neovascularization. B-scan ultrasonography of the OD demonstrated a flat retina with VH. After three weeks, the VH over the OD spontaneously resolved with the improvement of the vision to 6/9. Fluorescein angiography demonstrated peripheral capillary non-perfusion areas and aneurysmal arterioles dilatation with leakages. Serial blood tests were unremarkable. Our impression was IRVAN syndrome (OD–stage 3, OS–stage 2). Photocoagulation was commenced over the avascular zone and he was given intravitreal bevacizumab. During the follow-up, he was stable with no recurrence of VH.

Conclusions: It is imperative to recognize the early signs of IRVAN syndrome and initiate prompt treatment in order to prevent devastating visual loss.

CNVM in a Young Adult: A Rare Case Report

First Author: Aniket RAI
Co-Author(s): Khushboo CHAWLA

Purpose: Punctate inner choroidopathy (PIC) is a rare bilateral multifocal chorioretinopathy. The current etiology is unknown but is thought to have familiar predisposition to autoimmune/inflammatory diseases with response against antigens in the outer retina and inner choroid. Depending on the course of disease and development of complications, treatment may range from observation to systemic immunosuppression and intravitreal antiangiogenic therapies. We report a rare case of choroidal neovascular membrane (CNVM) in a young 24 year female secondary to PIC with BCVA of 6/60 in right eye. Fundus examination reveals a greyish green CNVM at the macula with a central yellow area suggestive of a scar. Multiple, round and yellowish choroidal lesions superior and inferior to the optic nerve, without any signs of intraocular inflammation. OCT showed increased retinal thickness with detachment of the neuroepithelium, RPE detachment with sub retinal fluid (SRF) and CNVM with sub retinal fibrosis/scarring in the macular area in the RE. Laboratory investigations were done to rule out other cause of multifocal choroiditis. Treatment was done with intravitreal anti-VEGF injections.

Methods: An observational study.

Results: CNVM with active choroidal lesions was found in a young female and treated in a timely manner to preserve her vision.

Conclusions: CNVM in a young patient should be evaluated in detail for the root cause. CNVM secondary to PIC usually gives a good visual prognosis when diagnosed early and treated timely.

Case Report: Candida Endogenous Endophthalmitis as a Cause of Initially Presumed Intermediate Uveitis in a Psoriatic Patient with Long-Term Immunosuppressive Treatment

First Author: Dewinta KURNIAWARDHANI
Co-Author(s): Ari DJATIKUSUMO, Rina LA DISTIA NORA, Robert SINTO

Purpose: The purpose of this study is to report a case of endogenous candida endophthalmitis that initially presented as intermediate uveitis.

Methods: A case report.

Results: A 52-year-old woman presented with a unilateral blurry vision on the right eye gradually worsened within five months. She had a history of Sjogren syndrome and psoriasis treated with prednisolone 5 mg/day and tacrolimus 0.5 mg/day since seven years ago. Visual acuity was hand movement with cells and a large snowball in the middle of the anterior vitreous on the right eye. The work-up was unremarkable except for a reactive toxoplasmosis IgG and a positive Interferon Gamma Release Assays (IGRA). Due to the unresponsiveness to the standard toxoplasmosis, we did a vitrectomy, and Candida albicans grew from the vitreous culture. The polymerase chain reaction (PCR) for toxoplasma and Mycobacterium tuberculosis from the vitreous and serology Toxocara test from the blood were negative. We decided to give amphotericin B intravitreal injection and voriconazole intravenous injection 200mg bid for two weeks. High definition optical coherence tomography (HD-OCT) showed a new cystoid macular lesion and increased in size in 3 days, responding to sub-tenon triamcinolone acetonide injection.

Conclusions: In long-term immunosuppressive treatment patients, we should consider candida as the possible etiology of intermediate uveitis. Early vitrectomy and antifungal treatment are essential. Cystoid macular edema is effectively controlled with periocular steroid injection.

Challenging Diagnosis and Management of Bilateral Mooren's Ulcer: A Case Report

First Author: Christella CAROLINE
Co-Author(s): Rina La NORA

Purpose: Mooren's ulcer (MU) is a rare and painful peripheral corneal ulceration in the absence of scleritis and systemic diseases. We present a case of painless bilateral MU with positive syphilis blood serology and unresponsive to syphilis and steroid treatment.

Methods: A case report.

Results: A 70-year-old male came with bilateral red eyes and progressive blurry vision for five months and did not improve after topical eye drops. The history of trauma or systemic complaints was not remarkable. Visual acuity was 0.5/60 (RE) and 1/300 (LE). We found peripheral corneal defects in both eyes with iris prolapse at inferotemporal of RE and edematous central cornea without infiltrate. We started to treat him with tacrolimus topically while waiting for systemic workup, which showed positive syphilis serology; thus, we treat him with penicillin, but the progression continues. We add systemic steroid, methotrexate, and azathioprine, but the improvement was significant only after conjunctival resection and limbal-scleral graft procedure. Peripheral corneal thinning recurred after two months, and we re-performed conjunctival resection with an amnion membrane transplant. Finally, after we increased the azathioprine dose, clinical remission was achieved.

Conclusions: Diagnosis of MU was made after excluding systemic disease. Stepwise management starts with adequate steroid and immunosuppressive agents to induce remission. Surgical management involved conjunctival resection, amniotic membrane

transplant, and corneal patch graft. Early patch graft is imperative to prevent corneal perforation as a recurrence risk factor. Ophthalmologists should be aware that comprehensive systemic investigation and stepwise management with adequate immunosuppressants and surgeries are crucial in managing MU.

Clinical Characteristics and Visual Outcome in Patients with Tubercular Uveitis Presenting to a Tertiary Eye Care Center in South India

First Author: Jyotirmay BISWAS

Purpose: To identify the clinical characteristics and visual outcome in patients with tubercular uveitis presenting to a tertiary eye care center in South India.

Methods: A prospective study was carried out in a uveitis clinic of a tertiary care center in South India from May 2018 to March 2019. Patients with predictive ocular signs and positive laboratory investigations for tuberculosis were enrolled in the study. Patients suspected to have a non-tubercular aetiology were excluded. All patients were started on ant tubercular therapy for a period of nine months after complete systemic evaluation by a chest physician.

Results: Eighty-five patients (128 eyes) were included in the study. Male predominance (57 patients, 67%) was noted with a mean age of 37 ± 13 years. Posterior uveitis (66 eyes, 52%) was the commonest presentation followed by intermediate uveitis (42 eyes,33%), panuveitis (13eyes,10%) and anterior uveitis (7 eyes, 5%). Among posterior uveitis, serpiginous like choroiditis followed by retinal vasculitis was the commonest presentation. The most common anterior segment sign predictive of tuberculosis was mutton fat keratic precipitate followed by broad-based posterior synechiae.

Conclusions: Serpignous like choroiditis was the commonest presentation of tubercular uveitis noted in our patients. A nine-month course of anti-tubercular therapy is found to be beneficial for patients with tubercular uveitis.

Clinical and Etiological Pattern of Anterior Uveitis in Southern Assam: A Hospital Based Study

First Author: Namrata SHREE
Co-Author(s): Rajneel BHATTACHARJEE

Purpose: To evaluate the clinical and etiological pattern of anterior uveitis in Southern Assam.

Methods: This was an observational study. Total 119 patients of all ages, of either sex, who presented in OPD of a tertiary centre over a duration of 6 months and diagnosed as anterior uveitis related to various causes excluding traumatic and post-operative cases, were included.

Results: In anterior uveitis, specific diagnosis could be made in 71 cases (59.66%), of which the most common underlying cause was seronegative spondyloarthopathy in 32 cases (26.89%) followed by juvenile rheumatoid arthritis in 13 cases (10.99%), phacolytic cataractous lens induced uveitis in 8 cases (6.89%). Other causes were infectious uveitis in 13 cases (9.76%), SLE in 4 cases (3.34%), rheumatoid arthritis in 1 case (0.91%). Diagnosis remained idiopathic in 48 (37.86%) cases.

Conclusions: Majority of anterior uveitis cases were idiopathic (37.86%). A higher incidence was seen in males (71.54%) as compared to females (28.46%).

Dual Risks of Cytomegalovirus Retinitis in Congenital Immunodeficiency Before and After Hematopoietic Stem Cell Transplantation

First Author: Ping FEI
Co-Author(s): Jia LUO, Peiquan ZHAO

Purpose: Patients with congenital immunodeficiency may suffer from cytomegalovirus（CMV）retinitis due to immunodeficiency and immunosuppressive status after hematopoietic stem cell transplantation (HSCT). This case series is to report the progression and prognosis of ten patients with Wiskott-Aldrich syndrome（WAS）(an X-linked recessive disease characterized by thrombocytopenia (TCP), eczema, and immunodeficiency) and CMV retinitis (CMVR).

Methods: Retrospective case series of ten patients diagnosed with WAS and CMVR, from June 2018 to February 2021. All of them were treated by allogeneic HSCT and antiviral therapy.

Results: Ten male patients were included with a median referral age of 13 months (5-23 months). All were diagnosed with WAS and treated by Allo-HSCT at a median age of 10.5 months (6-18 months). Five patients (50%) were diagnosed with CMVR and systemic CMV infection prior to HSCT, and three of them relapsed after HSCT. The other five patients developed CMVR after HSCT. Thirteen eyes (65%) were indolent granular retinitis. Three eyes (15%) were fulminant retinitis subtype, and four eyes (20%) presented as frosted branch angiitis. With proper treatment antiviral treatment and surgical intervention, fourteen eyes (70%) recovered stably, but the visual outcome of the remaining six eyes was perception of light due to retinal detachment (RD) and optic nerve atrophy.

Conclusions: Patients with WAS before or right after receiving HSCT have high risks to complicate with CMV retinitis which may lead to visual loss without timely treatment. Regular fundus examination and prompt treatment in these pre-verbal patients are very important before complete reconstitution of immune function.

Endophthalmitis following a Honeybee Sting

First Author: Bhuvan CHANANA

Purpose: The purpose of this study was to report a case of endophthalmitis following a honeybee sting.

Methods: A 30-year old female presented with diminution of vision in her left eye accompanied by pain and redness. The patient was attacked by a swarm of bees 5 days ago. The visual acuity was perception of light OS. External ocular examination showed ciliary congestion with corneal edema. Anterior segment examination showed a severe inflammatory reaction with hypopyon. Seclusio pupillae and total cataract were also present. A stinger was suspected to be present in the sclera temporally 5-6mm from the limbus. Ultrasonography suggested the presence of exudates in the vitreous cavity. The patient underwent pars plana vitrectomy with lensectomy and intravitreal antibiotics injection. The main outcome measures include resolution of infection, inflammation, and visual acuity improvement.

Results: Culture of vitreous aspirate obtained during surgery revealed Staphylococcus epidermidis. Postoperatively the patient was started on fortified topical antibiotics, cycloplegics and topical steroids. Systemic Ciprofloxacin and systemic steroids were also given. 4 weeks post-operative the patient's

eye showed clearing of cornea and absence of anterior segment inflammation. The best-corrected visual acuity improved to 20/80. Fundus examination was normal.

Conclusions: Bee sting injury is an uncommon ocular trauma but can result in severe sight-threatening complications. We are presenting an unusual complication following a bee sting, which was managed successfully. A meticulous examination is mandatory to rule out unusual cases like an ocular bee stinger.

Evaluation of Serum Angiotensin Converting Enzyme and Lymphopenia in Presumed Sarcoid Uveitis

First Author: Jyotirmay BISWAS

Purpose: To evaluate the diagnostic efficacy of elevated serum angiotensin converting enzyme and lymphopenia in presumed ocular sarcoidosis.

Methods: A single-center retrospective study was conducted on a cohort of 755 adult patients with uveitis between January 2019 and June 2020. Demographic, clinical and laboratory data were retrieved from our hospital database. Measurements of serum ACE and lymphocyte counts were done.

Results: Data from 755 consecutive patients with uveitis were retrieved from the database. The mean [SD] age of the study group was 41 ± 13 years range (18 – 83 y); 440 (58%) males and 315 (42%) females. Sarcoid uveitis was diagnosed in 50 (6%) patients, Tubercular uveitis in 222 (29%), and other uveitic entities noted in 483 (63%). The mean age in the sarcoid uveitis group was 42 + 11 years while in tubercular uveitis was 40 + 12.9 years. Intermediate and posterior uveitis was the most common anatomical diagnosis in sarcoid uveitis (59% and 20%, respectively) and in tubercular uveitis (46% and 38%, respectively). The other patterns of uveitis noted in sarcoidosis and tuberculosis were panuveitis (10.5% and 9.5%), anterior uveitis (9% and 5%) and intermediate uveitis with spillover (1% and 2%). High S ACE with lymphopenia was noted in 14% of sarcoid uveitis versus 8.5% in ocular TB.

Conclusions: A combination of elevated serum ACE and lymphopaenia more convincingly suggests sarcoid uveitis rather than used alone. Elevated serum ACE can alsooccur in tubercular uveitis.

Extrapulmonary Tuberculosis Presenting as Panuveitis in a 70-Year-Old Patient

First Author: Jard Evans GARCIA

Purpose: To present a case of tuberculous panuveitis in a 70-year-old patient.

Methods: Complete ophthalmologic and uveitic work-up were done.

Results: At the time of presentation, an ocular examination of the left eye revealed Hand movement with good light perception, and circumcorneal congestion, with a 5mm sluggishly reactive pupil, and brown pigments on the corneal endothelium. The anterior chamber had trace cells, with an Iris granuloma, and broad-based posterior synechiae, in addition to a NO3 NC3 C3 cataract. In the right eye, the BCVA was 6/6 (-1.75 sph), with a pupil of 2-3mm briskly reactive to light without RAPD. Posterior segment examination of the left eye revealed a yellowish-white lesion on the fundus with associated exudative Retinal Detachment. Systemic work-up was done which revealed biapical infiltrates and a positive TB quantiferon. Clinical diagnosis of chronic granulomatous panuveitis secondary to

tuberculosis was made.

Conclusions: The most common manifestation of ocular TB is intraocular disease involving the uveal tract wherein choroidal tubercles are the most common clinical manifestation. A diagnosis of ocular TB is most often a clinical diagnosis, with ocular findings supported by a consistent risk history for TB, evidence for TB elsewhere (such as the lungs), and/or a positive test for TB infection such as the tuberculin skin test (TST) or an interferon-gamma release assay (IGRA), since the culture of eye tissue or fluid frequently is not possible. The approach to treatment of ocular TB is generally the same as that for pulmonary TB.

Idiopathic Retinal Vasculitis, Aneurysms and Neuroretinitis (IRVAN) Syndrome Associated with Tuberculosis: A Case Report

First Author: Aasiah SHARIFUDDIN
Co-Author(s): Nazima ALI, Hanizasurana HASHIM, Amir SAMSUDIN

Purpose: To report a rare case of idiopathic retinal vasculitis, aneurysms and neuroretinitis (IRVAN) associated with tuberculosis (TB) hypersensitivity.

Methods: A case report.

Results: A 36-year-old man complained of worsening vision in his left eye. His right eye was blind for 6 years. On examination, vision in that eye was 6/12, while counting fingers in the right eye. The right eye fundus had multiple chorioretinal scars and optic atrophy, while the left eye had vitreous hemorrhage, neuroretinitis, and macular exudates. Optical coherence tomography (OCT) demonstrated right eye ellipsoid junction destruction while the left eye had macular exudation. Fundus fluorescein angiography (FFA) showed macroaneurysms, vasculitis and capillary-fall-out in both eyes. His TB quantiferon assay was positive. Another laboratory workup was negative. He was diagnosed with IRVAN syndrome and received bilateral pan-retinal laser photocoagulation (PRP). One month later, his left eye vision reduced to 6/36 and the fundus showed a newly developed hyperaemic optic disc, vasculitis and increasing macular exudation. OCT in that eye revealed subretinal fluid tracking from the optic disc towards the fovea, while FFA showed new vessels, a hot disc and areas of capillary fall-out. This time he was diagnosed with left eye TB hypersensitivity. He received further PRP in that eye and oral anti-TB medications. His left eye vision improved to 6/9 with a resolution of subretinal fluid after 2 weeks.

Conclusions: Management of IRVAN remains challenging because of the lack of clinical trials for such a rare entity. This condition, however, may be part of the spectrum of ocular TB.

Intraocular Filariasis Manifested as Posterior Uveitis: A New Case after 50 Years of Extinction in Taiwan

First Author: Yueh-chang LEE

Purpose: To report a case of intraocular filariasis superimposed with EBV infection manifested as posterior uveitis, and to raise the awareness of this rare clinical dilemma after 50 years of local extinction.

Methods: A case report.

Results: A 64-year-old man with a medical history of diabetes mellitus, dyslipidemia, and old pulmonary tuberculosis 15 years ago was referred under the impression of posterior uveitis OU. He suffered from decreased vision of both eyes for half a year, and acute

deterioration occurred after cataract surgery OD done by a previous ophthalmologist. Upon examination, his vision was light perception OD and 20/60 OS. Slit-lamp and fundus examination showed anterior chamber cell 1+ OU, anterior vitreous cell 4+ OD/ 1+ OS, vitreous haze 4+ OD/ 1+ OS. Fluorescein and indocyanine green angiography revealed disseminated chorioretinitis with retinal vasculitis OU, and multiple choroidal granulomas OD. Vitreous biopsy of the right eye was arranged, and qRT-PCR was positive for EBV infection. However, lots of whitish bands in vitreous OD were found 2 weeks after oral antiviral medication, so a repetitive vitreous biopsy of the right eye was performed. Under microscopy, the whitish bands were identified as microfilariasis. To further distinguish the filarial species, we arranged nested PCR and DNA sequencing for genotyping. Under the final diagnosis of intraocular filariasis superimposed with EBV infection, the patient was given oral anthelmintic and antiviral medication, but the visual outcome was still poor.

Conclusions: We used molecular characterization to detect a rare combination of intraocular filariasis superimposed with EBV infection. Awareness and timely treatment are crucial for a better visual prognosis.

Intraocular Lymphoma as Relapse after Remission for Primary Breast B Cell Lymphoma: A Case Report

First Author: Siti FADHILA

Purpose: Intraocular lymphoma (IOL) is a rare form of lymphocytic malignancy. It may pose a great diagnostic challenges as its clinical presentation highly masquerades different types of uveitis entities. Herein, we report a rare case of a relapsed IOL patient who had achieved complete remission for primary breast B cell lymphoma.

Methods: A 47-year-old woman complained of blurred vision of the right eye preceded by floaters since 5 months before admission. She has a history of complete remission for primary breast diffuse large B cell lymphoma for five consecutive years. Both eyes had vitreous haziness and several yellowish thickened retinal lesions with optic nerves appeared edematous and infiltrated. Best corrected visual acuity were hand movement for the right eye and 6/45 for the left eye. Diagnostic vitrectomy was performed, and cytopathologic exam showed B cell origin lymphoma. Cerebral MRI disclosed new parenchymal lesions suggestive of metastases. The patient was given multiple rituximab intravitreal injections and systemic chemotherapy.

Results: Patients treated for B cell lymphoma are still at continued risk of late relapse including intraocular infiltration following complete remission. Vitrectomy is required for both diagnostic and therapeutic purposes. The exploration of optic nerve infiltration is needed since it highly represents CNS involvement. Once optic nerve infiltration has been diagnosed, consider a more aggressive therapy to prevent poor visual and systemic prognoses.

Conclusions: Ocular relapse of primary breast B cell lymphoma is uncommon. Having a high degree of clinical suspicion in selected patients with lymphoma is essential to avoid unnecessary delay in diagnosis and treatment.

Intravitreal Ganciclovir as Monotherapy for Bilateral CMV Retinitis: A Case Report

First Author: Ana Margarita SARMIENTO
Co-Author(s): Jan Patrick CHU, Egidio FORTUNA

Purpose: To present a case of bilateral CMV retinitis managed with monotherapy of intravitreal ganciclovir.

Methods: A case report of a 30-year-old Filipino male diagnosed with CMV Retinitis seen in a tertiary government hospital in the Philippines.

Results: This is a case of a 30-year-old male diagnosed with HIV for 6 months prior to consultation and was started on anti-retroviral therapy (Efavirenz600mg/ Lamivudine300mg/ Tenofovir300mg). After 5 months of treatment, the patient noted gradual onset of generalized blurring of vision of both eyes associated with floaters. On examination, the patient's best-corrected visual acuity is 20/80 on the right eye and 20/100 on the left. A diagnosis of cytomegalovirus retinitis was made given the clinical history and the classic retinal findings. A baseline fundus photo was done revealing neuroretinitis and retinal necrosis with overlying hemorrhages along the inferior arcade on the right eye and along the superior and inferior arcades on the left. The patient is treated with a 3-week induction phase of twice a week intravitreal ganciclovir injection (2mg) and a maintenance phase of once a week injection. After the 3-week induction phase, the best-corrected visual acuity improved to 20/50 on the right and 20/30 on the left. Serial fundus photo revealed improvement of the disc margins of the optic nerve and decreasing amount of hemorrhages with drying up of the lesions surrounding the macula.

Conclusions: This case exhibits that monotherapy of intravitreal ganciclovir is effective in controlling CMV retinitis.

Is Traumatic Iridolenticular Abscess (ILA) a Spectrum of Evolving Endophthalmitis

First Author: Kirandeep KAUR
Co-Author(s): Balamurugan S

Purpose: To retrospectively analyze clinical profile and visual outcome of eyes with traumatic iridolenticular abscess (TILA).

Methods: 169 eyes of 169 patients were evaluated with B-scan and anterior segment-ocular coherence tomography. Lens extraction without primary IOL was done. Secondary IOL was planned after a minimum quiescence period of 3 months.

Results: All eyes had full-thickness entry wounds with BCVA range from Hand moments to light perception. 159 eyes had inflammatory control after cataract extraction and 10 eyes had non- resolving endophthalmitis. After 6 months, 101(59.8%) eyes had secondary IOL implantation. Bacterial growth was reported in 71(42.01%), fungal in 29(17.2%), and no growth in 69(38.8%) cases. Among bacterial, 59 showed Staphylococcus epidermis, 7 Nocardia, 4 Moraxella, and 1 Rhizobium. Final BCVA ranged from 20/30–20/120.

Conclusions: Patients presenting with TILA need to be managed aggressively with topical and systemic antibiotics. Primary IOL implantation is contraindicated in the Intralenticular abscess, as there are high chances of endophthalmitis resulting after lens extraction. Early lens extraction with systemic and local antibiotics helps in eradicating microbial load and resolution of inflammation with good visual outcomes.

Keratitis Occurring in Post-Kala-Azar Dermal Leishmaniasis Patients Treated with Miltefosine

First Author: Rakhi KUSUMESH
Co-Author(s): Anita AMBASTHA, Bibhuti Prassan SINHA, Nilesh Mohan MOHAN

Purpose: To describe the characteristic clinical features and management of keratitis in five patients with Post kala-azar dermal leishmaniasis (PKDL) receiving miltefosine.

Methods: The medical records of five PKDL patients presenting with keratitis were reviewed retrospectively from April 2018 to December 2019. The initial evaluation included a thorough medical history including drug detail regarding the dose and duration of miltefosine. Complete clinical and microbiological characteristics of keratitis were noted.

Results: The ocular symptoms included pain, redness, watering, photophobia, and a marked decrease in vision. Slit-lamp biomicroscopy in each case revealed a peripheral, paralimbal, ring-shaped, full-thickness stromal infiltration resulting in ulcerative keratitis. The keratitis was unilateral in three and bilateral in two patients. All five patients received miltefosine for an average period of 48 days before the onset of keratitis. The best-corrected visual acuity (BCVA) at presentation ranged from hand movement to 20/125. Discontinuation of miltefosine and initiation of corticosteroids therapy were used to manage keratitis in all cases. The unilateral cases have excellent outcomes with topical steroids, but poor outcomes were found in patients with bilateral disease which also required penetrating keratoplasty (PK).

Conclusions: Miltefosine when given for prolonged periods in PKDL patients can cause vision-threatening keratitis. Early diagnosis with discontinuation of the drug is the key to treatment efficacy. Topical steroids are effective in early and unilateral disease. However, advanced and bilateral diseases have poor outcomes and may require PK.

Multiple Migratory Caterpillar Hairs in the Eye: A Case Report

First Author: Kaaviya ASOKAN
Co-Author(s): Juhy CHERIAN, Nanthene RAJMOHAN, Dr.sarala SHANKAR, Veni Priya SIGAMANI

Purpose: To present a case of multiple migratory intraocular caterpillar hairs. Caterpillar hair may penetrate into the eye (the conjunctiva or cornea or AC) forcibly by direct contact or by being rubbed.

Methods: A 40 year old male presented to a tertiary care centre in southern India with history of caterpillar fall in the right eye followed by foreign body sensation, pain and redness. His BCVA was 6/6 both eyes. IOP was normal both eyes. On detailed examination of right eye, there were multiple caterpillar hairs in palpebral conjunctiva, superficial cornea and deep layers of cornea and also in anterior chamber without any AC reaction. Fundus examination was normal. Conjunctival hairs were removed with help of forceps under topical anesthesia. Patient was started on topical antibiotics and topical steroids. Patient was closely followed up.

Results: Patient was symptomatically better on symptomatic management. Superficial corneal hair was removed in subsequent visit. No anterior chamber or posterior chamber reaction was noticed in this patient. In last follow-up visit, 2 hairs were seen on the iris but no hairs in cornea or conjunctiva. Patient is under regular follow-up until now (2 months).

Conclusions: Caterpillar hairs are known to

cause inflammatory reaction in the eye as well as they have the ability to migrate intraocularly through the cornea. Therefore, the possibility of intraocular inflammation after the quiescent stage always has to be kept in mind.

Ocular Candidiasis with Hearing and Hair Loss in Latent Tuberculosis Adolescent

First Author: Hans PRAMONO
Co-Author(s): Ari DJATIKUSUMO, Rina La NORA, Hafizah SUKIRMAN, Ratna SITOMPUL

Purpose: Ocular candidiasis typically appears as a whitish, chorioretinal lesion and may mimic posterior uveitis. We present an unusual case of ocular candidiasis accompanied by systemic manifestations of uveitis disease entity such as hearing loss, hair loss, and latent tuberculosis in an adolescent girl.

Methods: A case report.

Results: A 14-year-old female came with a chief complaint of blurry vision on both eyes, accompanied by tinnitus, hearing loss, and hair loss during the past three months. She had a history of hospitalization and was given intravenous antibiotics, and her chest X-ray showed suprahillar opacity of the right lung. At that moment, we differential diagnosed her as Vogt-Koyanagi-Harada syndrome or tuberculosis (TB) uveitis, and started anti-TB drugs. We found no improvement and decided to do diagnostic vitrectomy, in which no microorganism were found. We started high-dose steroid treatment to treat the possibility of VKH. However, her condition worsened and we found Candida albicans from vitreous culture. Systemic and intravitreous antifungal were given, as well as vitrectomy to the fellow eye. After seven weeks of antifungal treatment, the inflammation finally subsided, but the visual acuity was light perception in both eyes.

Conclusions: Ocular candidiasis may appear similar to posterior uveitis. History of prolonged hospitalization with an indwelling catheter and primary immunodeficiency are some of the risk factors of ocular candidiasis. Late management of ocular candidiasis with antifungal therapy or vitrectomy leads to poor visual prognosis. In conclusion, ocular candidiasis is a rare, aggressive, and potentially vision-threatening condition. Prompt diagnosis and appropriate treatment are crucial.

Ocular Tuberculosis Masquerading as Atypical Ocular Toxoplasmosis

First Author: Albert John BROMEO
Co-Author(s): Cheryl ARCINUE, Sweet Jorlene LERIT

Purpose: To describe the diagnosis and management of an unusual case of ocular tuberculosis initially presenting with findings consistent with atypical ocular toxoplasmosis.

Methods: A case report.

Results: Ocular tuberculosis is a great mimicker of various uveitis entities. We present a case of a 29-year-old male who presented with blurring vision and floaters in the left eye. On examination, the left eye had anterior chamber cells and vitritis associated with retinitis. He had no other symptoms. The initial presentation was consistent with ocular toxoplasmosis and he was started on oral sulfamethoxazole-trimethoprim which showed a good response to treatment. However, work-up revealed negative Toxoplasma antibody titers but a positive M. tuberculosis interferon-gamma release assay test and Mantoux test, making the diagnosis of ocular tuberculosis more likely. The patient was shifted to antituberculous therapy which eventually resulted in resolution of inflammation with recovery of visual acuity. The diagnosis

of ocular tuberculosis requires a detailed medical history as well as microbiologic and immunologic studies. A high index of suspicion by the treating ophthalmologist is necessary to clinch the diagnosis.

Conclusions: Ocular tuberculosis can mimic the presentation of other inflammatory diseases, intraocular tumors, and other intraocular infections. A high clinical index of suspicion is required in the approach of such cases, particularly in areas of high prevalence of tuberculosis. Corroborative evidence of clinical findings and diagnostic work-up is necessary to clinch the diagnosis.

Recalcitrant Vision Threatening Serpiginous Choroiditis Treated with Intravitreal Methotrexate

First Author: Nitika BERI
Co-Author(s): Akshita AGGARWAL, Gopal DAS, Ankur SINGH

Purpose: To report the successful treatment of a young male with intravitreal methotrexate (MTX) with serpiginous choroiditis threatening the fovea progressing on pulse methylprednisolone.

Methods: A 17-year-old male presented with insidious onset, painless diminution of vision in the left eye for 2 days. A diagnosis of serpiginous choroiditis was made on the morphological placoid appearance of lesion with central healing and active periphery with an absence of vitritis. In view of the proximity of lesion to the fovea (abutting the fovea) and negative ancillary investigation for infective pathology the patient was treated with three doses of pulse methylprednisolone (1gm/day). Progression to the fovea with no improvement in visual acuity was noted, hence as a sight-saving intervention in uniocular recalcitrant disease, intravitreal methotrexate (400µg), 3 doses at a gap of 1 week were given along with oral systemic steroids (1mg/kg). Serial ophthalmologic examinations in conjunction with fundus photography, and SD OCT were used to assess the treatment response.

Results: Prompt improvement of relentlessly progressing disease was seen as arrested progression and healing of active edge with 3 weekly injections of unilateral intravitreal MTX. Signs of healing of active edge on OCT line scans corroborated with the healing of active edge as seen on fundus photography. No side effects and excellent tolerability were noted with intravitreal MTX. Pulse methylprednisolone was ineffective in arresting the progression of the disease.

Conclusions: Intravitreal MTX injections may represent effective treatment options for patients diagnosed with fovea threatening intraocular serpiginous choroiditis progressing on pulse methylprednisolone.

The Profile of Granulomatous Uveitis in North-East India: An Observational Study

First Author: Henal JAVERI
Co-Author(s): Dipankar DAS, Riddhi RAICHURA

Purpose: To analyse the etiological prevalence as well as the clinical characteristics and management of granulomatous uveitis cases in North-East India.

Methods: This was a hospital-based prospective, observational study over 18 months with a sample size of 73 patients. Demographic data including age, gender and place of residence were recorded. A full ophthalmic examination with emphasis on the inflammatory characteristics and systemic workup was performed. Treatment was provided as per standardised protocol with a follow-up at 2 and 6 weeks, respectively.

Results: Maximum patients were in the age group of 30-39 years. The most common etiology associated with granulomatous uveitis was tuberculosis (36.6%), followed by VKH (17.8%) and sarcoidosis (13.7%). Anterior chamber cells, flare and vitritis were common anterior and posterior segment findings, respectively.

Conclusions: Uveitis accounts for nearly 10-25% of legal blindness worldwide. Granulomatous uveitis makes up for 26-52% of cases of uveitis. Studies specifically describing the etiology and profile of granulomatous causes are sparse. Tuberculosis and VKH are important etiologies in this region. Knowledge from this study provides ophthalmologists and epidemiologists with a resource to form a region-specific outline for the best management of such cases and monitor future disease patterns.

Therapeutic Challenges among Vogt-Koyanagi-Harada Disease Patients in Tertiary Centre in Northern Malaysia A Case Series

First Author: Nur Atiqah HASAN
Co-Author(s): Roslin Azni ABDUL AZIZ, Haslina MOHD ALI, Muharliza MUSA, Mushawiahti MUSTAPHA

Purpose: To report therapeutic challenges among Vogt-Koyanagi-Harada Disease (VKH) patients in a tertiary centre of the northern part of Malaysia.

Methods: A case series.

Results: A total of 14 patients, average age at presentation was 37.7 years with female predominance (85.7%). All cases presented with acute uveitic stage and having bilateral eye involvement at first presentation. The most common findings were panuveitis with optic disc swelling (57.1%), followed by serous retinal detachment (28.5%) and anterior uveitis (14.2%). Most of the patients presented with poor vision of 3/60 and worse (57.1%), followed by moderate visual impairment (21.4%), severe visual impairment (14.2%) and mild or no visual impairment (7.1%). 11 patients required second line of treatment at initial presentation and only 3 patients responded well to oral corticosteroid. Most of the cases responded well to treatment in which they achieved mild or no visual impairment in 50% of cases, whereas 42.8% achieved moderate visual impairment and 7.1% were blind.

Conclusions: Most of our patients showed significant visual improvement with second line immunosuppressant agent.

Treatment Modalities of Vogt Koyanagi Harada's Panuveitis

First Author: Koshal DANI
Co-Author(s): Murugan BALA

Purpose: To analyze changing trends in clinical profile, treatment modalities of Vogt Koyanagi Harada's panuveitis over the last decade.

Methods: Retrospective analysis of 89 patients divided in 2 study groups. From 2010-14, 41 patients received oral steroids only without early immunosuppresants and parenteral steroids. From 2015-19, 48 patients in group 2 received early IV steroids and immunosupressants. EDI OCT, FFA were mandatory in group 2 but not in group 1.

Results: Group 2 had better visual recovery compared to group 1 ($p=0.037$). The complication rate of serous retinal detachment, CNVM, secondary angle closure glaucoma, cataract were higher in group 1 compared

to group 2 (0.018). The recurrence rate significantly decreased in group 2 (mean 1.34) compared to group 1 (mean 3.66). Less peripapillary atrophy in group 2 was observed.

Conclusions: Usage of early parenteral steroids combined with early immunosuppressant resulted in better visual outcome, reduced recurrences and complications.

Uveitis Associated with Concurrent Administration of Rifabutin and Clarithromycin: A Commonly Overlooked Scenario

First Author: Wu HSING-CHIEN
Co-Author(s): Chien-hsiung LAI, Jin-jhe WANG

Purpose: To describe a case wherein bilateral uveitis developed following rifabutin and clarithromycin combined therapy.

Methods: A case report.

Results: A 65-year-old man was being treated for four months with rifabutin (300mg/day), clarithromycin (500mg twice daily), and ethambutol (800mg/day, 15mg/kg/day) against pulmonary and left hip Mycobacterium kansasii infection. The patient developed pain and blurred vision in both eyes 3 days ago. His visual acuity declined to hand motion in his right eye and counting fingers in his left eye. Marked anterior chamber and vitreous reaction were discovered in both eyes, and the right eye further exhibited blocked detailed fundus examination. Ophthalmoscopy of the left eye showed discrete whitish infiltrates inferiorly in the vitreous. Uveitis slowly resolved after discontinuation of Rifabutin, and intensive topical steroids accelerated the recovery of vision to 20/20 in both eyes within 1 week.

Conclusions: Rifabutin is well-tolerated, rarely inducing uveitis at daily dosages less than 1200mg. However, rifabutin combined with clarithromycin and/or fluconazole may increase rifabutin concentrations through inhibition of the cytochrome P-450 system. In our patient, uveitis occurred even at a very low dose of 300mg/day. To reduce the risk of this adverse event, be aware of the safer dosage of Rifabutin, especially in multidrug regimens, and discontinue promptly once the side effects are recognized.

Miscellaneous

A Peck from an Angry Bird

First Author: Wang Shir YEN
Co-Author(s): Jemaima CHE HAMZAH, Karen KHOO KAH LUEN, Mun LAM, Foo Siu WAN

Purpose: This case illustrated an interesting presentation of penetrating ocular injury secondary to bird attack with good visual outcome.

Methods: A case study.

Results: A 12-year-old boy presented with a history of left eye bleeding and pain for 1 day after being pecked by a bird. At presentation, both eyes' visual acuity (VA) was 6/9 with no reverse relative afferent pupillary reflex. Left eye pupil was distorted and peaked at 8 o'clock. The left cornea showed a 1.2mm linear full-thickness corneo-limbal laceration wound at 8 o'clock with iris plug. The anterior chamber was shallow with cells 3+. Seidel test was negative. He underwent primary corneo-limbal toilet and suturing within 24 hours and intravenous Augmentin was commenced. Fundus examination was unremarkable. Postoperatively, he was started on topical ceftazidime and gentamycin eye drops. Postoperative day 2, he was discharged well with oral Augmentin for 6 days. On subsequent

follow-up, topical antibiotics were tapered down slowly and all corneal sutures were removed with the left eye best-corrected VA 6/6.

Conclusions: Penetrating eye injuries due to bird attacks are extremely rare. This case highlighted the potential danger of birds causing ocular injury. Community living in rural areas or farmers dealing with birds should be aware of potential danger and take feasible precautions.

Assessment of Biometry and Keratometry in Low and High Degrees of Myopic Patients of Barak Valley

First Author: Rajneel BHATTACHARJEE
Co-Author(s): Namrata SHREE

Purpose: The aim of the study is to compare biometry and keratometry values in low and high myopia.

Methods: A sample of 50 patients was selected aged between (6 to 60) years and divided into two equal groups of low and high degree of myopia. Only myopic patients and those giving consent were included, patients who had undergone ocular surgery were excluded. After proper ocular examination, keratometry and A-scan biometry were measured from both the eyes of each patient.

Results: The range of refraction did not differ very much between the two eyes. No significant difference was found between low and high degree of myopia in corneal curvature. Patients with high myopia were found to have longer axial length($P<0.0001$) as compared to low myopic patients.

Conclusions: Axial length has a lot more effect on the degree of myopia than corneal curvature.

Different Ocular Manifestations of Blunt Trauma to the Eye

First Author: Rajneel BHATTACHARJEE
Co-Author(s): Namrata SHREE

Purpose: To assess the different effects on eye and vision due to blunt injury to the eye.

Methods: A prospective study was conducted on 100 patients visiting the hospital. Local examination, visual acuity checking, direct and indirect ophthalmoscopy, slit-lamp examination and other necessary investigations like x-ray, CT scan were done.

Results: The study showed sex incidence of 3:1 M:F, male preponderance. Road traffic accidents showed the highest cause of blunt trauma to the eye (63%), followed by physical assault (22%). 71 patients(71%) had ecchymosis of periorbital tissue, 58 patients (58%) had lid edema. Only 2 patients(2%) were found to have retinal detachment.

Conclusions: Ocular lesions are fairly common with blunt trauma to the eye but rarely lead to serious residual disease in the future. Delay in the start of treatment in blunt injury cases due to lack of transportation or health care facility can be directly related to visual recovery and final visual outcome.

External Ocular Manifestations among Patients Diagnosed with Coronavirus Disease 2019 (COVID-19) in a Referral Center in the Philippines

First Author: Alyssa Louise PEJANA
Co-Author(s): Nilo Vincent FLORCRUZ, Maria-dominga PADILLA, Aramis Jr TORREFRANCA

Purpose: This study aimed to determine coronavirus disease 2019 (COVID-19)-related external ocular manifestations

in a referral center in the Philippines. Additionally, this study aimed to correlate the demographics, systemic manifestations, and systemic laboratory results with the ocular manifestations, and to determine the chronological relationship between the onset of ocular manifestations relative to the onset of systemic manifestations.

Methods: This single center, descriptive cross-sectional study included 72 subjects from the adult COVID-19 wards of the study setting. Methodology consisted of recruitment of subjects and data collection through clinical history taking and performing gross eye examination. Correlation between presence of at least one ocular manifestations and the different quantitative variables were assessed by point-biserial correlation while qualitative variables were assessed by chi-square or Fisher exact test of association.

Results: Ocular manifestations were observed in 31.9% of the subjects. The most prevalent ocular symptom and finding were foreign body sensation (11.1%) and conjunctival hyperemia (19.4%), respectively. The median age was 43 with a higher prevalence in males (73.9%). Only temperature and aspartate aminotransferase levels showed a low positive correlation. The majority (29.2%) experienced systemic symptoms prior to ocular symptoms.

Conclusions: Roughly one-third of patients with COVID-19 in this study population presented with ocular manifestations. At the time of writing, this is the first local study investigating the external ocular manifestations in patients with COVID-19. This signals the need to pursue more robust studies which will guide both ophthalmologists and other practitioners in strengthening existing guidelines in the management of COVID-19 patients.

Eye Irrigation as a First-Line Treatment and Diagnostic Method for Emergency Department Patients Who Complain of Ocular Foreign Bodies

First Author: Hung Da CHOU
Co-Author(s): Kuan-jen CHEN, Ching-hsi HSIAO, Yu-chuan KANG

Purpose: To determine whether external eye irrigation effectively removes ocular foreign bodies (FBs) and whether ocular pain can predict retained ocular FBs.

Methods: A Prospective, observational case series in a tertiary emergency department (ED). ED patients who complained of ocular FBs and passed open-globe screenings were enrolled. In the irrigation group (52 patients), ocular pain was evaluated with a visual analog scale before and after eye irrigation. The presence of FBs was determined under a slit-lamp after irrigation. In the non-irrigation group (27 patients), ocular pain was evaluated only upon arrival to the ED, and slit-lamp biomicroscopy immediately followed. The main outcome measures were FB retention rate, ocular pain score, and positive/negative predictive values of change in ocular pain score for FB retention.

Results: The corneal FB retention rate was significantly lower in the irrigation group (13/52 eyes, 25%) than in the non-irrigation group (13/27 eyes, 48%; $P = .04$), but the conjunctival sac FB retention rate was similar (33% vs. 26%, $P = .33$). After irrigation, the change in ocular pain score was significantly greater among patients without a retained FB (mean ± standard deviation: -2.6 ± 2.7) than among patients with retained FBs (-0.7 ± 1.4, $P = .02$). An improvement in ocular pain score of ≥ 5 points predicted the absence of FBs, with negative and positive predictive values of 100% and 58.3%, respectively.

Conclusions: Eye irrigation lowered corneal FB retention for patients complaining of ocular FBs. If ocular pain decreased considerably after irrigation, the probability of a retained FB was low.

Global Salvage in Klebsiella Pandophthalmitis

First Author: Wang Shir YEN
Co-Author(s): Jemaima CHE HAMZAH, Foo Siu WAN, Chai YEE JY

Purpose: This case illustrated an interesting case of Klebsiella pandophthalmitis management with multiple intravitreal antibiotic and steroid.

Methods: A case study.

Results: A 49-year-old Chinese male with no co-morbidities came with a complaint of right eye progressive decreased vision associated with redness, pain and swelling for 9 days. He had a history of acute urinary retention prior to the symptoms and was treated with a urinary catheter and oral antibiotics. Right eye visual acuity upon presentation was perception of light with positive reverse relative afferent pupillary defect. Examination showed anterior chamber cells 4+ and hypopyon. B-scan ultrasonography showed dense vitritis with scleral thickening and "T" sign. Urine culture grew Klebsiella pneumoniae which was sensitive to ciprofloxacin, ceftazidime and gentamycin. He was given intravitreal injection of vancomycin 2mg/0.1mil, ceftazidime 2mg/0.1mil and dexamethasone 0.4mg/0.1mil. He was also started on intravenous ciprofloxacin and topical gentamycin and ceftazidime. However, the patient developed temperature spikes 3 days later. Investigations done showed pneumonia and right liver lobe abscess. Thus, the patient was diagnosed with disseminated klebsiella syndrome and referred to surgical, chest and infection disease specialists for co-management. Subsequently, the patiet recovered and was discharged well on an oral antibiotic. Repeat culture sensitivity for vitreous, blood, urine and liver drainage showed no micro-organisms growth. His right eye inflammation remained stable after multiple intravitreal antibiotics and dexamethasone injections but eventually became phthisical.

Conclusions: Early diagnosis with aggressive treatment of Klebsiella panophthalmitis can arrest the infection and avoid enucleation thus salvaging the globe. However, the visual outcome remains poor.

Is Electronic Medical Record (EMR) a Boon or Bane in a Tertiary Eye Care Center?

First Author: Basitali LAKHANI
Co-Author(s): Bindiya C, Balamurugan S

Purpose: To assess the satisfaction and perceived quality of EMR among doctors in a tertiary eye care center and to evaluate how EMR has influenced the patient waiting time in the hospital.

Methods: A questionnaire-based cross-sectional survey was conducted among ophthalmologists in a tertiary eye care center. Patient waiting time before and after the introduction of EMR was calculated from pre-existing data.

Results: A total of 128 completed questionnaires were collected. 65% of the doctors rated EMR as an effective tool. Younger age ($p<0.04$), males ($p<0.05$) and non-residents ($p<0.03$) had higher odds while choosing EMR. Non-PGs opined that EMR will affect the drawing skills of trainees ($p<0.01$). It was found that there was

a significant decrease in the waiting time of patients after the introduction of EMR.

Conclusions: There is good satisfaction and perceived quality of EMR among doctors. EMR introduction has lead to significant decrease in the waiting time and has improved the service delivery to patients.

Penetrating Ocular Injury with Metallic Intraocular Foreign Body (IOFB): A Case Report

First Author: Nuratiqah Binti ZAINAL ABIDIN
Co-Author(s): Maya Sapira HANAPI, Adil Bin HUSSEIN, Najiha Binti MOHTAR, Zamri NOORDIN

Purpose: To report a case of penetrating eye injury with metallic IOFB.

Methods: A case report.

Results: A 25-year-old Myanmar laborer with no medical illness presented with an alleged left eye (LE) hit by a nail while hammering at his workplace without wearing an eye protector. He sustained LE pain and a sudden reduction of vision. On examination, his right eye (RE) visual acuity (VA) was 6/6 while LE VA was hand movement. There was no relative afferent pupillary defect. There was self-sealed full-thickness cornea laceration at 8 o'clock and a shallow anterior chamber (AC) with the presence of fibrin. The anterior lens capsule was breached with lens matter in AC and cataractous lens. There was no LE fundus view. Skull Xray showed the presence of small IOFB in LE. The patient underwent LE cornea toilet and suturing with lensectomy, vitrectomy, removal of IOFB and intravitreal antibiotic injection. He was started with intravenous Ceftazidime. The intraoperative findings were noted to have spiral-shaped cornea laceration wound at paracentral measuring 6 mm in length, traumatic cataract, vitreous hemorrhage and metal IOFB measuring 0.5mm in length embedded on the retina. On day 1 post-surgery, his LE VA was perception to light and intraocular pressure was 8 mmHg. LE fundus showed gas-filled 50% with inferior retina flat. He completed intravenous Ceftazidime for 1 week and was discharged with oral Cefuroxime for another week, with topical steroid and Moxifloxacin. However patient defaulted his follow-up after that.

Conclusions: Prompt treatment is crucial to prevent devastating ocular complications in penetrating eye injury with high velocity mechanism.

Prevalence of Musculoskeletal Disorders among Ophthalmologists in Malaysia

First Author: Hui Wen LIM

Purpose: To evaluate the prevalence and associations of musculoskeletal disorders among Malaysian ophthalmologists.

Methods: A cross sectional study. An electronic survey was emailed to all ophthalmologists who were registered with the National Specialist Register of Malaysia via Malaysia Ophthalmology Society.

Results: A total of 120 responses were obtained (12.5%). Our respondents were predominantly female (n=97, 80.8%), Malay race (n=46, 38.3%) with mean age of 43.5±7.7 years. 88.3% (n=106) worked in government institute, 67.5% (n=81) were general ophthalmologists with an average ophthalmic experience of 109.29±91.6 months. Median time spent in the clinic was 31 hours (IQR=22) per week and time spent operating was 13 hours (IQR=18.8) per week with 56.7% (n=68) reported inadequate supporting

staff in the workplace. The prevalence of self-reported musculoskeletal disorders was 70.8% (n=85). Arm-shoulder-hand pain (n=58, 48.3%) was the most commonly reported symptom, followed by neck pain (n=57, 47.5%) and lower back pain (n=48, 40%). Musculoskeletal disorders were more prevalent among subspecialists as compared to general ophthalmologists (back pain 43.6% vs. 38.3%; neck pain 48.7% vs. 46.9%; arm-shoulder-hand pain 51.3% vs. 46.9%). Obesity was found to be the only independent risk factor associated with neck pain (t=3.37 (116), p=0.001).

Conclusions: The rate of self-reported musculoskeletal disorders among Malaysian ophthalmologists was 70.8% with arm-shoulder-hand pain being the most common. A prospective study with larger sample size is suggested to elucidate potential causes leading to musculoskeletal pain among ophthalmologists.

Retrospective Analysis of Firecracker Injuries and Review of Literature at a Tertiary Eye Care Hospital in South India

First Author: Kirandeep KAUR
Co-Author(s): Veena KANNUSAMY

Purpose: To analyze demographics, risk factors, clinical features, functional and anatomical outcomes of firecracker injury patients presenting to a tertiary eye care center.

Methods: A total of 114 patients were retrospectively analyzed from April 2018 to March 2019 with a minimum follow-up of 3 months. The parameters recorded were demographics, mode of injury, type of cracker, BCVA, detailed anterior and posterior segment evaluation, seidel's test, intraocular pressure, and ocular complications. Investigations in the form of a B-Scan, X-ray, or CT scan was done whenever indicated.

Results: A total of 132 eyes of 114 patients were evaluated and included in our study. The mean(SD) age of patients was 18.96 +/- 15.4 years. The male to female ratio was 4:1. A total of 74 (64.91%) patients were less than 18 years of age. Eighteen patients (15.79%) had bilateral involvement. The ratio of RE: LE involvement was 1:1. The mean (SD) baseline visual acuity (BCVA) of the involved eye/eyes assessed on the first visit was 0.54(+/- 0.75). A total of 125 eyes had closed globe injuries and 7 eyes had open globe injuries and 17 patients needed hospital admission. The mean (SD) final BCVA improved to 0.23(+/- 0.62) till the last follow-up.

Conclusions: Firecracker injuries are a major cause of irreversible blindness, more commonly affecting the younger age group (64.91%). Prompt diagnosis with meticulous management can prevent devastating sequelae. Awareness regarding cracker-related injuries, rules regarding the use and sale of crackers, and promotion of safe fireworks are the need of the hour.

Seeing Stars: Starry Coloured Halos in Occipital Lobe Infarct

First Author: Kaaviya ASOKAN
Co-Author(s): Priyadarshini PARTHASARATHI, Prem SAI, Veni Priya SIGAMANI

Purpose: Coloured halos occur due to accumulation of fluid in the refractive media (corneal epithelium, lens) or tear film. It is usually seen in glaucoma, cataract and sometimes in muco-prulent conjunctivitis. Visual hallucination is seen in migraine, seizure disorders and sometimes in psychiatric disorders.

Methods: This presentation is about a 55

year old female who came to casualty with complaints of severe headache and sudden onset of defective vision for 3 days. She also complained of seeing multiple coloured rings in star pattern, each episode lasting for 10 to 15 minutes. Confrontation test showed right homonymous hemianopia. CT brain revealed left subacute occipital lobe infarct. HFA confirmed homonymous hemianopia. Gonioscopy and dilated fundus examination showed no evidence of glaucoma.

Results: Detailed ocular examination revealed no ocular cause of coloured halos and that the coloured halos was due to occipital lobe stroke.

Conclusions: Coloured halos could be a form of visual hallucination, and a rare but subtle sign of occipital lobe affection. A thorough history and a detailed systemic and ocular examination aids in correct diagnosis.

Sustainability of Primary Eye Care Model in Singapore: Singapore National Eye Center Perspective

First Author: Xu YANG
Co-Author(s): Jiayang LIM, Ranjana MATHUR, Amanda NG, Shirlyn SAM, Carin TAN

Purpose: Primary eye care (PEC) is designed to provide care to patients with stable eye conditions decanted from Singapore National Eye Center (SNEC). This study is to examine the outcome of this care model.

Methods: A collection of retrospective data from PEC

Results: PEC optometrists and non-specialist, general practitioner (GP) trained PEC physicians underwent an initial 6-month intensive training with SNEC consultants. Competency tests are completed before starting PEC. Ongoing training with consultants is continued after competency tests. Referral pathways for PEC are clear and appropriate. In the last 5 years, referral pathways for PEC have been revised, with expanding decanting criteria and decreasing refer back criteria to SNEC specialist outpatient clinics (SOC). From Feb 2015 to Jun 2019, a total number of 36,414 patient visits were seen in PEC. The total patient load has shown an increasing trend (from 4437 in 2015 to 10141 in 2018, and projected to be 12794 in 2019). The source of referral includes diabetic retina center, glaucoma and general clinic from SNEC. The primary diagnosis includes Diabetic Retinopathy (41.39%), glaucoma (41.61%) and cataract (17.00%). The referral back rate to the SOC has also shown a decreasing trend (from 32.60% in 2016 to 21.63% in 2018, and projected to be 12.75% in 2019). The main refer back reason (27.53%) is for cataract surgery.

Conclusions: Currently, our PEC is run by trained optometrists and GP-trained PEC physicians. PEC covers a variety of stable eye conditions and provides sustainable safety management for these patients.

The Effects of Regular Exercise on Intraocular Pressure

First Author: Justin YEAK
Co-Author(s): Mimiwati BT ZAHARI, Mohd Nahar Azmi MOHAMED, Norlina RAMLI

Purpose: Exercise may potentially provide an adjunctive measure to help control intraocular pressure in glaucoma patients. However, currently there is still no substantial evidence that regular exercise can produce a prolonged effect of intraocular pressure reduction. We aim to determine the effects of regular exercise on intraocular pressure in healthy individuals.

Methods: We conducted a prospective,

interventional study. Our subjects consist of 45 healthy participants in the intervention arm, and 38 healthy control participants who were age- and gender-matched. The intervention arm was enrolled into a supervised exercise program for a 6 weeks period, where controls were asked to continue their usual daily lifestyle. The intervention consists of 3 sessions every week, focused on aerobic exercise and strength training.

Results: Baseline intraocular pressure was measured, then remeasured again at the end of 6 weeks of exercise conditioning. In the intervention group, there was a reduction of baseline IOP from pre-intervention mean IOP of 15.55 ± 2.63 mmHg, down to 13.36 ± 3.16 mmHg at 6 weeks, a statistically significant reduction of -2.18 ± 2.25 mmHg ($p<0.001$) post-intervention. On the other hand, the control group recorded a non-statistically significant mean increase of 0.63 ± 2.47 mmHg ($p=0.123$) at 6 weeks.

Conclusions: Our study concluded that regular aerobic exercise can result in a significant intraocular pressure reduction in healthy individuals.

Neuro-Ophthalmology

6th Nerve Palsy following COVID-19 Vaccination

First Author: Arpitha PEREIRA

Purpose: To describe a case of 6th nerve palsy following COVID 19 vaccination.

Methods: A 60-year-old gentleman, who was otherwise healthy presented with sudden onset horizontal diplopia which was more for distance and on right gaze. The best-corrected visual acuity was 6/6 in both eyes. Anterior segment examination was unremarkable. Fundus examination was normal with no evidence of papilledema. Extrao cular muscle movements showed limitation of abduction of the right eye. The rest of the cranial nerve examination was normal. Blood investigation and blood pressure were within normal range. CT scan of the head showed no abnormality. The only positive history was vaccination (Astrazeneca) received for COVID-19 2 days prior to the onset of diplopia.

Results: 2 weeks post initial presentation, the degree of diplopia had decreased and ocular motility had improved.

Conclusions: Microvascular cranial nerve palsies are believed to arise from disruption of blood supply to the nerve. There have been recent reports of haemorrhage, blood clots and thrombocytopenia following the administration of COVID-19 vaccines that have raised concerns over the safety of genetic vaccines. This had also led to temporary suspension of Oxford/AZ CoViD vaccine in a number of countries across Europe. The above report shows that COVID Vaccination could possibly result in 6th nerve palsy.

A Case Report of Neurosyphilis: A Great Masquerader

First Author: Nurul Farah Huda SHAHRUDIN
Co-Author(s): Muhammad Fadhli AB HAMID, Rohana ABDUL RASHID, Julieana MUHAMMED, Noor Amalina SAIDI, Wan Norliza WAN MUDA

Purpose: To report a case of neurosyphilis mimicking fungal endopthalmitis.

Methods: A case report.

Results: A 53 year old gentleman with underlying retroviral disease (RVD) under highly active antiretroviral therapy (HAART) presented with left eye blurring of vision with

eye redness and pain for 2 weeks duration. Examination showed the vision over left eye was hand movement (HM). Anterior segment revealed moderate anterior uveitis and posteriorly showed dense vitritis, swollen optic disc and fungal ball inferiorly. Features are consistent with fungal endopthalmitis and intravitreal Amphotericin B, Vancomycin and Fortum was commenced. Vitreous tap for fungal and bacteria was negative. A week later, his Venereal Disease Research Labarotary (VDRL) result was positive with Rapid Plasma Reagin (RPR) test showing titers of 1:128. Intravenous Benzylpenicillin antibiotics was given for two weeks. There was marked improvement of his vitritis and vision after the treatment. Revised diagnosis of neurosyphilis with ocular involvement was made.

Conclusions: Syphilis is a great masquerader as it can mimic many eye pathologies. High index of suspicion is needed especially in patients with underlying RVD.

A Case Report of Optic Nerve Atrophy of Unknown Cause: Usefulness of Testing of Nuclear Gene Mutation

First Author: Wenhao BAI

Purpose: Optic nerve atrophy type 12 (OPA12) is an autosomal dominant nerve system disease, characterized by slowly progressive damage of visual acuity. Sometimes it is difficult to pinpoint the cause of the disease.

Methods: A 4-year-old girl was found to be presented with poor visual acuity in both eyes for half a year. Relevant ophthalmic examinations, examinations and laboratory tests were performed on the girl.

Results: The visual acuity: right eye index and left eye-0.01. Bilateral ocular Segment (-). RAPD(-). Fundus examination showed that the optic disc of both eyes was clear and pale, right: C/D=0.8, left C/D=0.8. The visual field couldn't be measured. The RNFL of the optic disc of both eyes and the ganglionic cells in the macular area were significantly thinned. Orbital MRI showed that the bilateral optic nerve was thin. No abnormality was found in rheumatism, immunity and infection related tests. No abnormality was found in Leber hereditary optic neuropathy and OPA1 gene test. However, the gene test related to optic nerve atrophy in this girl showed mutations in the nuclear gene AFG3L2 which has been shown to cause optic nerve atrophy type 12 (OPA12). Patients with this disease are presented with abnormal color vision, photophobia, paleness of optic disc, atrophy of optic nerve and decreased retinal nerve fiber layer thickness. Moreover, some patients may be presented with sensorineural deafness, impaired intellectual development, dystonia, dyskinesia and ataxia.

Conclusions: For patients with optic nerve atrophy of unknown cause, it is helpful to pay attention to the nuclear gene testing for clear diagnosis.

A Rare Case of Adie's Tonic Pupil

First Author: Muhammad ARFAN
Co-Author(s): Seskoati PRAYITNANINGSIH, Wino VRIEDA VIERLIA

Purpose: To report a rare case of Adie's tonic pupil and to exclude signs of emergency from third nerve palsy.

Methods: Case presentation of patient with anisocoria greater in bright light based on history taking, physical, ophthalmology examination and laboratory test to establish the diagnosis. Pilocarpine 0.1% was further given to exclude other possible causes of anisocoria

greater in bright light.

Results: A 37-year-old woman came to the eye clinic with chief complaint of different sizes of her pupils. The left pupil was bigger than the right pupil which was accidentally found while performing a medical check-up. There was no abnormality in physiologic deep tendon reflex and normal laboratory test results. Ophthalmology examination showed visual acuity was 6/6 for both eyes, there were no ptosis and ophthalmoplegia noted. Anterior segment examination revealed the presence of dilated left pupil with a worm-like appearance in the iris with vermiform contraction. Pupillary reaction to accommodation was normal. The diagnosis of Adie's tonic pupil was further confirmed following the miotic response of the left pupil after diluted pilocarpine 0.1% application.

Conclusions: A rare case of Adie's tonic pupil had been established by clinical examination and pilocarpine 0.1% sensitivity test. It is important to distinguish the disease from other causes of anisocoria that may lead to an emergency condition.

An Unusual Presentation of Traumatic Optic Neuropathy: A Treatment Dilemma

First Author: Edwin PHENG CHIN MENG
Co-Author(s): Wan Hazabbah HITAM, Nurul 'ain MASNON

Purpose: The objective of this case report is to highlight the unusual presentation of a case of traumatic optic neuropathy and its treatment option in a patient with congenital optic atrophy secondary to colpocephaly.

Methods: A 47-year-old man was referred to the ophthalmologist with a right eye sudden onset of poor vision post-trauma. He gave a history of good function right eye vision and poor vision over his left eye since childhood prior to the trauma. Further history review patient has underlying colpocephaly and suffered from epilepsy but has defaulted medical follow up since childhood. Examination shows reduced optic nerve function in both eyes with bilateral optic disc pallor and negative relative afferent pupillary defect in both eyes.

Results: A diagnosis of right eye traumatic optic neuropathy was made based on history and presentation. The patient was started on intravenous corticosteroids. The patient made a good recovery following high dose steroid and discharge with marked improvement of vision over his right eye and also improved optic nerve functions in his right eye.

Conclusions: Patients with congenital optic atrophy may present with an abnormal presentation of traumatic optic neuropathy. Complete history taking is vital in our diagnosis of traumatic optic neuropathy. The decision of intravenous steroid is made in view of poor vision in both eyes at presentation.

Atypical Optic Neuritis with Negative MRI: A Case Report & Review of Literature

First Author: Pricila WANG
Co-Author(s): Noel CHAN, Chun Yue, Andrew MAK

Purpose: N/A
Methods: N/A
Results: N/A
Conclusions: Optic neuritis (ON) occurs when there is demyelination or inflammation of the optic nerve. Conventionally, diagnosis can be established with magnetic resonance imaging (MRI) using contrast and appropriate sequences. We report a case of atypical ON with a negative MRI at disease onset. A 19-year-old

Chinese female of good past health, presented with a 2-week history of painless subacute visual loss in her left eye. With a presenting visual acuity (VA) of 6/200, a positive relative afferent pupillary defect (RAPD), red desaturation and a pink non-edematous optic disc, clinical diagnosis of retrobulbar optic neuritis was made. Yet, urgent MRI brain and orbits with gadolinium contrast showed no evidence of optic neuritis. Blood tests for anti-myelin oligodendrocyte glycoprotein antibodies (Anti-MOG Ab) and anti-aquaporin 4 antibodies (anti-AQP4 Ab) were negative. After performing an array of ophthalmic and systemic investigations to rule out other potential differential diagnoses, she was treated with a course of intravenous pulse methylprednisolone (IV PMP) according to Optic Neuritis Treatment Trial (ONTT). Her clinical course followed that of atypical optic neuritis with prompt improvement of VA and color vision upon steroid initiation. We discuss the sensitivity of MRI in patients with clinical diagnosis of optic neuritis and compare the differences between Asian and Caucasian population.

Beneficial Effect of Clonazepam in Acquired Pendular Nystagmus with Central Lesion

First Author: Resky MAYNORA
Co-Author(s): Seskoati PRAYITNANINGSIH, Wino VRIEDA VIERLIA

Purpose: To report a challenging case of acquired pendular nystagmus with central lesion and investigate the effect of clonazepam as its treatment.

Methods: The diagnosis was based on history taking, complete neuro-ophthalmology examination, cerebellar sign test and neuroimaging. The effect of clonazepam determined by improvement of nystagmus and oscillopcia frequency.

Results: A 49-year-old female complaint about unstoppable eye movements with oscillopsia for 5 months before admission. Visual acuity and other optic nerve function were within the normal range. No abnormalities in the anterior and posterior segment examination were revealed. Cerebellar sign tests showed a positive result for scanning speech, finger to nose test, dysdiadochokinesia and postural tremor. Systemic hypertension was also noted after examination and treated afterward. Brain and Orbits Magnetic Resonance Imaging (MRI) result showed midline side infarction of the pontine. The patient was then diagnosed with acquired pendular nystagmus due to a central lesion. Stroke therapy was later administered and oral clonazepam was given to treat the nystagmus. Improvement of nystagmus and oscillopsia were achieved after two weeks on clonazepam therapy.

Conclusions: Acquired pendular nystagmus accompanied with cerebellar sign as one of the life-threatening conditions may be caused by pontine infarction and clonazepam can reduce the nystagmus and oscillopsia.

Bilateral Atypical Optic Neuritis with Good Visual Recovery in Young Patient: A Case Report

First Author: Lee Min FOO
Co-Author(s): Rosiah MUDA, Khairy Shamel SONNY TEO

Purpose: To report a case of bilateral atypical optic neuritis (ON) in a young patient with good visual recovery.

Methods: A case report.

Results: A healthy 25-year-old gentleman presented with the first episode of acute, bilateral, progressive loss of vision (left followed by right eye) associated with eye

pain. He had no infective, connective tissue disease, or neurological symptoms. The best-corrected visual acuity at presentation was 6/6 in the right and hand movement (HM) in the left eye. Unfortunately, his vision in both eyes deteriorated to non-perception of light (NPL) within 2 days. The extraocular movement was in full range but associated with pain. Anterior segment examinations were normal. Fundus examination in both eyes revealed swollen optic disc with flamed shape hemorrhages, retina vessels were dilated and tortuous with scatter retinal hemorrhages in four quadrants. These features had significantly worsened on serial fundus examination within 1 week. Systemic examination was unremarkable. Inflammatory markers and infective screening were normal. He was diagnosed with atypical optic neuritis and treated with intravenous methylprednisolone 1g per day for 5 days, followed by oral prednisolone 80mg daily for 11 days. Magnetic resonance imaging was performed and showed no evidence of space-occupying lesion, optic nerve, or optic nerve sheath enhancement. Following treatment, his vision in both eyes markedly improved to 6/6 within 2 weeks. He had no recurrent episodes until date.

Conclusions: Unlike typical ON, atypical ON can have various aetiologies. Therefore, intensive work-up, early diagnosis and initiate proper treatment are critical to improve vision and prevent vision loss.

Bilateral Optic Perineuritis in Tuberculosis-Immune Reconstitution Inflammatory Syndrome

First Author: Fatimah ISMAIL
Co-Author(s): Shatriah ISMAIL, Wan Hazabbah WAN HITAM, Nurul-zulaikha WAHAB, Nurul 'ain MASNON

Purpose: To report a rare case of bilateral optic perineuritis (OPN) in an elderly patient on treatment for pulmonary tuberculosis (PTB).

Methods: A case report.

Results: A 79-year-old Malay man, presented with a painless bilateral blurring of vision for three weeks duration. He was diagnosed to have PTB and has been on anti-tuberculous (anti-TB) treatment for five months. Visual acuity in both eyes was only counting fingers. Optic nerve functions tests were significantly reduced bilaterally. Funduscopy showed bilateral segmental temporal optic disc pallor. Both visual field assessments were constricted. Other infective screenings and tumor markers were negative. Neuro-imaging revealed bilateral optic perineuritis involving the intraorbital segment. High-dose intravenous corticosteroids therapy was commenced, followed by slow tapering of oral prednisolone. Anti-tuberculous treatment was continued for a total course of 9 months. The left visual acuity improved to 3/60. However, the right eye vision remained poor. His general condition was good.

Conclusions: Optic perineuritis in PTB patients while on anti-TB treatment is rare. It may occur due to tuberculosis-immune reconstitution inflammatory syndrome (TB-IRIS). Visual prognosis is poor if not treated early.

Bilateral Papilloedema with Increased Intracranial Pressure in Recurrent Leukemia

First Author: Ching-lung CHEN
Co-Author(s): Weidar CHEN

Purpose: To report two rare cases of bilateral papilloedema with increased intracranial pressure (IICP) in recurrent leukemia.

Methods: A clinical retrospective case report

and literature review.

Results: The first case: A 18-year-old girl diagnosed with acute myelomonocytic leukemia (AML) had remission under peripheral blood stem cell transplantation (PBSCT). However, the patient presented with headache and bilateral blurry vision (OD: 0.4/ OS: 0.5) after 1 year of PBSCT, and low back pain was also mentioned. Under ophthalmic examination, bilateral papilloedema with large blind spots was noted. Spine MRI demonstrated a heterogeneous mass over L5 vertebral body, and the pathologic report of bone marrow biopsy showed the relapse of AML. After chemotherapy, bilateral papilloedema subsided and visual acuity was back to 0.9. The second case: A 13-year-old boy diagnosed with acute lymphoblastic leukemia (ALL) had remission under chemotherapy for 1 year. However, bilateral blurry vision (OD: 0.04/ OS: 0.5) with intermittent headache and vomit for 1 week. Under fundoscopic examination, bilateral papilloedema was impressed. Brain MRI showed increased enhancement at bilateral intraconal space around the optic nerves, highly suspected recurrent infiltrative leukemia. Then, the patient received PBSCT, the visual acuity was back to 0.3 of the right eye and 0.7 of the left eye.

Conclusions: Bilateral papilloedema with IICP could be the first presentation of recurrent leukemia. Early detection and treatment can get a better prognosis of visual acuity.

Bilateral Temporal Optic Disc Pallor as a Warning Sign of Pituitary Tumor

First Author: Ching-lung CHEN
Co-Author(s): Jin-jhe WANG

Purpose: Temporal pallor of the optic disc is indicative of an optic tract lesion that damages optic nerve fibers. This clinical sign warrants further investigation with neuroimaging in a patient with unexplained vision loss. We describe an example of how a detailed evaluation of the optic disc can be instrumental in making an important diagnosis in an emergent situation.

Methods: A clinical retrospective case report and literature review.

Results: A 63-year-old diabetic man presented with sudden blindness of both eyes following diffuse headache. On exam, he had no light perception at all. Optic disc assessment revealed apparent bilateral temporal pallor. An urgent magnetic resonance imaging of the brain including orbit disclosed a massive pituitary adenoma with hemorrhage. The hormone panel testing showed hypopituitarism. He said that he had no known pituitary tumor previously. Subsequently, he received an emergent transphenoid resection of the necrotic tumor. One month after the surgery, his visual acuity returned to 20/40.

Conclusions: Pituitary apoplexy is a rare medical emergency appearing in patients with pituitary adenoma, presenting with sudden onset of severe headache, and often associated with acute visual deterioration. Optic disc pallor or atrophy provides a clue for an ophthalmologist to substantiate this finding and then warrants further workup to determine the etiology.

Cerebrovascular Infarction Presenting as Bilateral Internuclear Ophthalmoplegia in a 75-Year-Old Patient

First Author: Kim AGUSTIN
Co-Author(s): Lourdes ANG

Purpose: To present a case of Bilateral Internuclear Ophthalmoplegia in a 75-year-old

patient.

Methods: A case report.

Results: A 75-year-old, Filipino, male, known hypertensive for 10 years but not compliant to medications, presented with a sudden onset bilateral exotropia and binocular, horizontal, diplopia associated with dizziness. No other symptoms like slurring of speech, body weakness, numbness were noted. Upon physical examination, the BCVA of the patient was 6/7.5 in both eyes. On Hirschberg, the pupillary light reflex fell on the nasal limbus of both eyes and 30 prism diopters exotropia on Krimsky. There was bilateral adduction deficit in both version and duction. Forced duction testing was done and there was no restriction on both eyes noted. Horizontal nystagmus of the abducting eye and gaze-evoked vertical nystagmus on both eyes were also noted. Imaging was done which revealed a hypodense focus in the subcortical region of the right centrum semiovale extending to the right corona radiata. Orbits, midbrain and pons were normal. Although imaging studies showed no pontine lesion, there were infarcts noted on the other part of the CNS.

Conclusions: WEBINO is still considered even without the presence of a pontine lesion in the imaging. 30% of patients with internuclear ophthalmoplegia showed no compatible lesions in imaging but there were other lesions noted in the other areas in the CNS which helped confirm the diagnosis.

Challenging Cases of Relapsing Active Moderate-to-Severe Graves' Ophthalmopathy

First Author: Veda PUTRI
Co-Author(s): Syntia NUSANTI, Mohamad SIDIK

Purpose: To highlight the importance of intravenous high dose steroid administration for a total of 6 weeks to avoid relapse in active moderate-to-severe Graves' ophthalmopathy.

Methods: A case series.

Results: This case series reported two cases of active moderate-to-severe Graves' ophthalmopathy. A 45-year-old female and 58-year-old smoker male presented with bilateral exophthalmos, lid retraction, limitation of ocular movements, redness, pain on movement, and hyperthyroidism. Based on assessment with EUGOGO consensus on clinical activity score and severity, both patients were diagnosed with active moderate-to-severe Graves' ophthalmopathy. Orbit CT scan revealed swelling of bilateral recti muscles with sparing of tendinous insertion. The patients were subsequently admitted for 3 days intravenous 500 mg methylprednisolone administration for 4 weeks. Their condition improved after treatment. However, several weeks later, both patients developed relapse and had dysthyroid optic neuropathy with pain, decreased visual acuity, and visual field defects. Therefore, they were treated with additional 2 weeks of intravenous high dose steroid administration and the first patient also underwent orbital radiotherapy. Both patients had remarkable improvements in visual acuity and clinical condition after complete treatments.

Conclusions: A total of 6 cycles of intravenous high-dose methylprednisolone are necessary for the optimal treatment in active severe Graves' ophthalmopathy to avoid relapse.

Clinical Features of Myelin Oligodendrocyte Glycoprotein Antibody-Positive Pediatric Optic Neuritis

First Author: Honglu SONG
Co-Author(s): Shihui WEI

Purpose: To investigate the clinical, radiographic features and prognosis of MOG-PON.

Methods: Clinical data about 62 children (106 eyes) with MOG-ON from January 2016 to September 2018, including 30 females (48.4%) and 32 males (51.6%), were retrospectively analyzed.

Results: Of the 62 cases, bilateral optic neuritis was the presenting symptom at the initial attack in 28 patients (45.2%), unilateral optic neuritis in 34 patients (54.8%), At the first onset, 41 patients (66.1%) suffered from ocular pain and 43 eyes (48.9%) had optic disc edema. The average thickness of pRNFL and mGCIPL were 69.89±12.21μm and 59.58±6.90μm at 3 months after ON attack. Orbital MRI scans showed that T2 hyperintensity of optic nerve occurred in 57 patients (96.6%), head MRI scans showed demyelinating lesions of the brain in 17 patients (77.3%), and spinal MRI scans showed demyelinating lesions of the spinal in 2 patients (40%). The follow-up lasted for 3 to 128 months, recurrent optic neuritis for 48.4%, and bilateral diseases at the final visit for 71.0%. Within 2 weeks of onset, 80.7% of the affected eyes had BCVA $\leq$ 0.1. At the final visit, 94.3% of the eyes had BCVA $\geq$ 0.5. A total of 2 patients (3.2%) developed myelitis, and 6 children (9.7%) were diagnosed with acute disseminated encephalomyelitis.

Conclusions: The clinical characteristics of MOG-ON were diverse in children, with severe visual impairment and easy recurrence. Most of them have a good prognosis. Additionally, some children may have demyelinating lesions in the central nervous system.

Crossed Quadrant Homonymous Hemianopia: A Case Report

First Author: Michael CHOU
Co-Author(s): Chia-yi LEE

Purpose: To describe a young female with antiphospholipid syndrome whose visual field represents checkerboard appearance that is correlated with the multiple bilateral brain lesions.

Methods: A case report.

Results: A 37-year-old female with a medical history of significant antiphospholipid syndrome visited our clinic due to progressive peripheral vision loss in daily life. Her medications included warfarin, atorvastatin, amlodipine, prednisolone, hydroxychloroquine, and azathioprine. She had noted progressive, bilateral, simultaneous visual loss when typing, turning around, and taking the stairs for two weeks. Magnetic Resonance Imaging (MRI) scan of the brain showed subcortical T2 hyperintensity over the right fronto-parieto-occipital lobe, left parietal lobe and right occipital lobe. Ophthalmic examination showed best-corrected visual acuity (BCVA) was 20/20 and normal intraocular pressure measurement in both eyes. There were no apparent pathological changes in the anterior segment of either eye. Fundus exam had no specific finding. Pupil reactions were normal with no evidence of an afferent pupil defect. Automated perimetry (Humphrey visual field 30-2) demonstrated a left, superiorly incongruous homonymous quadrantanopia with a juxtaposed right, inferiorly congruous homonymous quadrantanopia. This is known as the "crossed

quadrant homonymous hemianopsia" visual field defect (i.e., checkerboard).

Conclusions: A typical feature of CQHH is a relative sparing of central vision (as in our case). Clinicians should be aware that systemic disease may play an important role in unusual visual field defects.

Delichoectatic Arterial Compression Presenting as Combined Cranial Nerve Palsies: A Case Report

First Author: Channdarith KITH
Co-Author(s): Pagna HEANG

Purpose: We describe a case of a fifty-eight-year-old man with chronic hypertension, and poorly controlled type 2 diabetes mellitus, who complained of newly-onset visual loss, intermittent pain and other cranial nerve palsies following two consecutive episodes of ischemic strokes with distinguished clinical course(s) and presumed etiology. In addition, we also report a rare case of intracranial ectasia, detected by computed tomography angiography in a low-resource setting.

Methods: The systemic examination and neuroimaging studies were performed. The interdisciplinary care approach contributed to comprehensive management.

Results: The diagnosis is made by a combination of multiple cranial nerve palsies as a cavernous sinus syndrome and confirmed by the computed tomography angiography of the brain. This patient had cavernous internal carotid artery ectasia and a small vertebrobasilar dolichoectasia. No other visceral aneurysms were reported on the date. The patient was sent to the neurosurgeon and cardiovascular surgeon team for further investigation and management.

Conclusions: Dolichoectasia should be suspected in all cases with a history of cerebral infarction. The abnormally and/or ectatic internal carotid artery, not always aneurysm, should be taken into account in all cases of multiple cranial palsies. Impaired blood supply to the nerve running through the cavernous sinus, and probably in a combination of direct anatomical compression is the most likely mechanism responsible for such distinguished clinical manifestations. Similarly, this is also a rare case of dolichoestasia of the cavernous internal carotid artery disclosed by the cranial computed tomography angiography in our facility.

Etiological and Epidemiological Characteristics of Hospitalized Patients with Neuro-Ophthalmology Diseases: A Single Center Analysis

First Author: Shaoying TAN

Purpose: To investigate the distribution of etiologic factors and the location of neuro-ophthalmic disorders of patients in a single center of ophthalmology in China.

Methods: Clinical data about hospitalized patients with neuro-ophthalmic diseases in the department of neuro-ophthalmology of Chinese PLA General Hospital from January 2011 to July 2017 were collected and retrospectively analyzed.

Results: A total of 2673 patients with an average age of 37.91±18.12 years old, including 1365 males and 1308 females with a ratio of 1.04:1, were enrolled in this study. A number of 1881(70.37%) patients aged between 20 to 60 years old. The distribution of lesion loction: afferent visual system in 2376 (88.88%) patients, efferent visual system in 190 (7.11%) patients, orbital and intracranial vascular and connective tissue diseases in 107 (4.00%) patients. The distribution of etiology:

the inflammatory demyelinate optic neuritis was found in 845 (31.6%) patients, traumatic neuropathy in 282 (10.55%) patients, ischemic optic neuropathy in 236 (8.23%) patients, optic atrophy secondary to intracranial tumor in 207 (7.74%) patients, and 219 (8.19%) patients remained uncertain.

Conclusions: The majority of patients with optic neuropathy were middle-aged adults. The main pathogenesis was dysfunction in the afferent visual system, and the optic nerve was the most frequent lesion location. Inflammatory demyelinate optic neuritis, ischemic optic neuropathy, traumatic neuropathy were the main causes of neuro-ophthalmology diseases in the single center in China.

Evaluation of the Optic Nerve Changes by Optical Coherence Tomography in Leber Hereditary Optic Neuropathy

First Author: Jincui WANG
Co-Author(s): Shaoying TAN

Purpose: To evaluate the optic nerve changes in different disease durations by optical coherence tomography (OCT) in Leber hereditary optic neuropathy (LHON).

Methods: LHON patients diagnosed with mitochondrial genetic testing were recruited at a single study center. The subjects were divided into four groups according to the disease duration of less than 3 months, 4-6 months, 7-12 months and over 12 months. Each sector thickness of RNFL around optic nerve head, macular ganglion cell complex (GCC) and the inner limiting membrane to the retinal pigment epithelium (ILM-RPE) thickness were measured by spectral domain OCT on the subjects and compared among the study groups.

Results: A total of 219 LHON patients were recruited, including 182 males and 37 females. Significant thinning trend along the disease duration on thickness were detected among all the sectors of RNFL around optic nerve head and the macular GCC and ILM-RPE ($p<0.001$), except the central thickness of the macula ($p=0.397$). However, the thinning trend was no longer significant when the disease duration was longer than 6 months.

Conclusions: The optic nerve damage was conveniently detected by the OCT measurement on RNFL, GCC and ILM-RPE in LHON over the disease duration. The OCT could be a useful tool for disease follow-up in LHON.

Foster Kennedy Syndrome: A Case Report

First Author: Dyah KURNIATRI

Purpose: To present a case with Foster Kennedy Syndrome.

Methods: The case is a 43 y.o woman with blurred in the right eye, headache, anosmia and nausea for 5 months.

Results: The diagnosis of Foster Kennedy Syndrome was established based on the medical history, slit lamp examination, optical coherence tomography, Humphrey visual field test and magnetic resonance imaging. Visual acuity was 1.0 in both eyes. Ishihara right eye 3/21 and left eye 18/21. Contrast sensitivity in the right eye was 5% and 1.25% in the left eye. There was a right relative afferent pupillary defect. Slit-lamp examination was normal with normal intraocular pressures. Fundus examination demonstrated right optic disc pallor and left optic disc edema. Optical coherence tomography showed thinning of average ganglion cell inner plexiform layer

in the right eye. Humphrey visual field test showed left homonym hemianopsia. Magnetic resonance imaging revealed extra-axial lesion in fossa cranii media with broad-base in right sphenoid wings AP 5,59 x LL 5,56 X CC 4,84 cm, extend to right optic tract showed meningioma, accompanied signs of increased intraocular pressure.

Conclusions: Foster Kennedy syndrome is characterized by unilateral optic atrophy, central scotoma, anosmia and contralateral disc edema. The most common causes are frontal-lobe tumors and olfactory groove meningiomas. The patient was treated together with a neurosurgeon and planned to mass resection from the neurosurgery department. The prognosis in cases still varies, considering the initial visus of preoperative is still good.

Gradenigo Syndrome: A Case Report of a Rare Complication of Otitis Media

First Author: Zulhisham MOHMAD
Co-Author(s): Shatriah ISMAIL, Qi NGOO, Nurul-zulai-kha WAHAB

Purpose: To present a rare case of left abducen nerve palsy secondary to untreated otitis media.

Methods: A case report.

Results: A 15-year-old girl presented with sudden onset left eye deviation of one-day duration associated with diplopia, headache, left facial pain and left ear discharge. There was no fever, vomiting, body weakness, or blurry vision. There was no history of trauma. She stated the left ear discharge has persisted for one week and she did not seek treatment previously. Her vision was 6/9 bilaterally. She appears orthophoric on primary gaze. There was limited abduction on her left eye. Anterior and posterior segment examinations were unremarkable. Other cranial nerves were intact. Otoscopy revealed the presence of pus at the external auditory canal with an inflamed but intact tympanic membrane. Contrast-enhanced computed tomography (CECT) showed left petrous apicitis with epidural abscess and mastoiditis. Intravenous (IV) ceftriaxone, IV metronidazole, and ofloxacin ear drops were started. Serial CECTs were done to monitor progress and showed improvement of the lesion despite the presence of left petrous erosion. The patient was discharged well after completing 42 days of IV ceftriaxone. Both her extraocular movements were full. Final CECT showed complete resolution of the abscess.

Conclusions: Gradenigo syndrome is one of the rare causes of abducens nerve palsy. A multidisciplinary approach is often needed in its diagnosis and management. Serial imaging is also found to be useful in monitoring its progress.

Green Tea Extract Ameliorates Ischemia-Induced Retinal Ganglion Cell Degeneration in Rats

First Author: Tsz Kin NG
Co-Author(s): Ling-ping CEN, Jiajian LIANG, Ciyan XU, Yanxuan XU, Yaping YANG

Purpose: Oxidative stress induced by reduced blood circulation is a critical pathological damage to retinal ganglion cells (RGCs) in glaucoma. We previously showed that green tea extract (GTE) and its catechin constituents alleviate sodium iodate-induced retinal degeneration in rats. Here we investigated the therapeutic effect of GTE on ischemia-induced RGC degeneration in rats.

Methods: RGC degeneration was induced by ischemic reperfusion in adult Fisher F344 rats. Green tea extract (Theaphenon-E) was

intragastrically administered 4 times within 48 hours after ischemia. RGC survival, pupillary light reflex, expressions of cell apoptosis, oxidative stress and inflammation-related proteins were studied.

Results: Ischemic reperfusion significantly induced apoptotic RGCs, RGC loss and larger constricted pupil area compared to the untreated normal rats. Expressions of activated caspase-3 and caspase-8, Sod2 and inflammation-related proteins, as well as p38 phosphorylation, were significantly upregulated in the ischemia-injured rats. Compared to the saline-fed ischemic rats, a significantly higher number of surviving RGCs, fewer apoptotic RGCs and smaller constricted pupil area were observed in the GTE-fed ischemic rats. GTE also reduced the increased protein expressions caused by ischemic injury, but enhanced the Jak phosphorylation in the retina. Notably, green tea extract did not affect the survival of RGCs in the uninjured normal rats.

Conclusions: In summary, GTE offers neuroprotection to RGCs under ischemic challenge, suggesting a potential therapeutic strategy for glaucoma and optic neuropathies.

Herpes Zoster Ophthalmicus with Optic Neuritis and Secondary Retinal Venous Stasis in a Young Adult

First Author: Chee-ming LEE

Purpose: To describe a case of severe HZO with optic neuritis and secondary retinal venous stasis.

Methods: A case report.

Results: A 23-year-old male with right herpes zoster ophthalmicus was referred to an ophthalmologist due to decreased vision and redness in the right eye. His UCDVA was 6/60 in both eyes and intraocular pressure was 27mmHg, OD. Ocular examination revealed mild punctate keratitis in the right eye. He was admitted due to fever and treated with Acyclovir 400mg PO Q4H, topical acyclovir ointment and glaucoma medication. Treatment was shifted to intravenous acyclovir due to persistent fever. Follow-up showed progressed keratoconjunctivitis with iritis. Topical steroid and cycloplegics were added. After completing 7 days of systemic acyclovir, the patient was discharged. During follow-up, the BCVA in the right eye remained 6/60 despite improvement of keratitis and iritis. Fundus examination revealed dilatation and tortuosity of retinal vessels and optic disc swelling. Fluorescein angiography revealed delayed arterial phase, prolonged arterio-venous transit time, and late staining of the optic nerve in the right eye. Herpes zoster optic neuritis was diagnosed. Oral famciclovir for 14 days was prescribed and oral prednisolone was added for 10 days. The keratouveitis, disc swelling, and retinal abnormality were resolved completely. His BCDVA improved to 6/7 in the right eye.

Conclusions: HZO can be severe with multiple ocular and extraocular manifestations in healthy adults. Optic neuritis with secondary venous stasis is a rare presentation of HZO and can persist despite standard treatment with acyclovir. Extended antiviral treatment with oral Famciclovir may be needed in severe HZO with optic neuritis.

Infratentorial Anaplastic Ependymoma with Ocular Manifestation

First Author: Nur-najwa SUHAIFI
Co-Author(s): Adil Bin HUSSEIN, Nurul 'ain MASNON

Purpose: To report a case of infratentorial anaplastic ependymoma tumor with ocular manifestation in a 13-year-old boy.

Methods: A case study.

Results: A 13 year old boy presented with frontal headache, binocular diplopia and blurry vision for 3 months duration. Subsequently followed by unstable gait and vomiting for 1 month. His neurological examination revealed bilateral sixth and seventh cranial nerve palsy. Cerebellar examination revealed mild dysdinokinesia over left side and failed tendem gait. Ocular examination revealed visual acuity of right eye was 6/15 with pinhole 6/9, while the left eye was 6/21 with pinhole 6/12. Fundus examination showed bilateral papillodema. Computed tomography (CT) and magnetic resonance imaging (MRI) of the brain with contrast exhibited a midline intraventricular mass within the fourth ventricle with heterogenous enhancement and acute on chronic hydrocephalus. Right frontal VP shunt was performed with subsequent posterior fossa craniotomy and tumor debulking. Histologically, the tumor was consistent with anaplastic ependymoma, WHO grade III. No radiologic evidence of distant metastasis. There was evidence of residual lesion on MRI post operatively. He has completed radiotherapy and ongoing chemotherapy. On latest follow up, ocular examination revealed visual acuity of right eye has improved to 6/6, while the left eye 6/12, pinhole 6/9. Fundus examination showed bilateral optic atrophy. Bilateral sixth cranial nerve were partially improved, with resolved right seventh cranial nerve palsy.

Conclusions: This report raises awareness of the ophthalmic manifestations of infratentorial ependymomas. It points out the significance of perceiving the potential effects of infratentorial ependymoma in children and increased intracranial pressure on ocular structures.

Inhibition of Ferroptosis Alleviates Early Retina Injury after NMDA Insult In Vivo

First Author: Lingge SUO
Co-Author(s): Chun ZHANG, Di ZHANG

Purpose: Excitotoxicity is one of the pathogenesis in various retinal disorders including glaucoma, retinal ischemia-reperfusion and traumatic optic neuropathy. Our previous study indicated that ferroptosis may be linked to pathological cell death in the retina with NMDA insult. Ferrostatin (Fer-1) is a selevtive inhibitor of ferroptosis. Our purpose is that Fer-1 can attenuate oxidative, iron-dependent cell death early retina injury after NMDA insult.

Methods: Rats were divided into 5 groups and were given intravitreal injections. Group 1 (PBS group) was injected with vehicle; group 2 (NMDA group) was injected with NMDA while groups 3 (pre-), 4 (co-), and 5 (post-) treatments were injected with Fer-1, 24 h before, in combination or 24 h after NMDA injection respectively. We sought to explore the expression patterns of GPX4, ACSL4, SLC7A11 and Tfrc in rats to gain additional understanding of these genetic conditions. We used an RNA in situ detection technique called RNAscope to characterize GPX4, ACSL4, SLC7A11 and Tfrc expression patterns after Fer-1 intravitreal injection in NMDA insulting rats.

Results: The retinal morphometry showed reduced thickness of ganglion cell layer (GCL) and reduction in the number of retinal cells in GCL in NMDA group compared to the Fer-1-treated groups. GPX4, ACSL4, SLC7A11 and Tfrc are expressed in early NMDA insult.

Conclusions: This study provides insights into the ferroptosis is a reactive oxygen species (ROS)- and iron-dependent from of regulated cell death, playing critical roles in NMDA-

induced retinal injury. Fer-1 may alleviates early retina injury after NMDA insult in vivo.

Management of Optic Neuritis and Panuveitis in Syphilis Patient: A Case Report

First Author: Rusti SARI
Co-Author(s): Angga FAJRIANSYAH, Dianita GINTING, Antonia INDRIATI, Patriotika MUSLIMA, Arief MUSTARAM

Purpose: To report a case of optic neuritis and panuveitis as a manifestation in syphilis patient.

Methods: A 28-year-old man came with a sudden blurred vision for one week in his left eye (LE), but he already had visual impairment for 7 months in both eyes. He had a history of fever, vesicles and pustules on his face since 2 days ago. Ophthalmology examination revealed visual acuity was hand movement in both eyes, +1 cell in the anterior chamber on LE, decrease light reflex, optic disc swelling and pallor in both eyes, retinal atrophy, +2 cell in the vitreous chamber on LE. He was treated with 3 days of intravenous methylprednisolone injection 1 gr per day and oral acyclovir 800 mg five times per day. Laboratory test showed reactive VDRL (1: 16) and TPHA (1: 10240), then he had intramuscular benzathine penicillin G injection.

Results: Two months follow-up showed visual acuity improvement, 0.2 in the right eye and 0.1 in the left eye with no signs of inflammation of the optic disc and uveal tract.

Conclusions: Atypical optic neuritis with panuveitis requires further investigations to find out the causes of inflammation and treat them accordingly.

Neuro-Ophthalmic Manifestation of X-Linked Adrenoleukodystrophy: A Case Series

First Author: Basitali LAKHANI
Co-Author(s): Priya S

Purpose: There are various ways in which the eye is involved in X-linked ALD (Adrenoleukodystrophy). It may be first presented to an ophthalmologist. We are presenting a case series of 4 patients presented to us for ophthalmic complaints and were diagnosed as X-ALD.

Methods: An observational case study.

Results: Four patients of X-ALD presented with complaints of a decrease in vision gradually, painless in one or both eyes along with other ophthalmic features. These patients were of different age and sex. Out of 4, patient 1 was a known case of Addison's disease and patient 2 presented with exclusive ophthalmic signs. The remaining two had additional neurological signs. X-ALD mainly involves the adrenal gland and white matter of the brain resulting in hormonal imbalances and demyelination-like neurological manifestations. X-ALD is mostly underdiagnosed, if diagnosed early we can delay progression by regular follow-up.

Conclusions: As visual symptoms are common in X-ALD, ophthalmologist has a key role in the early diagnosis.

Neuro-Ophthalmic Manifestations of Intracranial Aneurysm

First Author: Syeda JINAT

Purpose: To report 4 cases of intracranial aneurysm with different neuro-ophthalmic manifestations.

Methods: An observational study.

Results: 1 patient presented with total 3rd nerve palsy with an aneurysm in the left internal carotid artery, 1 patient presented with 6th nerve palsy with an aneurysm of internal carotid artery, 1 patient had optic atrophy with an aneurysm in sellar area and 1 patient presented with recurrent optic neuritis with an aneurysm in internal carotid artery.

Conclusions: A common presentation in neuro-ophthalmology may unveil the clue of a severe life-threatening condition, misdiagnosis of which can jeopardize the patient's morbidity. The ophthalmologist must have a keen eye to avoid the dreadful complications.

Neuromyelitis Optica in Pediatric Age Group: A Case Report

First Author: Tinesh THAMOTARAN
Co-Author(s): Cheah CHUN FAI, Tan EE LING, Qi NGOO, Wan Hazabbah WAN HITAM, Azhany YAAKUB

Purpose: To report a case of bilateral eye neuromyelitis optica in pediatric age group.

Methods: A case report.

Results: A healthy 13-year-old girl presented with gradual onset of bilateral eye blurring of vision associated with pain upon moving eye and headache. Otherwise, the patient denies a history of fever, trauma, limb weakness, preceding history of infection or vaccination. Optic nerve function test impaired with color vision BE 0/17, reduced red desaturation and light brightness to 30%. Extraocular muscle movement was full with prominent opsoclonus BE. Anterior segment and fundi were normal. Other cranial nerve and neurological examinations were normal. Blood investigations showed positive anti-aquaporin-4 antibody and negative myelin-oligodendrocyte antibody. MRI-Brain shows an intra-orbital segment of bilateral optic nerve thickened with focal enhancement and at the periaqueductal region, periventricular white matter at left frontal and right parietal region and splenium of the corpus callosum. VEP showed an absence of P100 in RE, and prolonged P 100 in LE. She was treated with IV methylprednisolone 250mg QID for 5 days. The patient was then subjected to plasmapheresis for about 5 cycles and intravenous Immunoglobulin 66g OD given for 2 days because of poor clinical response. She was started on oral prednisolone 1mg/kg/day and tapered down while switching to second-line agent T Azathioprine 25mg OD as the patient developed side effects of prolonged steroid.

Conclusions: NMOSD in pediatric age group although infrequent, it can account up until 2-5% of all NMOSD case with median age of 14 years old. Seropositive NMOSD is a relapsing disorder if untreated, leading to significant relapse related morbidity.

OCT Observation and Analysis of the Difference between Pseudopapilloedema and True Optic Papilloedema

First Author: Wenjuan DUAN
Co-Author(s): Shihui WEI, Huanfen ZHOU

Purpose: To observe and analyze the OCT difference between pseudopapilloedema and early true optic papilloedema caused

by intracranial venous system thrombosis (CVST), and to provide the necessary clinical basis for its differential diagnosis.

Methods: A retrospective study was conducted to analyze the differences in OCT diagnosed with CVST caused papilloedema and diagnosed with pseudopapilloedema in our hospital from January 2015 to December 2020. The difference of the thickness of optic fiber layer（RNFL）in OCT, the average thickness from the inner boundary membrane to the pigment epithelium（ILM-RPE) in the macular area and the thickness of ganglia cells（GCIPL) in the macular area were observed at the onset time of less than 1 month, 1 month, 2 months, 3 months and 6 months.

Results: 1. A total of 37 patients (74 eyes) in the CVST group and 23 patients (46 eyes) in the pseudopapilloedema group were enrolled. 2. The difference of optic disc RNFL thickness between the two groups in the first 3 months was statistically significant ($p<0.05$).there was no significant difference between the two groups in 6 months; 3. The thickness of GCIPL in the macular area was significantly different between the two groups ($p<0.05$); 4. There was no difference between the two groups except that there was a statistical difference between the two groups in 2 months for the average thickness from the ILM-RPE in the macular area.

Conclusions: 1. SD-OCT is helpful to distinguish true papilloedema from pseudopapilloedema and detect its changes; 2.Macular ganglion cell thickness analysis can be used to differentiate between true and pseudopapilloedema in the early stage.

Ocular Manifestation as Presenting Sign of Neuroblastoma

First Author: Fatimah ISMAIL
Co-Author(s): Wan Hazabbah WAN HITAM, Nurul 'ain MASNON, Ismail SHATRIAH

Purpose: Neuroblastoma is one of the most common childhood tumor, and frequently arises from the adrenal gland and paravertebral regions. Orbital metastasis of neuroblastoma is relatively rare and associated with a poor prognosis. Since the symptoms and signs of orbital neuroblastoma are not specific, its diagnosis remains challenging.

Methods: A case report.

Results: A 5-year–old boy presented with intermittent squint which was noted 1 year ago associated with frequent fever, multiple joints pain and constitutional symptoms for 4 months before his first visit. However, his visual acuity was good bilaterally with no diplopia. Optic nerve functions were normal. The extraocular movement was restricted on the lateral gaze of the right eye. Both eye anterior segment and intraocular pressure were normal. Fundoscopy revealed bilateral pink optic disc with blurry disc margin, vessel not dilated and retina was flat. On systemic examination, the patient looked pale with scalp swelling over the right temporal region. Right abdominal mass palpable 4cm x 5cm with bilateral inguinal lymphadenopathy. Chest X-ray showed multiple lytic bony lesions. Computed tomography (CT) thorax abdominal pelvic revealed a right suprarenal mass with the necrotic center. Ultrasound-guided biopsy was suggestive of neuroblastoma. CT scan of brain and orbit showed multiple well-defined lobulated enhancing extra-axial dura-based masses at the bilateral vertex, bilateral parieto-occipital and bilateral temporal lobe. He was diagnosed with neuroblastoma with

central nervous system, skull, orbital & nodal metastasis.

Conclusions: Systemic and ocular clinical manifestations in combination with radiological analysis and histological findings, are important for the diagnosis of orbital neuroblastoma metastasis.

Optic Neuritis with Intrathecal Oligoclonal IgG Synthesis: Neurosyphilis or Multiple Sclerosis?

First Author: Cheau Wei CHIN
Co-Author(s): Choon Teng CHAN, Francesca VENDARGON

Purpose: Intrathecally synthesized oligoclonal IgG band in cerebrospinal fluid (CSF) is the immunological hallmark of multiple sclerosis, but is also seen in infective or inflammatory disorders of the central nervous system. We hereby report a case of neurosyphilis presenting with isolated bilateral optic disc swelling, and coexistence of intrathecal oligoclonal IgG band, which complicated the diagnosis.

Methods: A case report.

Results: A 48-year-old Indian gentleman presented with sudden onset of left temporal blurring of vision for 2 weeks. Fundoscopy examination showed bilateral eye optic disc swelling with clear vitreous. Humphrey's visual field (HVF) showed a left eye tunnel visual field defect, but brain imaging was unremarkable. Anti-nuclear antibody (ANA) seropositivity and presence of CSF oligoclonal IgG guided towards the diagnosis of multiple sclerosis. High-dose intravenous methylprednisolone was commenced. However, his vision deteriorated and HVF showed worsening of bilateral eye tunnel visual field defect which prompted for reinvestigation of the cause of optic neuritis. His rapid plasma reagin titer was 1:256 and his HIV test was positive. He was diagnosed with neurosyphilis as confirmed with CSF VDRL and completed 2 weeks of intravenous benzylpenicillin. His vision and visual field remained stable at 6 months.

Conclusions: We highlighted the complexity of the diagnosis of syphilis as the presence of CSF oligoclonal IgG and serum ANA were immune responses to treponema pallidum. Syphilis should always be ruled out in patients with optic disc swelling. A high index of suspicion for syphilis is important as delayed treatment is associated with poor outcomes.

Optic Pathway Glioma in a 2-Year-Old Female Treated with Chemotherapy: A Case Report

First Author: Juan Lorenzo SIMPAO
Co-Author(s): Roberto UY

Purpose: To discuss a case of a 2-year-old female with Optic Pathway Glioma who presented with proptosis on both eyes.

Methods: A case report.

Results: A case of a 2-year-old female with optic pathway glioma associated with neurofibromatosis type 1 initially presented with proptosis of the left eye is reported. The diagnosis was suggested by clinical examination findings of loss of vision, proptosis, relative afferent pupillary defect and café au lait spots and supported by imaging results. The patient underwent and completed 12 weeks cycle of induction chemotherapy of vincristine and carboplatin. Although there was no noted difference in imaging results before and after induction chemotherapy, there were noted gross clinical improvements in the patient. The patient is currently on the

maintenance phase of chemotherapy, however, due to nationwide lockdown due to pandemic, the patient was lost to follow-up.

Conclusions: Optic pathway gliomas are typically low-grade gliomas that are approximately found in 3-5% of childhood intracranial tumors and seen in 15-20% of patients with neurofibromatosis Type 1 (NF1). It should be always a consideration in young children who presents with painless loss of vision, proptosis, relative afferent pupillary defect in known NF1 patients. Good clinical history and physical examination supplemented by proper imaging are important in accurate and timely treatment and favorable prognosis.

Optical Coherence Tomography Measurements of Optic Nerve Head Changes in Idiopathic Optic Neuritis and Neuromylitis Optica Related Optic Neuritis

First Author: Xuefen LI
Co-Author(s): Shaoying TAN, Yang YING

Purpose: This study was to identify the characters of optic atrophy on optic nerve head (ONH) and macula in idiopathic optic neuritis (IDON) and neuromylitis optica related optic neuritis (NMO-ON).

Methods: Thickness of peripapillary retinal nerve fiber layer (RNFL) and macular ganglion cell layer (GCL) were examined and compared in IDON and NMO-ON eyes without optic edema under different disease duration groups of within 30 days, 1-3 months, 3-6 months, 6-12 months and over 1 year.

Results: A total of 93 IDON patients and 62 NMO-ON patients were recruited. There were 43 IDON and 39 NMO-ON eyes within the duration of 30 days, and the IDON eyes shown a significant thicker RNFL thickness around the whole circle of ONH (Temporal: IDON 90.95±58.11um, NMO-ON 66.92±13.21um, P=0.015; Inferior: IDON 199.72±105.89um, NMO-ON 143.23±48.58um, P=0.017; Nasal: IDON 122.02±71.57um, NMO-ON 89.03±45.04um, P=0.021; Superior: IDON 193.77±100.46um, NMO-ON 148.15±57.11um, P=0.044, respectively). In 1 to 3 months duration, except the nasal sector, the other three sectors of ONH in IDON eyes were still thicker than that in NMO-ON eyes (Temporal: IDON 73.05±39.39um, NMO-ON 55.48±15.64um, P=0.017; Inferior: IDON 154.74±82.95um, NMO-ON 108.70±27.30um, P=0.002; Nasal IDON 93.95±63.17um, NMO-ON 73.48±15.88um, P=0.287; Superior: IDON 142.5±67.51um, NMO-ON 102±23.85um, P=0.001, respectively). There was no difference in RNFL thickness in the duration of over 3 months.

Conclusions: NMO-ON eyes showed more severe optic atrophy than IDON eyes within 30 days detected by SD-OCT. ONH changes were becoming similar in the two types of ON after 3 months of disease duration.

Orbital Apex Syndrome with Encephalitis as a Rare Complication of Herpes Zoster Ophthalmicus: A Case Report

First Author: Ludwig TJOKROVONCO
Co-Author(s): Antonia INDRIATI, Bambang SETIOHADJI, Rusti SARI

Purpose: To report a herpes zoster ophthalmicus (HZO) case with rare neurologic complications that ophthalmologists should be aware of.

Methods: A 68-year-old man had a chief complaint of a sudden blurred vision in the right eye two days before admission, followed by a rash, redness, and pain on the right upper

eyelid and forehead. Visual acuity was hand movement on the right eye and 0.5 on the left eye. The patient had total ophthalmoplegia, total ptosis, relative afferent pupillary defect on the right eye, and right peripheral facial nerve palsy. Optic discs were found to be normal on both eyes. The patient was diagnosed with orbital apex syndrome secondary to HZO on the right eye and right peripheral facial nerve palsy. The patient received 800 mg oral acyclovir five times a day and 250 mg intravenous methylprednisolone four times a day for three days.

Results: After four days of admission, the patient had a seizure and lost consciousness. The patient was diagnosed with herpes zoster encephalitis and given anticonvulsant therapy by the neurologist. The patient regained full consciousness three days later. His visual acuity, color vision, visual field, and contrast sensitivity were improved. Ophthalmoplegia was partially resolved and peripheral facial nerve palsy was fully resolved.

Conclusions: HZO could affect the central and peripheral nervous system at the same time and could be life-threatening with delayed diagnosis and treatment. It may be necessary to collaborate with the neurology department to minimize the life-threatening complications of HZO.

Pineal Gland Mass Presenting as Parinaud Syndrome in a 21-Year-Old Patient

First Author: Patricia Abigail LIM

Purpose: To present a case of parinaud syndrome in a 21-year-old patient.

Methods: A 21-year-old Filipino male with no known co-morbidities came in due to diplopia.

Results: The patient had a one-year history of progressive diplopia with associated headache, dizziness and vomiting. No other symptoms like blurring of vision, oscillopsia or change in sensorium. Light near dissociation, physiologic anisocoria, bilateral upgaze palsy, convergence retraction nystagmus and pseudoabducens palsy of the left eye were also noted. Imaging was done which revealed pineal neoplasm with obstructive hydrocephalus. The imaging further cemented the diagnosis of parinaud syndrome (PS) secondary to pineal neoplasm with obstructive hydrocephalus. The patient underwent endoscopic-guided biopsy of pineal neoplasm and VP shunting, left with left tube ventriculostomy by the neurosurgery service.

Conclusions: Parinaud's syndrome usually presents as a sporadic condition. The majority of cases are due to pineal gland tumors. Diplopia is the common presenting sign of patients with parinaud syndrome. Of patients with PS, only 65% present with the classical triad of up gaze palsy, convergence nystagmus, and pupillary light near dissociation. Neuroimaging with MRI is suggested for all patients with symptoms suggestive of PS. Management of patients with PS relies heavily on finding the cure of the underlying condition. Symptoms may completely be reversed in patients with early hydrocephalus. Conservative management is sufficient in most cases although surgical treatment of upgaze palsy can be a useful option in refractory cases.

Prognostic Factors and Baseline Prism Diopter in Cranial Nerve Palsies: An Observational Study

First Author: Suklengmung BURAGOHAIN
Co-Author(s): Pushkar BHADANI, Dipankar DAS, Jayanta DAS, Henal JAVERI, Ganesh Ch KURI

Purpose: To analyze the prognostic factors and the association of baseline prism diopter with third, fourth, and sixth cranial nerve

palsies.

Methods: A total of 43 patients of cases of third (CN3), fourth (CN4), and sixth (CN6) cranial nerve palsies were included in the study according to the inclusion criteria. The amount of ocular deviation was measured with a baseline prism bar cover test (PBCT). The patients were then grouped according to the etiology and the cranial nerve which was involved. The groups were then compared based on the baseline PD and the recovery duration. Recovery was defined as less than 8 PD of deviation or absent subjective diplopia of the patient.

Results: The recovery rate was not associated with the etiology or the type of cranial nerve involvement. The recovery duration had a significant association between the type of cranial nerve involvement (p=0.021). The recovery was shortest in multiple cranial nerve involvement and was the longest in cases of sixth cranial nerve palsy. There was also a significant association between the baseline prism diopter and the type of cranial nerve involvement (p=0.002).

Conclusions: The prognosis of cranial nerve palsies depends on a number of factors. The recovery rate is not associated with the type of cranial nerve involvement or the etiology but the recovery duration depends on the type of cranial nerve involvement. There is a significant association between the baseline prism diopter and the type of cranial nerve involvement.

Radiation-Induced Optic Neuropathy: Clinical and Imaging Profile of Fifty-Three Patients

First Author: Yongping WANG

Purpose: Radiation-induced optic neuropathy (RON) is a form of delayed radionecrosis of the anterior visual pathways. Small series reports have adequately documented its clinical features and imaging characteristics, but OCT characteristics have been less completely described.

Methods: We accrued inpatients cases coded as “radiation optic neuropathy” from our hospital files between 2010 and 2021. All patients had undergone 3D-conformal linear accelerator (photon) external beam radiation. We collected clinical details of vision loss, including the temporal relationship to radiation, visual field and OCT.

Results: Fifty-three patients (86 eyes) met inclusion criteria. The average RNFL of RON is 90.82±46.01um (≤ 3mo). The average ILM-RPE of RON is 266.79±27.75um (≤3mo). Nasopharyngeal carcinoma 16/53 cases (30.2%). 39/46 (84.8%) eyes with MRI typically displayed a discrete region of enhancement of the affected optic nerve: intracranial segment 26/39 (66.7%) eyes, etc. High-dose corticosteroids can improve the BCVA (p=0.038) and hyperbaric oxygen treatment can not (p=0.104).

Conclusions: The visual loss of RON is often acute, profound, and monocular but may decline slowly after acute onset and later affect both optic nerves. High-dose corticosteroids can improve the BCVA alone, combined with hyperbaric oxygen treatment does not further improve the prognosis. High-resolution MRI of the optic nerves usually will display enhancement of a discrete segment of the intracranial prechiasmatic optic nerve,

often with accompanying expansion and T2 hyperintensity. Enhancement lingers for a wide interval, ranging in this study from 2 weeks to at least 36 months. The RNFL and ILM-RPE of RON tend to be stable 12 months after onset.

Recurrent Optic Neuritis with Underlying Disc Drusen in Pediatric Anti-N-Methyl-D-Aspartate Receptor Encephalitis

First Author: Jinn Shian CHAN
Co-Author(s): Nor Fadhilah MOHAMAD, Nurul 'ain MASNON, Lakana Kumar THAVARATNAM, Wan Hazabbah WAN HITAM

Purpose: To describe a case of recurrent optic neuritis associated with anti-N-methyl-D-aspartate receptor (anti-NMDAR) encephalitis.

Methods: A case report.

Results: Optic neuritis associated with anti-NMDAR encephalitis, albeit rare, demands prompt recognition in order to achieve a good clinical outcome. We report a case of a 14-year-old girl with underlying history of anti-NMDAR encephalitis who presented with four recurrent episodes of optic neuritis in the same eye. Blurring of vision, pain on eye movement and headache were the presenting symptoms in all episodes. Fundoscopy demonstrated optic disc swelling with the incidental finding of optic disc drusen. Each episode was treated with intravenous methylprednisolone following which, visual acuity, colour vision and visual field significantly improved to normal. Neuroimaging was unremarkable. She developed a relapse of anti-NMDAR encephalitis after the recurrent episodes of optic neuritis despite being on Azathioprine. Intravenous immunoglobulin and cycles of cyclophosphamide were started, and she has been free from optic neuritis and encephalitis for more than one year. Anti-NMDAR optic neuritis and encephalitis are reversible with intensive immunotherapy. Early and accurate diagnosis lead to better management of this condition.

Conclusions: Patients diagnosed as NMDAR syndrome may have complex neuropsychiatric symptoms associated with optic neuritis, which may also be associated with certain neoplasm. Confirmatory of the disease with CSF autoantibody testing is crucial. This immune-mediated encephalitis syndrome is potentially reversible with intensive immunotherapy and can be associated with good visual outcome.

Retinal Layer Segmentation in Neuromyelitis Optica Spectrum Disorders: A Systematic Review and Meta-Analysis

First Author: Junxia FU

Purpose: It is important to recognize early and monitor the neurodegeneration of the retinal nerve layer in neuromyelitis optica spectrum disorders (NMOSD). This study aimed to evaluate the feature of different retinal layer segmentation in NMOSD with spectral-domain optical coherence tomography (SD-OCT).

Methods: We retrieved four electronic databases, including Pubmed, Embase, Cochrane Library, and Web of Science from inception to 30 July 2020. A meta-analysis was performed to compare the different retinal layer segmentation thicknesses between patients with or without a history of optic neuritis (ON) in NMOSD and the control group, including multiple sclerosis (MS), healthy controls (HC), and idiopathic optic neuritis(ION).

Results: Thirty-six studies were enrolled and the interval between the last ON onset

and examination was greater than 3 months. Compared with that of HC eyes, the loss of retinal nerve fiber layer (RNFL) and macular ganglion cell and inner plexiform layer (GC-IPL) was serious in NMOSD, especially after ON. Moreover, compared with that of ION or MS-related-ON eyes, the injury of the peripapillary retinal nerve fiber layer (pRNFL) was severe in NMOSD-related-ON eyes. In addition, the correlation coefficient between pRNFL and prognostic visual acuity was 0.43. Whereas, the one-arm study revealed the inner nuclear layer (INL) was thickened in NMOSD-related-ON compared with HC eyes.

Conclusions: The inclusion of the RNFL and macular GC-IPL are recommended for monitoring disease progression and we should pay attention to the changes in INL.

Reversible Ethambutol-Induced Optic Neuropathy: A Case Report

First Author: Syntia NUSANTI
Co-Author(s): Rianti Wulandari PRATIWI, Rasyidia Lasksmita PUTRI, Dearaini SOEPOMO

Purpose: Ethambutol (EMB) is commonly used as first-line anti-tuberculosis therapy. One of its precarious side effects is ethambutol-induced optic neuropathy (EON). This study aims to present a case of reversible EON with early detection and intervention.

Methods: A 60-year-old man presented with gradual and painless visual loss since 3 months prior to visit. The accompanying symptoms were frequent headache, photophobia, and double vision. He had been diagnosed with pulmonary tuberculosis for 9 months and consumed EMB for 7 months before being advised to discontinue. There was neither history of systemic diseases nor family history of neuropathy. Examination showed reduced visual acuity with positive RAPD on right eye. Humphrey test showed bilateral generalized visual loss. OCT showed RNFL thickness was normal. MRI brain indicated unremarkable result for optic neuropathy. Based on the examinations listed above, this patient was diagnosed as EON and prescribed oral citicoline 1000mg and zinc supplementation. After 1st and 3rd month follow up, patient's visual function was gradually improved.

Results: Ocular symptoms may develop from days to months after EMB initiation. The typical clinical manifestations are subacute, bilateral, painless, and symmetrical central vision loss. It is still debateable whether visual disturbance in EON is reversible. Various studies have mentioned that EMB cessation might improve the visual impairment. Currently, there is no effective treatment for EON but zinc supplementation and citicoline play roles in preventing retinal ganglion cell loss.

Conclusions: This case suggests that an early detection and intervention in patient with EON has promising result in visual outcome.

Reversible Visual Impairment Induced by Hepatic Encephalopathy: A Case Report and Review of the Literature

First Author: Athirah AMINUDIN
Co-Author(s): Mimiwati BT ZAHARI

Purpose: To present a rare case of transient cerebral visual impairment induced by hepatic encephalopathy and to review previously documented similar case reports.

Methods: Full systemic clinical examination and laboratory/radiological investigations to elicit the diagnosis.

Results: We present a rare case of transient visual impairment, or cortical blindness in a young patient, induced by hepatic

encephalopathy. This patient presented with sudden onset loss of vision while being treated in the ward for autoimmune hepatitis. Upon referral to ophthalmology team, her vision was hand movement in both eyes, with normal anterior and posterior segment findings. She then developed slurred speech and became disoriented during examination. Hepatic encephalophaty was suspected and patient was immediately treated. Her vision improved after treatment to 6/36 in both eyes. Patient however deteriorated despite treatment and subsequently passed away.

Conclusions: Cortical blindness can be the initial symptom of hepatic encephalopathy, preceeding all the other mental and physical signs including cognitive impairment or disorientation, slurred speech, tremor or swaying gait. It is a rare complication of hepatic encephalopathy and has only been reported in few cases worldwide. Therefore further evaluation and discussion of documented cases are required in order to provide guidance and ensure prompt future management of patients with hepatic encephalopathy or patients with progressive liver disease, should they present with any visual symptoms.

Steroid in Foster Kennedy Syndrome Type II with Sphenoid Wing Meningioma: Does It Work? A Case Report

First Author: Anggun RENGGINASTI

Purpose: To evaluate the use of steroid in unusual case of Foster Kennedy syndrome type II with sphenoid wing meningioma.

Methods: Diagnosis was based on history taking, best-corrected visual acuity (BCVA), applanation tonometry, Hertel exophthalmometry, Hirschberg test, fundus photography, and optical coherence tomography (OCT). Optic nerve function was evaluated with the Pelli-Robson test, Ishihara test, and Humphrey automated perimetry. The intracranial lesion was evaluated with computed tomography (CT) scan.

Results: A 46-year-old woman presented with a blind right eye (RE) for 2 months. RE visual acuity (VA) was no light perception and left eye (LE) was 1.0 with S-0,25. Anterior segment examination was normal in both eyes. Hertel exophthalmometry revealed proptosis of RE compared to LE with a value of 19 vs 14 (base 94). Fundus photography and OCT showed athrophy of RE optic nerve and LE optic nerve edema. LE optic nerve function examination showed arcuate defect. No red-green deficiency was found and contrast sensitivity was decreased to 1.35 with the Pelli-Robson test. CT-Scan showed a sphenoid wing meningioma. The patient was then diagnosed with Foster Kennedy syndrome type II due to sphenoid wing meningioma. The patient was treated with neuroprotector and methyl prednisolon 8mg q8h. In 1 month follow-up, VA was improved to 1.0 without correction, Pelli-Robson test was improved to 1.50, but there was no visual field improvement.

Conclusions: Oral steroid may improve optic nerve function in Foster Kennedy syndrome type II presenting with optic nerve edema associated with inflammation

The Difference on Clinical Characteristics between Autoimmune Optic Neuritis and Idiopathic Optic Neuritis

First Author: Zhao FANGCUI
Co-Author(s): Shaoying TAN, Yang YING

Purpose: To study the difference of clinical characteristics between autoimmune optic neuritis (AON) and idiopathic optic neuritis

(IDON).

Methods: The clinical parameters of laboratory tests, visual acuity, visual evoked potential (VEP), electroretinogram (ERG) and optical coherence tomography (OCT) were compared between a cohort of AON and a matched group of IDON patients.

Results: A total of 33 patients with AON and matched group of 33 IDON patients were recruited. The level of glycosylated serum protein was lower (AON: 144.86±21.36μmmol/L; IDON: 169.25±47.83μmmol/L, P=0.012) and the positive rate of ANA was higher (AON: 56.3%; IDON: 6.3%, P<0.001) in the AON group by compared with IDON group. The thickness of the retinal nerve fiber layer (RNFL) was generally thinner in the AON group (AON: 95.49±53.38 μm; IDON: 131.74±79.75 μm, P=0.019), and it was more specifically thinner at the superior (AON: 118.02±74.43 μm; IOON: 157.67±93.43 μm, P=0.039), inferior (AON: 123.12±73.35 μm; IDON: 179.62±115.68 μm, P=0.012) and nasal sectors (AON: 59.05±27.80 μm; IDON: 84.72±48.96 μm, P=0.006). It was found a lower P100 amplitude in VEP in AON patients (AON: 94.61±49.46 μV; IDON: 125.24±15.50 μV, P=0.03).

Conclusions: A thinner RNFL thickness and lower P100 amplitude in VEP were found in AON patients than that in matched IDON patients. AON patients may have more serious structural and functional visual defects than IDON patients.

The Magnetic Resonance Imaging Findings of Demyelinating Optic Neuritis: A Systemic Review and Meta-Analysis

First Author: Junxia FU

Purpose: Magnetic resonance imaging plays a significant role in assessing optic neuropathy and providing more detailed information about the lesion of the visual pathway to help differentiate optic neuritis from other visual disorders. This study aims to systematically review the literature and verify if there is a real difference in lesion location of different subtypes of optic neuritis (ON).

Methods: A systematic search was conducted including 8 electronic databases and related resources from the establishment of the database to August 25th, 2020. We classified the demyelinating ON into 5 subtypes and divided the visual pathways into five segments mainly comparing the differences in the involved visual pathway sites of different subtypes.

Results: The abnormal rate of conventional MRI examination in the acute phase was as high as 92% and the orbital segment of the optic nerve was most frequently involved (87%), whereas optic tract involvement was the rarest. The involvement of the orbital segment was more common in MOG-ON and CRION, while the lesion was found to be located more posteriorly with chiasmal involvement in NMOSD-ON.

Conclusions: MRI examination is recommended for ON patients in the acute phase. For MOG-ON, anterior involvement is more common and the involvement length is mostly over 1/2 of the optic nerve length, whereas posterior involvement, optic chiasm, is more common for NMOSD-ON.

The Planum Sphenoidale Meningioma Presented with Monocular Visual Field Defect: A Case Report

First Author: Michael CHOU
Co-Author(s): Chia-yi LEE

Purpose: We aim to demonstrate a case with a monocular visual field defect that results from a planum sphenoidale meningioma.

Methods: A case report and literature review.

Results: A 67-year-old female was in her usual health and presented with left eye blurred vision that progressed slowly. On examination, the best-corrected visual acuity was 0.8 in the right eye and 0.1 in the left eye while the intraocular pressure revealed a normal value. There was no prominent abnormality concerning the external eye, anterior segment structure, fundus examination and optical coherence tomography exam (Figure 1). However, the visual field test showed left paracentral and longitudinal visual field defect in the left eye and a near-normal result was illustrated in the right eye (Figure 2). Since the possibility of intraorbital optic nerve lesion cannot be excluded for the monocular visual field defect, the magnetic resonance imaging was arranged which a well-defined dense enhancing 2.5 cm mass located at planus sphenoidale was found which compressing the optic chiasma at both T2 images (Figure 3) and proton density mode (Figure 4). As a consequence, the planum sphenoidale meningioma was diagnosed and the patient was referred to the neurosurgical department for operation. The surgery was performed smoothly but the visual defect persisted with a final visual acuity of 0.2.

Conclusions: In conclusion, the chance of planum sphenoidale meningioma leading to monocular visual defects is rare but could still occur. Extraorbital lesion should be considered in monocular visual defect if no other possible intraorbital etiology was found.

Tissue-Proved Giant Cell Arteritis Presenting as Central Retinal Artery Occlusion

First Author: Wan-ju LEE
Co-Author(s): I-chuang LIAO

Purpose: We report a case of tissue-proved giant cell arteritis (GCA) presenting as central retinal artery occlusion (CRAO).

Methods: A case report.

Results: A 79-year-old male who had DM, hypertension, dyslipidemia and obesity was referred to our hospital for sudden onset of vision loss about 2 weeks ago. The referral sheet recorded a “cherry-red spot” in the right eye at that moment. On examination, the patient was afebrile. Visual acuity (VA) in the right eye was 20/1000 and in the left eye was 20/50. Fluorescein angiography revealed delayed arterial filling (OD: 32 seconds, OS: 24 seconds), patches of choroidal hypoperfusion in the right eye, and no disc leakage in both eyes. For temporal headache, temporal artery sonography was performed which demonstrated a hypoechoic thickened wall in his right temporal artery with dilated diameter. Temporal artery biopsy confirmed the diagnosis of temporal arteritis.

Conclusions: GCA is a prevalent disease in Western countries instead of Asian countries, therefore there are very few cases in Taiwan. In addition, our case was first presented as CRAO, which was a relatively rare clinical manifestation. Most GCA patients in suspicion didn’t have vessels biopsy or failed to get a tissue-prove diagnosis even they received

biopsies. Our patient was in old age and presented a temporal headache with right eye CRAO. Elevated ESR, abnormal temporal artery sonography and typical pathological findings in temporal artery biopsy all gave us a definite diagnosis.

Use of Botulinum Toxin-A Injection in Management of Crocodile Tears Syndrome

First Author: Hasiana LUMBAN GAOL
Co-Author(s): Mohamad SIDIK

Purpose: To present a case of crocodile tears syndrome (Bogorad's syndrome) as a rare ocular complication following facial nerve palsy, and the use of botulinum toxin-A injection as its management.

Methods: A case report of a 70-year-old male with excessive lacrimation on his right eye that occurs every time he chews, especially when he eats spicy foods. His complaint happened following a palsy on his right facial muscles (Bell's palsy) that occurred one year before admission. Clinical examinations of the eye and lacrimal appendage are within normal limits. Type 1 Schirmer examination was performed before and after chewing stimulation. The result for the right eye was 6 mm and increased to 22 mm after stimulation. On his left eye, the result was 6 mm and remain unchanged after chewing. He then received botulinum toxin-A injection transconjunctivally on his right lacrimal gland with a dose of 20 unit and was asked to control in two weeks.

Results: In crocodile tears syndrome, the salivary nerve fibers undergo aberrant regeneration to lacrimal gland and causing pathologic lacrimation in response to salivary stimuli (gustatory-lacrimal reflex). Botulinum toxin-A injection is shown to be effective in several case reports. After the injection, the patient came with significantly reduced tears while chewing. The right palpebra was slightly ptosis. The result of type 1 Schirmer examination on his right eye was 6 mm and it increased to only 7 mm after stimulation.

Conclusions: Botulinum toxin-A injection on lacrimal gland was effective in managing hyperlacrimation in patients with crocodile tears syndrome.

New approaches to patient management and dealing with unmet need in the era of COVID-19

Can Corona Virus Be Detected in the Eye?

First Author: Simon GEORGE
Co-Author(s): Kg AMJITH, Sarada DEVI, K SAJEESH, N SARITHA, Sahasranamam V

Purpose: To determine the proportion of COVID-19 (coronavirus disease-19) patients in whom coronavirus can be detected by conjunctival swab RT-PCR (reverse-transcription polymerase chain reaction).

Methods: Hospital-based cross-sectional study done in South India. The nasopharyngeal swabs and conjunctival swabs were taken from COVID-19 patients within the first 24 hours after admission for treatment. Both the swabs were subjected to RT-PCR testing for coronavirus in the central microbiology laboratory.

Results: 51 nasopharyngeal swab positive patients were included in the study. 35 patients (68.6 %) were males. 67 % were in the 45 - < 75 years age group. None of the patients had

traveled outside India. None of the 51 patients had any ocular symptoms. Fever, cough and breathlessness were the common systemic complaints in these patients. The conjunctival swabs taken from 6 patients (3 males and 3 females) were coronavirus RT-PCR positive (11.76 % of COVID-19 patients had a positive conjunctival swab result).

Conclusions: Coronavirus can be detected in the conjunctival swabs taken from COVID-19 patients with no ocular symptoms. In this study conducted in COVID-19 patients with no ocular symptoms, the proportion of patients with positive coronavirus conjunctival swab result is more than the results mentioned in most published studies from other parts of the world. In this era of COVID-19 pandemic, proper protective measures should be adopted during the ocular examination of all patients even if they have no ocular symptoms.

Comparative Visual Outcomes of Proliferative Diabetic Retinopathy before versus after the Onset of COVID-19 Pandemic in New York City, USA: Lessons Learned from Abroad

First Author: Thamolwan SURAKIATCHANUKUL
Co-Author(s): Jonathan HU

Purpose: To compare visual outcomes and occurrence of vitreous hemorrhage (VH) in patients undergoing treatment for active proliferative diabetic retinopathy (PDR) before and after the peak of COVID-19 pandemic in the epicenter of New York City.

Methods: Retrospective review of PDR patients who had treatment with retinal specialists at a tertiary care hospital from 11/2019 – 03/2020 (defined as pre-lockdown period) with at least 1 follow-up appointment during 07/2020 – 03/2021. Baseline and follow-up characteristics were evaluated with ANOVA.

Results: 108 eyes of 54 patients with active PDR requiring treatment pre-COVID-19 were studied. 50% were male and the average age was 57. The average hemoglobin A1c was 8.9. Mean follow-up was 13 months. Average initial logMAR visual acuity (VA) was 0.74 (median 0.48) and final logMAR VA 0.70 (median 0.48) with changes of logMAR 0.0 (median 0.0; range -2.4 to +2.5). The average initial central foveal thickness (CFT) was 359 um (median 311) and final 321 um (median 290). VH occurred in 19% of eyes. Compared with non-VH, those with VH showed no statistically significant differences in initial & final VA, changes in VA, and initial & final CFT. VA in VH has worsened by 0.10 logMAR on average, while VA in non-VH group has improved by 0.10 logMAR (median 0.00, p=0.23). Patients with VH missed slightly more appointments (p=0.34).

Conclusions: High VH incidence occurred during pandemics. Despite suboptimal follow-up intervals, PDR patients regained prior VA with treatment. These findings may be particularly relevant internationally as novel variants emerge and countries deal with new outbreaks.

Impact on Ocular Surface Health by Protective Masks during COVID-19

First Author: Prashansa THAKUR
Co-Author(s): Sharon DSOUZA, Archana PADMANABHAN NAIR, Swaminathan SETHU, Tanuja VAIDYA

Purpose: To investigate the effect of mask wearing for long hours on ocular surface clinical parameters, immune cell proportions and tear fluid soluble factors in subjects.

Methods: Samples were collected from healthy volunteers after written consent and

prior approval of the institutional ethics committee. OSDI score, Schirmer's test-1(ST1), tear break-up time (TBUT), lipiview, ocular scatter index were measured before and during COVID-19 pandemic (8 hours of mask wear). Tear fluid collected using Schirmer's strip was used to measure soluble factors (30- cytokines, chemokines, etc) by multiplex ELISA. Ocular surface cells collected using ocular surface wash (sterile saline) were immunophenotyped by flow cytometry.

Results: An increase in OSDI score, ST1 & TBUT were observed during pandemic compared to pre-pandemic samples. Inverse relationships between OSDI and ST1/ TBUT were seen in the COVID-19 pandemic but not in pre-pandemic measurements. A significant difference in tear soluble factors (increased – IL-1a/b, IL-2, BDNF, NGF, IFNb, LIF, Perforins, RANTES, TSLP; decreased – IL-8, IL-13, HGF, VEGF) was noted during pandemic period samples compared to pre-pandemic. Higher proportions of leukocytes, T cells, Natural killer T cells & lower proportions of B cells were observed in ocular surface wash samples collected during the pandemic compared to the pre-pandemic period.

Conclusions: Unique changes in ocular surface clinical metrics were observed in between the pre-pandemic and COVID-19 pandemic periods. Clinical parameters, tear factors and immune cell profile observed in mask associated ocular surface discomfort is distinctly different from the dry eye disease. This has implications for OPD practice in cataract and refractive surgery clinic and necessitates understanding the root cause of such changes.

Ocular Imaging

A Novel Technique to Assess Severity of Diabetic Retinopathy using Optical Coherence Tomography Angiography

First Author: Colin TAN

Purpose: Optical coherence tomography angiography (OCTA) produces high resolution imaging of the retinal microvasculature in vivo. We aimed to correlate the retinal vasculature parameters seen on OCTA with the clinical severity of diabetic retinopathy (DR).

Methods: A prospective cohort study involving 82 diabetics with mild to severe non-proliferative diabetic retinopathy (NPDR) were compared against 20 healthy controls. The foveal avascular zone (FAZ) and vessel densities were measured for both superficial and deep capillary plexus and correlated with the severity of DR, graded using color fundus photography (CFP).

Results: Mean FAZ sizes were significantly larger in patients with DR compared to controls (0.47 mm2 vs 0.28 mm2, $p<0.01$). In those with DR, mean FAZ sizes increases with severity of DR. (mild: 0.36 mm2 vs moderate: 0.52 mm2 vs. severe: 0.56 mm2, $p<0.05$). Vessel densities were lower in patients with DR compared to controls (44.2% vs. 51.3%, $P<0.001$). The vessel densities were also progressively lower with worsening severity of DR (mild: 46.5% vs. moderate: 43.9% vs. severe: 40.9%, $p<0.005$). No spatial predilection in vessel density reduction in relation to specific ETDRS subfields was observed.

Conclusions: Retinal microvascular parameters measured on OCTA varies according to the degree of severity of DR. This ability to differentiate DR severity is important

in the clinical evaluation of DR. OCTA derived parameters may potentially be useful as a novel imaging biomarker for DR disease severity.

Association between Alzheimer's Disease and Artificial Intelligence-Based Glaucomatous Optic Neuropathy

First Author: Anran Emma RAN
Co-Author(s): Carol CHEUNG, Christopher Li-hsian CHEN, Vincent MOK, Clement THAM, Tien-Yin WONG

Purpose: The associations between Alzheimer's disease (AD) and glaucoma are inconsistent in the current literature. We aim to assess the association between AD and glaucomatous optic neuropathy (GON) using artificial intelligence (AI) predicted GON scores from optical coherence tomography (OCT) volumetric scans.

Methods: This study included 2,269 volumetric optic disc OCT scans measured with Cirrus HD-OCT (Carl Zeiss Meditec, Dublin, CA) from 440 eyes of 233 AD subjects and 1,158 scans from 271 eyes of 136 cognitively normal subjects. GON score was calculated from each scan using a validated AI deep-learning algorithm. It was a continuous variable ranging from 0 to 1, and a greater score represented a higher probability of GON. Average and quadratic retinal nerve fiber layer (RNFL) thicknesses were also extracted from the OCT device.

Results: There was no significant difference in AI-based GON scores between AD and cognitively normal subjects (0.28 ± 0.31 vs. 0.30 ± 0.33, p = 0.20). After adjusting age and image signal strength, a simple linear regression test showed that the association between AD and AI-based GON scores was insignificant (p = 0.199). GON scores is equal to 0.297-0.015x (diagnosis) when diagnosis is 0 (normal) or 1 (AD). Pearson's R correlation test showed weakly and inversely association between AD and RNFL average (R = -0.125, p < 0.001), temporal (R = -0.174, p < 0.001), and inferior (R = -0.103, p < 0.001) thicknesses.

Conclusions: AD is not associated with AI-based GON score. Further research is still warranted to confirm the null association between AD and GON.

Characterization of Myopia in Spontaneous and Resistant Strains of Guinea Pigs: Differences in Anterior Segment and Response to Cycloplegia

First Author: Liqin JIANG
Co-Author(s): Veluchamy Amutha BARATHI, Joanna Marie BUSOY, Karen Jane Villanueva CATBAGAN, Quan HOANG

Purpose: Guinea pig (GP)s closely resemble humans in terms of emmetropization and are a widely-used model for myopia. GP eye optical properties and anterior segment anatomical changes may be readily-evaluated using clinical. Here, we compare the properties of two GP strains and the effect of cycloplegia.

Methods: Both eyes of fifty-five day-old albino (n=3) and pigmented (n=3) GPs were instilled with 1% cyclopentolate (x3 at 5-minute intervals). Baseline cycloplegic refraction was measured by retinoscopy. Anterior segment structures were assessed using RTVue OCT (Optovue) before and 40 minutes post-cycloplegia.

Results: Albino GP eyes (versus pigmented) had lower baseline refraction (-0.88±2.97D vs. +3.46±1.09D, n=6, p=0.01), central cornea thickness (CCT, 218±6µm vs. 230±4µm, p=0.003), and anterior chamber depth (ACD, 935±40µm vs. 992±23µm, p=0.02). Albino pupils dilated more with cycloplegia

(3.8±0.4mm baseline vs. 4.8±0.4mm, p<0.001) than pigmented (4.5±0.3mm vs. 4.9±0.2mm, p<0.001). Post-cycloplegia, albino eyes became more myopic (-0.88±2.97D vs. -1.21±2.71D) and pigmented more hyperopic (+3.46±1.09D vs. +4.08±1.15D). These changes did not reach statistical significance with our sample size. Cycloplegia also resulted in non-significant trends toward greater CCT (+1µm in albino vs. +4µm in pigmented) and ACD change in albino (935±40µm baseline vs. 962±29µm, p=0.058) but not in pigmented (992±23µm vs. 991±25µm).

Conclusions: RTVue is able to image GP eyes at high resolution and demonstrate optical and anatomical differences between albino and pigmented eyes. These promising trends need to be confirmed with larger to confirm the responses of pupil size responses to cycloplegia and myopia development trends in these two vastly different GP strains.

Comparison of Choroidal Thickness Measurements between Spectral-Domain Optical Coherence Tomography and Swept-Source Optical Coherence Tomography in Children Aged 6 to 8 Years: Hong Kong Children Eye Study

First Author: Chun On LEE
Co-Author(s): Carol CHEUNG, Shumin TANG, Nan YUAN, Jason YAM, Xiujuan ZHANG

Purpose: Associations of choroidal thickness have been reported for many ocular pathologies. Whether the choroidal thickness measured by different generations of optical coherence tomography (OCT) is interchangeable remains unclear. Thus, we compared choroidal thickness measurements between spectral-domain optical coherence tomography (SD-OCT) and swept-source optical coherence tomography (SS-OCT) in children eyes.

Methods: 114 Chinese children aged 6 to 8 years from the population-based Hong Kong Children Eye Study were included. Choroidal thickness of the right eye was measured by SD-OCT with manual segmentation of the choroidal layer; and SS-OCT with automatical built-in segmentation. Intra-class correlation coefficients (ICCs) were analyzed for the agreement between the two devices.

Results: The central foveal choroidal thickness (CFCT) obtained by SD-OCT and SS-OCT was 273.24±54.29µm and 251.84±47.12µm respectively. Inter-device agreement was good with an ICC of 0.840 (95% confidence interval [CI]: 0.616-0.918) (P<0.001). Nevertheless, SD-OCT was significantly thicker than that obtained by SS-OCT (mean difference of CFCT = 21.40±33.13µm (P<0.001)). Bland-Altman limit of agreement on the relative difference scale for SD-OCT/SS-OCT was 86.33µm. Validated conversion equation for translating CFCT was SS-OCT = 35.261 + 0.810 x SD-OCT. Subgroup analysis revealed poorer inter-device correlation coefficient in myopic children (CFCT: 0.754; 95%CI: 0.454-0.888) (P<0.001).

Conclusions: In healthy pediatric eyes, ICC shows a satisfactory agreement between choroidal thickness measured by SD-OCT and SS-OCT, however, there is a statistically significant inter-device difference. Hence, the two OCT-results cannot be interchanged.

Comparison of Optical Coherence Tomography Angiography Metrics in Primary Angle-Closure Glaucoma and Normal-Tension Glaucoma

First Author: Ruyue SHEN
Co-Author(s): Carol CHEUNG, Poemen CHAN, Clement THAM, Yumeng WANG

Purpose: To investigate the peripapillary

vascular metrics measured by optical coherence tomography angiography (OCT-A) in eyes with mild normal tension glaucoma (NTG) and primary angle closure glaucoma (PACG).

Methods: A total of 59 PACG patients, 63 NTG patients, and 59 normal subjects were recruited. Each participant underwent OCT-A with swept-source OCT (DRI-OCT Triton, Topcon, Japan) imaged for a 3x3mm peripapillary region and was assessed by an automated customized MATLAB program. OCT-A metrics – circumpapillary vessel density (cpVD), fractal dimension (cpFD), and vessel density index (cpVDI) – were obtained and compared between groups. Univariable and multivariable analyses were performed to determine the association of structural and functional parameters and the OCT-A metrics.

Results: NTG eyes had significantly lower global cpVD (53.659±0.597% vs 55.592±0.706%, P=0.037) compared with PACG despite comparable visual field parameters and average retinal nerve fiber layer (RNFL) thickness. This difference remained true for the superotemporal, inferotemporal, and inferonasal regions (all $p \leq 0.043$). For PACG and NTG eyes, decreased cpVD (β=-5.617 and β=-3.667), decrease cpFD (β=-9.941 and β=-8.794), and increase cpVDI (β=5.447 and β=3.189) were associated with decreased RNFL thickness in multivariable analysis (all $p \leq 0.039$). Decreased cpFD was also associated with a decrease in visual field index (VFI) for both PACG (β=-2.149; p=0.020) and NTG eyes (β=-3.551; $p \leq 0.002$).

Conclusions: Mild NTG had lower cpVD than mild PACG despite similar structural and functional parameters, particularly in the superotemporal, inferotemporal, and inferonasal regions. Decrease in cpVD, cpFD, and increase in cpVDI were associated with a reduction of RNFL thickness in both NTG and PACG.

Comparison of Optical Coherence Tomography Angiography Parameters between Diabetic and Non-Diabetic Chronic Kidney Disease

First Author: Kuan Sze TAN
Co-Author(s): Wan Haslina HALIM, Meng Hsien YONG

Purpose: To compare optical coherence tomography angiography (OCTA) parameters between diabetic kidney disease (DKD), non-diabetic kidney disease (non-DKD) and healthy controls.

Methods: A cross-sectional pilot study of 159 subjects (53 subjects each group) was conducted. Demographics, relevant blood and urine tests were collected followed by colour retinal photographs and OCTA. Three OCTA parameters such as foveal avascular zone (FAZ), vessel density (VD) and perfusion density (PD) of superficial capillary plexus (SCP) over macula 6mm x 6mm were analyzed.

Results: The mean age for DKD, non-DKD and healthy control were 58.77±7.02, 50.96±11.64 and 45.34±12.95 years respectively. After age-adjusted, there were no statistically difference in FAZ (p=0.520), central VD (p=0.126) and central PD (p=0.146) between the three groups. However, there were statistically significant difference in inner VD (p=0.004), outer VD (p<0.001), full VD (p<0.001), inner PD (p=0.014), outer PD (p<0.001), and full PD (p=0.001) among the three groups. There was no significant correlation between OCTA parameters with DR, and HbA1c in DKD group. Multiple linear regression analysis among CKD group showed

significant positive linear relationship between UPCI and FAZ (b=0.061, p=0.046), and between age and full VD (b=-0.063, p=0.004) and full PD (b=-0.167, p=0.003). Diabetes mellitus (DM) has significant negative linear relationship with full VD (b=-1.279, p=0.004) and full PD (b=-2.856, p=0.013).

Conclusions: Our study showed OCTA specifically VD and PD may be a potential screening parameter to be used for detecting diabetic microvascular damage in CKD patients. UPCI is an important determinant for FAZ whereas age and DM are independent determinants for VD and PD in CKD group.

Comparison of Two Novel Swept-Source Optical Coherence Tomography Devices to a Partial Coherence Interferometry-Based Biometer

First Author: Poemen CHAN
Co-Author(s): Tommy CHAN, Vivian Sm CHIU, Wing Ki Gilda LAI, Christopher LEUNG, Marco YU

Purpose: To evaluate the repeatability and agreement of cornea and biometry measurements obtained with two swept-source optical coherence tomography (SSOCT) and a partial coherence interferometry-based device.

Methods: This is a cross-sectional study. Forty-eight eyes of 48 patients had three consecutive measurements for ANTERION (Heidelberg Engineering, Germany), CASIAII (Tomey, Japan) and IOLMaster500 (Carl Zeiss Meditec, USA) on the same visit. Mean keratometry (Km), central cornea thickness (CCT), anterior chamber depth (ACD) and axial length (AL) were recorded. Corneal astigmatic measurements were converted into vector components – J0 and J45. Intra-device repeatability and agreements of measurements amongst the devices were evaluated using repeatability coefficients (RCs) and Bland-Altman plots, respectively.

Results: All devices demonstrated comparable repeatability for Km ($p \geq 0.138$). ANTERION had the lowest RC for J0 amongst the devices ($p \leq 0.039$). Systematic difference was found for the Km and J0 obtained with IOLMaster500 compared to either SSOCTs ($p \leq 0.010$). The ACD and AL measured by IOLMaster500 showed a higher RC compared with either SSOCTs ($p<0.002$). Systematic difference was found in CCT and ACD between the two SSOCTs ($p<0.001$), and in AL between ANTERION and IOLMaster500 ($p<0.001$), with a mean difference of 1.6 µm, 0.022mm and 0.021 mm, respectively.

Conclusions: Both SSOCTs demonstrated smaller test-retest variability for measuring ACD and AL compared with IOLMaster500. There were significant disagreement in keratometry and AL measurements between the SSOCTs and PCI-based device; their measurements should not be considered as interchangeable but the disagreement could be refined by readjustment of intraocular lens constant in clinical practice.

Effect of Sodium Glucose Cotransporter 2 Inhibition on Optical Coherence Tomography Angiography Parameters in Diabetic Chronic Kidney Disease

First Author: Siti Husna HUSSEIN
Co-Author(s): Norasyikin A. WAHAB, Wan Haslina HALIM, Ayesha MOHD ZAIN, Meng Hsien YONG

Purpose: To compare the optical coherence tomography angiography (OCTA) parameters in diabetic kidney disease (DKD) before and after initiation of Empagliflozin.

Methods: A prospective study included 87 subjects with type 2 diabetes mellitus with CKD and divided into two groups:

proteinuria and non-proteinuric. They received Empagliflozin 25mg daily for a one-month duration. Fundus photography and OCTA macula scan by using AngioPlex Cirrus 5000 were taken at baseline and post-intervention. The OCTA parameters measured are the fovea avascular zone (FAZ) area, perfusion density (PD), and vessel density (VD). The PD and VD are divided by subregion; central (cC), inner (iC), outer (oC), and full (w).

Results: The median FAZ area in both groups was similar. For PD and VD, the highest value was at the oC ring, and the lowest was at cC. All parameters showed non-significant differences between the groups. Following intervention, the overall median value of FAZ was larger after treatment (0.24 (0.15) mm2 vs. 0.25 (0.11) mm2, p=0.625). The overall mean value for cC-PD and cC-VD were also larger after treatment (cC-PD=16.23 ± 1.04 % vs. 17.1 ± 9.85%, p=0.457 and cC-VD=7.29 ± 4.50 mm/mm2 vs 7.64 ± 4.10 mm/mm2, p=0.520). The results were similar in each group. Age significantly predicts the FAZ value in the proteinuric group (R2 0.102, p=0.029). Co-existing IHD affects the w-VD and w-PD in non-proteinuric groups (R2 0.118, p=0.03 and R2 0.126, p=0.025 respectively).

Conclusions: There is no difference in the OCTA parameters between proteinuric and non-proteinuric DKD after one month of Empagliflozin treatment.

Identification of Sex and Age from Macular Optical Coherence Tomography and Feature Analysis Using Deep Learning

First Author: Yi-ting HSIEH
Co-Author(s): Homer H. CHEN, Kuan-ming CHUEH, Sheng-lung HUANG, I-hsin MA

Purpose: To develop deep learning models for identification of sex and age from macular optical coherence tomography (OCT), and to analyze the features for differentiation of sex and age.

Methods: 6147 sets of macular optical coherence tomography (OCT) images from the healthy eyes of 3134 persons were collected. Deep learning based algorithms were used to develop models for the identification of sex and age, and 10-fold cross-validation was applied. Gradient-weighted class activation mapping (Grad-CAM) was used for feature analysis.

Results: The accuracy for sex prediction using deep learning from macular OCT was 85.6 ± 2.1%, compared to the accuracy of 61.9% by using macular thickness and 61.4 ± 4.0% by using deep learning from infrared fundus photography. The MAE for age prediction using deep learning from macular OCT was 5.78 ± 0.29 years. A thorough analysis of the prediction accuracy and the Grad-CAM showed that the cross-sectional foveal contour leads to a better sex distinction than the macular thickness or the fundus photography, and the age-related characteristics of the macula were on the whole layers of the retina, rather than the choroid.

Conclusions: Sex and age could be identified from macular OCT using deep learning with good accuracy. The main sexual difference of macula lies in the foveal contour, and the whole layers of retina differ with aging. These novel findings provide useful information for further investigation in the pathogenesis of sex and age-related macular structural diseases.

Longitudinal Relationship of Diabetic Retinal Neurodegeneration to the Onset and Progression of Diabetic Retinopathy

First Author: Ziqi TANG
Co-Author(s): Carol CHEUNG

Purpose: To prospectively determine the relationship of diabetic retinal neurodegeneration (DRN) as quantified by optical coherence tomography (OCT) to diabetic retinopathy (DR) onset and DR progression.

Methods: Subjects with diabetes were followed up for at least 2 years. DR outcomes were determined from fundus photographs using the modified Airlie House classification system. Macular ganglion cell-inner plexiform layer (m-GCIPL), macular retinal nerve fiber layer (m-RNFL), and peripapillary RNFL (p-RNFL) were measured with Cirrus HD-OCT (Carl Zeiss Meditec, Dublin, CA). Hazard ratios (HR) were calculated to determine associations between baseline OCT measurements and DR outcomes.

Results: Of 232 eyes included, 19.7% and 22.4% eyes developed DR onset and DR progression. After adjustment for baseline age, glycated hemoglobin, duration of diabetes, mean arterial blood pressure, body mass index, diabetic kidney disease, axial length, and OCT signal strength, inferior m-GCIPL (HR, 1.52; 95% CI, 1.01-2.28), and p-RNFL at 7 o'clock position (HR, 1.78; 95% CI, 1.15-2.76) were associated with DR onset. After further adjusting for baseline DR severity, inferior m-GCIPL (HR, 1.51; 95% CI, 1.09-2.08), inferotemporal m-GCIPL (HR, 1.38; 95% CI, 1.02-1.85), inferior m-RNFL (HR, 1.41; 95% CI, 1.01-1.95), inferotemporal m-RNFL (HR, 1.58; 95% CI, 1.13-2.20), and p-RNFL at 7 o'clock position (HR, 1.40; 95%CI, 1.03-1.90) were associated with DR progression.

Conclusions: Macular OCT measurements and p-RNFL thickness at 7 o'clock were associated with DR onset and DR progression. Our findings support that OCT measurements may be considered as DRN to stratify individuals with a higher risk of DR deterioration.

Posterior Lens Capsular Pigmentation: A Rare Presentation of Blunt Ocular Trauma

First Author: Mithun THULASIDAS
Co-Author(s): Pradeep BALAN, Lakshmi PRABHA, Ajita SASIDHARAN

Purpose: To report a rare case of posterior lens capsular pigmentation secondary to blunt ocular trauma.

Methods: A 58-year-old man presented with blurred vision in his left eye (LE). He had a history of old blunt trauma to LE 3 years ago. The corrected distance visual acuity was 6/6 in right eye and 6/9 in LE with normal intraocular pressure in both eyes. Gonioscopy revealed angle recession <270° in LE.

Results: On slit-lamp examination, irregular areas of pigmentation on the posterior capsule of LE were noted. RE examination was within normal limits. Fundus examination showed an optic nerve head cup disc ratio of 0.2:1 in RE and 0.4:1 in LE with normal macula in both eyes.

Conclusions: Posterior capsular pigmentation following blunt ocular trauma is a rare finding. A blunt trauma may lead to disruption of Wieger's ligament and entrapment of aqueous in Berger's space with pigment deposition over posterior capsule.

Retinal Microvascular Changes following Internal Limiting Membrane Peeling Surgery for Epiretinal Membrane or Macular Hole

First Author: Kyungwoo YOON
Co-Author(s): Eung-suk KIM, Kiyoung KIM, Seung Young YU

Purpose: To evaluate macular microvascular changes following internal limiting membrane (ILM)-peeling surgery for epiretinal membrane (ERM) or macular hole (MH).

Methods: A retrospective study, total of 66 patients (66 eyes), 50 patients diagnosed with epiretinal membrane and 16 with macular hole, were evaluated with SS-OCTA after ILM peeling during PPV. Periforveal microvascular change and nonperfusion area were measured by Matlab from the 6mmx6mm SS-OCTA images excluding FAZ. The presence of dissociated optic nerve fiber layer (DONFL) was evaluated using en-face SS-OCTA images.

Results: In a total of 66 eyes, the best corrected visual acuity after surgery was significantly improved. In epiretinal membrane, periforveal vessel density in superficial and deep plexus layer was decreased in inferio-temporal sector 1 year after surgery. In macular hole, the periforveal vessel density in superficial and deep plexus layer after surgery showed a significant decrease in temporal sector. DONFL was observed in 75% patients diagnosed with macular hole, but in 22% patients diagnosed with epiretinal membrane. The correlation between periforveal microvascular change and DONFL was not statistically significant.

Conclusions: Periforveal vessel density 1 year after ILM peeling surgery tend to decrease in both groups.

Ocular Oncology and Pathology

Acute Angle Closure Attack as an Initial Presentation of Metastatic Lung Adenocarcinoma

First Author: Zen Kuang THAM
Co-Author(s): Norlina RAMLI, Azida Juana WAN AB KADIR

Purpose: Lung cancer has been observed to be related for eye metastasis. To report a case of acute angle closure attack as a rare initial presentation of metastatic lung adenocarcinoma.

Methods: A case report with literature review.

Results: We report a case of a previously healthy male, aged 66-year-old who presented with intense eye pain and poor vision of the right eye for 2 days. The ophthalmological examination showed an oedematous cornea, shallow anterior chamber, and intumescent lens. Intraocular pressure (IOP) was 52 mmHg in the right eye (RE) and 10 mmHg in the left eye (LE), and her best-corrected visual acuities (BCVAs) were hand movement (HM) in the right eye and 6/9 in the left eye. Gonioscopy showed all closed angles in the RE and open angles in the LE. B-scan ultrasound revealed bullous retinal detachment (RD). MRI orbit showed RD with an intraocular nodule on the posterior aspect of the retinal layer of the right globe. Subsequently, lung carcinoma was diagnosed based on chest x-ray, CT thorax, and a lung tissue histopathological biopsy. Radiotherapy to the right globe and chemotherapy was commenced. After 1 month of treatment with steroids and anti-glaucoma medications, the patient's intraocular pressure returned to normal but visual acuity was reduced to no perception of light (NPL).

Conclusions: The rare feature in this case was a clinical presentation of acute angle closure

attack as the first manifestation of the disease. Clinician should be aware of this rare initial manifestation of metastatic lung carcinoma.

Advanced Ocular Amelanotic Melanoma Presenting as Pyogenic Granuloma in an Asian Male

First Author: Mary Ellaine DIAZ
Co-Author(s): Marco TUMALAD

Purpose: Amelanotic orbital melanoma is rare and is diagnosed late due to its misleading presentation. This report aims to discuss a case of advanced amelanotic melanoma thereby increasing the knowledge and awareness of ophthalmologists regarding cases like this so that prompt diagnosis and management can be given to the patient.

Methods: A 39-year-old male was referred to the orbit clinic for an enlarging left orbital mass that started as a fleshy opacity 21 years prior. Two years prior, it was diagnosed as pyogenic granuloma and was advised excision and biopsy but he was lost to follow-up. One year prior, the patient returned with an enlarged, fleshy orbital mass with areas of purulent discharge. Computed tomography (CT) scan and incisional biopsy were done.

Results: The orbital mass was ~70x65x40mm in size, with gross bleeding, purulent necrosis, and severe pain. A firm nodular, mass around 20x20mm was seen on the ipsilateral pre-auricular area. Contrast CT scan showed an enhancing conal/ extraconal soft tissue mass density within the left orbit. Histopathology revealed neoplastic spindle and epithelioid cells. Immunohistochemical stains showed immunoreactivity for S100, HMB-45 and Vimentin, consistent with primary malignant melanoma, amelanotic type. Orbital exenteration was done. Oncologic work-up revealed metastatic foci on the lungs and left frontal lobe. He was again lost to follow-up, and returned 5 months after with local recurrences around the exenteration site.

Conclusions: Amelanotic conjunctival melanoma can be mistaken for benign entities like pyogenic granuloma. Prompt histopathologic examination must be done for all suspicious conjunctival lesions, to avoid debilitating and fatal disease outcomes.

Aneurysmal Bone Cyst of Orbit and Paranasal Sinus

First Author: Koshal DANI
Co-Author(s): Dipali PARMAR, Jayagayathri R., Dayakar YADALLA

Purpose: To report a rare case of aneurysmal bone cyst of right orbit and paranasal sinus in pediatric age group.

Methods: A 4-year-old female child presented to the tertiary health care centre with right eye rapidly progressive proptosis and globe displacement with restricted eye movements in all gazes since one month not resolved with systemic antibiotics. There was no history of trauma. Patient underwent CECT orbit with PNS and MRI orbit with contrast suggestive of erosive lesions in sphenoid and lateral wall of orbit in favor of malignant bone lesion with no evidence of intracranial extension. Post craniotomy biopsy for histopathological examination sent for confirmatory diagnosis.

Results: Patient was operated under general anesthesia. Craniotomy was performed and mass sent for biopsy. Frozen section biopsy confirmed the diagnosis of aneurysmal bone cyst.

Conclusions: Aneurysmal bone cyst is a rare lesion of orbit and paranasal sinus. It is a benign multi-cystic mass, locally destructing and rapidly expandable. Although rare, it

should be considered in differential diagnosis of proptosis with similar clinical picture in the pediatric age group as timely surgical intervention gives favorable cosmetic result and visual prognosis.

Cataract in a Child: A Red Herring

First Author: Nadzirah SAFFIAN

Purpose: To report a case of retinoblastoma with cataract as the initial presentation.

Methods: A case report.

Results: A 3 year old boy with history of squint presented to a private ophthalmology centre with left eye cataract and increased intraocular pressure. On examination; there was left eye redness, cataract and elevated intraocular pressure of 50 mmHg. A diagnosis of left eye cataract with secondary glaucoma was made. He subsequently underwent left eye lens aspiration. Post operatively, there was reduction of intraocular pressure. However, after 4 months he developed proptosis with scleral thinning. He was then referred to our centre. On examination, the cornea was hazy with presence of band keratopathy and shallow anterior chamber. There was no view of the fundus. Right eye was normal. Imaging was done. The left globe was diffusely enlarged with heterogenous enhancement, hyperdense vitreous, multiple calcification within the globe especially at its posterior aspect with thickened optic nerve suggestive of left eye retinoblastoma with adjacent bone and left temporal dural metastases. His parents were counseled for left eye enucleation with adjuvant chemoradiation. Unfortunately the patient defaulted his follow up and he succumbed to his illness 4 months later.

Conclusions: Retinoblastoma can sometimes present atypically. A high index of suspicion is needed to avoid missing an ocular malignancy. Furthermore cataract presentation in retinoblastoma is rare. Examination in a clinical setting for young children can often be challenging. Ideally examination under anesthesia is required for thorough examination in young children.

Chemotherapy or Radiotherapy as the First-line Therapy of Ocular Adnexal Extranodal Marginal Zone Lymphoma: A Literature Review

First Author: Karina LUTHFIA
Co-Author(s): Mutmainah MAHYUDDIN

Purpose: To evaluate the efficacy and safety of chemotherapy as the main therapy of extranodal marginal zone lymphoma (EZML), in comparison with radiotherapy.

Methods: Literature search was conducted using five online databases (PubMed, ScienceDirect, Google Scholar, ProQuest, and SpringerLink). Studies were selected based on the established inclusion and exclusion criteria. The outcomes of this study are local control rates, the disease-free survival rates, overall survival rates, complications, recurrences dan relapses from both treatment groups.

Results: Ten retrospective studies are included in this review. Three studies compare both treatments as the first-line therapy of EZML, three studies use chemotherapy only, and the other four use radiotherapy only as the main therapy. Both treatment groups as the first-line treatment have high complete remission rate, with only one study from the chemotherapy group, where seven out of sixteen patients still retained lesions even after the completion of therapy. The disease-free survival rate in 5 years of chemotherapy and radiotherapy ranged from 69.7-90.3% and 76-100%, while the 5 year overall survival rate between the two

groups are 100% and 90.4-100%, respectively. The complications from the chemotherapy group were mostly systemic but were said to be manageable, while the radiotherapy group showed ophthalmic complications. As for recurrences, radiotherapy may be insufficient to prevent distant recurrence (10–33%).

Conclusions: Both radiotherapy and chemotherapy showed high local control rates and survival outcomes especially in the early stages of EMZL. Since EMZL does not have high mortality rate, it is important to consider the treatment's complications and the possibilities of systemic involvement.

Choroidal Metastasis as the Initial Presentation in Lung Cancer: A Case Series

First Author: Mutmainah MAHYUDDIN
Co-Author(s): Anggun YUDANTHA

Purpose: To report three cases of choroidal metastasis as the initial presentation in lung cancer.

Methods: Three non-smoker 33-58 year old male patients presented with initial complaint of blurry vision. Two patients was previously treated as posterior uveitis and 1 patient as central serous retinopathy for several months prior to referral. Funduscopy found pale-yellow fundus, subretinal fluid, and underlying elevated choroidal lesion. Ocular computed tomography (OCT) showed 'lumpy bumpy' choroidal surface, thickening and detachment of retinal pigment epithelium with subretinal fluid. Ultrasound discovered echo-dense, low to medium spike, diffuse choroidal mass. Vitreous cells were prominent in 2 patients. Bilateral identical lesion was observed in 1 patient.

Results: All patients had high result of blood tumor markers that support to lung cancer detection. Thorax CT (computed tomography) showed enhanced nodule that suggestive to primary lung cancer. Further whole body scan revealed all patient had multiple metastasis to the lymph nodes and bones. All patients were treated with bevacizumab intravitreal injection alongside paliative chemotherapy. One patient had improved vision after treatment. The patient with bilateral invovement passed away 2 months after the diagnosis, the other two patients survive after 6-8 months and still being followed up until present.

Conclusions: Choroidal metastasis could present as the first and only clinical manifestation in lung cancer patient and often mimick posterior uveitis. Any patient with non improving of atypical inflammatory choroidal lesion should raise awareness of possibility in choroidal metastasis. Characteristics of metastatic choroidal lesions must always be in mind so this life threatening condition could be early detected.

Ciliochoroidal Epithelioid Cell Melanoma in a 22-Year-Old Female: A Case Report

First Author: Diane CO
Co-Author(s): Jacqueline MUPAS-UY, Alex SUA, Roberto UY

Purpose: The objective of this case report is to present a case of an aggressive tumor, a ciliochoroidal melanoma, in a young adult patient.

Methods: A case report.

Results: This is a case of a 22-year-old female with an aggressive form of ciliochoroidal melanoma who presented with unilateral periorbital pain. The patient had good vision (BCVA 20/20), but posterior segment examination revealed an inferior exudative

retinal detachment on the left eye. Clinical diagnosis of choroidal melanoma was done through indirect ophthalmoscopy, supported by B-scan ultrasonography. PET/CT scan revealed a tumor with poor metabolic activity and low FDG uptake, which are characteristics of a benign lesion thus causing a dilemma in diagnosis. The patient later underwent enucleation of the left eye and histopathologic findings revealed epithelioid cell melanoma with scleral involvement and spread towards the optic nerve head distant from the main tumor.

Conclusions: A large, and aggressive tumor, like in our case is associated with a high mortality rate, therefore early detection and treatment is warranted. The important role of indirect ophthalmoscopy, supported by imaging in accurately diagnosing an intra-ocular melanoma clinically is emphasized in this case. Knowing the tumor size and characteristic behavior are important in predicting prognosis and therapeutic decisions should be carefully planned and made based on individual patient needs.

Clinico-Demographic Profile of Orbital Exenteration in a Tertiary Eye Care Centre

First Author: Sahil AGRAWAL
Co-Author(s): Mandeep BAJAJ, Seema KASHYAP, Rachna MEEL, Neelam PUSHKER

Purpose: To determine clinical indications for orbital exenteration, demographic profile and clinicopathological correlations, assess its impact on patient survival and compare these results with previously published data.

Methods: It is a retrospective study on exenterations performed at a tertiary eye care centre in India over 18 years (January 2001 to December 2020). We reviewed patient records to obtain demographic data, presenting symptoms and their duration, laterality, and clinical and histopathological diagnosis.

Results: A total of 342 cases (210 males and 132 females) were identified. Patients ranged in age from 11months to 87years (median age 50 years). Classification of cases on histopathological criteria showed exenterations were performed mostly for eyelid tumors (194 cases) followed by retinoblastoma (66 cases) and primary orbital tumors. Squamous cell carcinoma (94 cases) was the most common eyelid tumor, followed by sebaceous gland carcinoma (39 cases), malignant melanoma (39 cases), and basal cell carcinoma (20 cases). Primary orbital malignancies like the adenoid cystic carcinoma of the lacrimal gland (17 cases), OSSN (10 cases) and mucormycosis (6 cases) contributed to the lot, most were poorly differentiated. In 11 cases, exenteration was performed as a debridement procedure for the control of fulminant fungal orbital infection.

Conclusions: The most common indications worldwide are eyelid and periorbital malignancies that are not amenable to any other treatment modality. In our study, SCC and EORB were the commonest malignant tumours for which exenteration was performed, in contrast to BCC reported in Western literature. Secondary orbital spread of malignant lesions and need for exenterations can be avoided if they are diagnosed and treated at an earlier stage with a close follow up.

Does Adjuvant Plaque Brachytherapy Help Improve Local Tumor Control in Conjunctival Melanoma with Scleral or Corneal Invasion?

First Author: Rolika BANSAL
Co-Author(s): Santosh HONAVAR, Kaustubh MULAY, Vijay Anand REDDY

Purpose: Considering the high malignant potential and post-surgical local tumor recurrence of conjunctival melanoma, we evaluated the role of adjuvant plaque brachytherapy in such cases.

Methods: A retrospective case series of 15 consecutive patients.

Results: The median age was 33 (range 8-65) y. The majority originated from primary acquired melanosis 7 (47%) or nevi 6 (40%). The mean diameter was 9.9+3.2 (range 4-17) mm and the mean height was 2.9+1.2 (range 1.5-6) mm. Corneal and scleral invasion was assessed pre-operatively clinically and by ultrasound biomicroscopy, optical coherence tomography or MRI, intraoperatively, and by histopathology. Ru-106 plaque brachytherapy was performed at primary excision in 8 (54%) or following histopathology confirmation of base invasion in 7 (46%) to 2-3mm depth with 10000 cGy apex dose with a mean duration 37.4+18.9 (range 11.5-74) h. Two patients with regional lymph node metastasis were treated with radical neck dissection, radiotherapy and biologicals. At a mean final follow-up of 8.1 y, vision salvage (20/40 or better) and local tumor control were achieved in all, with no mortality.

Conclusions: Adjuvant plaque brachytherapy provides excellent outcomes in CM with scleral and corneal invasion. Conjunctival melanoma has a high rate of local tumor recurrence. Apart from that, patients with corneal stromal invasion or scleral invasion are typically treated with enucleation. Following tumor excision in patients with corneal and/or scleral invasion, adjuvant Ru106 plaque brachytherapy plays an excellent role in the preservation of the eye and vision and minimizing the risk of local tumor recurrence.

Extranodal Natural Killer/T Cell Non-Hodgkin Lymphoma, Nasal-Type Presenting as Ocular Adnexal Tumor and Maxillary Sinusitis

First Author: Neni ANGGRAINI

Purpose: Extranodal natural killer/T cell lymphoma, nasal type (ENKTL-NT), presents predominantly as a localized disease involving the nasal cavity and its adjacent structures. This case report aimed to increase the awareness of a rare ENKTL-NT case presenting as an ocular adnexal tumor and maxillary sinusitis.

Methods: A case report.

Results: A 34-year-old woman presented with unilateral mass on her eyelid since a month before admission. Two months prior, she undergone functional endoscopy sinus surgery (FESS) due to left maxillary sinusitis confirmed by paranasal sinus x-ray. One month after surgery, she complained a painless, progressively enlarging mass, extending from the lower to the upper left eyelid. Histopathology confirmed high-grade diffuse non-Hodgkin lymphoma. Immunohistochemistry examination showed positive for CD3, Mum1, Ki67 95%, CD99, CD56, Perforin, Granzyme, LCA and negative for CD20, CD10, CD79a, Bcl6, CD138, CD30, ALK, and TdT, concluded as ENKTL-NT. In situ hybridization Epstein-Barr encoded RNA (EBER) showed positive result. No systemic involvement was found. The combination of concurrent chemoradiotherapy significantly reduce the tumor size. Unfortunately, at one-year follow-up, she died due to systemic involvement.

Conclusions: Extranodal natural killer/T cell lymphoma, nasal type is a rare and aggressive extranodal non-Hodgkin lymphoma. However, ENKTL-NT frequently extends locoregionally

to the paranasal sinuses, orbits, and lymph nodes, and can also develop outside the nasopharynx. The combined approach of chemotherapy and radiotherapy has been proposed as the first-line treatment for a newly diagnosed patient with localized nasal ENKTL. Ophthalmologist should be aware of its existence and have to consider it as one of ocular adnexal tumor differential diagnosis.

Extraocular Retinoblastoma Managed during COVID-19 Pandemic

First Author: Sameeksha TADEPALLI
Co-Author(s): Khushdeep ABHAYPAL, Byanjana BASHYAL, Urmila KUMARI, Usha SINGH

Purpose: To study the demographic features, clinical presentation, and treatment of children presenting with extraocular retinoblastoma (EORB) in the backdrop of the COVID-19 pandemic. We also looked at factors causing interruptions in treatment.

Methods: A retrospective chart review of all extraocular retinoblastoma patients presenting between December 2019 to May 2021, at a tertiary care referral institute.

Results: Total 32 patients presented with extraocular retinoblastoma with mean age of 45 months (range 2.5-132). Delayed presentation was noted in 17 (53%) cases, reasons being COVID-19 related lockdown (19%), misdiagnosis (16%) and family-related issues (21%) despite early referral. Extraocular advanced disease involved one eye in 30 and both eyes in two patients. Common presenting symptoms were leukocoria in 19 (56%), proptosis in 14 (26%) and mass growing over eye in 4 (12%). Overt orbital disease was seen in 19 (56%) of whom 10 (29%) had grossly visible mass. Imaging revealed optic nerve extension in 23 (68%) and intra cranial extension in 5. Treatment modalities included chemotherapy in 19 (56%), radiotherapy in 9 (26%) and enucleation in 15 (44%) eyes. Patients defaulted during treatment (25%) and follow-up (44%) in this challenging period. Average duration of follow-up was 8 months (range 1 day-40 months). All but one was alive at last visit.

Conclusions: Pandemic fear, travel restrictions and socio-economic issues were major factors causing delay in presentation, seeking treatment and non-compliance to therapy, leading to advanced disease. COVID-19 pandemic has led to untold suffering of families of retinoblastoma patients resulting in sub-optimal management.

Globe Salvaging Conservative Management of Retinoblastoma

First Author: Purnima RAJKARNIKAR STHAPIT
Co-Author(s): Malita AMATYA, Hom Bahadur GURUNG

Purpose: Retinoblastoma is the most common intraocular tumor in children. Globe salvaging conservative management is gaining popularity with advances in early diagnosis and the advent of focal and systemic therapies.

Methods: This is a retrospective noncomparative interventional study at the oculoplasty and ocular oncology department of Tilganga Institute of ophthalmology, Nepal in 2017-18.

Results: Thirty-five retinoblastoma patients with forty-five affected eyes were treated during the study period. Twelve eyes were salvaged and twenty-six lives were saved though more than sixty-five percent of eyes were in group D or E. We could avoid exenteration and minimize enucleation in the study.

Conclusions: Globe salvaging management is possible with early diagnosis and multimodal management.

Maggots Have Saved Life: A Case Report with Long-Term Follow-Up and Biogenesis of Maggots In Vitro

First Author: Mohammad IDRIS

Purpose: To report a case of maggots with long-term follow-up and biogenesis of maggots in vitro.

Methods: A case report.

Results: A 70-year-old male presented with complaints of bleeding and foreign body sensation and crawling of maggots falling from the lateral side of the large disfiguring mass of right orbit for 1 week. The socioeconomic status of the patient was poor with uncontrolled diabetes. At presentation, the right eyeball was completely destroyed and filled with fungating disfigured mass, foul-smelling and ulcerated with wound extended all around the globe involving upper and lower eyebrows with multiple maggots crawling over the wound. The left eyeball was completely normal. He was admitted and around 150 maggots were manually removed under local anesthesia with maggot oil. The patient was started on intravenous antibiotics and analgesics. The CT scan revealed a disfigured large mass. No intracranial extension was seen. The biopsy report revealed squamous cell carcinoma invasive into the orbit. Meanwhile, the maggots underwent biogenesis in vitro.

Conclusions: The growth of maggots in the orbit is a rare and serious condition. Low socioeconomic status, lack of timely specialist consultation and diabetes are key factors. Maggots have forced the patient for timely intervention and hence saved his life as bones and optic nerve were intact.

Mast Cell Count, IgG4, TNF-α, and TGF-β Expressions and Histopathological Types as Predictive Factors for Recurrence of Orbital Pseudotumor

First Author: Neni ANGGRAINI
Co-Author(s): Rita S SITORUS

Purpose: To determine whether mast cell count, IgG4, TNF-α, and TGF-β expressions and histopathological type can be used as predictive factors of orbital pseudotumor recurrence.

Methods: This was a total sampling, retrospective cross-sectional study. All biopsy-proven orbital pseudotumor patients admitted between 2006 and 2017 at a tertiary referral hospital in Indonesia, with at least 12 months of follow-up was assessed.

Results: A total sample of 50 cases biopsy-proven orbital pseudotumor. There were 16 (32%) recurrence cases (Group I) and 34 (68%) no recurrence cases (Group II). Orbital pseudotumor recurrence predominantly occurred in lymphoid type (35,3%), followed by sclerosing (33,3%), granulomatous type (27,8%). The mean rank of mast cell count, IgG4 expression, TNF-α expression, and mean+/- SD of TGF-β expression were lower in Group I compared to Group II. The correlation between histopathological type and biomarker expressions with recurrences, however, was not statistically significant ($p>0.05$).

Conclusions: Mast cell count and expressions of IgG4, TNF-α, TGF-β, and histopathological types can not be used as predictive factors for orbital pseudotumor recurrence.

Mucoepidermoid Carcinoma Mimicking Cavernous Hemangioma

First Author: Priyanka GOLHAIT
Co-Author(s): Ruchi GOEL, Shweta RAGHAV, Ravindra SARAN, Gaurav SINGH

Purpose: To report a case of primary low-grade mucoepidermoid carcinoma of the orbit with intraconal extension.

Methods: A 35-year-old male presented with unilateral painless abaxial proptosis. The proptosis was initially small with a lateral palpable mass, gradually increased over three years to 3mm vertical dystopia. The extraocular movements were limited with resistance to retropulsion, ocular adnexa being normal. The vision was diminished in that eye with choroidal folds in the fundus. Non-contrast computed tomography (NCCT) orbit showed a hyperdense mass lesion in the left intraconal space adjoining the lacrimal gland. Systemic investigations including CECT chest and abdomen were unremarkable. Making a provisional diagnosis of left cavernous hemangioma the patient underwent excision biopsy by lateral orbitotomy approach.

Results: Histopathology suggested low-grade mucoepidermoid carcinoma, adjoining lobules of the lacrimal gland with chronic inflammatory infiltrate and lymphoid follicles. The proptosis resolved post-operatively with vision and fundus back to normal. Meticulous systemic work-up was done to rule out systemic tumor nests. After a year-long follow-up, a whole body 18F-FDG PET-CT scan was done for tumor restaging showed no uptake of 18F-FDG. There has been no recurrence so far in three years of follow-up.

Conclusions: Mucoepidermoid carcinoma is the most common neoplasm of major salivary glands. Orbital origin is rare, usually arising from the lacrimal gland. It should be differentiated from the conventional squamous cell carcinoma which carries a better prognosis. Meticulous systemic workup is mandatory to detect tumor nests and necessitates close follow-up due to high recurrence rates. It has to be kept in mind as a differential while working up orbital tumors for early detection and management.

Multimodal Management in Orbital Rhabdomyosarcoma can Optimize Eye and Life Salvage

First Author: Harika REGANI

Purpose: To evaluate the outcomes of orbital rhabdomyosarcoma (OR) by multimodal management.

Methods: Retrospective interventional case series of 40 consecutive OR managed with surgery + chemotherapy (vincristine+actinomycin D+cyclophosphamide, alternating with ifosphamide+etoposide) X 3 + stereotactic radiotherapy 4500-5500cGy + continued chemotherapy X 6. Eye salvage, local tumor control and metastasis were the outcome measures.

Results: Mean age was 8.6 (range 0-40) years. Common clinical presentations were proptosis in 22 (55%), diminution of vision in 9 (22%), pain in 6 (15%) and ptosis in 3 (7%). Presentation was acute in 17 (42%), subacute in 14 (35%) or chronic in 8 (20%). Orbital tumor was anterior in 12 (30%) and 23 (57%) had limited ocular motility. Surgery was incisional biopsy in 27 (67%), debulking in 3 (8%) and excision biopsy in 10 (25%). Histopathological types were embryonal in 25 (63%), alveolar in 12 (30%), botryoid in 1 (3%) and anaplastic in 2 (5%). Three (7.5%) needed orbital exenteration, local tumor control was achieved in 40 (100%) and 3 (7%)

patients succumbed to metastasis at a mean follow-up of 42m.

Conclusions: Multimodal treatment provides excellent chance of local tumor control and life salvage in OR.

Ocular Surface Squamous Neoplasia in Xeroderma Pigmentosa: Treatment and Outcome

First Author: Marem CHRISTY
Co-Author(s): Santosh HONAVAR, Kaustubh MULAY, Vijay Anand REDDY

Purpose: To present ocular surface squamous neoplasia (OSSN) in patients with xeroderma pigmentosa (XP) and their management and outcome.

Methods: To present ocular surface squamous neoplasia (OSSN) in patients with xeroderma pigmentosa (XP) and their management and outcome.

Results: XP constituted 35 of 580 (6%) patients of OSSN seen in the study period. 17 (49%) were bilateral, 23 (66%) were male, and mean age was 18.2+12 (4-42) y. 32 (60%) had dysplasia, 21 (40%) invasive squamous carcinoma. Management included excision biopsy 30 (57%), primary plaque brachytherapy 3 (6%), secondary plaque brachytherapy 2 (4%), enucleation 3 (6%), exenteration 5 (9%), and primary topical chemotherapy 20 (38%). 32 (60%) were on adjuvant long term prophylactic topical interferon alpha 2b IFN). At a median follow up of 16 months, 5 (9%) eyes showed recurrence, 5 (9%) had regional nodal metastasis, 45 (85%) eye salvage and 100% life salvage.

Conclusions: OSSN in XP seems to be more aggressive. Appropriate surgery, prophylactic topical immunotherapy and long term follow up can achieve eye salvage in 85% of patients.

Orbital Malignant Peripheral Nerve Sheath Tumor with Angiosarcomatous and Liposarcomatous Differentiation

First Author: Rodel Jr. BARAIRO
Co-Author(s): Anthony Christopher ORTIZ, Honeylen Maryl TEO

Purpose: Malignant peripheral nerve sheath tumor (MPNST) is a rare, highly aggressive soft-tissue sarcoma that originates from peripheral nerves. Involvement of the orbit is uncommon; it usually arises de novo, or in association with neurofibroma or schwannoma. We report the first case of an orbital MPNST with both angiosarcomatous and liposarcomatous differentiation in a 50-year-old man with an 8-month history of unilateral proptosis.

Methods: A 50-year-old man came in for an 8-month history of worsening, painless left-sided proptosis. Ophthalmologic examination on the left eye revealed visual acuity of 20/40; 5mm proptosis with inferonasal globe displacement; -4 limitation on abduction; hyperemic conjunctiva with a fleshy, pink, immobile subconjunctival lesion measuring 3.5 x 3 mm (horizontal x vertical dimensions) on the superotemporal area; intraocular pressure of 18 mmHg; 3mm reactive pupil, and unremarkable fundoscopic findings.

Results: Computed tomography showed a heterogeneously enhancing, intraconal tumor measuring 4.6 x 1.8 x 2.2 cm (horizontal x vertical x anteroposterior dimensions) in the left orbit. Lateral orbitotomy with excision biopsy of the tumor was performed. Histopathologic examination revealed a malignant spindle cell neoplasm that is positive for S-100, vimentin, and CD34. Deeper regions of the tumor revealed both

liposarcomatous and angiosarcomatous differentiation. He was referred for systemic imaging, chemotherapy, and radiotherapy.

Conclusions: To our knowledge, this is the first reported case of an orbital MPNST demonstrating both liposarcomatous and angiosarcomatous differentiation. Although divergent histopathologic differentiation of MPNST has been previously described in the literature, its value in the management and prognostication of MPNST has yet to be determined.

Orbital Metastases: Presenting Sign of Underlying Malignancy - Clinical, Pathological Features & Outcomes

First Author: Monisha APTE
Co-Author(s): Vandana JAIN, Akshay NAIR, Mahipal NATARAJAN, Rima PATHAK, Anil TIBREWAL

Purpose: To describe the clinical features and outcomes of patients presenting with orbital metastases as the first sign of underlying malignancy

Methods: A retrospective case series.

Results: Between 2014-2019, 25 cases of orbital metastases were diagnosed, of which orbital metastases were the sole presenting feature in 7/25 (28%) cases. Lung was the most common site of primary tumor (3/7; 42%); followed by breast (2/7;28%). Other sites were prostate and gall bladder. The mean duration of complaints prior to presentation was 1.4 months (range: 1-5 months). The mean number of metastatic sites involved (on PET-CT screening) at the time of diagnosis was 3.1. All cases were treated with palliative chemotherapy/radiotherapy - 5/7 (71.4%). Patients died due to cancer-related causes while on treatment. In this cohort, the mean survival following diagnosis was 6.2 months.

Conclusions: Our study of cases where orbital metastases were the sole presenting feature of the underlying metastatic disease shows that these cases have poor survival following diagnosis and are indicative of disseminated metastatic disease.

Orbital Solitary Fibrous Tumor: Clinical Manifestations, Management and Outcome

First Author: Rolika BANSAL
Co-Author(s): Santosh HONAVAR, Kaustubh MULAY, Vijayanand P REDDY

Purpose: Orbital solitary fibrous tumor (SFT) is a rare mesenchymal tumor and we are assessing its clinical manifestations, radiological correlation, histopathology and optimal management.

Methods: A retrospective, interventional, consecutive case series.

Results: 35 patients with SFT constituted 1% of all orbital tumors. The median age was 34 (range 14-63) with male predominance M:F 3.3:1. Chronic proptosis (mean 10 m) in 33 (94%) was the main presenting feature. Palpable mass was present in 21 (60%), located anteriorly 12 (34%) or supero-medially 8(23%), with restricted motility in 2 (5%). Excision biopsy in 33 (94%) and incisional biopsy in 2 (6%), histopathology and immunohistochemistry confirmed the diagnosis. Adjuvant radiotherapy was given 14 (40%). Recurrence occurred in 10 (38%), more 9 (35%) in the group that did not receive radiotherapy (p=0.02). Re-excision and radiotherapy for recurrence achieved local tumor control in all. At a mean follow-up of 10.9+6.9 y, all were alive and well.

Conclusions: Even though rare, orbital SFT has an aggressive course. Meticulous surgical

handling and complete excision, with expert histopathological analysis to categorize risk and well-planned adjuvant therapy are recommended to reduce the chances of local tumor recurrence and metastasis to ensure life salvage.

Outcomes of Ruthenium-106 Plaque Brachytherapy in Ocular Surface Squamous Neoplasia with Corneal Stromal and Scleral Invasion

First Author: Gaurav GARG
Co-Author(s): Sonal CHAUGULE, Sumeet LAHANE, Vijay Anand PALKONDA, Raksha RAO

Purpose: Efficacy and safety of Ruthenimu-106 (Ru-106) plaque brachytherapy in the treatment of ocular surface squamous neoplasia (OSSN) with corneal stromal and scleral invasion.

Methods: Retrospective interventional case series including 66 eyes of 66 patients, who underwent Ru-106 plaque brachytherapy. Tumor regression, eye salvage, vision salvage, and metastasis were the primary outcome measures.

Results: The mean age at presentation was 50.5±15.0 years. A mean dose of 5300±534 cGy was delivered over a mean duration of 22.0±9.6 hours. Thirty (45%) underwent primary brachytherapy and 36 (55%) secondary. Mean follow-up was 36.2±16.7 months. Tumor regression and eye salvage were noted in 58 (94%) eyes and 62 (94%) eyes respectively. Vision improved (>2 Snellen lines) or was stable in 50 (81%). Cataract was noted in 6 eyes. None developed metastasis.

Conclusions: Ru-106 plaque brachytherapy provides gratifying outcome with impressive tumor control and eye and vision salvage in corneal stromal and scleral invasive OSSN.

Outcomes of Tandem Intravitreal Chemotherapy for Refractory Vitreous Seeds in Retinoblastoma

First Author: Gaurav GARG
Co-Author(s): Mohammed Moinul HOQUE, Vijay Anand PALKONDA, Mrittika SEN

Purpose: Efficacy and safety of tandem intravitreal chemotherapy (Topotecan + Melphalan) for refractory (eyes which had failed monotherapy) vitreous seeds in retinoblastoma.

Methods: Retrospective interventional case series including 20 eyes of 20 patients, who underwent tandem intravitreal chemotherapy (Topotecan 30µg in 0.05ml + Melphalan 20µg in 0.05ml). A mean number of intravitreal injections was 3.5±1.9 (range 1-7). Regression of vitreous seeds and eye salvage were the primary outcome measures.

Results: The mean age at presentation was 42.6±31.1 months. Mean follow-up was 26.2±18.7 months. Vitreous seeds regression was noted in 17 (85%) eyes with 100% eye salvage. Recurrence of vitreous seeds occurred in 3 eyes, of which 2 were associated with local tumor recurrence. Retinal pigment epithelial alterations were seen in 4 eyes.

Conclusions: Tandem intravitreal chemotherapy is highly effective and safe, with impressive regression for refractory vitreous seeds in retinoblastoma.

Safety-Enhanced Cataract Surgery in Children with Retinoblastoma: A Retrospective Case Series

First Author: Mrittika SEN
Co-Author(s): Aashish BANSAL, Vijay Anand REDDY

Purpose: To assess outcome of cataract surgery in patients treated for retinoblastoma (RB).

Methods: A retrospective case series of 73 eyes of 68 consecutive patients who underwent safety-enhanced cataract surgery by clear corneal incision and posterior capsule preservation. Tumor recurrence, enucleation or metastasis were the unfavorable outcomes.

Results: Surgery was performed for tumor visualization in 48 (66%), for visual rehabilitation in 25 (34%). The interval between tumor regression and cataract surgery was 21+/-19 m. 16 (22%) achieved BCVA > 20/200. RB recurred in 15 (21%) eyes. 14 (19%) needed enucleation. None had metastasis. The mean interval between treatment completion for RB and cataract surgery was 9.5+/-16 m in patients with unfavorable outcomes vs 18+/-19 m in those with favorable outcomes (p=0.07). The unfavorable outcome was significantly more when surgery was performed for tumor visualization (21/48 vs 4/25, p=0.018).

Conclusions: Cataract surgery 6 months following regression is considered safe, 1 year is optimal. Surgery when performed emergently for tumor visualization correlates with tumor recurrence and enucleation.

Sebaceous Gland Carcinoma of the Eyelid in a Young Boy: A Rare Case Report and Review of the Literature

First Author: Suresh RASAILY
Co-Author(s): Malita AMATYA, Sabita BISHOWKARMA, Ben LIMBU, Rohit SAIJU

Purpose: To report a case of sebaceous carcinoma of the upper eyelid in a young boy who had undergone incision and curettage(I and C) several times for being misdiagnosed with chalazion. The study aimed to highlight the need for a high degree of suspicion, sound clinical skills, and full-thickness biopsy in case of recurrent chalazion for successful management of eyelid malignancy.

Methods: Detailed history regarding onset, progression, other associated symptoms was obtained. The documents of previous medical and surgical treatment were reviewed. A thorough clinical evaluation of the tumor regarding its location, size, shape, surface, skin overlying tumor, margin, eyelashes, induration, and fixity to underlying structures was done. Anterior and posterior segment examination of both eyes was done. After Local and systemic metastasis workup, the patient was prepared for surgery. A wide local excisional biopsy with double freeze-thaw cryotherapy in all margins of skin and conjunctiva followed by reconstruction using the first step cutler beard technique was done. After 6 weeks, the second step cutler beard procedure was done and frequently examined for recurrence of the tumor.

Results: The histopathological examination confirmed the sebaceous gland carcinoma of the eyelid with a margin free of tumor. There was no evidence of local recurrence of tumor on subsequent follow-up visits till 1 year. The functional and aesthetic outcome was good without any complication.

Conclusions: The recurrent chalazion in the young population also requires a high degree of suspicion, full-thickness biopsy, and an appropriate technique of reconstruction to achieve better functional and aesthetic outcomes.

Spectral Domain Optical Coherence Tomography Features of Vitreoretinal Lymphoma in 55 Eyes

First Author: Xiaolu YANG

Purpose: To evaluate spectral domain optical coherence tomography (SD-OCT) features of vitreoretinal lymphoma (VRL).

Methods: A review of records and SD-OCT images of vitreoretinal lymphoma evaluated between 1 July 2000, and 1 April 2019.

Results: There were 55 eyes of 32 patients included. At presentation, SD-OCT features included vitreous opacities (n = 36, 65%), preretinal deposits (n = 7, 13%), intraretinal deposits (n = 8, 15%), subretinal deposits (n = 20, 36%), retinal pigment epithelium abnormalities (n = 35, 64%), and subretinal pigment epithelium deposits (n = 35, 64%). Of 36 eyes with observed tumor progression, comparison (initial visit vs. time of progression) revealed more intraretinal deposits (17% vs. 50%, P = 0.005) at progression. Of 15 eyes with tumor recurrence, comparison (initial visit vs. time of recurrence) revealed more intraretinal deposits (7% vs. 47%, P = 0.04) at recurrence. At last visit, 39 eyes demonstrated tumor regression. By comparison (initial presentation vs. regression), there were less frequent vitreous opacities (67% vs. 0%, P , 0.001), intraretinal deposits (15% vs. 0%, P = 0.03), subretinal deposits (36% vs. 0%, P , 0.001), and subretinal pigment epithelium deposits (69% vs. 21%, P , 0.001) at regression.

Conclusions: Using SD-OCT in patients with vitreoretinal lymphoma, local tumor regression correlated with a reduction in vitreous opacities, intraretinal deposits, subretinal deposits, and subretinal pigment epithelium deposits. SD-OCT is useful in judging vitreoretinal lymphoma response to therapy.

Systemic Anaplastic Large T-Cell Lymphoma (Alcl) Presenting with Conjunctival Involvement: A Case Report

First Author: Lee Min FOO
Co-Author(s): Nur Afiah KAMALUDDIN, Khairy Shamel SONNY TEO

Purpose: To report systemic anaplastic large T-cell lymphoma which first presented on the eye.

Methods: A case report.

Results: A 41-year-old gentleman with a known case of diabetes mellitus, presented with a mass arising from the right medial canthus which progressively increased in size within 1 week. It was associated with tearing. He had no constitutional symptoms nor a family history of malignancy. Examination revealed a bilateral vision of 6/6, right conjunctiva mass situated nasally measuring 16mm (Height)x 18mm (Vertical), with broad base stalk arising from bulbar conjunctiva. The mass was pink, mobile, not adhered to underlying tissue and had no feeding vessel. The anterior chamber and vitreous were devoid of cells. He had multiple lymphadenopathy at the neck, brachial and inguinal regions, otherwise he was systemically well. No skin lesions were present. Excisional biopsy revealed high-grade ALCL. The cells were moderately enlarged with hyperchromatic, horseshoe-shaped nuclei. Mitosis was brisk. Immunohistochemistry study showed that atypical lymphocytes were positive to CD3 and CD30, negative to CD20, CD79a and CD5 with high proliferative index(>95%). The full blood picture was normal. Computed tomography(CT) scan showed multiple lymph nodes involvement, including cervical, mediastinal, retropancreatic and left inguinal nodes. There were right parotid gland lesions,

left lung nodule, stomach and anterior abdominal subcutaneous lesions. The patient was referred to a hematologist. He underwent 6 cycles of CHOP (cyclophosphamide, doxorubicin, vincristine, and prednisolone) and responded well to treatment.

Conclusions: Although ocular lymphomas are uncommon, thorough systems review, prompt conjunctiva biopsy with expedited hematological review will allude to the diagnosis of lymphoma. Prompt diagnosis and treatment may improve the survival rate.

Ophthalmic Epidemiology and Prevention of Blindness

Age Related Cataract-Prevalence and Emerging Risk Factors: A Cross-Sectional Study from Central India

First Author: Deepayan SARKAR
Co-Author(s): Fazil KHURRUM, Anshukita PRAKASH, Bhavana Sharma SHARMA, Ria SHARMA

Purpose: To study the prevalence of various types of age-related cataracts from central India. The study also aims to assess the most common age group affected as a secondary objective along with the association of tobacco use and socio-economic status, if any, with cataractogenesis.

Methods: Hospital-based cross-sectional single-center study. 1033 patients diagnosed with cataract over a period of two years were enrolled, data pertaining to demography, socio-economic profile, cataract grading, tobacco consumption were collected from the patient records. A p-value of <0.05 was considered significant.

Results: Among the 1033 subjects, 48.4%, 40.7%, 6.3% and 4.6% were in the age group of 60-79, 40-59, 20-39 and >85 years respectively. Prevalence of nuclear sclerosis(NS), cortical(CC)and posterior subcapsular cataract(PSC) was found to be 78.1%(807), 33%(341) and 59.1%(610) respectively. 87.2% of subjects had mixed type of cataract, [NS+PSC] had the highest prevalence of 39.2%. Smokers were found to have 1.09 times higher odds (p=0.628) of developing nuclear sclerosis and 1.24 times higher odds (p=0.236) of developing mature cataract in comparison to non-smokers. Lower socio-economic status was found to have 1.31 times higher odds (p=0.273) of developing nuclear sclerosis ,1.21 times higher odds (p=0.289) of developing cortical cataract and 1.56 times higher odds (p= 0.067) of developing mature cataract.

Conclusions: The prevalence of cataract is found to increase over the last decade, with more individuals of pre-senile age-group(<60years) being affected. A higher prevalence of PSC is found in this region of central India. Smoking and lower socio-economic status are found to have a positive association with the higher prevalence of cataract.

Association between Body Mass Index and Diabetic Retinopathy in Asians: A Participant-Level Meta-Analysis: The Asian Eye Epidemiology Consortium (AEEC)

First Author: Charumathi SABANAYAGAM
Co-Author(s): Jost JONAS, Govindasamy KUMARAMANICKAVEL, Rajiv RAMAN, Tyler Hyungtaek RIM, Su Jeong SONG

Purpose: Obesity is a major risk factor for diabetes, but the association between obesity and diabetic retinopathy (DR) is inconclusive, in particular in Asians. We conducted a participant-level meta-analysis to examine the

cross-sectional association between obesity and DR in Asian populations.

Methods: We performed a systematic review in PubMed for articles published till June 2019 and unpublished data were identified through discussion with collaborators as part of the Asian Eye Epidemiology Consortium (AEEC). We identified 12 population-based studies from Singapore, China, India, South Korea, Japan and Central Russia (Asian) that provided data on 11,162 diabetic adults. Outcomes of any DR and vision-threatening DR (VTDR) were assessed by digital retinal photographs/ ophthalmoscope. Body mass index (BMI) was categorized into normal, overweight and obese (<25, 25-29 and ≥30 kg/m2). We used a two-stage meta-analytic approach, whereby each study was analyzed separately and the estimated odds ratio (OR) and 95% confidence interval (CI) adjusted for age, sex, HbA1c, cholesterol, systolic blood pressure, and diabetes duration were combined using random-effects models.

Results: The pooled prevalence of any DR and VTDR were 18% and 5%. In multivariable models, obesity showed a significant inverse association with any-DR (pooled OR [95% CI] = 0.69 [0.53-091]). In continuous analysis, BMI was associated with both any DR (0.96 [0.94-0.99]) and VTDR (0.91 [0.84-0.98] per unit increase). Being overweight did not show a significant association with either outcome.

Conclusions: Our findings suggest that BMI and obesity were inversely associated with DR in Asians. Further longitudinal studies are warranted to confirm and understand the association.

Burden of Blindness in China: A Systematic Literature Review

First Author: Li ZHAOHUI
Co-Author(s): Mukesh DHARIWAL, Yong ZHONG

Purpose: To collate and review published evidence in order to assess burden of blindness in China.

Methods: A systematic literature search was conducted in PubMed (period: January 2006 – May 2019) to collate and synthesized published evidence on burden of blindness in China.

Results: Overall, eight publications were included. Prevalence of blindness in China has been reported between 0.3% in people aged >40 years to 1.7% in people aged >50 years. Cataract remained the most frequent (36.7% to 52.6%) cause for blindness in the Chinese adults. Other leading causes of blindness in China included myopic retinopathy (24.8% to 36.4%), myopic macular degeneration (7.7% to 10.9%), glaucoma (6.25% to 9.1%) and corneal opacity (6.2% to 16.2%). In 2015, 111.7 million cataract cases were reported in China, of which 11.7 million suffered from blindness (BCVA<0.05). Further, it is projected that by 2050, cataract would affect 240.8 million Chinese people between 45-89 years of age. The Chinese Ministry of Health has reported that 45% of China's county hospitals do not offer cataract surgery services and most rural residents are unable to afford surgery in urban centers.

Conclusions: Chinese population is progressively ageing, resulting in an increasing burden of preventable blindness. There is a rural urban divide in access to surgery in China; lack of disease awareness and concerns

about the quality of local services appear to be the principal barriers in the rural Chinese population.

Clinical Profile and Risk Factors for Chronic Central Serous Chorioretinopathy: A 3-Year Report

First Author: Saurabh DESHMUKH
Co-Author(s): Manabjyoti BARMAN, Krati GUPTA, Ronel SOIBAM, Hemlata DEKA

Purpose: To form a profile and to investigate the risk factors resulting in chronic central serous chorioretinopathy (CSC) at a tertiary eye care institute.

Methods: This study done on all patients of chronic CSC who have undergone one sitting of focal laser photocoagulation. All the risk factors for CSC were documented and statistical analysis done.

Results: In total, 136 patients were enrolled in the study: 28 (20.5%) with acute CSC and 108 (79.5%) with chronic CSC. The mean age of presentation was 43 years. 102 (75%) cases showed one eye involvement and 34 (25%) cases had bilateral involvement. The most common presenting symptom was the diminution of vision, followed by seeing wavy lines and also complaint of seeing scotoma.

Conclusions: Old age males with stress and sleep disorders are more likely to progress to chronic CSC and may benefit from early laser photocoagulation. Treatment for systemic diseases, sleep disorders and deaddiction are strongly recommended.

Common Problems Experienced by Custom-Made and Ready-Made Prosthetic Eye Wearers: A Report from a Prosthetic Eye Center in Thailand

First Author: Pimkwan JARU-AMPORNPAN
Co-Author(s): Supredee PONGRUJIKORN, Kanograt PORNPANICH, Manachaya PRUKAJORN, Sucheera SARUNKET

Purpose: To examine the characteristics and determine the causes of eye loss in patients who visit an ocular prosthetic center in Bangkok, Thailand. Additionally, we aim to investigate the common problems experienced in prosthetic eye wearers and changes after custom-made prosthesis fitting.

Methods: The medical records of 183 patients visiting an ocular prosthetic center in Bangkok, Thailand over 5 years (2014-2019) were retrospectively reviewed. Patients' characteristics and problems when wearing ready-made and custom-made prostheses were collected for descriptive statistics and odds ratios (OR) were calculated. McNemar test was used to determine statistical significance (p-value < 0.05).

Results: Among 183 patients, the leading cause of eye loss was trauma (52.5%), followed by congenital malformations (14.8%), and infection (13.1%). 107 patients had anophthalmic sockets and 76 had phthisis bulbi. 93 patients never wore prostheses (group 1), while 90 already wore ready-made prostheses (group 2) prior to the first visit. Group 2 reported more problems including discharge (OR = 6.8), discomfort (OR = 5.6), spontaneous fall-out (OR = 8.6), and cosmesis (OR = 16.5) compared to group 1. These problems significantly improved after custom-made prostheses were fitted for those who previously wore ready-made prostheses (group 2), while ptosis was not significantly improved with custom-made prostheses.

Conclusions: According to our study, discharge, discomfort, spontaneous fall-out and cosmesis were chief concerns among Thai prosthetic eye wearers. The custom-made ocular prosthesis fitting significantly improved the problems experienced in those who wore ready-made prosthesis. Therefore, custom-made eye prostheses should be promoted for Asian prosthetic eye wearers.

Diabetes and Hypertension among Pre-Senile Nuclear Cataract Patient: A Cross-Sectional Study

First Author: Khairun NASA
Co-Author(s): Niaz ABDUR RAHMAN, Golam HAIDER

Purpose: To assess the frequency of diabetes (DM) and hypertension (HTN) among pre-senile nuclear cataract patients.

Methods: This descriptive cross-sectional observational study was done on patients diagnosed with pre-senile nuclear cataract (aged 31-50 years) and DM & HTN, with either single or combined attendance at a Specialized Private Eye Hospital & Institute, Dhaka, from 1st January 2018 to 31st December 2018. A detailed history including duration (less than 5 years) of diabetes mellitus, hypertension, and ocular examination findings was recorded using a semi-structured datasheet. Any other ocular pathology was excluded. Descriptive statistics were used for data analysis.

Results: Out of 107 patients enrolled, the male was 41.90% and the female was 58.10%. The mean age was 43.49 years (±5.693). 75(70.10%) cases were having a bilateral cataract, 16 (14.95%) cases had left eye and 16 (14.95%) cases had right eye involvement. 52 (48.60%) cases were having nuclear grade III, 47 (43.92%) were grade II and only 8 (7.48%) were grade IV. The frequency of diabetes mellitus [p=<0.001*] and hypertension [p=<0.001*] was found statistically highly significant.

Conclusions: At this age group, hypertension was found more frequent in 35 (32.71%) cases followed by diabetes mellitus in 20 (18.69%) cases, and 52 (48.60%) cases were found to have both diseases. Thus we recommend that every patient who presents with a pre-senile nuclear cataract should undergo a detailed and careful systemic evaluation. Ophthalmic evaluation is necessary for patients with DM and HTN for a better management plan.

Myopia Progression in School Children after COVID-19 Lockdown in Russia: The Ural Children Myopia Study

First Author: Gyulli KAZAKBAEVA
Co-Author(s): Mukharram BIKBOV, Albina A. FAKHRETDINOVA, Jost JONAS, Songhomitra PANDA-JONAS, Azaliia M. TULIAKOVA

Purpose: To explore an influence of COVID-19-related lockdown on the development of myopia in school children.

Methods: The Ufa children myopia study included children of randomly chosen schools in Ufa/Russia. At baseline in 2019/2020 before the COVID-19 outbreak and between 11/2021 and 03/2021 after the COVID-19-related lockdown and closure of the schools, they underwent a detailed interview and ophthalmological examinations including cycloplegic refractometry and laser interferometric biometry for axial length measurement.

Results: The study included 469 school children (235 (50.1%) boys; mean age:10.7±2.1 years; range:6.8-16.9 years) who were examined before the COVID-19C pandemic and in 2021 after a mean follow-

up of 1.43±0.34 years (median:1.42 years; range:0.73-2.07 years). Age-adjusted axial length was longer at study end than at baseline (24.23±0.92mm versus 23.98±0.85mm; P<0.001) with a difference of 0.26±0.20mm (median:0.26 mm; range:-0.21mm,0.94mm). In multivariable analysis, larger age-adjusted axial length difference between baseline and study end was associated with longer axial length at baseline (standardized regression coefficient beta: 0.30; non-standardized regression coefficient B:0.06;95% confidence interval (CI):0.04,0.08; P<0.001) and female sex (beta:0.22; B:0.09; 95%CI:0.05,0.12; P<0.001). Mean age-adjusted refractive error was significantly more myopic at study end than at baseline (-1.77±1.66 diopters (D) versus -1.61±1.39D; P<0.001) with a mean difference of -0.16±0.83D (median:-0.24D; range:-2.32D,+4.46D). In multivariable analysis a lower refractive error difference between baseline and study end was associated with longer axial length at baseline (beta:-0.34; B:-0.30; 95%CI:-0.37,-0.22; P<0.001) and female sex (beta:-0.18; B:-0.30; 95%CI:-0.45,-0.15; P<0.001).

Conclusions: The COVID-19-related lockdown in Russia was associated with an axial elongation of 0.26±0.20mm and myopic refractive shift of -0.16±0.83D in addition to an age-related myopization in school children in Russia. This lockdown-related myopization was stronger in girls than boys and the axial elongation increased by 0.05 mm for each millimeter of axial length at baseline.

Prevalence of Concurrent Vision and Hearing Impairment and Cognitive Dysfunction in an Old Population: The Ural Very Old Study

First Author: Mukharram BIKBOV
Co-Author(s): Jost JONAS, Gyulli KAZAKBAEVA, Songhomitra PANDA-JONAS, Ellina M. RAKHIMOVA, Iuliia RUSAKOVA

Purpose: Impairments in vision, hearing and cognitive function being common in elderly individuals, associations of vision or hearing impairment, or of dual sensory impairment (DSI) as the combination of both, with cognitive dysfunction, have not fully been explored in old populations yet.

Methods: The population-based Ural-Very-Old-Study was conducted in rural and urban Bashkortostan/Russia. Out of 1882 eligible individuals aged 85+ years, 1526 (81.1%) individuals participated who underwent a detailed ocular and systemic examination including assessment of moderate to severe vision impairment/blindness (MSVI) (best-corrected visual acuity <6/18), moderate to severe hearing loss (MSHL), and cognitive function.

Results: Hearing loss (MSHL) and cognitive function. The study included 731 (47.9%) individuals (mean age:88.1±2.7 years (median:87 years; range:85-98years) with measurements of MSVI/blindness, MSHL and cognitive function. The prevalence of MSVI/blindness, MSHL, DSI and dementia were 51.8% (95% confidence interval (CI):48.2,55.5), 33.1% (95%CI:29.7,36.5), 20.5% (95%CI:17.8,23.5), and 48.2% (95%CI:44.5,51.8), respectively. Lower cognitive function score was associated with lower visual acuity (P<0.001) and higher hearing loss score (P=0.03), after adjusting for older age (P=0.001), rural region of habitation (P=0.003), lower educational level (P<0.001),

and higher depression score (P<0.001). Higher dementia prevalence was associated with higher MSHL prevalence (OR:2.18;95%CI: 1.59,2.98;P<0.001), higher MSVI/blindness prevalence (OR:2.09;95%CI:1.55,2.81 ;P<0.001), and higher DSI prevalence (OR:2.8 0;95%CI:1.92,4.07;P<0.001).

Conclusions: In this very old, multi-ethnic population from Russia, dual sensory impairment (prevalence:20.5%), as compared to hearing impairment (OR:2.18) and vision impairment alone (OR:2.09), had a stronger association (OR: 2.80) with dementia. The findings show the importance of hearing and vision impairment, in particular their combined occurrence, for dementia prevalence in an old population.

Profile of Occupation Related Ocular Trauma: An Observational Study in a Quaternary Care Institution

First Author: Jophy CHERRY
Co-Author(s): Anika AMRITANAND, Smitha JASPER

Purpose: To study the profile of patients presenting with occupation-related ocular injuries.

Methods: A prospective observational study was carried out and patients 18 years or above who presented with eye injuries at their workplace within 1 month were recruited for the study. A questionnaire was administered to determine the demographic, socio-economic and clinical profile of the 88 patients. The use of safety devices and protective eyewear was also included. They were followed up after 1 month.

Results: Men (81.8%) were more affected than women with eye injuries at their workplace. The age group maximum affected was within 31-40 years. The maximum number of persons presenting with workplace-related eye injuries were farmers (27%) followed by welders(13%). Metallic foreign body was the commonest cause of injury in the industrial sector and vegetative matter among the non-industrial sector. Only 36% of patients were aware of eye protective devices when asked. Among them, only 25% of them were using eye protective devices at the time of injury. 80% of patients employed in the industrial sector claimed that they did not use any type of safety device while at work. All patients with open globe injury (12.5%) and 96% of the patients with closed globe injury were from the lower SES. The study had 4 patients with retained intraocular foreign bodies requiring surgical intervention. The causes for low vision at 1-month follow-up were noted.

Conclusions: Occupation-related eye injuries are a preventable cause of ocular trauma. Enhancing education, safety and awareness are of prime importance.

Systematic Review and Meta-Analysis of the Literature with Case Series of Badminton-Related Ocular Trauma

First Author: Fadzilah RAHIM
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Purpose: To report a systematic review and case series of badminton-related ocular trauma.

Methods: A systematic review on badminton-related ocular trauma was performed on articles identified from CENTRAL, MEDLINE, EMBASE and Informit Health Collection databases. We included a retrospective case series of 14 patients badminton-related ocular injuries from Kuala Lumpur. Clinical characteristics, nature of trauma and visual outcomes were compared to

published reports.

Results: The electronic search retrieved abstracts of 37 distinct published articles; 10 articles were eligible for full-text review. The studies were published between 1974 and 2020, with the largest number from the period 2017 to 2020. A total of 375 badminton-related eye injuries were identified across 18 included studies. Male-to-female ratio was 2.5:1 with the average age of 21.0. All injuries reported were monocular. The object responsible for the injury was the shuttlecock in 85% (226/267) cases with the racket being responsible for the remainder. Most injuries (97%) involved closed globe injuries (CGI) with 5 open globe injuries (OGI). None reported use of protective eyewear. Angle and lens injuries were the most described in 14 cases of badminton-related ocular trauma. Nine patients achieved visual acuity of 6/12 or better (62%). Retinal imaging from 2 cases showed significant permanent macular injury.

Conclusions: Badminton poses a high risk for ocular trauma due to the nature of play and size and shape of shuttlecocks, causing severe eye damage. Awareness of necessity for eye protection is severely lacking. We highlight the significant impact of badminton-related ocular trauma on vision and the importance of trauma prevention.

Tiers in Retinoblastoma Outcomes: A Clustering Approach

First Author: Wai Chak CHOY
Co-Author(s): Wai Kit CHU, Calvin PANG, Suhan Emily WONG, Jason YAM

Purpose: To identify country clusters and vulnerable zones in retinoblastoma outcomes, and systemic differences in associated socioeconomic and healthcare (SEH) factors.

Methods: 62 articles reporting both survival and globe salvage from 5 databases were analyzed. 16 SEHs were identified from the World Bank database. Countries were clustered into outcome groups using K-means clustering and variations in SEHs were assessed together with their association with income level. A random forest model was trained to predict country tiers using the SEHs. Predictions were compared with known cross-border referral patterns. Synergistic factors associated with tier classification were identified by hierarchical clustering and logistic regression.

Results: The sample covered 13,751 patients from 27 countries. Countries were clustered into 3 tiers (poor – good) by retinoblastoma survival and globe salvage. The classification model attained 70% accuracy. Globally, Sub-Saharan Africa and West Asia were the most vulnerable zones. Predictions aligned with known cross-border referral patterns. Doctor density and out-of-pocket healthcare expenses (OR: 5.99, $P<0.001$, $R=-0.218$), and primary education and birth delivered by health staff (OR: 1.51, $P=0.019$, $R=0.708$) demonstrated interaction comparing tier 1-2 and 2-3 respectively. Allied eye care worker density ($P=0.032$) and vision loss percentage ($P=0.050$) are associated with better visual outcomes in tier 3 with weaker links to income level ($|R|<0.5$).

Conclusions: Tier 2 countries may share borders with tier 1 countries and should consider cross-border care-seeking during planning. Healthcare accessibility was crucial to promote countries to tier 2, while active and passive screening acted synergistically for reaching tier 3. Prediction accuracy can be enhanced by including clinical variables.

Work Productivity Losses due to Blindness in Working Chinese Adults Aged ≥50 years and their Caregivers

First Author: Yong ZHONG
Co-Author(s): Mukesh DHARIWAL, Li ZHAOHUI

Purpose: To estimate the patient and caregiver burden resulting from productivity losses in working Chinese adults aged ≥50 years suffering from blindness.

Methods: A productivity loss estimator model was developed in Microsoft Excel. Input parameters: Prevalence of blindness in the working Chinese adults aged ≥50 years was sourced from Zhao et al. epidemiology study. On average 50% loss of remaining working-age years per blind person was assumed after considering state retirement age-limit (5 and 2.5 years respectively men and women). World Bank data on Chinese gross national income per capita ($8,690) was used. Assuming one caregiver per blind person, caregiver productivity loss was set at 10% and number of years of lost productivity for caregivers were assumed at 3.75 years.

Results: An estimated 1.66 million Chinese men and 0.96 million Chinese women aged ≥50 years in the working age population suffered from blindness. Productivity loss due to blindness in working Chinese adults aged ≥50 years and their caregivers was estimated to be $102.4 billion ($72.1 billion for men, $21.6 billion for women, and $8.6 billion for their caregivers). Productivity losses in cataract related blindness, the cumulative burden for men, women and their caregivers was estimated at $53.9 billion (due to cataract) and $25.4 billion (due to retinal diseases).

Conclusions: Blindness affects 1.7% of China's population ≥50 years and it poses significant burden on society due to losses in work productivity. Health policy makers should aim to further improve access to vision care and reduce the incidence and prevalence of preventable blindness in China.

Orbital And Oculoplastic Surgery

5-Year Real Life Evaluation of Orbital Biopsies: Accuracy between Clinical and Radiological Diagnoses Compared to Surgical Orbital Biopsies

First Author: Audrey TANG
Co-Author(s): Bernard CHANG, Taras GOUT, George KALANTZIS, Helen NG

Purpose: Surgical orbital biopsy is essential in diagnosing orbital lesions of an unknown cause. There is limited research comparing the consistency between diagnoses from clinical examination, imaging and histology. Concordance between the three diagnoses is evaluated in this study.

Methods: A retrospective case note review analyzed all patients within a single hospital trust who had undergone surgical orbital biopsies between 1 January 2015 and 31 December 2019. Accuracy of and concordance between the clinical, radiological, and histological diagnoses are reported as percentage sensitivity and positive predictive value (PPV).

Results: 132 procedures involving 115 patients were identified. Three histological samples from biopsies were inconclusive; no clinical diagnoses were offered in 15 cases. Radiological imaging was done in 111 cases, but no diagnoses were offered in 11 cases. Sensitivities of 46.2% and 32.4% were found in clinical and radiological diagnoses respectively when compared with histological diagnoses. Inflammatory conditions had the

lowest sensitivity in both clinical (30.2%) and radiological (17.2%) diagnoses. The PPV was 46.2% and 32.4% for clinical and radiological diagnoses respectively. Vascular lesions which are believed to have characteristic features both clinically (85.7%) and radiologically (66.7%) had the highest sensitivity. There was no operative mortality, and no post-operative complications were recorded.

Conclusions: Accurate diagnoses are difficult to reach by relying on clinical examination and imaging alone. Surgical orbital biopsy should remain the gold-standard tool in identifying aetiology of orbital lesions with unknown origins.

A Case Report on the Rare-Rosai Dorfman Syndrome (RDD): A Syndrome So Queer

First Author: Rakhi DCRUZ

Purpose: To report a rare case of Rosai-Dorfman disease, which presented with bilateral ptosis as the initial manifestation.

Methods: Common clinical manifestations of RDD disease along with specific ocular manifestations, pathogenesis and their management and when to suspect such cases will be described in detail.

Results: RDD also known as sinus histiocytosis with massive lymphadenopathy is a rare disorder-nonmalignant proliferation of distinctive histiocytes within lymph node & extranodal sites. Most common presentation is with bilateral cervical lymphadenopathy. Less than 10% of cases are reported to have ocular manifestations. Bilateral ptosis with rubbery nodular masses leading to mechanical ptosis is very unique. A 7-year-old male child presented with gradual progressive painless nodular swelling bilaterally for two years. O/E-complete ptosis RE, LE also showed similar rubbery swelling in the lower lid leading to moderate ptosis. Similar nodular masses in the right cheek and genitalia were noted. CT scan (brain+spine+orbit) -isodense well-circumscribed lesion in the preseptal area extending to midorbit (RE)and up to posterior orbit LE. Debulking excision for BE was done and the specimen was sent for HPE and IHC-confirmed RDD. Complete systemic work-up along with BM biopsy, USG abdomen, PET-CT were done. The child was given systemic steroids because of diffuse involvement to prevent recurrence and tapered slowly.

Conclusions: RDD-suspected in young individuals with U/L or B/L slowly progressive proptosis with rubbery mass. CNS and spinal RDD has high chances of recurrence (20%) and can be fatal. PET-CT is helpful to discover whole body lesions and radiotherapy, steroids, and/or chemotherapy are utilized individually or in cases with residual lesions.

A Case Series of Traumatic Enucleation by Rare Objects

First Author: Mohammad IDRIS

Purpose: To report a case series of traumatic enucleation caused by rare objects.

Methods: Three unilateral traumatic enucleation cases were prospectively studied. Complete history about trauma and examination including general and ophthalmic was done followed by imaging (X-ray orbit, CT scan of orbit and brain and MRI). Patients were followed after initial repair for any complications.

Results: The first case was secondary to a fall from the roof with no fence with an associated severe head injury. The second case is due to a fall from a tree when a pointed stone has

caused a complete transaction of the optic nerve along with the globe. The third case was a male patient who suffered accidental trauma with the sharp leaf of sugar cane (Saccharum officinarum). The eyes were not salvageable but all the patients were managed successfully.

Conclusions: Traumatic autoenucleation is a rare complication of trauma. In developing countries like Pakistan, improper buildings, houses and lack of education about eye protection are some of the circumstances that increase the chances of such rare injuries.

A Patient with Thyroid Eye Disease and Large Descemetocele Managed with Conjunctival Flaps: A Case Report

First Author: Po-yu LEE

Purpose: To report a patient of thyroid eye disease (TED) with descemetocele repaired with vascularized conjunctival flap.

Methods: This 41-year-old male has had hyperthyroidism and TED for more than 10 years. Long-term exposure keratitis led to left eye corneal melting and deteriorated after accidental eye-poking by himself. Upon examination, left eye temporal side descemetocele size about 10mmx5mm was found. The anterior chamber was shallow at the nasal side and collapsed at the temporal side, with the iris touching the endothelium. The vision in the right eye was 0.7 and the left eye was 0.1. The patient refused self-paid amniotic membrane transplantation and penetrating keratoplasty. We arranged conjunctival flaps aiming to promote healing and control pain. Tarsorrhaphy aided at the end of surgery.

Results: The cornea gradually thickened with scarring. The anterior chamber was formed. The vision in the left eye was 0.4.

Conclusions: Exposure to keratitis leading to descemetocele has some treatment options include tissue glues, conjunctival flaps, amniotic membrane transplantation, and keratoplasty. This patient had large size of melting area which made tissue glue and amniotic membrane unsuitable. He also refused self-paid options including keratoplasty. The melting area was mostly on the temporal side and the visual axis may be saved if timely managed. Therefore, we chose conjunctival flaps aiming to thicken the cornea and prevent deterioration to eyeball rupture. After the flaps dissolved and the cornea thickened by scarring, this patient attained some useful vision instead of eyeball rupture disaster. Conjunctival flaps is an alternative way to promote healing of large cornea melting.

A Rare Bird on the Branch: Bilateral Traumatic Globe Luxation following a Naso-Orbito-Ethmoidal Complex Fracture

First Author: Vatsalya VENKATRAMAN
Co-Author(s): Paran Jyoti BARMAN, Rahul GOGOI, Ganesh Ch KURI, Shyam MOHAPATRA

Purpose: The goal of this report is to meticulously document the clinical findings and the multi-disciplinary management of a patient with bilateral globe subluxation with optic nerve transection following a naso-orbito-ethmoidal (NOE) complex fracture.

Methods: A 39-year-old male was presented to the emergency department following a road traffic accident. On examination, both his globes were luxated out of their sockets with deep facial lacerations. Visual acuity was nil light perception in both eyes. Computed tomography revealed NOE complex fractures and intracranial injury. A multi-disciplinary panel was convened consisting of ophthalmic

plastic, maxillo-facial and neurosurgeon who collectively chalked an appropriate surgical plan involving the repositioning of both the globes back into their respective orbits.

Results: This case was managed timely utilizing the expertise of various sub-specialties. Despite all of the herculean efforts, the patient's left eye eventually went into phthisis with symblepharon and he continued to have nil perception of light bilaterally. His prognosis was explained and eventually, he accepted his visual handicap.

Conclusions: Bilateral traumatic globe luxation is an uncommon and complex clinical scenario which demands a collective and structured plan of action formulated by a multidisciplinary team of doctors. Although the loss of vision seemed an inevitable consequence, repositioning and preserving the globes gave an acceptable aesthetic outcome. It still bore the risk of phthisis bulbi as globe integrity was compromised but, prompt intervention was attributed to alleviating the associated psychological stress for the patient and his caregivers.

A Rare Case Report of Conjunctival Amyloidosis Presenting as Bilateral Chronic Hypertrophic Conjunctival Lesion

First Author: Nitika BERI
Co-Author(s): Rahul BHATIA, Gopal DAS, Nitish KUMAR, Pramod SAHU, Pratibha SESAMA

Purpose: To report a case of hypertrophic conjunctival lesions in a male.

Methods: A 73-year-old male presented with bilateral multiple progressive, painless, hypertrophic, elevated and yellowish lesions in both upper and lower palpebral conjunctiva for more than one year. Ocular examination revealed no signs of inflammation or any evidence of regional lymphadenopathy. Rest of the ophthalmic and systemic examination was within normal limits. Based on clinical findings of chronic progressive multiple conjunctival lesions an excisional biopsy of few nodules from either eye were sent for histopathology.

Results: Histopathology revealed amyloid deposits which was confirmed by Congo Red staining. Thorough systemic examination revealed no amyloid deposits in any part of the body. Histopathological and photographic documentation will be submitted.

Conclusions: Isolated ocular amyloidosis, though rare (only a few cases reported in world literature), should be considered as a differential diagnosis in cases of bilateral chronic hypertrophic conjunctival lesions.

An Orbitocranial Injury with an Unusual Foreign Object

First Author: David Jr DICIANO
Co-Author(s): Elaine Marie OMANA, Maria Suzanne SABUNDAYO

Purpose: In this case report, we discussed the approach and management of a patient that presented with a penetrating orbitocranial injury, from management at the emergency unit to post-operative care.

Methods: A 36-year old male presented with toilet brush on the supero-nasal aspect of the right orbit, with visual acuity of 6/60 and lacerated upper eyelid. The globe had minimal movement on all gazes, but pupil was reactive to light with no afferent defect. On plain cranial and orbital CT-scan, the foreign body entered the anterior and medial aspects of the right orbit penetrating the right superior orbital wall, right medial lamina

papyracea, and the lateral and inferior border of the right frontal sinus with its distal tip at the intracranial region at the right frontal lobe compressing the medial rectus along its tract. Two hours after injury, patient underwent wound exploration, removal of foreign body, repair of eyelid laceration, right craniotomy, frontal contussectomy, duraplasty, and JP-drain insertion under general anesthesia.

Results: Intraoperatively, canaliculus was transected and conjunctiva was avulsed with the medial rectus, intact and attached. Frontal lobe was contused with embedded fragments of right posterior orbital bone with 3cm opening on the dura. Post-operatively, Fluconazole was added to the medications. Patient was discharged after 21 days with visual acuity of 6/6 in both eyes and improved ocular movement.

Conclusions: These types of injury warrant thorough and systematic history taking and physical examination, pertinent imaging modalities to visualize the extent of injury, and execute intervention that is multidisciplinary.

Anatomy of the Lacrimal Sac and Skull Base: Implication of Risk of Cerebrospinal Fluid Leakage in Dacryocystorhinostomy

First Author: Shinjiro KONO
Co-Author(s): Hirohiko KAKIZAKI, Munekazu NAITOU, Takashi NAKANO, Yasuhiro TAKAHASHI

Purpose: To examine the positional relationship between the lacrimal sac and skull base.

Methods: In this experimental study, 16 embalmed Japanese cadavers were used (22 sides; 7 males and 9 females; 12 right and 10 left; mean age at the time of death, 84.6 years). The medial canthal tendon (MCT) and lacrimal sac were exposed. After opening the sac, a probe was inserted from the lacrimal punctum to confirm the position of the common canalicular orifice (CCO). After craniotomy, the skull base above the lacrimal sac was exposed. The presence or absence of the frontal sinus lying between the frontal bone and skull base was examined. The vertical distances from the upper edge of the MCT to the CCO, lacrimal sac fundus, skull base, and the top of the frontal sinus were measured. The thicknesses of the skull base and frontal bone at the level of the top of the frontal sinus were measured.

Results: The mean distances of the CCO and lacrimal sac fundus were -0.91 mm and 4.36 mm, while the distances of the skull base and frontal sinus were 14.00 mm and 26.55 mm, respectively. The frontal sinus intervened on 18 sides (81.8%). The thicknesses of the skull base and frontal bone were 4.06 mm and 8.60 mm, respectively.

Conclusions: The skull base was considerably thick and away from the MCT, and the frontal sinus with a thick frontal bone intervened in most cases. These results imply that the risk of cerebrospinal fluid leakage is extremely low during dacryocystorhinostomy.

Apocrine Adenocarcinoma of the Eyelid: A Case Report and Review of the Literature

First Author: Po-yu LEE

Purpose: To report a case of left lower eyelid apocrine adenocarcinoma.

Methods: A retrospective case report and literature review.

Results: A 39-year-old male presented with a palpable mass 6*20mm in size and madarosis over the left lower eyelid for years. The lesion

was previously diagnosed as apocrine tubular adenoma after incisional biopsy. However, the residual lesion progressed to a larger size (8*25mm) over one year. No palpable lymph node was noticed. An excisional biopsy was obtained and the section showed focal invasive growth of apocrine glandular epithelial cells, forming varying-size glandular or cribriform structures, which was consistent with apocrine adenocarcinoma. Reconstruction of the lower eyelid was performed, using ipsilateral upper free tarsal graft and lower lid advancement flap. Orbital magnetic resonance imaging demonstrated no evidence of soft tissue or bone involvement. The patient had no recurrence at a one-year follow-up.

Conclusions: Eyelid apocrine adenocarcinoma is rare and potentially life threatening. It can sometimes be confused with benign lesions. Treatment includes surgical excision, radiotherapy for extensive lesion and chemotherapy for lymph node/bone involvement. Orbital exenteration may be needed in some cases for further control. Early diagnosis and timely management are essential.

Aponeurotic Ptosis: Management and Outcome in 123 Patients

First Author: Mrittika SEN

Purpose: To assess clinical profile, surgical management and outcome in patients with aponeurotic ptosis (AP).

Methods: Retrospective interventional study of 154 eyes of 123 consecutive patients with AP over 7 years old. Outcome was good if residual ptosis <1mm, margin reflex distance 1 (MRD1)>2mm, MRD1 asymmetry <1mm, with good lid contour.

Results: AP constituted 123/847 (15%) of all ptosis in the study period. The mean age was 36.9+/-19.1y. AP was congenital in 41(33%), bilateral in 35 (23%). 124 (81%) had disinsertion, 12 (8%) had dehiscence, while 20 (13%) had fatty degeneration. Preoperative palpebral fissure height (PFH) 6.5+/-1.7 (2-10) mm, MRD1 0.2+/-1.5 (-4-3) mm and levator action 12.2+/-2.8 (6-20) mm. Skin approach aponeurosis repair included reinsertion in 124 (81%), plication in 11 (7%), resection 13 (8%), with suture adjustment in 21 (14%) at a median of 7d; and Fasanella-Servat in 4. Postoperative PFH 9+/-1.2 (5-12) mm, MRD1 2.6+/-1 (-2 to 5) mm at mean follow up 33+/-28 m, with good outcome in 137 (89%).

Conclusions: Our study had relatively younger patients with AP, the congenital form constituting a third of patients. Aponeurosis repair by anterior approach provides a good outcome.

Bilateral Marcus Gunn Jaw Winking (MGJW) Phenomenon with Unilateral Elevation Deficiency: A Case Report with Literature Review

First Author: Rohit SAIJU
Co-Author(s): Malita AMATYA, Ben LIMBU, Purnima RAJKARNIKAR STHAPIT

Purpose: To report a case of bilateral MGJW phenomenon with right-sided congenital ptosis in a 42-year-old male. This case report aimed to highlight the need for a high degree of suspicion, sound clinical skills to diagnose and for successful management of unilateral congenital ptosis with synkinetic movement in upper eyelids.

Methods: Detailed history regarding onset, progression and other associated symptoms was obtained. The previous medical treatments were reviewed. A thorough clinical evaluation of both eyelids was performed

regarding its palpebral fissure height, eyelid excursion, Margin reflex distance(MRD1), Bell's phenomenon, MGJW phenomenon, Orbicularis muscle tone and corneal sensation to plan for proper surgical management. Anterior and posterior segment examination of both eyes was done. Under local anesthesia right eye underwent a complete extirpation of levator palpebrae superior aponeurosis up to Whitnall ligament through anterior lid crease approach and open frontalis sling suspension with Silicon rod uneventfully. The patient was kept in Follow up in a week and 6 weeks to evaluate the cornea, ptosis and jaw winking phenomenon.

Results: The ptosis in the right eye was corrected with normal palpebral fissure height of 9 mm with clear cornea and complete elimination of Jaw winking phenomenon. In the left eye, there was still jaw winking remained. The functional and aesthetic outcome was good without any complication.

Conclusions: The congenital ptosis can be associated with synkinesis and should be considered for detailed evaluation with an appropriate surgical plan to achieve the best functional and aesthetic outcomes. Jaw winking phenomenon can be treated with levator extirpation and frontalis sling surgery successfully.

Breastfeeding-Related Lid Injuries in Children Less than Two Years of Age in a Tertiary Eye Hospital

First Author: Koshal DANI
Co-Author(s): Jayagayathri R., Dayakar YADALLA

Purpose: To create an awareness regarding proper breastfeeding techniques in mothers of children less than two years of age.

Methods: Retrospective study from hospital medical records from July 2016-December 2018.

Results: Forty-seven children less than 2 years of age had lid related injuries. Twenty-three children (50%) had injuries during breastfeeding (as per the informant–mostly mother). Nine out of 23 had only canalicular tear, 6 had partial thickness lid tear with canalicular tear, 2 had full thickness lid tear with canalicular tear. Four children had superficial lid tear only, 2 had minor lid abrasions.

Conclusions: The major cause being lack of awareness among mothers regarding proper techniques and care while breastfeeding. Community-based maternal awareness to avoid breastfeeding related injuries to babies can prevent epiphora. Timely referral to oculoplastic surgeon and intervention (stent procedure) can prevent complications and thus achieve better outcomes.

Cavernous Hemangioma of the Orbit with an Atypical Presentation: A Case Report

First Author: Channdarith KITH
Co-Author(s): Kong PISETH, Sopanhavatei SO

Purpose: To illustrate a case of an atypical orbital tumor with challenging diagnosis and management in a low-resource setting.

Methods: The systemic examination and neuroimaging study was performed. The masses resected were examined.

Results: A 43-year-old man presented with a solid mass around the left eye, persisting for 30 years followed by gradually soft-to-hard mass without preceding trauma or surgery. Neuro-ophthalmological inspection showed no abnormalities. No proptosis. There were no extraocular muscle limitations or

visual impairments. Apparently, the painless mass was mobile with gentle pressure. No pulsations. No bruits audible. These symptoms did not vary with straining, posture, and valsala maneuver. Neither signs of conjunctival chemosis nor anterior chamber reactions. Neuroimaging showed an irregularly shaped, non-homogeneous mass with enhancement, and intra-tumoral calcification. No intracranial involvement. Transconjunctival surgical exploration through the lower fornix revealed 3 red-pink, and heterogeneous masses encapsulated prominently by vessels, adhering to the surrounding rim. The masses were totally resected. No intra- or postoperative complications. The orbit was reconstructed with blepharoplasty and orbital reconstruction. The pathological report showed lumens of channels filled with erythrocytes, or thrombus, and the channels' walls were covered by smooth muscles. These include an orbital cavernous hemangioma with no signs of malignancy.

Conclusions: This is a rare case report on the clinical feature of the cavernous hemangioma which occurred in a middle-aged man, and the mass is surprisingly located outside the extraocular muscle cone. An orbital cavernous hemangioma may present an atypical appearance which confused diagnosis and could have made the surgical plan even more difficult.

Coexistence of Immunoglobulin G4-Related Ophthalmic Disease and Lung Cancer in a Patient with Diabetes Mellitus

First Author: Chih-heng HUNG

Purpose: We reported a case of IgG4-related disease (IgG4-RD) with bilateral lacrimal glands (LGs) involvement and pulmonary mucoepidermoid carcinoma.

Methods: A case report.

Results: A 64-year-old Asian man had a history of diabetes mellitus and hypertension under medical control. The patient suffered from right upper lid edema for 6 months. Ophthalmic examination showed non-tender temporal masses over bilateral upper lids. Orbital computed tomography (CT) disclosed bilateral diffusely enlarged lacrimal glands (LGs). Biopsy demonstrated diffuse dense lymphoplasmacytic infiltrate and fibrosis in the right LG. IgG4-positive plasma cells exceeded 50 cells per high-power field while the overall IgG4/IgG ratio was above 40%. Serological studies unveiled eosinophilia (9.7%) and high serum concentrations of IgG4 level (848 mg/dL). After discussion with this diabetic subject, he made the decision to closely follow up without systemic steroids treatment. One and half years later, the patient was found with a right axillary mass, which also was proven to be compatible with IgG4-RD. During the regular follow-up period, there was no further progression in bilateral lacrimal glands and lymphadenopathy. However, a nodule with homogenous enhancement was found at the right medial lower lung on chest CT one year later. Pathology revealed non-small cell carcinoma with mucoepidermoid morphology. The patient still responded well without any chest symptoms after surgery during the follow-up period of 1.5 years.

Conclusions: We presented a clinicopathologic diagnosis of IgG4-RD with bilateral LGs involvement and axillary lymphadenopathy. There was no further progression in LGs for four years without systemic steroids treatment. However, the rare coexistence of IgG4-RD and subsequently pulmonary mucoepidermoid carcinoma was reported.

Collision Tumor of the Eyelid

First Author: Jin-jhe WANG
Co-Author(s): Chao-yin CHEN

Purpose: Collision tumors are rare tumors composed of multiple independent and heterogeneous neoplasms adjacent to each other at the same location. The association of a squamous cell carcinoma and a malignant adnexal tumor is even infrequent.

Methods: A retrospective case report and literature review.

Results: A 79-year-old woman presented with a slow-growing and painless tumor of the lower eyelid. The lesion, about 15 mm in diameter, was nodular, irregular and yellow-discolored. Histopathologic and immunohistochemical findings disclosed concurrence of sebaceous carcinoma as well as squamous cell carcinoma in one specimen. Wide excision of the tumor with frozen section control was performed. The oncologic survey revealed no other lesion. At the six-month follow-up, there was no evidence of recurrence or metastasis.

Conclusions: The occurrence of a collision tumor is likely to be a coincidence (chance phenomenon) although any current possible speculations of mechanisms remain controversial and unestablished. A thorough clinical examination and detailed histopathologic analysis along with multidisciplinary discussion is a prerequisite when dealing with such complicated lesions.

Complications of Delayed Tube Removal after DCR Surgery in the COVID Era

First Author: Purnima RAJKARNIKAR STHAPIT
Co-Author(s): Anish MANANDHAR, Manish PAUDEL

Purpose: A silicon stent intubation, done after dacryocystorhinostomy (DCR) surgery, is generally removed after 6 weeks. However, COVID-19 related lockdown as well as recommendation to hold the lacrimal procedures for safety related purpose has led to delay in silicon tube removal for many months. Side effects of even short term silicon stenting are well known. The purpose of this study is to assess the complications of delayed stent removal after DCR surgery, due to COVID restrictions.

Methods: A prospective observational study that included 35 post DCR patients whose silicon tube removal was delayed due to COVID restrictions. Detailed history and clinical examination to note the DCR surgery and tube related complications were noted. Silicon tube was removed and syringing done where possible.

Results: Mean age was 41 years (SD 14.3; range 7-68 years). Among them, 29 (83%) were females. The most common presenting symptom was persistent watering in 19 patients (54.2%); however syringing was found to be patent in 30 patients (85.7%). Out of 35 eyes, 26 (74.3%) had the silicon tube in situ in normal position without puncta or canaliculus complications. The mean time of delay in tube removal after DCR surgery was 38.1 weeks (median 40; range 6 -59). The average (SD) delay time in weeks of study participants who had complications and without complications were 33.0 (10.9) and 39.9 (11.3) respectively which was not statistically significant.

Conclusions: Delay in silicon tube removal is a safe practice in the COVID era.

Congenital Eyelid Imbrication Syndrome

First Author: Sunita MANJHU
Co-Author(s): Dr Mrs Kiran BHANOT, Dr Nawab Zishan FAROOQUI, Pooja KOTHARI

Purpose: To describe a rare entity of congenital Imbrication syndrome & progression. A clinical observational case report.

Methods: Full-term newborn examined after uneventful emergency caesarian section indicated by meconium stained liquor & fetal distress.

Results: Description of rare congenital condition of Eyelid Imbrication with floppy eyelid and spontaneous eversion in a healthy newborn. Main feature is bilateral overlapping of lower eyelids by floppy upper eyelids during resting period and sleep. With slightest effort & on crying there was eversion of the upper eyelids exposing hyperemic conjunctiva. Condition resolved spontaneously on conservative treatment within 2 weeks.

Conclusions: Congenital eyelid imbrication with floppy lid &spontaneous lid eversion in newborns is rare with good prognosis when managed conservatively. Although the entity may look grave to parents at presentation, normal anatomy is achieved without any sequel hence parental counseling is deemed necessary.

Different Clinical Presentation of Dacryops: A Case Series Study

First Author: Chih-heng HUNG
Co-Author(s): Szu-yuan LIN, Shwu-huey LEE, Shun-ling LIN

Purpose: To characterize the different clinical presentation of dacryops in 14 eyes of 13 patients.

Methods: A retrospective case-series study.

Results: The average age of 13 patients was 45.6 years. Seven cases (53.8%) were female, and 7 cases were involved in the right eye. The main lacrimal gland ductal cysts (dacryops) presenting unilaterally was noted in all cases, except for one subject (7.7%) with bilateral involvements. All presented with conjunctival hyperemia adjacent to a superotemporal, transilluminating cystic lesion. Type 1: Two cases presented with orbital cellulitis accompanying by decreased visual acuity and eye of motion limitation, relieving symptoms with systemic antibiotics. Type 2: Four cases presented as a reddish lesion with focal cellulitis and pus formation. The surgical histopathology demonstrated the dacryops formation manifested as the cystic lesion covered by pseudostratified columnar epithelium admixed with some goblets cells and squamoid cells with mixed acute and chronic inflammation cells infiltration, edema, congestion, and fibrotic change in the cystic wall. Computed tomography revealed a cystic lesion with enhancement of the wall in these 2 types of cases. Type 3: One case presented with a reddish, cystic lesion with multiple dacryoliths, resolving with meticulous incision and curettage, oral antibiotics, and topical steroid ointment. Type 4: Six cases presented with a cystic lesion, and treated with topical antibiotics and steroid.

Conclusions: Dacryops is a rarely reported lesion, accounting for 2%-9% of lacrimal gland diseases. However, different clinical presentations, including orbital cellulitis and focal cellulitis were noted in our case series. Early treatment may avert a serious infection.

Diffuse Large B-Cell Lymphoma of the Lacrimal Sac Presenting as Acute Dacryocystitis in a 41-Year-Old Male: A Case Report

First Author: Juan Lorenzo SIMPAO
Co-Author(s): Manuel PALMERO

Purpose: To discuss a case of diffuse large B-cell Lymphoma of the lacrimal sac in a 41 year-old male.

Methods: A case report.

Results: A case of diffuse large B-cell lymphoma of the lacrimal sac in a 41-year-old male who presented with swelling, discharge and epiphora of the left eye initially diagnosed with nasolacrimal duct obstruction, to consider acute dacryocystitis is reported. Biopsy of the lacrimal sac showed poorly differentiated malignant neoplasm and final pathologic diagnosis showed diffuse large B-cell lymphoma of the lacrimal sac. Orbital CT-scan showed large fungating heterogeneously enhancing mass with areas of necrosis. The patient was referred to the oncology service and still tolerated 2 cycles of chemotherapy. Unable to proceed with another chemotherapy due to generalized weakness, the patient then expired due to cardiorespiratory arrest.

Conclusions: Lacrimal sac lymphoma is very rare that in the past 30 years, only less than 70 cases were reported in the literature with only less than 10 cases of diffuse large B-cell lymphoma of the lacrimal sac were described in Asia. Malignancy should always be a consideration in differential diagnosis in patients who presented with swelling, discharge and epiphora not responding to anti-microbial drugs. Malignant neoplasm can impinge on the nasolacrimal duct system causing obstruction and present with the same symptoms with nasolacrimal duct obstruction and dacryocystitis. Early detection with imaging including CT scan or MRI, and biopsy are vital in prognostication and treatment. Lastly, chemotherapy is the first line of treatment in patient with B-cell lymphoma of the lacrimal sac.

Extensive Orbital Inflammatory Myofibroblastic Tumor: A Case Report

First Author: Mohd Alif W MOHD
Co-Author(s): T NORINA, Nasyitah YAKUB, Sakinah Binti ZAKARIA, Ismail SHATRIAH

Purpose: To report a case of young adult presented with orbital inflammatory myofibroblastic tumor (IMT) with extensive surrounding tissue involvement.

Methods: A case report.

Results: A 30-year-old-lady with no comorbidity, presented with left upper and lower lids painful swelling for 1 month It was associated with left eye (LE) reduced in vision, LE redness, headache and significant loss of weight. There was no history of trauma. Upon examination, her visual acuity was 6/9 and 6/36 on right eye (RE) and LE, respectively. Her LE appeared proptosis and hypotropia with limited abduction on movement. There was a firm subcutaneous mass at the lower and upper lid with partial ptosis. Anterior segment showed inflamed conjunctiva with superficial punctate keratitis and scar over the lower part of cornea. The rest of her ocular examination was normal. Radio imaging of the orbit showed LE orbital mass from the anterior part extending posteriorly almost to orbital apex. There was evidence of optic nerve, lacrimal gland and multiple extraocular muscles involvement. An incisional biopsy was done with the histopathology examination result was consistent with IMT. She showed improvement in term of proptosis, lid swellings and visual acuity one month after on oral steroid.

Conclusions: Orbital IMT is a rare occurrence and most of the cases are commonly found in abdomen, lungs, and retroperitoneum. A high index of suspicion is needed especially in patients presenting with proptosis. Radio imaging plays a crucial role in defining the extension of the tumor. Early treatment is important to prevent poor visual prognosis.

Foam Sclerotherapy: A Management Option for Benign Cystic Orbital Lesions

First Author: Swati GOYAL

Purpose: To analyze the outcome of foam sclerotherapy in patients with benign cystic lesions of the orbit.

Methods: A retrospective computerized data analysis was conducted on 18 cases of Benign cystic orbital lesions (peri-orbital dermoid (9), lymphangioma (5), microphthalmia with cyst (3) and development cysts (2) with age range of 3 months to 50 years over a 3 year period. Clinic-radiological reduction in size was the outcome parameter. Cyst aspiration was performed using 18 g needle under under full aseptic precautions. Foam was prepared using Tessari method [Sodium Tetradecyl Sulphate (30mg/ml)]; 10% volume equivalent of total aspirate was injected, followed by patching. Follow up for outcome parameter and complications was done on day 1, 30, 90.

Results: At the end of 90 days, 78% of cysts led to complete resolution or cosmetically acceptable reduction in size, 11% resulted in resolution after second injection and 11% required surgical intervention.

Conclusions: Foam sclerotherapy is an effective, safe minimally-invasive therapeutic modality for orbital benign cystic lesions.

Frequency and Outcome of Emergent Oculoplastic Disorders with Adaptations in Management during COVID-19 Pandemic at a Tertiary Oculoplastic Service

First Author: Mohammad IDRIS

Purpose: To determine whether treating emergent oculoplastic conditions during the pandemic with protective modification has any effect on treatment outcome.

Methods: We selected cases operated during the pandemic from March to September 2020 at oculoplastic service. Blinded review first screened at triage system to reduce exposure to both patient and health care providers. Treated patients were having a follow-up with the help of telemedicine. Protective modifications were adopted to treat emergency cases which include the use of loupe instead of surgical microscope to keep safer distance and mainly local anesthesia was used. Cautery was used judicially. Absorbable suture was used. Patients were followed through phone calls and advised of minimum visits. Outcomes of patients were recorded.

Results: A total of 117 patients were eligible for inclusion in the present study with a mean age 25.399 ± 34.89 (range less than 1–87) years. The majority of patients were male 74 (63.2%). The mean follow-up time was 04 months (range 1–5 months). Satisfactory surgical and functional outcome was seen in 107 (91.5%) patients. There was no statistically significant difference found in gender (p-value of 0.824) and treatment (p-value of 0.168) and the detail of these emergent ophthalmic plastic reconstructive procedures. Similarly, the treatment outcome was found statistically insignificant (p value 0.342). Unsatisfactory outcome due to various complications was seen in 10 (8.5%) patients at follow-up of 01 to 05 months.

Conclusions: Emergency oculoplastic conditions treated during the present pandemic include trauma, orbital cellulitis and advance tumors. With adopted protocols and modifications in techniques, the outcome was acceptable.

I Share the Same Disease with My Cat! A Case Report of Parinaud's Oculoglandular Syndrome Associated with Sporothrix Schenckii

First Author: Chuah SEAH
Co-Author(s): Adlina ABDUL RAHIM, Wan Mohd Redzuan BIN WAN HASSAN, Juanarita JAAFAR, Julieana MUHAMMED

Purpose: To report a case of left eye Parinaud's oculoglandular syndrome associated with Sporothrix schenckii from the sporothrichosis epidemic in its zoonotic form.

Methods: A retrospective case report.

Results: A 28-year-old lady with underlying atopy (allergic dermatitis and allergic rhinitis) presented with left eye redness, grittiness and watery discharge for one-week duration that preceded with multiple painful ipsilateral cervical lympadenopathy one month before the condition. Otherwise, her visual acuity and fundoscopy were normal. History revealed that she had multiple episodes of cat scratch and her cat is under treatment for sporotrichosis. She was treated as Parinaud's oculoglandular syndrome (POS) whereby oral Azithromycin was initiated along with topical steroid and topical Ciprofloxacin but unfortunately she developed an allergic reaction towards oral azithromycin in the form of urticaria and rashes. Medication was changed to oral Doxycycline however clinically condition showed no remission of the lesion after one month of Doxycyclin. She was admitted and started on intravenous Ciprofloxacin. Bartonella serology taken was noted to be negative. Left eye conjunctival incision biopsy was done and revealed the same organism as her cat, Sporothrix schenkii. Hence, oral Itraconazole was given along with topical Amphotericin B and subsequently, her condition improved gradually.

Conclusions: Parinaud's oculoglandular syndrome is a curious medical condition and it has been associated with several different infectious diseases. Classically this condition is associated with bacterial etiology.However,sporothrix species are found worldwide and most common in tropical and subtropical climate.Early recognition and diagnosis helps in fast recovery of patient eye condition.

Incidence of Speculum-Related Blepharoptosis in Patients Undergoing Topical Phacoemulsification: A Prospective Observational Study

First Author: Jayagayathri RAJAGOPALAN
Co-Author(s): Joy ANUPAMA, Dayakar YADALLA

Purpose: To assess the role of the speculum as a causative factor for blepharoptosis in patients undergoing topical phacoemulsification.

Methods: A prospective observational study was carried out on all patients who underwent phacoemulsification under topical anesthesia from October 2017 to May 2018 at a tertiary eye hospital in South India. Preoperative assessment of margin reflex distance 1, LPS function and margin crease distance was done. Postoperatively patients were assessed for ptosis on the first postoperative day, 1 month, 3 months and 6 months using the same parameters and the level of ptosis was documented both clinically and photographically.

Results: We assessed 250 eyes of 221 patients who underwent uneventful phacoemulsification under topical anesthesia. Among the 34 patients in whom ptosis was observed 20 (15.8%) eyes were operated using rigid speculum and 14 (11.4%) eyes were operated using non rigid speculum. At postoperative 1 month, 4 out of 34 patients were found to still have ptosis of which 1 was operated with rigid speculum and 3 were operated using non rigid speculum. In our study, incidence of speculum related ptosis after phacoemulsification was 1.7% and it was concluded that there is no association between ptosis and type of speculum used and most of these were found to have transient ptosis.

Conclusions: Speculum alone cannot be cited as a causative factor for postoperative ptosis. Several modifiable factors such as superior rectus bridle suture, anesthesia, prolonged patching and duration of surgery cause an additive effect along with speculum use in the evolution of postoperative ptosis.

Incidence of Sympathetic Ophthalmia after Penetrating Ocular Trauma: A Systematic Review and Meta-Analysis

First Author: Bonnie HE
Co-Author(s): Edsel ING, Stuti M TANYA, Nurhan TORUN, Chao WANG

Purpose: Sympathetic ophthalmia (SO) is a rare panuveitis that occurs following accidental or surgical trauma to the eye. A reliable incidence figure for SO following penetrating eye trauma is important to ascertain so that patients can be accurately informed of their risk of SO, and to guide shared physician-patient decision making in patients with severe ocular trauma if eye removal is being considered. The objective of this study was to determine the incidence rate of SO following penetrating ocular trauma.

Methods: A systematic literature search of electronic databases was searched up to August 20, 2020. The study was registered with PROSPERO (ID# CRD42020198920). A random-effects meta-analysis was performed using the metarate command in RStudio (RStudio PBC, MA, USA). A log transformation of the incidence rates was used for continuity correction for any study-specific incidence rates that had zero events, but not for the meta-analysis.

Results: 1,100 unique citations were retrieved from the literature search. Screening of the titles, abstracts, and full texts resulted in the exclusion of 1076 items. The final 24 studies were utilized in the meta-analysis. The incidence of sympathetic ophthalmia after penetrating trauma was estimated at 33 per 100,000 globe ruptures per year, (95% CI 19.61-56.64) with an I2 of 63%.

Conclusions: Overall, the incidence of SO after penetrating eye trauma is rare at 0.033% per year following penetrating ocular trauma. Further studies are needed to examine the influence of age, the extent and location of the trauma, and prophylactic eye removal on the incidence of SO.

Is Naso-Lacrimal Mucosal Flap Recreation Necessary during Difficult Revision DCR Surgeries? A Prospective Comparative Study on Sutured Flaps versus Flapless Revision DCR with 2-Year Follow-Up

First Author: Aashish PANT
Co-Author(s): Purushottam JOSHI

Purpose: To compare the outcomes of nasal and lacrimal sac mucosal flap suturing vs flapless technique in revision dacryocystorhinostomy (DCR) surgery with lacrimal intubation and Mitomycin C (MMC).

Methods: This prospective comparative nonrandomized study included 30 failed DCR cases re-operated between January 2017- June 2018 followed up for at least 2 years (till June 2020). Surgical steps included distal canalicular opening or removal of fibrous and granulation tissue, ostium revision, MMC application (0.02%, 2 minutes, 0.5 ml) (circumosteal mucosal injection followed by a flush), and lacrimal intubation. Whenever possible nasal and lacrimal sac mucosal flaps were created and sutured (14 cases- group A). However flapless closure was done in difficult conditions in 16 cases which constituted group B. Anatomical and functional success was evaluated at 3, 6,12, and 24 postoperative months. The lacrimal stent was removed at 3 months.

Results: Overall, inadequate and improperly placed bony ostium (24 cases, 80%), fibrosis around the ostium (20 patients, 66.67%) and canalicular obstruction (6 cases, 20%) were the main intraoperative findings. There was no significant difference in the anatomical success (100% in both groups at 12months; 100%-group A, 93.75% group B at 24months) and functional success (85.7% group A, 81.25% group B at 12months; 78.57% group A, 75% group B at 24months). No adverse events with MMC were noted.

Conclusions: Though preferable, difficult revision DCR surgeries should not focus solely on the creation of flaps and suturing as flapless revision DCR is equally effective when combined with intraoperative mitomycin C and lacrimal intubation.

Lacrimal Gland Ductule Dacryolith with Hairs Inside: A Case Report

First Author: Po Yen LEE
Co-Author(s): Po-yu LEE

Purpose: To report a rare case of lacrimal gland ductule dacryolith which had several hairs in its nucleus.

Methods: A retrospective case report and literature review.

Results: A 41-year-old woman presented with right eye redness, swelling and discharge for more than 1 month. An ophthalmic exam revealed right eye a subconjunctival abscess at superotemporal orbit. The left eye revealed an asymptomatic subconjunctival cyst with some hairs inside at superotemporal orbit. The culture of discharge showed pseudomonas aeruginosa. Oral antibiotics, topical steroid and antibiotics were prescribed and showed only partial improvement. Orbital computed tomography was arranged and demonstrated a well-defined high-density mass surrounded with an abscess within the right lacrimal gland. A lacrimal gland dacryolith was impressed. Surgical removal was done and a brown, hard mass with hairs inside was found in the dilated lacrimal gland ductule. Her symptoms resolved quickly after surgery. There was no recurrence or postoperative development of dry eye.

Conclusions: Lacrimal gland dacryolith is rarely found. When dacryoadenitis and conjunctivitis don't respond well to medical treatment, imaging studies may be considered. The exact mechanism of lacrimal gland dacryolith formation is not clear yet. In this patient, she has a suspected left lacrimal gland dermoid cyst with hair follicles inside. Therefore, the right lacrimal gland dacryolith with hairs in its nucleus may be related to the dermoid cyst. Although lacrimal gland dacryolith is a rare condition, we should be aware of the possibility and take proper management.

Large Foreign Body Presenting as an Intraorbital Tumor: A Diagnostic Challenge

First Author: Tanvi GAONKER
Co-Author(s): Shweta DHIMAN, Anju RASTOGI, Ketaki RAJURKAR

Purpose: To report a case of a large foreign body presenting an intraorbital tumor.

Methods: A 35-year-old female presented with a decrease in vision, pain and inability to move the left eye (LE) for one year. Best-corrected visual acuity (BCVA) in the right eye (RE) was 6/6 and in the LE was finger counting 1 meter with accurate projection of rays. RE ocular examination was within normal limits. LE examination showed hypotropia, conjunctival chemosis, marked limitation of extraocular motility in all gazes and choroidal folds in inferior quadrant on fundus evaluation. Computed Tomography of the orbit showed a mass lesion measuring 22 mm x 14.5 mm in the lateral half of the posterior orbit with proptosis. Incisional biopsy was performed which revealed inflammatory infiltration. Provisionally diagnosing it as orbital inflammatory disease, tablet Prednisolone (1mg/kg body weight) was started.

Results: There was a reduction in the size of the swelling after starting steroids and a hard mass could now be palpated. On surgical exploration, a large wooden foreign body measuring 3.3 x 1 cm x 0.3 cm was retrieved. Postoperatively, there was a drastic improvement in BCVA to 6/6 but the eye was still in hypotropia.

Conclusions: Any penetrating injury to the orbit should be evaluated for intraorbital foreign bodies. However, wooden foreign bodies may present a real radiological diagnostic challenge due to their varied appearance. Ambiguous history, delayed recognition and management can also cause significant complications. Thus, a high degree of clinical suspicion is required in such cases.

Levator Recession as a Successful Procedure to Correct Eyelid Retraction due to Thyroid Associated Orbitopathy: A Case Report

First Author: Sri Hudaya WIDIHASTHA
Co-Author(s): Shanti BOESOIRIE, Rinaldi DAHLAN, R KARTIWA, Niluh WARDHANI

Purpose: Surgical repair of upper eyelid retraction is necessary to minimize lagophthalmos, reduce corneal exposure, and restore the normal appearance of the face. In this case report, we reported a successful corrective procedure for eyelid retraction due to thyroid-associated orbitopathy by using levator recession.

Methods: A case report.

Results: A 35-year-old woman came to Cicendo National Eye Hospital with a chief complaint of bulging on the right eye in the last ten years. Asymmetry of lid height was reported, with proptosis and lagophthalmos found in her right eye. The patient had good levator function and no ocular motility reduction. The patient was diagnosed with thyroid-associated orbitopathy and she underwent levator resection. After a maximal levator recession was performed, she had a satisfactory lid height. The desirable result was achieved with an improved cosmetic appearance.

Conclusions: Among the oculoplastic procedures, repair eyelid retraction due to thyroid-associated orbitopathy to correct the position of eyelids improve their cosmetic appearance are some of the challenging procedures. Levator recession is one effective

technique in the treatment of upper eyelid retraction caused by thyroid-associated orbitopathy. However, further follow-up is recommended to see long-term good functional and cosmetic outcomes.

Look Beyond Tolosa

First Author: Suriya DJEAMOURTHY
Co-Author(s): Nanthene RAJMOHAN, Dr.sarala SHANKAR, Renuka SRINIVASAN, Dr.veni Priya VIJAY

Purpose: Tolosa Hunt syndrome is a rare idiopathic condition caused by non-specific granulomatous inflammation of the cavernous sinus, superior orbital fissure, and/or orbital apex. It is a diagnosis of exclusion. We report a case of multiple cranial nerve palsy diagnosed as Tolosa Hunt after excluding other etiologies, but responded well to empirical anti-tuberculosis treatment rather than steroids.

Methods: A 45-year-old, known diabetic came with complaints of drooping of the right eyelid and facial pain for 1 month with the inability to move the right eye. On CT, a small 7-8 mm extra enhancing lesion was noted in the cavernous sinus. Blood investigations were normal. He was diagnosed Tolosa Hunt syndrome and was given intravenous steroids for 3 days and followed by oral steroids in a local hospital. Despite this, there was no improvement, so ATT was given for 20 days and discontinued. For further management, he came to our hospital. On examination, his BCVA was 6/6 in both eyes. On right eye examination, there was 15-degree exotropia and hypotropia on primary gaze, with complete ptosis with a poor levator function. Extraocular movements were restricted in all gazes with intact corneal sensations. So he was diagnosed to have pupil sparing 3rd nerve palsy with 4th and 6th nerve palsies. He was investigated for tuberculosis and routine which was normal.

Results: Clinically he responded to ATT.

Conclusions: For external ophthalmoplegia due to Tolosa Hunt syndrome not responding to conventional treatment, tuberculous etiology should be kept in mind in endemic areas like India.

Minimally Invasive Harvesting Fascia Lata (FL) in Ophthalmic Plastic Surgery

First Author: Syeed KADIR
Co-Author(s): Md Sharfuddin AHMED, Golam HAIDER, Mohammad MOSTAFA HOSSAIN, Riffat RASHID

Purpose: To describe a minimally invasive technique of harvesting fascia lata, and also to analyze the clinical uses and the outcome of fascia lata in ophthalmic plastic and reconstructive surgery.

Methods: This quasi study was done in two tertiary care eye hospitals in Bangladesh from July 2014 to June 2020. We obtained autologous fascia lata for the correction of congenital ptosis with poor levator function (≤ 4 mm), covering the ciliary staphyloma, and also used in an ophthalmic socket surgery. Preserved FL was used only for children under 6 years of age for the treatment of congenital ptosis.

Results: Out of 60 subjects, 38 (63.3%) were male, and 22 (36.7%) were female. Autogenous fascia lata was used for frontalis brow suspension (FBS) in 25 (41.67%) patients of congenital ptosis with poor levator function, as of patch graft in ciliary staphyloma (11 cases, 18.3%), to wrap orbital implant following enucleation in intraocular malignancies (09 cases, 15%), to repair of implant extrusion following evisceration (5 cases, 8.3%) and as a fascial sling to correct recurrent paralytic ectropion (1 case, 1.67%).

Allogenic or preserved fascia lata was used to correct congenital ptosis in less than 5 years of age (09 cases, 15%). The mean follow-up time was 5.32 months.

Conclusions: Fascia lata has varied uses in ophthalmic plastic surgery. The minimally invasive FL method was successful with the least scar on the thigh to correct congenital ptosis, ciliary staphyloma, repair of extruded implant, and in wrapping implant after enucleation to get better cosmesis and motility.

Ocular Presentation of Kimura Disease

First Author: Syarifah Nur Humaira SYED MOHD KHOMSAH

Purpose: To report a case of Kimura disease as differentials of orbital pseudotumor.

Methods: A case report.

Results: A 12-year-old boy with underlying bronchial asthma presented with generalized edema for 2 days with multiple skin lesions and he was treated for poststreptococcal glomerulonephritis. Incidentally, after the edema resolved we noticed painless right arm swelling for 4 years not increasing in size and left eye proptosis, eye redness and swelling for 7 days but denies double vision. On examination, his visual acuity was 6/6 bilaterally. No reverse afferent pupillary defect. Left eye axial proptosis with no lagophthalmos and presence of iris nodule. Fundoscopy revealed normal findings bilaterally. Ct orbit showed generalized enlargement of the left lateral rectus muscle with features likely representing left orbital pseudotumor. MRI of the right arm showed distal right arm soft tissue lesion with surrounding inflammatory changes and regional lymphadenopathy. Histopathology of forearm swelling was Kimura disease.

Conclusions: Kimura disease presents as benign subcutaneous swelling predominantly around the head and neck region and has been described in the orbit, eyelids and lacrimal gland causing proptosis, lid swelling, ocular dysmotility, or a palpable mass. They should be considered in the differential diagnosis of orbital lesions. It also has a high incidence of renal involvement.

One Stage Surgery with Total Excision and Reconstructive for Medium-Large Sized Divided Nevus of the Eyelids

First Author: Junping LI
Co-Author(s): Anshi DU, Dongping LI, Yuhong WANG

Purpose: To describe a method of one-stage resection and reconstructive for medium-large sized congenital divided eyelid nevus.

Methods: Clinical records of 6 patients with medium-large sized divided eyelid nevus were reviewed with attention to presenting features, surgical management, histopathology, and follow-up course. Surgical approach involved the use of autologous tarso-conjunctival flap and allogeneic sclera to rebuild eyelids.

Results: Six patients with medium-large sized divided nevus were treated with one-stage surgical approach: all cases were primary. The average age was 36.5 years at primary presentation (range, 18-55 years). The average follow-up was 14 months (range, 6-24months). The eyelids are in good shape, there is no obvious allogeneic scleral dissolution or rejection. No recurrence or malignant transformations were observed. The only complication was the sacrifice of eyelashes.

Conclusions: Patients with medium-large sized divided eyelid nevi often present for surgical management because of cosmetic and functional concerns. The tarsus was often

involved which has a risk of recurrence and malignant transformation, so total excision is necessary. One stage surgical approach with tarso-conjunctival flap and allogeneic sclera may be a reasonable treatment strategy for these patients.

Orbital Hemangiopericytoma Presented as an Enlarging Eyelid Tumor

First Author: Chin-te HUANG

Purpose: To report a middle-aged woman who presented with an enlarging eyelid tumor.

Methods: A case report.

Results: This 49-year-old female presented to our office with the chief complaint about enlarging upper eyelid tumor in her right eye in recent 1 month. Except hypertension, she denied any other systemic diseases. She also felt right eye protrusion, but no pain or limited extraocular movement. Ocular examination revealed a solitary mass without tenderness underneath upper eyelid near medial canthus of right eye. Orbital magnetic resonance imaging (MRI) showed a 15*16*11 strong contrast enhancing lesion over the anterior-medial- superior aspect of the right orbital cavity, abutting to right eyeball. The possibility of hemangioma may be first considered. During orbital exploration, an elastic reddish tumor was excised successfully. A pathological study revealed hemangiopericytoma features with storiform pattern of hypercellular round to spindle-shaped cells and prominent vasculature with the staghorn blood vessels. No obvious evidence of recurrence was noted 6 months after the operation.

Conclusions: Orbital solitary fibrous tumor with hemangiopericytoma features can be removed via orbital exploration. However, long-term follow-up is necessary because local recurrence and late metastases may occur regardless of the extent of resection.

Orbito-Facial Fractures with Simultaneous Rupture of Eye Ball: Etiology, Injury Pattern and Prognostic Factors

First Author: Virendra P SINGH
Co-Author(s): Apjit KAUR, Rajendra MAURYA, Gangadhara SUNDAR

Purpose: Orbito-facial fractures with simultaneous globe rupture are not uncommon. We investigate the etiology, clinico-radiological pattern and prognostic factors.

Methods: A retrospective review of patients having orbito-facial fractures with concomitant globe rupture was done to determine age, sex, time & place of injury, cause of injury, type and site of the bony fracture, number of orbital wall fracture, zone of globe injury, ocular trauma score (OTS), surgical procedures and final outcome. The correlation between OTS and final visual acuity was assessed.

Results: A total of 62 patients with eyeball rupture complicated by orbito-facial fractures were assessed. The majority of the patients were male (77.42%) between 21-30 years. The cause of injury included was road traffic accidents (43.54%), physical assault (20.97%), fall from height (11.29%) and recreational activities (8.10%). The commonest orbital wall fracture was combined medial wall & floor fracture (35.48%) followed by a combined lateral wall and floor fracture (32.26%) and isolated medial wall and floor fracture in 24.9% & 20.97% respectively. The majority of patients had > 2 orbital wall fractures. However, 6.45% of patients had pan orbito-facial fractures. The majority of globe ruptures resulted in zone II (51.61%) and zone III (33.87%) injury. An intra-orbital foreign body was seen in 19.35 % of eyes. Surgical

intervention was done in 87.10% cases. The OTS correlated with final visual acuity (p<0.001).

Conclusions: Orbito-facial fractures with simultaneous globe rupture are vision-threatening conditions and usually required a multi-specialty treatment approach. This study highlights that zone of injury, OTS, number of orbital wall fractures and RAPD are the most important prognostic factors.

Outcome of Injection Botulinum Toxin in Blepharospasm

First Author: Malita AMATYA
Co-Author(s): Ben LIMBU, Purnima RAJKARNIKAR STHAPIT, Rohit SAIJU

Purpose: To find out the outcome of injection botulinum toxin type A in blepharospasm.

Methods: It was a hospital-based prospective study conducted on patients diagnosed with benign essential blepharospasm (BEB), meige syndrome (MS) and hemifacial spasm (HFS) by an oculoplastic surgeon at the oculoplasty department OPD, Tilganga Institute of Ophthalmology, within one year period from December 2018 to November 2019. 43 patients who fulfilled all the inclusion criteria were enrolled. The patients had been explained about the study and informed consent was taken. After taking all standard precautions for botulinum toxin injections, 6 to 8 sites for injecting 2.5 to 5 IU of the toxin were given. All the patients were evaluated before and after injections according to Jankovic spasm grading and improvement in functional impairment scale and followed on one week, one month, three months and when the symptoms reappeared.

Results: A total of 43 cases which included 32 cases of benign essential blepharospasm, 9 hemifacial spasm and 2 meige symdrome. The mean Jankovic severity score was 3.51 +/- 0.51 (range 3-4). The mean improvement in functional score was 2.60 +/- 0.54 (range 1-3), was statistically significant (p-value <0.001). The effective period of injection was 130 +/- 20.82 (93 - 189) days. 38 patients had repeated injections after the reappearance of symptoms. 4 patients had side effects of redness and hematoma at one site.

Conclusions: Botulinum toxin type A is effective in the management of benign essential blepharospasm.

Outcome of Surgical Technique Using Bioceramic Implants

First Author: Alexander Gerard GUNGAB
Co-Author(s): Reynaldo JAVATE

Purpose: The study aims to assess the technique and surgical outcomes of patients who received Bioceramic implants.

Methods: This is a retrospective chart review of patients who received Bioceramic implants from a single surgeon at a single institution. Data gathered include age, gender, laterality, and indication for orbital implantation.

Results: Eight patients who underwent enucleation received Bioceramic implant. The number of patients was equally divided in both genders with the median age being 62 years old. The leading indication for surgery is Phthisis bulbi (75.0%) with lateralization on the right eye (87.5%)

Conclusions: The use of bioceramic implant is ideal for anophthalmic sockets due to its better compatibility created by its bioinert property and better fibroblast growth.

Periorbital Necrotizing Fasciitis in a Pediatric Patient

First Author: Elyse Dorothy ANSELMO
Co-Author(s): Sandra TAN, Marco TUMALAD

Purpose: To describe the presentation, management and outcome of a case of periorbital necrotizing fasciitis in a 2 year old.

Methods: A case report.

Results: A 2 year old female presented with tense dark discoloration of the right upper eyelid, erythema and swelling of bilateral periorbital areas, crossing over the central nasal bridge area, and extending to both malar areas, accompanied by fever, incessant crying and irritability, progressing in severity over 24 hours. She was started on empiric intravenous antibiotics and anti-inflammatory medications. Progression of condition despite medications prompted incision biopsy of both periorbital areas. Intra-operatively, a white, caseous avascular plane, in between the skin and tarsal plate, crossing over the nasal bridge was noted, and subsequently debrided. Post-operatively, there was decreased erythema and edema of periorbital areas within a week, accompanied by notable improvement in her temperament. The surgical defect was allowed to granulate, with eventual shift to oral antibiotics. Histopathology results showed epidermal-dermal subcutaneous necrosis with dense neutrophilic infiltrates compatible with the diagnosis of necrotizing fasciitis.

Conclusions: Periorbital necrotizing fasciitis is rare in children. It is a life-threatening disease which develops rapidly and warrants immediate surgical intervention. Given the rarity of the condition, with a presentation that may be similar to pre-septal or orbital cellulitis, the diagnosis may not be the first consideration, particularly on early presentation. In pediatric patients, wherein verbal expression of symptoms may be limited, we must rely on the acute history, tell-tale signs of tissue discoloration, and temperament indicative of intense pain, accompanied by supporting blood work-up, and imaging.

Posterior Lamellar Tarsorrhaphy in Early Treatment of Severe Eyelid Trauma/ Burns

First Author: Sahil AGRAWAL
Co-Author(s): Deepsekhar DAS, Sujeeth MODABOYINA, Neelam PUSHKER, Pallavi SINGH

Purpose: In patients with eyelid trauma, it is imperative to ensure adequate closure of eye. Sometimes it is difficult to surgically close eyelids by conventional methods of tarsorrhaphy. We describe our experience of posterior lamellar tarsorrhaphy, done as an emergency procedure to rescue cornea in acute presentation of severe eyelid trauma.

Methods: This was a retrospective study done at a tertiary eye care hospital. We analyzed the patients with eyelid/facial trauma, with at least one eyelid margin lost to injury, where posterior lamellar tarsorrhaphy was chosen over the conventional methods of tarsorrhaphy for eyelid closure. Primary outcome measure was improvement of visual acuity and ocular surface.

Results: Eight patients with burns/trauma with extensive eyelid and periorbital tissue loss were studied. All were male patients with age range, 8 – 59 years. All except one patient presented within few hours to 4 days of injury. All patients had associated severe lagophthalmos with ocular surface injury. Due to traumatized and/or loss of extensive periorbital tissues, reconstruction using flap or grafting procedure did not seem a viable option. Posterior lamellar tarsorrhaphy with mobilisation advancement of posterior

lamellae flap not only protected the globe but also led to significant vision recovery.

Conclusions: Our novel approach of performing posterior lamellar tarsorrhaphy in acute injury patients with extensive loss of eyelid and periorbital tissues helped in salvaging the globe both anatomically and functionally. Because of the inherent iatrogenic damage to eyelid margin, the procedure should be considered strictly in such small subset of patients.

Recurrent Skip Ulcers of the Socket Post-Radiation

First Author: Priyanka GOLHAIT
Co-Author(s): Ruchi GOEL, Shweta RAGHAV

Purpose: To present a case of radiation-induced necrosis of the socket post-radiotherapy for osteosarcoma of maxilla.

Methods: A 26-year-old male presented to the OPD with left orbital and maxillary defect. He had a history of extended exenteration and adjuvant intensity-modulated radiotherapy for chondroblastic osteosarcoma of maxilla. He was planned for magnetic ocular prosthesis. He was subjected to hyperbaric oxygen therapy and prophylactic antibiotics for tissue healing and good placement of metallic implants. In the second stage, the osseointegrated implants were exposed. During follow-up, the patient developed diffusely scattered necrotic ulcers in the socket walls for which antibiotics were given based on antibiotic sensitivity. However, there was a recurrence of the lesions at new sites. Non-contrast computed tomography (NCCT) was done to rule out post-radiation osteomyelitis and osteoradionecrosis.

Results: A trial of hyperbaric oxygen therapy was given with antibiotic therapy and daily saline irrigation. Nutritional supplementation was given in addition. The healing abutment was removed and implants submerged to accelerate healing. The patient responded well to the therapy and the lesions gradually healed.

Conclusions: Radiation therapy is one of the mainstays in the management of maxillofacial malignancies. It may cause soft tissue loss and compromise the local blood supply and healing capacity, leading to a dry socket thus exposing the underlying bone with resultant ulceration and necrosis. Hyperbaric oxygen therapy has been found to be promising in improving surgical outcomes. It promotes angiogenesis and increases oxygen supply, inducing fibroblastic proliferation and the healing capacity of the tissue. Nutritional supplementation as an adjunct is helpful in early recovery.

Retained Intraorbital Wooden Foreign Body with Discharging Sinus

First Author: Riffat RASHID
Co-Author(s): Farzana AFZAL, Nazmul HAQUE ROBI, Syeed KADIR, Sadia SULTANA

Purpose: To emphasize the potential complications of a retained orbital wooden foreign body and the rationale of a surgery.

Methods: This retrospectively analyzed 48 cases of intraorbital wooden foreign bodies managed at the Department of Oculoplasty, from January 2014 to December 2019. All patients had a history of injury and underwent orbital CT scan examination before surgery. Surgery was performed under general anesthesia with orbital wound debridement and suture, as well as exploration and removal of wooden foreign bodies. Patients were followed up for one year post-operatively.

Results: Total patients were 48, male 40 (83.4%) and female 8 (16.6%). Age ranging

from 3-60 years (mean 17.5 years). Right eyes were 20 (41.6%), left eyes 28 (58.4%). The presenting features were proptosis 38 (79.0%), ophthalmoplegia 22 (45.8%) and discharging sinus 41 (85.5%). H/O trauma with removal of orbital foreign body were done in 100% cases. The interval between injury and surgery was ranging from 2-6 months. Operations were performed via primary wound approach in 33 (68.8%) cases, conjunctival approach in 4 (8.2%) cases, and anterior orbitotomy in 11 (23.0%) cases. The length of foreign bodies ranged from 1.0 cm to 4.0 cm. Four (8.2%) cases had incomplete removal of foreign bodies, 2 cases extrude spontaneously and 2 cases received a secondary surgery. One (2.0%) patient developed post-operative conjunctival granuloma.

Conclusions: Retained orbital wooden foreign bodies is complex. An initial good history-taking, keen clinical observation and high index of suspicion, coupled with CT scan orbit, are necessary to make a correct diagnosis. Surgical exploration should be extensive and foreign bodies must be removed.

Retained Peri-Orbital Foreign Body in a Child following Trauma: A Rare Case Presentation

First Author: Zulhisham MOHMAD
Co-Author(s): Shatriah ISMAIL

Purpose: To report a rare presentation of chronic retained peri-orbital foreign body in a child following a history of trauma.

Methods: A case report.

Results: A 4-year-old boy presented with non-resolving left upper lid swelling for 2 months. There was no pain or redness associated with swelling. There was no decrease in vision. Further history revealed there was history of fall which was not witnessed by adults. The child suffered a small forehead laceration which was sutured at a nearby district hospital. There was no laceration at the lids but left upper lid swelling was noted at the time. Upon examination, vision for both eyes was 6/9. There was a hard and mobile swelling in the left upper lid measuring 2.5cm. There was mild ptosis but no tenderness or erythema. A small scar was noted at the forehead about 1cm superonasal to the eyebrow. Apart from the left upper lid, the anterior and posterior examinations were unremarkable. Contrast Enhanced Computed Tomography (CECT) orbit revealed linear dense material at the left periorbita with no collection. Surgical exploration revealed a pen tip measuring 2.1 cm in length which was situated between the preseptal fat and orbicularis muscle. The pen tip and surrounding granuloma were removed. The child recovered well following the surgery and a course of antibiotics.

Conclusions: This case highlights that a foreign body may be embedded further away from the initial entry wound. Thorough history-taking and examination are imperative. The use of CECT is helpful in diagnosis and planning for its management.

Risk Factor Analysis for the Postoperative Visual Outcome in Cornea Laceration Patients

First Author: Muhammad ADINEGARA
Co-Author(s): Kentar ARIMADYO, Sri INAKAWATI, Trilaksana NUGROHO, Raja ERINDA

Purpose: This study aims to analyze the risk factors for postoperative visual acuity in corneal laceration patients.

Methods: The design was cohort retrospetive. All subjects had corneal laceration and corneal repaired surgery. Demographic data, grading of

laceration, etiologies, duration of trauma, OTS (ocular trauma score), location of the incident, preoperative visual acuity and postoperative visual acuity were obtained from medical records. Incomplete data and posterior segment abnormalities were excluded in this study. All data are processed using computerized formulations.

Results: Twenty-three patients had corneal laceration and cornea repaired surgery. The demographic results obtained by the male patients was 87% with the most common age range was 41-50 years (21.7%). Grade 4 corneal laceration was 69.6%, sharp penetrating trauma resulted in 34.8%, time to hospital <12 hours was found in 82.6%, 43.5% having OTS score 2, 34.8% of trauma occurred at home. Visual acuity preoperative and postoperative with blind category (VA <3/60) was 86.9% and 52%. The result of multivariate analysis showed the risk factor that affected the outcome of postoperative visual acuity was OTS (p value 0.013).

Conclusions: The most affected risk factor for the patient's visual acuity outcome was OTS (p 0.013), 8 of 23 patients had improved visual acuity post-operative.

Risk Factors for Orbital Floor Fractures in Cases of Work-Related Ocular Trauma

First Author: Aditya UPPULURI
Co-Author(s): Neelakshi BHAGAT, Marco ZARBIN

Purpose: To identify risk factors for orbital floor fractures (OFFs) in cases of work-related ocular injury in hospitalized adult patients (19-64 years).

Methods: This study utilizes the 2007-2014 National Trauma Databank (NTDB), which compiles data from 900+ contributing trauma centers and codes for diagnoses and etiologies of trauma using ICD-9 codes. IBM SPSS 23 and R package version 3.4.3 were used for statistical analysis.

Results: Between 2007 and 2014, 11,097 cases of work-related ocular trauma were included in the NTDB. Of those cases, 4278 (38.6%) had OFFs. The most common etiologies of trauma observed in OFFs were accidental falls (39.8%), motor vehicle accidents (16.5%), and collision with another object/person (9.1%). Of the OFFs, 87.2% involved a concurrent fracture of another facial/skull bone. Spinal/trunk fractures (30.4%), upper extremity fractures (28.4%), lower extremity fractures (13.1%), and intracranial hemorrhages (16.3%) were other commonly seen injuries in cases of OFF. On multivariable regression analysis, older age (40-64 years of age) (RR = 1.09), male gender (RR = 1.22), accidental falls (RR = 1.50), trauma from falling objects (RR = 1.34), involvement in an unarmed fight (RR = 1.63), assault by a blunt object (RR = 1.59), and injury caused by animals (RR = 1.63) were risk factors for OFFs.

Conclusions: Over a third of injuries involved fracture of the orbital floor. The plurality of injuries was due to accidental falls. Over 80% of OFFs involved additional facial/skull fractures. Assault by a blunt object, involvement in an unarmed fight, and injuries caused by animals had the strongest association with OFFs.

Role of B-Scan Ultrasonography in the Diagnosis of Proptosis

First Author: Pallavi SINGH
Co-Author(s): Mandeep BAJAJ, Rachna MEEL

Purpose: To evaluate the role of B-scan ultrasonography (USG) in the diagnosis of proptosis.

Methods: Forty eyes of 37 patients with proptosis were evaluated with USG to look for location, consistency, extent, and relationship of the lesion to adjacent structures. Correlation with CT and MRI was performed when available.

Results: USG was successful in predicting location in 90%, consistency in 92%, extent in 86%, and adjacent relations in 90% of the cases. The sensitivity, specificity, PPV, NPV, and accuracy of ultrasound, when compared to CT and MRI, was 99.2%, 94.2%, 98.8%, 95.9% and 95.2% (p-value < 0.05).

Conclusions: B scan USG is an excellent initial modality for the evaluation of cases with proptosis. It correlates greatly with higher cross-sectional imaging modalities and forms a major basis for management decisions in a significant number of cases. We highlight the utility of USG in proptosis evaluation, especially for primary centers with little access to advanced imaging.

Role of Cutaneous Incision and Drainage by a General Ophthalmologist in Prompt Management of Orbital Abscess with Impending Compressive Optic Neuropathy: A Case Report

First Author: Tuan Mohd Amirul Hasbi TUAN PAIL
Co-Author(s): Haslinda A RAHIM, Noor Amalina SAIDI, Evelyn TAI LI MIN, Akmal ZAMLI, Shawarinin JU

Purpose: To report a case of orbital abscess which improved from cutaneous incision and drainage.

Methods: A case report.

Results: Orbital abscess is an extension of periorbital infection which could be potentially sight-threatening or even life-threatening. The rapid course of progression warrants prompt management, often with combination of antimicrobial therapy and surgical drainage. However, surgical drainage involves orbitotomy, which commonly performed by the oculoplastic surgeon or an endoscopic approach by the rhinologist. General ophthalmologist too could play a part in draining the abscess cutaneously. We highlight a case of orbital cellulitis complicated with orbital abscess evidenced radiologically in a 41-year-old female with no comorbidity. She improved following cutaneous incision and drainage along with intravenous ceftriaxone and warm compression. Her pus yielded a positive culture of Staphylococcus aureus in an absence of preceding trauma and infection of the eyelid, adjacent sinus, or dental cavity. The decision for cutaneous incision and drainage was made following slow response of antimicrobial after 24 hours, progressive painful erythematous eyelid swelling, and deterioration of vision without detected relative afferent pupillary defect.

Conclusions: Cutaneous incision and drainage deserves serious consideration in prompt management of orbital abscess in appropriate cases.

Selective Apical Endoscopic Orbital Decompression via Transcaruncular Approach for Compressive Optic Neuropathy Secondary to Thyroid Eye Disease: A Case Report

First Author: Alexander Gerard GUNGAB
Co-Author(s): Reynaldo JAVATE

Purpose: To demonstrate the advantages and surgical outcomes of endoscopic orbital decompression via transcaruncular approach for compressive optic neuropathy secondary to thyroid eye disease.

Methods: A case of a 61-year-old male,

hyperthyroid, underwent endoscopic bony decompression of the right orbital apex via transcaruncular approach with removal of the posteromedial ethmoid and posteromedial inferior orbital walls. Presented with a 1-month history of progressive blurring of vision, right with moderate proptosis. On orbital CT scan, there was enlargement of the medial and inferior recti muscles. Pre-operative visual field perimetry revealed generalized depression of the right eye. Outcome measures were improvement in visual acuity, visual field, reduction of proptosis and no postoperative diplopia.

Results: Visual acuity of the right eye was 20/400 improved to 20/40 with improvement in Ishihara color vision test score 29 days post-operatively. Visual field perimetry showed marked improvement of the generalized depression. Proptosis decreased from 19mm to 16mm. No post-operative diplopia. Orbital CT scan postoperatively revealed no inferomedial shift of orbital structures. There is prolapse of fat into the posteromedial inferior and posteromedial (ethmoid) wall of the orbit, right.

Conclusions: Endoscopic decompression via transcaruncular approach for compressive optic neuropathy secondary to thyroid-associated orbitopathy is a successful technique. This allows medial orbital wall and apex access without an external scar. Decompression of the orbital apex including the ethmoid posteromedial wall and posteromedial inferior orbital wall spares the anteromedial and anteroinferior orbital walls that are typically removed in a standard inferomedial decompression. Endoscopy empowers better visualization of anatomy and helps perform surgical maneuvers with better precision.

Silicone Tubing for Complete Nasolacrimal Duct Obstruction in Adult

First Author: Ariunbold TUMENJARGAL

Purpose: To evaluate outcomes of adult complete nasolacrimal duct obstruction by relief silicone intubation.

Methods: The subjects of this study involved 18 patients from September 2017 to October 2019. Patients were diagnosed based on signs and clinical symptoms including tearing. Patients were reviewed by probing test. Patients who received unilateral nasolacrimal duct silicone tubing, adult complete nasolacrimal duct obstruction were enrolled in this retrospective study.

Results: A total of 18 patients ranging from 40 to 83 years, 12 (66.7%) were female and 6 (33.3%) were male. The mean follow-up period was 2 years (3months, 6 months, 12 months, 24 months). 16 patients (88.9%) with successful outcomes with silicone tubing and 2 patients (11.1%) with unsuccessful outcomes. No severe intraoperative and post-operation complications.

Conclusions: Complete nasolacrimal duct obstruction patients using silicone tubing is the most effective surgical procedure. The success rate was high with silicone tubing.

Steroid Response after Decompression Surgery for Compressive Optic Neuropathy Related to Thyroid Eye Disease

First Author: Chin-te HUANG

Purpose: To report a female patient with persistent uncontrolled intraocular pressure (IOP) even after orbital fat decompression for

compressive optic neuropathy.

Methods: A case report.

Results: This 63-year-old female patient has had type 2 diabetes mellitus for 10 years. She was diagnosed with hyperthyroidism for 6 months. She presented to our clinic due to worsened vision and discomfort in her bilateral eyes for 1 month. On examination, her corrected visual acuity was 20/30 in her right eye and 20/50 in her left eye. The IOP was 29 mmHg in the right eye and 54 mmHg in the left on her first visit. Her IOP returned to normal limit temporarily after intravenous injection of mannitol, but got worse again on every visit. Then, she was admitted for steroid pulse therapy for the probable compressive optic neuropathy, but in vain. Therefore, 1 week later, orbital fat decompression was arranged with periocular injection of steroid at the end of surgery. Unanticipated higher IOP over 60 mmHg in her bilateral eyes was noted with no evidence of retrobulbar hemorrhage on post-op day 1. At this point, we believed that this patient is a steroid responder. Under the cover of topical anti-glaucomatic agent, her IOP returned to normal range after stopping the use of steroid.

Conclusions: Steroid response should be taken into account when we meet a patient with unexpected high IOP after decompression surgery for compressive optic neuropathy.

Success in the Use of Propanolol for Early Treatment of Lymphatic Malformation in a 2-year-old Child. A Case Report and Review of Literature

First Author: Alex SUA

Purpose: To report a case of lymphatic malformation (lymphangioma) in a 2-year-old boy masquerading as lid abscess.

Propanolol which is broadly used for infantile hemangioma was found to be also effective in the resolution of lymphangioma.

Methods: Patient was started on oral propranolol at an initial dose of 1mg/kg/day in 3 divided doses after clearance from the cardiologist. Cardiac monitoring including heart rate were done during the entire hospital stay and follow up visits. The size and color of the tumor were assessed at Day 1, Day 3, Day 7, Day 14, Day 28 and 2 months after.

Results: From an initial size of 30 x 20 x 6 mm, the tumor was reduced in size by 30% in 4 days, 70% in 10 days, 80% in 2 weeks and 90% in one month. Color of the lesion also improved from chocolate brown to light flesh colored skin tone. Complete resolution was achieved after 2 months of propranolol therapy.

Conclusions: Propanolol at a dose of 1 mg/kg/day shows a dramatic response after 3 days and complete resolution after 2 months in the treatment of lymphangioma. The mechanism of action may be similar to its effect in infantile hemangioma targeting the vascular endothelial growth factors. This anti-angiogenic activity shows potential in the early treatment of vascular malformations such as lymphangioma. Further studies are needed to confirm this treatment modality.

Surgical Management of Congenital Lid Coloboma Presenting at Different Ages

First Author: Nitika BERI
Co-Author(s): Rahul BHATIA, Gopal DAS, Nitish KUMAR, Pramod SAHU, Ankur SINGH

Purpose: To highlight the importance of different surgical techniques for two cases of congenital lid colobomas.

Methods: Congenital upper lid coloboma

presented at different age and location in two cases and needed different management individualised for both. In one case a 15-year-old female with right upper lid congenital coloboma involving middle one third of the lid underwent Cutler Beard surgery. The second stage was performed after 8 weeks. In another case, 1 year old female presented with right upper lid asymmetric coloboma involving more of medial aspect of lid, sparing the medial canthus. A Tenzel semicircular rotational flap with lid reconstruction was done. This approach was preferred because of the medially positioned lid defect and to prevent iatrogenic occlusion amblyopia from Culter Beard procedure.

Results: Both techniques individualised for the patients resulted in satisfactory cosmetic and functional outcomes. Photographic documentation will be provided in both the cases.

Conclusions: Meticulous planning and appropriate choice of surgical procedure for different cases of congenital lid coloboma can give excellent functional and cosmetic surgical outcomes. Cutler Beard procedure in young children can lead to iatrogenic occlusion amblyopia which must be avoided.

Tailored Surgical Approach for Primary Intraosseous Cavernous Haemangiomas of Zygomatico-Maxillary Complex

First Author: Aditi MEHTA
Co-Author(s): Ganesh Ch KURI, Shyam MOHAPATRA, Vatsalya VENKATRAMAN

Purpose: Primary intraosseous cavernous hemangioma (PICH) is a benign vascular neoplasm commonly affecting the vertebrae. Craniofacial PICHs are very rare and comprise less than 0.2% of osseous neoplasms of the skull. We report the surgical approaches and management of two cases of orbital PICH involving the zygomaticomaxillary complex.

Methods: A retrospective review of records of a tertiary level ophthalmic hospital of two histopathologically proven cases of PICH involving the ZMC.

Results: Case one was of a 20-year-old girl who presented with an eight-year history of right eye proptosis associated with swelling over the inferolateral orbital rim. Imaging was followed by pre-operative embolization of the lesion prior to en-bloc excision and reconstruction with bone and cartilage graft. The second case was of a 40-year-old lady who presented with a two-year history of a firm swelling over the left inferior orbital rim leading to fullness and reduced left palpebral fissure height. Treatment involved en-bloc excision of the lesion and reconstruction. Computed Tomography scans in both cases revealed osseous elements with internal hypodensities and enhancement of the non-osseous component. Histopathological examination confirmed the diagnosis of PICH in both.

Conclusions: Eccentric proptosis, swelling or asymmetry of long duration warrants orbital imaging. Radiological characteristics of intraosseous lesions with honeycombing of trabeculae may be suggestive of PICH. Pre-operative embolization can reduce the risk of intraoperative hemorrhage. Complete resection with primary reconstruction of the bony orbit results in resolution of symptoms with good functional and cosmetic outcomes. The choice for surgical incision is guided by the location and size of the lesion.

The Effect of Surgical Resection Combined with Glucocorticoid on Benign Lymphoepithelial Lesions of Lacrimal Gland

First Author: Fuxiao LUAN
Co-Author(s): Jianmin MA

Purpose: By following up the LGBLEL patients who are treated with glucocorticoid after surgical resection and identifying the factors affecting the prognosis, we justify the effectiveness of this therapeutic approach and analyze the factors affecting the prognosis of LGBLEL patients.

Methods: We recruited 160 patients who were diagnosed with LGBLEL by pathological histology from August 2010 to August 2019 in our experimental group. With the following up of 160 LGBLEL patients after surgical resection combined with glucocorticoid therapy, we assessed the feasibility of the therapeutic approach to LGBLEL, calculating the cure rate and recurrence rate of this treatment for LGBLEL. 90 cases of LGBLEL patients were divided into two groups according to relapse (17 cases) and non-relapse (73 cases), and the factors affecting prognosis of LGBLEL patients were analyzed.

Results: The follow-up time of all LGBLEL patients was distributed between 6.75 and 117.10 months, with a median follow-up time of 52.18 months. The recurrence rate was 14.2%, and the cure rate was 85.8%. The incidence of intraoperative complications was 3.4%, early postoperative complications was 1.4%, postoperative mid-long-term complications was 4.1%. Multi-factor logistic regression analysis of LGBLEL relapse and non-relapse groups showed that IgG4 was an independent factor for LGBLEL ($P < 0.05$). The peripheral blood IgG4 level of patients in LGBLEL relapse group was significantly higher than that of non-relapse group ($t = 2.210$, $P < 0.05$).

Conclusions: Surgical resection combined with glucocorticoid treatment for LGBLEL is safe, feasible, and effective. And IgG4 is an independent factor affecting the prognosis of LGBLEL patients.

The Rare Presentations Masking an Underlying Choroidal Melanoma: Sterile Orbital Cellulitis and Secondary Glaucoma

First Author: Michelle DAGTA
Co-Author(s): Jan Patrick CHU, Mariel Angelou PARULAN, Cancio Lorenzo R

Purpose: To present a rare case of choroidal melanoma mimicking as sterile orbital cellulitis and secondary glaucoma.

Methods: A 48-year-old Filipino female previously diagnosed with bullous retinal detachment, right eye suddenly presented with severe pain with periorbital swelling, redness, and poor vision. Physical exam revealed diffuse lid swelling, discharge, chemosis, grade 4 hyphema, elevated intraocular pressure, ophthalmoplegia, and no view of the posterior segment. B-scan ultrasound revealed a dome-shaped, acoustically hollow structure in the superior retina with low-to-mid spikes on A-scan. CT scan with IV contrast showed a hyperdense, lobulated lesion in the supero-lateral half of the right globe with enhancement. After controlling the ocular inflammation and intraocular pressure with antibiotics, anti-inflammatory and anti-glaucoma medications were prescribed and enucleation was done. Histopathology revealed a 2 x 2 x 2 cm intraocular mass occupying the entire right globe containing epithelioid melanoma cells without extrascleral extension. The final diagnosis revealed stage III epithelioid choroidal melanoma with sterile

orbital cellulitis, secondary glaucoma, and exudative retinal detachment.

Results: Sterile Orbital cellulitis is a rare sequelae of choroidal melanoma that can mask the underlying intraocular tumor. Choroidal melanoma may also rarely mimic any type of secondary glaucoma and the most common mechanism is neovascularization. Both rare manifestations of choroidal melanoma are believed to be a result of ischemic tumor necrosis.

Conclusions: Choroidal melanoma is a locally destructive disease with a poor prognosis. It is complicated further by masquerading as sterile orbital cellulitis and secondary glaucoma. A high index of suspicion is therefore needed to prevent misdiagnosis and delayed management.

Timolol 0.5% Gel in Steroid Refractory and De Novo Conjunctival and Periocular Pyogenic Granulomas

First Author: Sujeeth MODABOYINA
Co-Author(s): Sahil AGRAWAL, Mandeep BAJAJ, Deepsekhar DAS

Purpose: To see the efficacy of the use of gel formulation in steroid refractive and de novo pyogenic granulomas.

Methods: In this retrospective interventional study, the authors retrospectively evaluated the records of patients with conjunctival and periocular pyogenic granulomas who were treated with topical timolol gel in a tertiary eyecare hospital in northern India from January 2019 to December 2020. The clinical features were studied, entered in MS excel and the data was evaluated.

Results: The study found 40 individuals with 41 pyogenic granulomas. There was a male predilection (3:2), and the age of presentation varied from 6 months to 35years. The most common aetiology was trauma (15/41) followed by surgery (11/41) and chalazion (9/41). The most common morphologic type was sessile. 68.29% of all patients showed a total response and 14.63% showed a partial response. Pedunculated morphology had a better response than sessile variants. The mean response time for complete resolution of PF was 3.1 weeks. There were no obvious systemic or ocular side effects.

Conclusions: Timolol gel 0.5% is an effective option is the management of all types of conjunctival pyogenic granulomas in pediatric and adult age groups. There are no obvious ocular and systemic side effects using the medication in the same age group.

To Study the Long-Term Outcomes of Bleomycin Sclerotherapy for Conjunctival Lymphatic Malformations

First Author: Priyanka WALVEKAR
Co-Author(s): Tarjani DAVE

Purpose: To describe the clinical presentation and long-term outcomes of treating predominantly conjunctival VLM with transconjunctival bleomycin sclerotherapy.

Methods: A retrospective interventional study of 15 eyes having conjunctival VLM and treated with non-image guided transconjunctival bleomycin sclerotherapy (1IU/ml) was analyzed. The response was assessed as less than 25% regression, 25-50% regression, 50-75 % regression, >75% to complete regression of the lesion

Results: The mean age at presentation was 17 years (range 3- 59). Isolated conjunctival component seen in 3 eyes, conjunctival & lid components in 2 eyes, and conjunctival, eyelid and orbital components in 10 eyes. Based on

clinical appearance conjunctival components were sub-classified into frog egg vesicular morphology (3 eyes), conjunctival mass (10 eyes) and lymphangiectasia (2 eyes). The average units of bleomycin injected per patient was 9IU (range 1–32 IU) and the average number of sittings was 2 ± 1 (median 2, range 1–4). Complete regression of conjunctival component seen in 5 eyes (33.33%) and minimal residual lesion in 8 eyes (53.33%). A significant residual lesion was seen in one eye and recurrence was noted in one eye after long-term follow-up. Adverse reactions included moderate grade of inflammation in 5 eyes (33.33%), periocular pigmentation in 5 (33.33%) and restricted extraocular motility in 4 eyes (26.66%). There was a sustained regression of the lesion over a mean follow-up duration of 12.4 months

Conclusions: 55% of eyes with conjunctival VLM showed good response with minimal residual lesion and 33% showed complete regression with bleomycin and no serious adverse events. The results were promising over mean follow-up of 12.4 months.

Unilateral Ptosis: Diverse Etiologies

First Author: Gayathri SELUARIZE
Co-Author(s): Fazliana ISMAIL, Lathalakshmi THANGAVELU

Purpose: To demonstrate various presentation of adult-onset of ptosis with good vision.

Methods: A case series.

Results: Case 1 is a 35-year-old lady with no known medical illness presented with left eye ptosis for 2 weeks. On examination; visual acuity was 6/9, partial ptosis of left eye, no anisocoria with normal optic nerve function. Contrast enhanced CT Brain(CECT) showed contrast enhancing left lacrimal gland and superior rectus tendon. She was diagnosed as left Idiopathic Orbital Inflammatory Disorder(IOID). Case 2 a 22 years old lady with no known medical illness presented with left eye ptosis for 2 weeks. On examination; visual acuity was 6/9, left upper eye lid fullness with ptosis, diplopia on left lateral gaze and optic nerve function were normal. B scan showed posterior scleral thickened and CECT Brain showed left medial and inferior rectus tendon thickened. She was diagnosed as left eye posterior scleritis and IOID. Case 3 is a 57-year-old lady with underlying diabetes, hypertension and a history of multifocal infarct presented with left eye ptosis for 2 days. She is on oral aspirin and denies any recent trauma. On examination; visual acuity was 6/9, partial ptosis of left eye, restricted extraocular movements, absence of bruit with normal optic nerve function.CECT Brain showed left orbital hematoma involving superior rectus extending into intra-conal space.

Conclusions: Acute ptosis may indicate serious pathology. Imaging aids in disclosure of various etiology of ptosis. Thorough clinical examination and history taking are of extreme importance to elicit leading signs towards the diagnosis.

Upper Eyelid and Eyebrow Dimensions in Adult Filipinos

First Author: Elaine Marie OMANA
Co-Author(s): Lourdes ANG, Franklin KLEINER, Maria Suzanne SABUNDAYO

Purpose: To determine the values for upper eyelid and eyebrow among adult Filipinos and the effects of age and sex.

Methods: This is a descriptive study involving 75 Filipino adults who were recruited from a single tertiary government hospital in the Philippines. Data included age and sex,

while measurements of the pretarsal skin height (PSH), eyelid crease height (ECH) and eyebrow height (EBH) by a single observer, with the average of an individual's eyes used as the representative measurement. An inter-eye correlation coefficient was calculated. The subjects were categorized into 4 age groups (early, early middle, late middle, and late adulthood) and according to gender for statistical analyses. All measurements were compared across age groups using Analysis of Variance (ANOVA) and between sexes using t-test.

Results: This study included 43 males and 32 females. Mean PSH measured was 4.5 mm; ECH was 5.9 mm, while EBH was 10.4 mm. Sex-related differences include greater PSH values in males than females across all age groups, significantly in late adulthood ($p = 0.046$); while both ECH (p values = 0.008) and EBH (p value = 0.016) measurements were greater in females of all age groups except in the late middle adulthood. An age effect was significantly observed in female EBH values ($p = 0.016$). A high degree of inter-eye correlation was observed ($r = 0.94$ to 1.00).

Conclusions: Filipinos have larger PSH and smaller ECH. Sex-related differences were identified in PSH and ECH. Only EBH in female subjects have shown a significant age effect.

Pediatric Ophthalmology and Strabismus

A Long-Standing Traumatic Sixth Nerve Palsy: Is Augmented Hummelsheim Procedure Effective?

First Author: Randy SARAYAR
Co-Author(s): Anna PUSPITASARI BANI, Gusti Gede SUARDANA

Purpose: Long-standing sixth cranial-nerve (CN VI) palsy could cause debilitating head posture. Augmented Hummelsheim technique is one option of muscle transposition procedures for persistent abducens nerve palsies, with a reported effectiveness to correct 43Δ±5Δ deviation.

Methods: A 43-year-old patient came with right compensatory face-turn and neck pain due to CN VI palsy after motorcycle accident 16 years ago. The right eye demonstrated inability to move vertically and across midline, with a -5 abduction, -5 supraduction, and -5 infraduction. Krimsky was 60Δ esotropia. Forced duction test was negative. Due to the large angle of deviation and a -5 abduction, the patient underwent an augmented Hummelsheim procedure by recessing of both halved-vertical rectus muscle at 4 mm from insertion combined with medial rectus recession on the right eye.

Results: Three months postoperatively, esotropia reduced to 40Δ, abduction improved from -5 to -4, but with a significant clinical improvement in face-turn.

Conclusions: The Hummelsheim procedure can be less effective in treating deviation due to persistent CN VI palsy, especially when the case is complicated by vertical recti muscle involvement, even with additional Foster or Wright suture and medial rectus recession. Nonetheless, clinical improvement in face-turn and patient quality of life was achieved in our case.

An Unusual Case of Recurrent Exotropia

First Author: Jung LO
Co-Author(s): Hsiu-mei HUANG, Hsu-huei WENG

Purpose: To report a patient of paracavernous sinus neoplasm presenting as recurrent exotropia after primary strabismus surgery.

Methods: A case report.

Results: A 25-year-old man was referred to us due to recurrent exotropia of his right eye after strabismus surgery 3 years ago. Before referral to our hospital, he experienced right eye exodeviation and binocular diplopia when he was 22 years old. Ocular examination at that time revealed right eye 30 prism diopters (PD) exodeviation and a severe limitation on right eye adduction, leading to 45 PD exodeviation when left gaze. The initial diagnosis was constant exotropia of his right eye, therefore, he underwent a unilateral recession-plication surgery of his right eye. However, 1 month after the operation, he noticed right eye exodeviation again with limitation on adduction. He lost to follow-up until recently he suffered from severe right eye exodeviation, so he was referred to our hospital. Ocular examination revealed right eye exotropia with limited ocular motility, mild ptosis and pupil dilation, therefore, a right oculomotor nerve palsy was impressed. Magnetic resonance imaging (MRI) with angiography (MRA) of the brain showed a small paracavernous sinus extra-axial nodule without any vascular malformation, and a neuroma with differential diagnosis of meningioma was highly suspected. Radiotherapy will be arranged for this patient soon.

Conclusions: Recurrent exotropia after strabismus surgery is not rare, but ocular motility disorders including oculomotor nerve palsy or intracranial lesion should be considered. Ocular examination with neuroimaging may be mandatory for patients with recurrent strabismus.

Assessing the Validity of Guardian-Obtained Visual Acuity Measurements in Children with Amblyopia

First Author: Talia BURSTEIN
Co-Author(s): Basak CAN, Maryo KOHEN, Tinh LE, Faruk ORGE

Purpose: We assessed the reliability of guardian-obtained visual acuity (VA) measurements compared to clinic-obtained measurements in amblyopic children.

Methods: Inside Out Medicine is an online platform that improves tracking of amblyopia treatment by creating a virtual “log” where guardians record treatment compliance. The platform gives guardians step-by-step instructions for assessing the child’s VA at home via Eyehandbook app or printable eye charts. Providers at an urban, academic center enrolled eligible patients (amblyopia patients undergoing occlusion or penalization therapies). Providers instructed guardians to measure and report the patient’s VA within 14 days of the visit using the platform. We recorded baseline characteristics and compared home-based VA measurements to corresponding clinic-obtained measurements utilizing the intraclass correlation (ICC) coefficient. We removed an extreme outlier, (20/400 vs 20/50), as no other set of measurements differed by more than 3 lines, with an average difference of .59 lines.

Results: 19 patients underwent parent-obtained VA measurements within 14 days of a clinic visit, for a total of 76 individual eye measurements. The cohort had an average age of 5.68 years (std = 2.06), contained 47.4% females, and right eye was amblyopic eye in 63.2% of patients. ICC comparing clinic-

obtained and home-obtained VA measurements was .489 (p=.006) for amblyopic eyes, .360 (p=.038) for non-amblyopic eyes, and .521 (p<.001) for the entire sample.

Conclusions: In this pilot study, home-obtained VA measurements in amblyopic children correlated significantly with clinic-obtained values in both non-ambylopic and amblyopic eyes, suggesting possible utility of home-obtained VA testing for tracking changes over time between clinic visits.

Assessment of Strabismus Re-Operation Rate and Surgical Factors

First Author: Amar PUJARI
Co-Author(s): Swati PHULJHELE, Rohit SAXENA, Pradeep SHARMA

Purpose: To identify the rate, type and other surgical factors strabismus re-operation from a large set of data.

Methods: A total of 4100 strabismus patients' data operated between 2014 to 2017 were systematically evaluated. Primary diagnosis, under or over correction, the number of muscles operated at each surgery and the mean duration between each surgery were noted.

Results: Out of 4100 patients, a total of 422 patients underwent re-surgery. Amongst these only 317 horizontal cases were included. The average age was 19.22 years and 217 patients were male. The most common indication for re-surgery was under-corrected exotropia (n=141) followed by under-corrected for esotropia, (n=95) and over-corrected esotropia (n=68) and over-corrected exotropia (n=13) in descending order. The mean number of muscles operated during first, second, third and fourth surgery were 1.99, 1.53, 1.52, and 1 respectively. The mean duration between first to second (2.2 yrs), second to third (1.5 yrs) and third to fourth (1.3 yrs) were also noted.

Conclusions: A total of 10.29% patients needed second, 0.60% third and 0.14% fourth surgery.

Awareness is the Key to Success-Analysis of ROP Awareness amongst Parents in South India

First Author: Bindiya C

Purpose: To study the awareness of ROP among parents in South India and the influence of educational modality (verbal, video, online) and literacy on ROP awareness among parents.

Methods: A questionnaire-based cross-sectional study was done including parents of premature babies who have been referred for ROP screening.

Results: There were 217 completed surveys. Most of the parents knew that ROP is an eye disease (83%,p<0.01) and prematurity is a risk factor (77%,p<0.01) of ROP. But the majority were unaware of risk factors like long term oxygen exposure (92%,p<0.017), low birthweight (67%,p<0.01) and did not know about complications of ROP like strabismus, amblyopia, glaucoma (p<0.01). It was found that parents' educational status and government referral hospitals have a positive association with the awareness about ROP.

Conclusions: This study demonstrates the need for improving awareness of parents about ROP.

Bilateral Internuclear Ophthalmoplegia Developing as a Manifestation of Dengue Fever and Treatment by Modified Nishidas: A Case Report and Review of the Literature

First Author: Neelam PAWAR

Purpose: To report bilateral internuclear ophthalmoplegia (INO) and surgical treatment by modified Nishidas.

Methods: Diplopia associated with INO severely impacts the patient's quality of life, orthoptic treatment usually fails and therefore appropriate surgical treatment should be considered. We here in report the unique case of a 25 year man with bilateral INO developing as manifestation of Dengue fever related encephalitis and its successful treatment by modified Nishidas procedure.

Results: This patient had large angle exotropia secondary to Dengue related INO. Our modified technique of transposition of the vertical recti (modified Nishidas) successfully corrected large-angle exotropia and also improved adduction in both eyes and obviates risk of anterior segment ischemia. Surgery for binocular internuclear ophthalmoplegia with exotropia in infectious cases may result in binocular restoration of function and diplopia free field. Dengue related INO may be considered as a acquired INO after Dengue fever.

Conclusions: Our modified technique of transposition myopexy of the vertical recti successfully corrected large-angle exotropia and also improved adduction without limiting abduction. Functional results can be achieved even in longstanding cases.

Bilateral Pupillary Membrane: An Uncommon Cause of Amblyopia in Pediatric Patient

First Author: Jung LO
Co-Author(s): Hsiu-mei HUANG

Purpose: Persistent pupillary membrane (PPM) is a remnant of tunica vasculosa lentis which normally regresses after birth. It may cause deprivational amblyopia when it does not regress and disrupts the central vision. Herein, we aim to present an amblyopic child with uncommon bilateral PPM who achieves vision 20/20 after our treatment.

Methods: A case report and literature review.

Results: A 6-year-old boy was referred to us due to left eye amblyopia. His past medical history was not contributory. His right eye vision was normal, but the best-corrected visual acuity was 20/100 of his left eye. Cycloplegic autorefraction of his both eyes revealed a refractive status of hyperopia +1.75/+4.75 and astigmatism –1.0/ -1.50, respectively. Ocular examination revealed membranes covering the pupillary area of both eyes, which caused disruption of the visual axis, especially his left eye. Lens status and fundus were partly obscured by those membranes. A clinical diagnosis of PPM was made, therefore, we started conservative treatment with full-time occlusion of his right eye, spectacles correction, topical mydriatic agents use for his left eye, and amblyopic training. One month later, his left eye corrected vision improved to 20/40, so we kept conservative treatment with a 3-month interval of follow-up. After 1 year, his left eye corrected vision improved to 20/20.

Conclusions: In summary, amblyopia caused by PPM can be treated with adequate conservative treatment with regular follow-up. Surgical interventions including excision

or laser-induced lysis are reported to be indicated if the vision does not improve after conservative treatment.

Botulinum Toxin Therapy in Thyroid Eye Disease-Related Strabismus: A Retrospective Observational Case Series

First Author: Cheuk Ling YIM
Co-Author(s): Sui Lam Stephanie CHEUNG, Chow PRUDENCE PO CHEE, Suhan Emily WONG, Jason YAM

Purpose: To evaluate the efficacy of Botulinum toxin (BT) therapy as a definitive or interim treatment in thyroid eye disease (TED)-related strabismus.

Methods: Operation records from January 2011 to June 2020 in a single eye center in Hong Kong were retrieved and screened. 17 patients were identified and the data extracted included smoking status, ophthalmic history, presence of diplopia, treatment course, angle of deviation, and whether subsequent strabismus surgery was required. Treatment success was defined as a reduction in angle to a degree that surgery is no longer required. Partial success is defined as a reduction in angle so that lesser amount of correction is needed in strabismus surgery. Transient improvement is defined as temporary improvement in the symptoms of diplopia after BT injection.

Results: 10 patients (58.8%) were benefited from BT injection. 2 patients achieved treatment success, 8 patients (47%) achieved partial success or transient improvement. Partial success and transient improvement were observed to be more frequent in groups with a larger pre-injection angle of deviation. Sex, smoking status of the patient, age at TED onset and BT injection, duration of TED, history of orbital radiotherapy or decompression surgery, the muscle injected and the number of injections did not seem to affect the treatment outcome.

Conclusions: BT serves as a useful interim treatment for patients with active TED and diplopia. Complete resolution of strabismus with BT alone is rare, but 58.8% of patients in our series showed partial or transient improvement in the angle of deviation which alleviated their symptoms.

Central Corneal Thickness and Intraocular Pressure Changes after Congenital Cataract Surgery: A Prospective Study

First Author: Jayeeta MAZUMDER
Co-Author(s): Mahesh CHATTOPADHYAY

Purpose: To evaluate the changes in central corneal thickness and intraocular pressure in infants and children aged 3 months to 12 years who had undergone congenital or developmental cataract extraction surgery.

Methods: Institution based prospective longitudinal study was carried out among patients with congenital or developmental cataract undergoing phacoaspiration and anterior vitrectomy. They had IOL implantation (pseudophakic group) or remained aphakic (aphakic group). The CCT and IOP were measured in all cases preoperatively and at 1 month, 6 months, and 12 months postoperatively.

Results: The study evaluated 50 eyes (50 patients). The mean pre-operative CCT was 553±29.29 microns and the mean preoperative IOP was 11.88±1.75 mm Hg. At 12 months postoperative follow-up, mean CCT was 580±35.84 microns and mean IOP was 16.24±3.24 mm Hg, the difference of which is statistically significant ($p<0.0001$). Also in patients kept aphakic, the mean CCT at post-

operative 12 months was greater (608±12.43 microns) than in pseudophakia (567±35 microns) and IOP was 19±3.8 mm Hg and 14.9±1.74mm Hg respectively.

Conclusions: Central corneal thickness increased in patients after 12 months of congenital or developmental cataract extraction with a significant increase in intraocular pressure.

Clinical Characteristics, Treatment and Risk Factor of Retinoblastoma Patients in Central Java, Indonesia

First Author: Raissa HARTANTO
Co-Author(s): Liana EKOWATI, Arnila Novitasari SAUBIG

Purpose: To determine clinical characteristics, treatment and risk factors of children with retinoblastoma in Central Java, Indonesia.

Methods: A retrospective study with a descriptive approach, conducted at Central Java using medical records of retinoblastoma patients from April 2018 to April 2021.

Results: Fifty-one cases (54 eyes) of retinoblastoma were obtained in this study which most patients were male (29 cases; 56.86%) and came from the coastal areas, while the location close to industrial areas was 26 cases (50.98%). Most of the age at presentation occurred in the 2-3 years (13 cases; 25.49%) while the highest onset was 0-1 years (42 cases; 82.35%). The disease was unilateral in 46 cases (89.2%), with the chief complaint was leukocoria (35 cases; 68.63%) followed by proptosis and red eyes in 8 cases (15.69%). Retinoblastoma which had invaded the optic nerve were found in 38 cases (74.51%). Enucleation with chemotherapy (92.59%) was the most common therapeutic procedure.

Conclusions: Retinoblastoma patients are generally male with grade E retinoblastoma and most of the patients live close to industrial areas. The most common clinical symptom is leukocoria. Most age of presentation was 2-3 years old with a duration of symptoms for approximately 0-1 years. The highest risk factor identified was the area of residence close to industries. Most patients had optic nerve invasion and no metastasis with enucleation followed chemotherapy as the most therapy.

Co-Presence of Accommodative Esotropia and Intermittent Exotropia

First Author: Min-hsiu SHIH
Co-Author(s): Fu-chin HUANG

Purpose: To present two groups of cases, the first group presented intermittent exodeviation and became accommodative esotropia following strabismus surgery. The second group had accommodative esotropia but developed intermittent exotropia after spectacles correction.

Methods: A retrospective case review. Data including eye alignment, visual acuity, refractive error, and stereoacuity were recorded.

Results: Group 1 included five boys and ten girls with average age of 4.2 years at the initial visit and 9.5 years at the final visit. Spherical equivalent refractive errors ranged from +0.5 D to +7.0 D. All had intermittent exodeviation ranging from 20 prism diopters (PDs) to 60 PDs. They received strabismus surgery and became orthophoria or esophoria on the next day. However, progressive esodeviation was noted soon or 3 years later. Group 2 included five boys and three girls. The average age was 2.94 years at the initial visit and 10.17 years at the final visit. Refractive errors ranged from +3.5 D to +11.0 D. All had esotropia and

became orthophoria after wearing glasses for 1.14 years (3 months to one year). However, exodeviation occurred at 7 years old (2.5 years to 11.25 years). Three cases had exodeviation by 15-20 PDs and five cases had greater than 35 PD, and two of them restored good alignment following strabismus surgery.

Conclusions: Both accommodative esotropia and intermittent exotropia have a high accommodative convergence/accommodation ratio. For hyperopic children with good visual acuity, reminding the possibility of accommodative esotropia before exotropia surgery is necessary. As spectacle correction for hyperopia-related esotropia, intermittent exotropia might reveal due to a decrease in accommodative demand.

Coats Disease in Mongolia

First Author: Tsengelmaa CHULUUNBAT

Purpose: To assess features and outcomes of Coats disease in Mongolia.

Methods: Retrospective review of Coats disease patients at National Center for Maternal and Child Health.

Results: There were 5 eyes of 5 patients with Coats disease from 2016 to 2021. The presenting median age (5.6 years), all cases were unilateral, and 5 (100%) were male. At presentation, 1 (47%) had stage 2 disease (retinal exudates), 3 (53%) had stage 3 disease (subtotal or total exudative retinal detachment) and 1 had stage 4 (total retinal detachment and glaucoma). As for the treatment, 3 patients underwent antivascular endothelial growth factor injection as primary treatment, after that received additional treatment diode laser, combined with laser photocoagulation in 2 patients. Retreatment was required in 5 (100%) patients. After a median follow-up of 5.2 years, visual acuity was 20/30 in 1 patient (20%), counting fingers in 1 (20%), hand motion or worse in 2 (40%) and no light perception in 1(20%). Vitreous fibrosis evolving into tractional retinal detachment occurred in 1 patient receiving combined with intravitreal bevacizumab injections and diode laser and no patients required enucleation.

Conclusions: Over the 5 years, greater use of laser photocoagulation and injections has led to improved disease resolution with greater globe salvage.

Comparison between Inferior Oblique Weakening Procedures in Mild Inferior Oblique Overactions

First Author: Lung-chi LEE
Co-Author(s): Ke-hung CHIEN, Chang-min LIANG

Purpose: Inferior oblique muscle overaction (IOOA) is a common type of strabismus and can be idiopathic or secondary to a superior oblique muscle underaction or paralysis. In most cases, a procedure is chosen depending on the surgeon's preference to weaken the inferior oblique (IO) muscle. The purpose of this study is to evaluate the surgical outcomes of the different surgical approaches for mild IOOA (Grade ≦ 2).

Methods: A retrospective study on patients who underwent IO weakening surgeries for mild IOOA in a single center from January 2013 to December 2018.

Results: A total of 126 eyes were enrolled and then been separated into four groups according to the IO weakening surgery (IO myectomy group - Group 1), IO recession group (Group 2), the IO anteriorization group (Group 3), and the IO Z-myotomy group (Group 4). Using postoperative vertical deviation in primary gaze ≦ 4 PD as a definition of success, group 4

showed the highest success rate at 100%, while group 3 has the lowest success rate at 76.5%, although without intergroup significance. Group 2 showed the highest postoperative IO underaction rate with flipped vertical deviation (10 %) and the lowest rate was in group 4 (0 %) though without significance. Group 4 showed a significantly higher reoperation rate (50%) and the lowest rate was in group 1 (8.3%).

Conclusions: All groups demonstrated a non-significant difference in success rate, postoperative diplopia, and IO underaction with flipped vertical deviation in those with mild IOOA. The only reoperation rate was significantly higher in group 4 (Z-myotomy).

Compressive Optic Neuropathy by Early-Developed Optic Nerve Sheath Meningioma: A Case Report

First Author: Pei-tzu KUAN
Co-Author(s): Chia-yi LEE

Purpose: The objective of this study is to present a rare case of optic nerve sheath meningioma with early-onset and to review the related literature.

Methods: A case report and literature review.

Results: In this article, we described a 6-year-old boy found drooling in recent 2 weeks by the family. The neurologist arranged a brain MRI and accidentally found a left orbital tumor, then referred the patient to an ophthalmology exam. On examination, the patient's best visual acuity was 1.0/0.3 (OD/OS), and intraocular pressure was 8/10 mmHg (OD/OS). A relative afferent pupillary defect was found over the left eye. Fundus examination revealed a pallor optic disc in the left eye. Visual field testing showed generalized constriction in the left eye. MRI revealed a tumor located at lateral aspect with segmental thickening of the left optic nerve, appearing grey matter on both T1 and T2 weighted imaging, and also showed typical tram-track sign. The diagnosis of an optic nerve sheath meningioma was made. The patient chose observation in the clinics of ophthalmology and neurology.

Conclusions: The treatment of optic nerve sheath meningioma depends on size, mass effect and symptoms. Vision loss may be unavoidable in most patients despite receiving optimal treatment. Managing with multidiscipline and preventing the extension of disease are the most important goals of treatment.

Corticosteroid Induced Glaucoma in a Patient with Nephrotic Syndrome

First Author: Hendrian DYATMIKO

Purpose: Steroid-induced glaucoma is the most serious complication of long-term steroid use. The systemic side effects of corticosteroid are well known, yet steroid-induced glaucoma remains silent cause of ocular morbidity. This report presented the optic nerve damage resulting in irreversible visual compromises among children on long-term steroid use and the importance of regular monitoring for ophthalmologist referral.

Methods: A case report of patient from ophthalmology outpatient clinic. Diagnosis was based on history taking, physical examination, ophthalmology and ancillary examinations.

Results: An 11-year-old child came to the outpatient clinic ophthalmologist with chief complaint of redness in both of his eyes for two weeks. Ophthalmology examination obtained visual acuity for the right eye was

6/9f and 6/7,5f for the left eye. There was no abnormality of the anterior segment on both eyes, but the tonometry examination revealed high intraocular pressure results of 56 mmHg in the right eye and 26 mmHg in the fellow eye. Posterior segment examination showed enlarged cup disc ratio of 0,7, and 0,6 for the right and left eye. Optical Coherence Tomography (OCT) result also confirmed the diagnose of secondary glaucoma due to drug-induced steroid.

Conclusions: This report showed the importance of intraocular pressure monitoring in patients on systemic corticosteroid treatment with peripheral visual disturbance.

Determination of a Better Clinical Diagnosis of Childhood Allergic Conjunctivitis

First Author: Carlos CARRION OJEDA

Purpose: In Peru there are three million children. So far no studies of the prevalence of infantile allergy conjunctivitis have been reported. Showing a method for a simplified clinical diagnosis by physicians not necessarily ophthalmologists is necessary. Determining the frequency of eye allergy using simple guidelines for diagnosis is necessary.

Methods: 2011 students from 6 to 11 years old from eight schools in South Lima were evaluated. We used and evaluated a simple method of low cost for the diagnosis, examining in situ in each school to the schoolchildren, by resident doctors of ophthalmology and by non-ophthalmology doctors. The exploration used a portable magnifying glass, with the lens of 3 magnification, of mark lighthouse, illuminating to 15 centimeters and to the same height of the plane of the eyes, with eversion of the lower blink. For the cálculus, we used Excel 2010 and SPSS 15.0. The data was taken between 2008 and 2010.

Results: Both resident ophthalmology physicians and non-ophthalmologists obtained similar results in their diagnoses, 16.63% and 16.19% respectively. The frequency of eye allergy increased together with age. Prevalence of allergic conjunctivitis (16.3% $p < 0.01$) was found in the population between 6 and 11 years old.

Conclusions: The diagnosis was made with simple technique and without expensive equipment, we found the infantile allergic conjunctivitis is ascending as age progresses ($Y=0.0305X-0.0638$). This could be related to a longer time of exposure to allergens, as well as to peculiarities of the lifestyle of the pre-adolescents.

Different Presentation of Bardet-Biedl Syndrome in a Tertiary Eye Hospital: A Hospital-Based Study

First Author: Sidratul NAZNIN
Co-Author(s): Mamunur CHOWDHURY, Quazi IFTEKHAR, Mohammad MOSTAFA HOSSAIN, Shifat TOUFIQE, Farhana YASMIN

Purpose: To report the different spectrum of clinical presentation of Bardet-Biedl syndrome (BBS) patients in a tertiary eye hospital.

Methods: It was a prospective case series study conducted from July 2016 to 2019. Patients were selected from the pediatric outpatient department of a tertiary eye hospital. Selected patients underwent a detailed history, cycloplegic refraction, ocular and systemic examination, fundus evaluation, echocardiogram, ultrasonogram of kidney ureter bladder region and serum creatinine analysis.

Results: Out of 52 patients, 66% were male.

The average age at diagnosis was 11 years. Postaxial polydactyly was present in 100%, truncal obesity in 88%, hypogenitalism in 61% of the selected patients. Ninety-two percent of patients had rod-cone dystrophy. Hypertension was found in 34% of patients, renal problems in 30% of patients, cardiac problems in 14% of patients. Mental retardation accounted for 69% of patients. Refractive error was a common eye problem. Out of these 70% had myopic astigmatism. Nystagmus and strabismus were also common associations. Our study identified some novel clinical features including speech problems, behavioral abnormalities, facial dysmorphism and dental anomalies.

Conclusions: Proper identification of the different spectrums of presentation facilitates earlier diagnosis and management of this disorder and will consequently increase the life expectancy of a good number of BBS patients. Genetic counseling remains the keystone in the families affected by the condition which facilitates the early diagnosis, conservative management, visual rehabilitation and special education.

Early Anisometropia following Unilateral Intravitreal Bevacizumab Injection and Bilateral Laser Photocoagulation in Retinopathy of Prematurity: A Case Report

First Author: Sieng Teng SEOW
Co-Author(s): May-may CHOO, Tajunisah IQBAL, Nurliza KHALIDDIN

Purpose: We report a case of retinopathy of prematurity (ROP) associated with early-onset anisometropia following unilateral intravitreal bevacizumab injection of the right eye and subsequently laser photocoagulation of both eyes.

Methods: A case report.

Results: A baby girl was born prematurely at 23 weeks 6 days with a birth weight of 675g. She was diagnosed with stage 3 zone 1 ROP with plus disease in the right eye and stage 1 ROP in the left eye at 35 gestation weeks. The right eye was injected with 0.625mg of bevacizumab. During the subsequent examination, vascular activity continues to decrease bilaterally, though more prominent in the right eye. However, 7weeks after treatment, both eyes developed stage 2 ROP at zone 2 with plus disease. Thus, laser photocoagulation was performed bilaterally. The ROP and plus disease regressed completely with the appearance of laser scars. Cycloplegic refraction at 5months corrected age revealed bilateral compound myopic astigmatism with significant anisometropia. The right eye exhibited high myopia and high astigmatism compared to the left eye (RE -7.50/-3.50x180; LE -0.50/-1.75x180). The spherical equivalent difference between both eyes is 7.875 dioptre. Otherwise, no significant strabismus or nystagmus was found. Her anterior and posterior segments were unremarkable with normal intraocular pressure.

Conclusions: Longer follow-up is warranted for ROP patients who received intravitreal bevacizumab to monitor long-term ocular sequelae such as refractive errors, strabismus, and amblyopia. It is not possible to come to a definitive conclusion with a single case. However, this case report provides another premise for a prospective clinical trial.

Efficacy of DE-127 in Slowing Myopia Progression According to Baseline Spherical Equivalent in the Phase 2 Randomized APPLE Study

First Author: Audrey CHIA
Co-Author(s): Nozhat CHOUDRY, Hiroshi INOUE, Cheryl NGO, Donald TAN, Yutaka YAMAKAWA

Purpose: To assess potential correlation between the effect of atropine sulfate (DE-127) solution on the progression of myopia according to baseline spherical equivalent in pediatric subjects diagnosed with mild or moderate myopia.

Methods: This phase II, randomized, double-masked, placebo-controlled, parallel-group trial compared the efficacy and safety of DE-127 ophthalmic solution 0.0025%, 0.005% and 0.01% with placebo in 99 children aged 6 to 11 years with mild-moderate myopia. The trial included a 12-month treatment phase in which they received one drop in each eye daily at bedtime and a 6-month follow-up phase. The change from baseline to month 12 was analyzed according to spherical equivalent (determined by cycloplegic autorefraction) at baseline in three subgroups: <-4 D; ≥-4 D to <-2 D; ≥-2 D.

Results: The change in spherical equivalent according to baseline subgroup is shown below. Change from Baseline to month 12 in spherical equivalent (SD);Placebo (n=26), DE-127 0.0025% (n=24), DE-127 0.005 (n=24), DE-127 0.01% (n=25) < -4 D (n=36), -0.49 (0.551), -0.55 (0.104), -0.19 (0.492), -0.05 (0.32) ≥ -4 to < -2 D (n=48), -0.60 (0.403), -0.58 (0.423), -0.37 (0.351), -0.36 (0.501) ≥ -2 D (n=15), -0.71 (0.088), -0.49 (0.296), -0.81 (0.530), -0.79 (0.531).

Conclusions: The efficacy of DE-127 in slowing the progression of myopia differed between baseline groups. The <4 D and ≥4 to <2 D subgroups had numerically smaller mean decreases from baseline in the DE 127 0.005% and 0.01% groups compared to placebo. DE-127 was safe and well-tolerated at all study doses.

Efficacy of Low-Dose Atropine Eyedrops on Myopia Progression after Cessation of Treatment: A Two-Year Randomized, Double-Masked, Placebo-Controlled, Cross-Over Trial

First Author: Shifei WEI
Co-Author(s): Ningli WANG

Purpose: The aim of this study was to evaluate the myopia progression and axial elongation after stopping 0.01% atropine eye drops.

Methods: This was a randomized, double-masked, placebo-controlled, cross-over trial in mainland China. 220 children with low and moderate myopia were randomly assigned to receive 0.01% atropine or placebo once nightly for one year in the phase 1 study. In phase 2, the 0.01% atropine group was crossed over to the placebo group (referred to as the "atropine-placebo group") and the placebo group was crossed over to the 0.01% atropine group (referred to as the "placebo-atropine group") for one year. All children underwent the examination of cycloplegic refraction and axial length at 6-month intervals.

Results: Of 133 subjects who had completed 2 years follow-up, 65 and 68 children allocated into the atropine-placebo and placebo-atropine groups. The mean difference of myopia progression between atropine-placebo group and placebo-atropine group in the first year (0.21±0.08 D) was similar to the second year (0.22±0.07 D) during the cross-over treatment. At the end of two years, the mean myopia progression was -1.26±0.66 D and -1.25±0.70 D in the atropine-placebo and placebo-atropine groups (mean difference, 0.01±0.12 D, P =0.954), with mean axial elongation over two years were 0.68±0.31 mm and 0.72±0.32 mm (mean difference, 0.04±0.06 mm, P =0.537). No serious adverse events related to atropine were reported.

Conclusions: In our study, the results showed that no rebound effect was found after cessation of 0.01% atropine eye drops.

Efficacy of Low-Dose Atropine Eyedrops on Ocular Biometrics in Chinese Children: A Randomized Clinical Trial

First Author: Shifei WEI
Co-Author(s): Ningli WANG

Purpose: To investigate the efficacy of 0.01% atropine eye-drops on ocular biometrics over one year in Chinese children.

Methods: This was a randomized, double-masked, placebo-controlled trial. 220 children with low and moderate myopia were enrolled. Subjects were randomly assigned in a 1:1 ratio to 0.01% atropine or placebo groups to be administered once nightly to both eyes for 1 year. At baseline, 6 months, and 12 months, all children underwent the examination of cycloplegic refraction and ocular biometrics, including axial length (AL), corneal curvature (K), anterior chamber depth (ACD), and lens thickness (LT). Vitreous chamber depth (VCD) and axial length to corneal radius ratio (AL/CR) were calculated.

Results: After one year, 76 children and 83 children allocated into the atropine, 0.01%, and placebo groups, respectively. Over one year, the mean changes of AL in the 0.01% atropine group was 0.32±0.19 mm compared with 0.41±0.19 mm in the placebo group (P=0.004). The mean ACD was increased by 0.02±0.06 mm in the 0.01% atropine group, however, decrease by 0.01±0.08 mm in the placebo group (P=0.023). The mean VCD was increased by 0.29±0.21 mm in the 0.01% atropine group, and 0.41±0.23 mm in the placebo group (P=0.010). The K, LT, and AL/CR remained stable in both groups (all P>0.05). The myopia progression in 0.01% atropine group was associated with VCD (P<0.05) after adjusting for age and gender.

Conclusions: Low-concentrations of atropine 0.01% have significant effect on AL, ACD, and VCD. The anti-myopic effects of 0.01% atropine act mainly on reducing VCD elongation.

Extraocular Retinoblastoma with Orbital Cellulitis as Masquerading Syndrome

First Author: Hing SIAU TIAK
Co-Author(s): Prof Prof.Dr Mimiwati BINTI ZAHARI, Chan LI YEN

Purpose: Retinoblastoma is the commonest intraocular malignancy in childhood which can be life threatening. Here we describe a case of extraocular retinoblastoma with orbital cellulitis which had been mismanaged as infectious orbital cellulitis leading to delay in the diagnosis and treatment.

Methods: Case report.

Results: A 2-year-old girl with no known family history of retinoblastoma, initially presented with left upper eye lid swelling and redness, associated with eye discharge for few days. She was treated as infectious orbital cellulitis in other center with systemic antibiotics. Examination revealed left eye proptosis after resolution of cellulitis. Subsequent computed tomography scanning depicted enhancing calcified left globe mass with extraconal component, left optic nerve and chiasmal involvement. Child was then diagnosed as extraocular retinoblastoma with intracranial extension. Upon referral to our center, examination under anesthesia further revealed left eye proptosis with engorged vessel, total hyphema, pseudo-hypopyon, and restricted extraocular movement. Intraocular pressure was normal. Patient is currently

under co-management with pediatric oncology team, planned for chemotherapy follow by enucleation.

Conclusions: Orbital cellulitis is an uncommon clinical manifestation of retinoblastoma which commonly masks the underlying pathology. Delay in the diagnosis and treatment can lead to devastating consequences which is life-threatening. Ophthalmologist should never overlook when dealing with orbital cellulitis amongst pediatric patients, especially in patient with anterior segment involvement, including rubeosis iridis, uveitis, corneal opacification, and glaucoma.

Four-Year Natural Course of Acute Acquired Comitant Esotropia in a 12-Year-Old Girl

First Author: Shih-wen WANG

Purpose: To present a 4-year natural course of acute acquired comitant esotropia (AACE) treated successfully with recession and resection surgery.

Methods: A case report.

Results: This 12-year-old girl came to our clinic with chief complaint of acute onset double vision for one week. A comitant 10~15 prism diopter esotropia with square wave jerks was noted. There was no other neurological sign. Intracranial abnormalities were excluded by brain magnetic resonance imaging. Type 2 (Franceschetti type) AACE was preferred. The patient was told to wait 6 months for possible surgical intervention. Otherwise, she was lost to follow-up for 4 years. She came to our clinic again for persistent double vision. On examination, a comitant 52 prism diopter esotropia with bilateral adduction under depression was found. There was no nystagmus. Combined recession and resection surgery were performed successfully. There was no diplopia with good ocular alignment 4 months post-operatively.

Conclusions: Acute acquired comitant esotropia could occur in children as old as 12 years old. It might be accompanied by nystagmus and superior oblique weakness without neurological pathology. The angle of esotropia could increase with time without treatment. Patients with acute acquired comitant esotropia have good binocular potential resulting in good surgical outcomes.

Fundus Albipunctatus with a Novel RDH5 Gene Mutation

First Author: Madhusmita MAHAPATRA
Co-Author(s): Ankit AHIR, Nilutparna DEORI, Mitesh JAIN, Sakshi MISHRA

Purpose: To report a case of fundus albipunctatus in an Indian girl child born out of consanguineous marriage with a novel homozygous nonsense variation in exon 4 of the RDH5 gene (chr12:g.55723941C>T; Depth: 121x) that resulted in a stop codon and premature truncation of the protein at codon 209 (p.Arg209Ter; ENST00000257895.10).

Methods: DNA extracted from blood was used to perform targeted gene capture using a custom capture kit. The libraries were sequenced to mean >80-100X coverage on Illumina sequencing platform. The sequences obtained were aligned to human reference genome (GRCh38.p13) using Sentieon aligner and analyzed using Sentieon for removing duplicates, recalibration and re-alignment of indels. Clinically relevant mutations were annotated using published variants in literature and a set of diseases databases: ClinVar, OMIM, GWAS, HGMD (v2020.2) and SwissVar. Common variants were filtered

based on allele frequency in 1000Genome Phase 3, gnomAD (v2.1), EVS, dbSNP (v151), 1000 Japanese Genome and our internal Indian population database.

Results: A homozygous nonsense variation in exon 4 of the RDH5 gene (chr12:g.55723941C>T; Depth: 121x) that resulted in a stop codon and premature truncation of the protein at codon 209 (p.Arg209Ter; ENST00000257895.10) was detected. The observed variation the p.Arg209Ter variant has not been reported in the 1000 genomes databases and has a minor allele frequency of 0.003%, 0.003% in the gnomAD.

Conclusions: This is the first reported case of a child with fundus albipunctatus who had RDH5 variant in Assam.

Hess Chart in Patients with Positive Three-Step Test Suggesting Superior Oblique Paresis

First Author: Wan-ju CHEN

Purpose: Parks-Bielschowsky three-step test is a useful examination for acquired ocular vertical deviation. The most common type of ocular vertical deviation is related to superior oblique muscle. However, a positive three-step test suggesting a cyclovertical muscle problem does not necessarily make the diagnosis. Herein, we presented the clinical manifestations and Hess chart test of patients with positive three-step test suggesting superior oblique paresis and conduct a brief literature review.

Methods: The current study is a retrospective chart review. Acquired vertical strabismus patients receiving three-step tests were included. Patients with positive three-step tests suggesting superior oblique paresis were selected. Cases without Hess charting examination or with a history of strabismus surgery were excluded. Visual acuity was checked before performing three-step test.

Results: Seven patients with complaints of vertical diplopia were reviewed. Their age was 50.29 ± 14.83 years old. There were 5 female and 2 male patients. Prism cover test showed 10.86 ± 3.18 prism diopter of vertical deviation. Among the seven patients with positive three-step test suggesting superior oblique paresis, 5 patients (71.4%) had typical blotting in Hess chart compatible with superior oblique paresis, while one patient was diagnosed as thyroid-associated orbitopathy due to the findings of neuroimage. Two patients (29.6%) had incompatible Hess charting and were diagnosed as Myasthenia Gravis thereafter. Two patients had symptoms subsiding and Hess charting improved spontaneously during the period of follow-up.

Conclusions: Parks-Bielschowsky three-step test can be misleading in patients with vertical deviation. Hess charting is essential, and neuroimage is important in selected cases.

High Myopia Strabismus or Abducens Nerve Palsy? A Case Report

First Author: Chih-yu CHEN
Co-Author(s): Yi Cheng TING

Purpose: To discuss a patient who was suspected of high myopia strabismus or abducens nerve palsy.

Methods: A case report.

Results: We present a case of a 51-year-old male patient who visited our outpatient department due to diplopia for 6 months. Examination revealed left hypotropia at primary position with left gaze limitation. Esotropia(ET) was measured 8 prism diopters

and right hypotropia (LHoT) 14 prism diopters. The best-corrected distance visual acuity (BCDVA) was 0.7 of the right eye and 0.1 of the left eye. Refraction results was Right eye (OD) Sphere(Sph):-4.75 diopters(D)/ Cylinder(Cyl):-0.50D/Axis(A):140 degrees, Left eye(OS) Sph-7.25/Cyl-3.00/A:81 degrees. Axial length was 27.87mm OD and 27.88mm OS. Lens nuclear sclerosis 1+ OD and 3+ OS. Magnetic Resonance Imaging(MRI) revealed superior rectus muscle(SR) was slightly shifted nasally, lateral rectus muscle(LR) was shifted inferiorly. A single procedure of loop myopexy of the LR and SR fixated at 15mm posterior to the limbus was performed over the left eye. The patient's eye position was left hypertropia upon one-month follow-up postoperatively. MRI showed a restored anatomic position of the extraocular muscles. We further performed cataract surgery of the left eye. The patient's BCDVA improved to 0.7 OD and 0.7 OS. One month later, he is free of diplopia and his eyes were orthotropic.

Conclusions: The patient's strabismus may be associated with high myopia with displaced extraocular muscles or abducens nerve palsy. However, the axial length of this patient is relatively short compared with the current literature. Moreover, treatment for strabismus proved to be effective with loop myopexy followed by cataract surgery in this patient.

Knapps Procedure in Monocular Elevation Deficiency: A Case Series

First Author: Jai KELKAR
Co-Author(s): Dr.Aditya KELKAR

Purpose: To evaluate outcome measures based on ocular alignment, improvement in elevation and binocular functions in patients treated with Knapps procedure for Monocular elevation deficiency (MED), that is characterized by a unilateral defect in elevation, caused by paretic, restrictive or combined etiology.

Methods: 18 patients were included in this study, from June 2018 to August 2020. 10 patients underwent Knapp procedure, with or without horizontal squint surgery, 8 patients had combined inferior rectus recession and Knapp procedure. The choice of procedure was based on the results of forced duction test (FDT).

Results: Forced duction test was positive in 8 cases (44%). Fifteen of 18 patients (86%) were aligned to within 10 prism diopters. Elevation improved in 7 patients (38.8%) from no elevation above primary position (-4) to only a slight limitation of elevation (-1). Five patients had preoperative binocular vision and none gained it postoperatively. No significant postoperative complications or duction abnormalities were observed during the follow-up period

Conclusions: Management of MED depends upon the selection of the correct surgical technique based on employing the results of FDT, for a satisfactory outcome.

Knowledge, Attitude, and Practices Related to Digital Eye Strain Among Parents of Children Attending Online Classes in the COVID-19 Era: A Cross-Sectional Study

First Author: Kirandeep KAUR
Co-Author(s): Veena KANNUSAMY, Fredrick MOUTTAPA

Purpose: The COVID-19 related lockdowns have led to a dramatically increased risk for digital eye strain (DES), dry eyes, and myopia; especially among the pediatric population. This study assessed the prevalence of DES among children and extrapolated the association between knowledge, attitude, and

practice patterns related to device usage.

Methods: A cross-sectional, descriptive, questionnaire-based analysis was done to assess the knowledge, attitude, and practice patterns related to digital device usage among parents of children attending online classes.

Results: A total of 305 responses were obtained. The most common reason for device use was online classes among 288 children (94.4%) and the most common mode was Smartphone by 263 children. The prevalence of DES was 64.6%. The mean knowledge score (K) was 48.5 ± 5.1, the mean attitude score (A) was 26.7 ± 4.9, and the mean practice score (P) was 17.8 ± 3.5. The difference of KAP scores among parents of children with and without glasses was not statistically significant (p-values of 0.580, 0.521, and 0.503 respectively). A direct correlation was found between the knowledge and practice scores (p-value 0.002), though attitude scores did not show a significant correlation (p-value 0.712).

Conclusions: Digital devices have been a boon to continue education, amidst the ongoing pandemic. This study reveals a large knowledge gap among parents related to safe digital device usage. Further, there is a need to adopt innovative methods to spread awareness about the effects of excessive screen time in form of DES and Myopia and the corrective measures to avoid the same.

Kyphoscoliotic Ehlers Danlos Syndrome with a Novel PLOD 1 Gene Mutation

First Author: Sakshi MISHRA
Co-Author(s): Nilutparna DEORI, Bhavya GOKANI, Mitesh JAIN, Madhusmita MAHAPATRA

Purpose: To report a case of kyphoscoliotic Ehlers Danlos syndrome (kEDS) in an Indian girl born of a non-consanguinous marriage with a novel recessive homozygous frameshift deletion c.1252deIT (p.Phe418Serfs*39) at exon 12 (NM_000302) of PLOD 1 gene mutation.

Methods: Next-generation sequencing using a targeted panel for connective tissue disorders was performed. Genomic DNA was extracted from the peripheral blood of the patient. Exon sequencing was performed using Illumina chemistry. Genome was sequenced to mean >80-100X coverage and a minimum of ~95% of bases sequenced to atleast 20 X coverage. Paired-end 151 bp reads were aligned to the NCBI reference sequence (GRCh37.75) using bowtie2.2.1 short read aligner, and variant calls were made using open source algorithms. Sequencing of the patient's genome was performed and covered ~97% of all positions at 20X coverage or higher, resulting in over 12427 variants compared to a reference genome.

Results: The patient showed recessive homozygous frameshift deletion c.1252delT (p.Phe418Serfs*39) at exon 12 (NM_000302) of PLOD1 gene associated with kEDS (OMIM #225400).

Conclusions: This is the first reported case of a child with kEDS who had PLOD 1 gene mutation in Assam.

Longitudinal Changes in Refractive Error after Treatment of Retinopathy of Prematurity and Risk Factors for Early-Onset High Myopia

First Author: Saiko MATSUMURA
Co-Author(s): Yuichi HORI, Takashi ITOKAWA, Momoko KAWAMURA, Tadashi MATSUMOTO, Masahiko TOMITA

Purpose: To investigate the prevalence

of myopia and high myopia (HM) and the risk factors for HM within 3 years among extremely low birth weight infants with retinopathy of prematurity (ROP).

Methods: We retrospectively analyzed 92 preterm infants (182 eyes) with ROP, birth weight less than 1,500 g, and follow-up data more than 3 years, from October 2008 to March 2018 at Toho University Omori Medical Center. Cycloplegic autorefraction was performed to measure refractive outcomes. The multivariate analysis determined risk factors for early-onset HM (≤ -5.00D) at 3 years old.

Results: The prevalence of myopia and HM at the age of 3 was significantly higher in the treated group (62.0% and 20.7%, respectively) than in the untreated group (19.7% and 0%, respectively) ($p < 0.001$). Spherical equivalent (SE) at 3 years old was more myopic in the treatment group (-1.70 ± 3.51 D) than in the untreated group (0.54 ± 1.08 D) ($p < 0.001$). Sub-analysis of the treatment group revealed a significant correlation between SE at the age of 3 and the number of laser exposures ($R2 = 0.41$, $p<0.01$). Multivariate logistic analysis showed that the number of laser exposures was an independent risk factor for early-onset HM ($p<0.05$).

Conclusions: The number of laser shots is an independent risk factor for early-onset HM. Preterm infants who have undergone laser photocoagulation for severe ROP should be considered for early optical correction with the cycloplegic refractive examination.

Muscle Which Didn't Lose Hope!

First Author: Prakhar SINGH
Co-Author(s): Sanjay DHAR

Purpose: To report a case of the severed medial rectus muscle.

Methods: 6 year old male presented to our sub-specialty department with pain, redness, and mass at the medial aspect of the right eye. The parents gave a history of him undergoing multiple squint surgeries elsewhere. He developed the abovementioned complaints post the last intervention. On examination, distant visual acuity was 20/20 OU with exotropia on HBT. Clinically, there was a mass at the medial aspect of the eye with overlying conjunctival congestion and discharge. He was planned for exploration under GA wherein medial rectus was identified after exploration and secured followed by re-attaching 5.5 mm from the limbus.

Results: There was a -1 adduction deficit in the right eye with 15 degrees exotropia on HBT. He was planned for squint surgery in the fellow eye at a subsequent date.

Conclusions: Surgical exploration is the most important step in lost muscle and incision in these cases to ensure maximum exposure. Medial rectus can also be retrieved and counseling of the parents should always be done.

Patient Compliance with a Novel, Online Platform for Tracking Amblyopia Treatment: 3 Month Results

First Author: Tinh LE
Co-Author(s): Talia BURSTEIN, Basak CAN, Maryo KOHEN, Faruk ORGE

Purpose: Although effective treatments for amblyopia exist, compliance remains a major hurdle to optimal outcomes. We assessed 90-day compliance rates of patients enrolled in a novel, online amblyopia tracking platform.

Methods: Inside Out Medicine is an online platform that improves tracking of

amblyopia treatment by creating a virtual "log," reviewable by providers, in which guardians record daily treatment (hours patched per day, etc.). Providers at an urban academic center enrolled eligible patients (amblyopia patients age 1-12 years undergoing occlusion or penalization therapies) in the platform. Guardians were instructed to log all administered treatment in the platform. Baseline characteristics and treatment compliance (defined as logging >66% of assigned treatment on the platform) were collected for patients enrolled for at least 90 days.

Results: As of 5/14/21, 53 patients had been enrolled in the platform for at least 90 days. The cohort has an average age of 5.13 years (std = 2.20) and is 57% female. The right eye is amblyopic in 49% of patients. 23% of patients were compliant with logging at 90 days. The cohort displayed a strong bimodal distribution, with an average compliance rate of 11% of assigned logs in the noncompliant group, and 88% in the compliant group.

Conclusions: We report the use of a novel online platform to provide timely/up-to-the-minute data on patients' amblyopia treatment compliance. At 90 days, 23% of enrolled patients were compliant with platform logging, suggesting the potential of this online, easy-to-use platform to improve amblyopia patient outcomes by improving compliance monitoring and oversight.

Pediatric Cataract Profiles in Central Java, Indonesia: A 2-Year Retrospective Story

First Author: Noor AMINAH
Co-Author(s): Liana EKOWATI, Arnila Novitasari SAUBIG

Purpose: To describe clinical characteristics and management of pediatric cataract in Central Java, Indonesia, focused in Semarang from March 2019 to March 2021.

Methods: This study was retrospective with a descriptive approach. Data were obtained from medical records of pediatric cataract patients who were treated in the ophthalmology clinic from March 2019 to March 2021.

Results: Two hundred twenty-one eyes were obtained from a total of 145 patients in this study, which were divided into congenital cataracts (56.56%) and developmental cataracts (43.44%). The highest age group at diagnosis and at the time of surgery were both over 5 years (28.97% and 44.14% respectively). Most of the sexes were men (62.07%), while the largest percentage of laterality was bilateral cataracts (52.41%). The majority of etiology is congenital rubella syndrome (43.45%). Complementary systemic conditions were found in 66 patients (45.52%), most of whom were a history of preterm birth (18.84%). More than half of the cataract morphology is total cataract (66.97%). The most common cataract surgery performed was a combination of lens extraction, primary posterior capsulotomy, anterior vitrectomy, with intraocular lens implantation (45.70%).

Conclusions: Congenital cataracts were more common than other types of pediatric cataracts. The majority of pediatric cataracts cases were bilateral and the morphology was total cataract. The most commonly performed cataract surgery technique was a combination of lens extraction, primary posterior capsulotomy, anterior vitrectomy, with intraocular lens implantation.

Pediatric Retinal Diseases in Mongolia

First Author: Tsengelmaa CHULUUNBAT

Purpose: To describe the utility of RetCam in pediatric retinal diseases in Mongolia.

Methods: A total of 354 patients (683 eyes) were done fundus imaging by RetCam portable Clarity medical system, Pleasanton, CA, USA by trained pediatric ophthalmologist and nurse. A retrospective chart review was carried out in 249 eyes of 137 pediatric patients who were detected ROP and diagnosed or suspected to have retinal diseases in children at the National Center for Maternal and Children Health in Mongolia for 2 years. RetCam was carried out using the 130-degree lens of RetCam portable. Treatment (intravitreal injection, laser/cryotherapy) was carried out wherever required.

Results: RetCam was helpful in establishing a diagnosis in 137 (38.3%) patients. Diseases studied included - retinopathy of prematurity was done in 206 eyes of 103 (75.1%) prematurity babies. Retinoblastoma was done in 22 eyes of 19 (13.8%) patients, coats disease was done in 3 eyes of 3 (2.1%) patients, optic nerve coloboma was 5 eyes of 3 (2.1%) patients, optic nerve hypoplasia was 6 eyes of 3 (2.1%) patients, glory morning syndrome was 3 eyes of 3 (2.1%) patients, congenital retinal folds and persistent fetal vasculature was 2 eyes of 2 (1.4%) patients and familial exudative vitreoretinopathy was 2 eyes of one patient.

Conclusions: RetCam is extremely useful to document in pediatric patients and helps to establish a diagnosis and therapeutic decision.

Periventricular Leukomalacia: A Cause of Pseudoglaucomatous Cupping

First Author: Nadzirah SAFFIAN

Purpose: To report on the pseudoglaucomatous cupping in a child related to periventricular leukomalacia (PVL) and prematurity.

Methods: A case report.

Results: A 7-year-old boy with underlying cerebral palsy was referred for enlarged optic disc (OD) cupping with suspected diagnosis of glaucoma. He was born premature at 33 weeks; birth weight of 1.9 kg, history of ventilation and oxygen therapy after birth. Eye screening performed after birth showed no ocular abnormalities. However at 1 year old, left eye (LE) optic disc appear pale. He then defaulted follow-up. Patient was seen again at 7 years old for LE exotropia (XT) which was present since he was 1 year old. Magnetic resonance imaging (MRI) at 5 years old showed bilateral periventricular leukomalacia with thin corpus callosum. On examination, right eye (RE) vision 6/18, LE vision 6/21. Ocular alignment showed a 15-degree XT in the LE. Both anterior segments and intraocular pressures were normal. However, both eyes (BE) showed a rounder OD configuration with temporal pallor, and an increased cup to disc ratio of 0.6 in the RE and 0.8 in the LE. The clinical findings suggest that he has pseudoglaucomatous cupping related to PVL and not glaucoma.

Conclusions: PVL is a form of brain injury in premature babies characterized with structural loss of white matter pathways that carry visual information from lateral geniculate bodies to visual cortex. We would like to emphasize that PVL should be a differential diagnosis of glaucoma, especially in premature babies. Detailed birth history with careful examination

of the optic nerve will assist in differentiating the two conditions.

Post-Operative Outcome of Squint Correction Surgery in Tertiary Care Hospital: A Retrospective Observational Study

First Author: Shaukat CHHIPA
Co-Author(s): Sharmeen AKRAM, Asma RAHMAN

Purpose: To evaluate the desirable post-operative outcome of squint correction surgery that is (motor ocular alignment within 10 prism diopters) in tertiary care hospital.

Methods: All those patients who underwent squint correction surgery in the mentioned period between were included in the study and those having amblyopia, corneal or retinal pathologies and lost to follow up were excluded. Medical records were retrieved using the hospital information system. Prism diopters of squint before and after squint correction surgery was obtained. A performa was filled containing the patient's biodata, pre-operative visual acuity, squint measurements, procedure performed and post-operative ocular alignment up to 6 months of follow-up.

Results: Total 119 patient records were evaluated to see post-operative outcomes at 1st day, one week, one month and six months follow-up visits. It was found that among 119 patients 54.6% were male and 45.4% were female with 34.5% of patients belonging to 0-6 year's age group. Post-operative outcomes among the study participants were reported, squint correction target of within 10 prism diopters of orthophoria was found in 75.5% of patients.

Conclusions: In this study, 75.5% of patients achieved the required result of ocular alignment within 10 prism diopters of orthophoria at the final follow-up visit.

Predictive Value of Plasma Level of Apelin in Retinopathy of Prematurity

First Author: Jing FENG
Co-Author(s): Yong TAO

Purpose: To investigate plasma levels of apelin, vascular endothelial growth factor (VEGF), erythropoietin (EPO), and insulin-like growth factor (IGF-1) levels in infants with or without retinopathy of prematurity (ROP).

Methods: This was a single center cross-sectional study. Fifty preterm infants with ROP and 50 preterm infants without ROP were enrolled. Analysis included evaluation of basic clinical conditions and measurement of plasma cytokines concentrations using by multiplex bead assay.

Results: The mean birth age and mean birth weight were 31.4 ± 1.5 weeks and 1,606.6 ± 300.6 g, respectively, in infants without ROP and 30.3 ± 2.1 weeks and 1,350.0 ± 299.3 g, respectively, in infants with ROP. Plasma VEGF, EPO and IGF-1 levels were lower in infants with ROP (all $P<0.001$), while plasma apelin level was higher in infants with ROP ($P<0.001$). The area under the receiver operating characteristic (ROC) curve was 0.794 (95% CI [0.694–0.894], $P < 0.001$). With the prespecified Apelin cut-off 21.08 pg/ml as the test-positive, the sensitivity was 72%, specificity was 80%, and the Youden index was 0.52. Multivariate logistic regression analysis showed that only the plasma Apelin were independently associated with the risk of developing ROP ($P = 0.02$, Exp [B] = 16, CI = 95%: 1.537-166.533).

Conclusions: The screening of ROP is not universal owing to lack of skilled personnel,

especially in the rural areas. Apelin level of plasma demonstrated good sensitivity and specificity with regard to the predictor of ROP, which can provide preliminary risk notification to the strong recommendation for the screening.

Pupil Size Analysis and Efficacy of DE-127 (0.0025%, 0.005%, 0.01%) versus Placebo in Slowing Myopia Progression: The Randomized Phase 2 APPLE Study

First Author: Audrey CHIA
Co-Author(s): Nozhat CHOUDRY, Hiroshi INOUE, Cheryl NGO, Donald TAN, Yutaka YAMAKAWA

Purpose: To assess efficacy, safety, and dose-response of atropine sulfate (DE-127) ophthalmic solution for slowing myopia progression in children in the APPLE Study.

Methods: In this randomized, double-blind, placebo-controlled APPLE study, patients (n=99) aged 6 to 11 years with mild or moderate myopia received DE-127 0.0025%, 0.005%, 0.01%, or placebo. One drop was administered in both eyes once daily on Day 1 to Month 12. The primary endpoint changed from baseline to Month 12 in spherical equivalent (measured using cycloplegic autorefraction [D]). Change in axial length was a secondary endpoint. Pupil size was measured to assess safety.

Results: After randomization, 24 subjects received 0.0025%, 24 received 0.005%, and 25 received 0.01% DE-127. Mean change from baseline to month 12: Placebo (n=26), DE-127 0.0025% (n=24), DE-127 0.005% (n=24), DE-127 0.01% (n=25); spherical equivalent [1,2], D (SE) -0.60 (0.063), -0.49 (0.067), -0.37[a] (0.065), -0.35[b] (0.063); axial length[1,2], mm (SE) 0.36 (0.024), 0.30 (0.026), 0.27[c] (0.025), 0.25[d] (0.025); photopic pupil size, mm (SD) -0.00 (0.815), -0.00 (0.715), 0.26 (0.609), 0.31 (0.628) [1] Least Square Mean; [2] Mixed-effect Model for Repeated Measures Analysis of Covariance [a] P=0.0090; [b] P=0.0056; [c] P=0.0123; [d] P=0.0026. No subjects receiving placebo reported ocular AEs. The most common ocular AEs were eye pruritus and blurred vision (4 subjects each [4.0%]), with similar incidence in each DE-127 dose group.

Conclusions: DE 127 0.005% and 0.01% dosage regimens were significantly effective in reducing myopia progression. All DE 127 study doses were safe and well-tolerated. Changes in pupil size at month 12 were minimal.

Real-World Surgical Outcomes of Exotropia

First Author: Shih-wen WANG

Purpose: To evaluate the real-world surgical outcome of exotropia conducted by a single surgeon.

Methods: A retrospective chart review was performed on patients who had surgery for exotropia during the period 2017 and 2020 by a single surgeon (Dr. Wang). A successful outcome is considered as esotropia ≤ 5 prism dioptres (PD) to exotropia ≤ 10PD at the last visit. The age, gender, type of exotropia, pre- and post-operative deviation angles, and follow-up period were documented.

Results: Twenty-two patients were identified (mean age, 29.6 years, 4-73 years old). Fifteen of them were male (68.2%), and 7 were female (31.8%). Three (13.6%) of them had sensory exotropia, 2 (9%) with convergence insufficiency exotropia, and 17 (73.3%) with intermittent exotropia. The mean pre-operative exotropia angle was 37.3 PD. The overall success rate was 81.82% at the last visit.

The mean follow-up period was 7.3 months (ranging from 4 days to 28 months).

Conclusions: The surgical success rate was comparable to the literature. Due to the nature of real-world data, the follow-up period was not long enough and diverse. Young age and the diagnosis of sensory exotropia seems to be the risk factor of failure. Further controlled study should be done to confirm the conclusions.

Refractive Effect of Prophylactic Laser Treatment in Premature Infants Treated with Primarily Intravitreal Bevacizumab

First Author: Sadık BAYRAMOĞLU

Purpose: The follow-up management of persistent peripheral vascular immaturity is challenging in anti-VEGF treated eyes. The study investigates the refractive effect of laser treatment on the peripheral persistent avascular retina after a postmenstrual age (PMA) of 60 weeks in eyes treated with primarily intravitreal bevacizumab (IVB).

Methods: Inclusion criteria in the study consisted of several parameters: 1) Being treated primarily with IVB; 2) Laser applied to the peripheral avascular retina after PMA of 60 weeks between February 2018 and December 2019; and 3) Pre-laser and post-laser refraction measurements being recorded on the patient chart. Forty-six eyes of 26 infants fulfilled the inclusion criteria.

Results: Laser was performed in the same session with fluorescein angiography (FA) in 45 eyes. In 14 of 45 eyes, there was hyperfluorescent leakage on FA. In 44 eyes, pre-laser retinal vascularization exceeded the posterior border of zone II. The mean pre-laser refraction age, laser age, and post-laser refraction age were 23.50 ± 13.80, 27.39 ± 14.42, and 44.58 ± 17.03 months, respectively. The spherical equivalent before and after laser was 1.21 ± 2.64 diopter (D) and 0.58 ± 2.41 D, respectively (p = 0.006). After laser, a mean myopic change of 0.63 ± 1.01 D was detected at a mean follow-up of 21.08 months.

Conclusions: Despite developing a myopic shift after the laser, the physiological emmetropization of childhood might have contributed to this alteration. Further studies are needed to understand whether this myopic shift is related to the laser.

Refractive Outcome of Laser-Treated and Non-Laser-Treated Retinopathy of Prematurity: A 2-Year Retrospective Review

First Author: Aasiah SHARIFUDDIN
Co-Author(s): Fiona CHEW, Irina EFFENDI-TENANG, Amir SAMSUDIN

Purpose: To compare the refractive outcome of laser-treated, and non-laser-treated retinopathy of prematurity (ROP) infants, at two years of age in a tertiary hospital.

Methods: Retrospective review involving patients born between 2016 and 2018. Cycloplegic refraction results at two years of age were compared.

Results: There were 22 eyes from 11 infants in the laser-treated group, all of which had zone 2 ROP with plus disease; of these, 4 had stage 2 ROP while 18 had stage 3. Meanwhile, there were 53 eyes from 28 patients in the non-laser-treated group. Mean birthweight for laser-treated and non-laser-treated groups were 966.9±92.6 g and 1019.3±282.0 g respectively. Mean gestational age for laser-treated and non-laser-treated groups were 28.2±2.2 weeks and 27.7±2.2 weeks respectively. At 2 years, the mean refractive error for the laser-

treated and non-laser-treated groups were -0.19±2.40 D and 0.65±1.19 D respectively (P=0.045). Myopia was commoner in the laser-treated group (6 eyes (27%) vs. 5 eyes (9%), P=0.001), and 2 (10%) from this group also developed high myopia (>-5.00 D). For hypermetropia and astigmatism, there were no statistically significant differences between the groups (all P>0.05). High myopia was strongly related to post-conceptual age when receiving laser therapy (P=0.025). In the laser-treated group, two infants (9%) had amblyopia and one (5%) had exotropia at 2 years. None of the eyes developed structural retinal sequelae.

Conclusions: Despite achieving normal anatomical outcomes, a significant number of laser-treated ROP eyes developed myopia. This highlights the need for regular refractive screening in these patients.

Responder Characteristics for 0.01% Atropine in Treating Childhood Myopia

First Author: Lung-chi LEE
Co-Author(s): Ke-hung CHIEN, Meng-wei HSIEH, Chang-min LIANG, Po Liang CHEN

Purpose: Myopia is one of the most prevalent ocular disorders in the modern world. Topical atropine eye drops have been proven for their efficacy and safety in lessening myopia progression. Recently, low concentration atropine (0.01%) has gained popularity in controlling myopia progression with satisfying effects and minimal side effects. However, information about responders to 0.01% atropine has not been fully studied. In this study, we tried to determine the responder characteristics of 0.01% atropine in Asian children for myopic control therapy.

Methods: A single-center retrospective observational cohort study.

Results: A total of 140 children (70 boys and 70 girls) who had at least one myopic eye were analyzed. In total, 249 eyes were evaluated in this study. The mean age was 9.13 ± 2.6 years old. The mean baseline spherical equivalent (SE) was -1.56 ± 1.52 diopter (D). The mean annual SE change was -0.52 ± 0.49 D. A 71.5% responder rate of myopic control (178/249) was achieved with 0.01% atropine in our entire cohort under the criteria of less than 1.0 D of myopic progression annually. We then further stratified our subjects based on a baseline SE of -1.5 D and a baseline age of 9 years old to serve as cut points between the responder and non-responder groups.

Conclusions: Our results demonstrated that children who had myopic refraction better than -1.5 D and who were younger than 9 years of age had the highest potential to achieve successful myopic control under 0.01% atropine therapy.

Risk Factors Associated with Myopia in School-Going Children

First Author: Tarzia ZAFRULLAH

Purpose: To assess the prevalence and identify associated risk factors in paediatric myopia.

Methods: The prospective cross-sectional study was carried out in a tertiary eye hospital. Eligible patients were 5 to 15 years old between July 2019 and December 2019. The baseline examination included visual acuity, cycloplegic with subjective refraction and questionnaire interview. Among the potential risk factors, the lack of natural daylight exposure, lack of physical activity together with an excess of near-work activities in children are the most prevalent. Parental refractive status was also observed.

Results: Among 8,600 school-going children

screened, 2750 (32%) had a subnormal vision. Of these 1430 (52%) were due to myopia Incidentally boys accounted for 65.3% of subnormal vision while girls for 34.7%. Myopia was more common in older children (14.8% in 5-8-years old,59.0% in 13-15- year old). Simple myopia in 610 (42.58%), myopic astigmatism in 814 (57%), unilateral myopia with amblyopia in 6 (0.42%). Among the simple myopic the degree of myopia was the same in both eyes in 286 (46.8%). On the other hand, among the astigmatic group, almost identical cylinder in either eye was seen in 363(44.6%) of cases non-identical cylinder in 435 (53.4%) cases and unilateral astigmatism in 16 cases. Among 1430 myopic patients,1079 (75.45%) were urban participants but 351 (24.54%) were rural participants. A significant association between outdoor activity time (in hours per day) and the children's spherical equivalent (in diopters) was found. About 6% of myopic patients had a history of myopia in both parents.

Conclusions: Myopia independently associated with modifiable factors might suggest that it may be a target for public health efforts.

Roll-Over Plication

First Author: Sujeeth MODABOYINA
Co-Author(s): Amar PUJARI

Purpose: To describe a simple intra-operative maneuvering during rectus muscle plication.

Methods: Patients undergoing horizontal recti surgery were included. Patients who were planned for rectus muscle plication (medial or lateral rectus) underwent the following intraoperative maneuvering. After the passage of 6-0 polyglactin sutures along the desired site of plication, a non-serrated, end grasping forceps was passed across the muscle at its midway. After grasping the muscle between the forceps limbs, it was rolled over anteriorly to bring the sutures just anterior to insertion. Following this, the anterior scleral sutures were passed, and knots were tied to achieve the desired folding of the muscle.

Results: Roll-over plication was successfully emulated in a total of 15 patients, and it was technically easier and replicable. The need for triple instruments during regular plication was alleviated by a simple roll-over maneuver using non-serrated forceps.

Conclusions: The regular technically difficult muscle hook and lens hook-assisted plication can be supplanted by a less traumatic and easily negotiable roll-over plication.

Scenario of Refractive Error in School going Children in Some Areas of Bangladesh

First Author: Sidratul NAZNIN
Co-Author(s): Tarikul AHASAN, Mamunur CHOWDHURY, Quazi IFTEKHAR, Mohammad MOSTAFA HOSSAIN, Shifat TOUFIQE

Purpose: To assess the refractive status of school-going children in a developing country like Bangladesh and treat them.

Methods: It was a prospective study that was conducted in the tertiary eye care hospital in some areas of Bangladesh by student sight testing program (SSTP) from March to June 2019. It was designed to detect the refractive error of school-going children and refer those who required cycloplegic refraction or consultation for other non-refractive eye diseases to the base eye hospital.

Results: Total 32,748 students (6,401 students from Dhaka, 8,462 from Barisal, 8,074 from Jamalpur and 9,811 from Naogaon) were screened out nationally by SSTP. Among all

the students 2,733 children were referred to base eye hospitals in Dhaka, Barisal, Jamalpur and Naogaon. In Dhaka 1,739 out of 6401 children, Barisal 759 out of 8,462 children, Jamalpur 123 out of 8074 and Naogaon 112 out of 9,811 children underwent cycloplegic refraction. Out of them, a total of 1,696 students (5.2%) were required spectacle. In Dhaka 812, Barisal 221, Jamalpur 251 and Naogaon 412 students were prescribed glasses after cycloplegic refraction. In Dhaka, 888 children were with logMAR acuity (o.20-0.50), and 298 children were with logMAR acuity (0.50-1). 73 children with less than logMAR acuity 1 were discovered.

Conclusions: Uncorrected refractive error in children is an important cause of childhood visual impairment and creating a significant public health issue day by day in many developing countries. SSPT is a good and simple way to identify and correct the refractive errors of children by provision of spectacle to reduce visual morbidity.

Slanted Medial Rectus Recession versus Recession with Faden for Convergence Excess Esotropia

First Author: Deepti JOSHI
Co-Author(s): Krishnaprasad R

Purpose: Management of partially accommodative convergence excess esotropia has always been debatable. In this paper, we compare the effect of medial rectus slanted recession versus medial rectus recession with Faden for convergence excess esotropia.

Methods: A total of 16 (5-14 years) patients with convergence excess esotropia were included in this randomized, blinded and prospective study. They were divided equally into two groups. Group 1 underwent slanted recession of medial rectus where the lower pole of muscle was recessed larger than the upper pole. Group 2 underwent conventional recession of medial rectus with Faden at 13-14 mm from insertion. Patients were followed for 1 year.

Results: In group 1, the mean near distance disparity reduced from 16.30+/-4.5PD to 4.55+/-3.20PD (76.55; P=0.043). In group 2, it reduced from 15.35+/-4.23PD to 3.02+/-4.08PD (82.7; P=0.052).

Conclusions: Faden of medial rectus has a higher success rate in dampening near distance disparity in convergence excess esotropia, yet slanted recession is preferred as is technically easy, simple, less time consuming and with fewer complications.

Small Incision Wound of Modified Nishida's Procedure for Ocular Muscle Palsy following Brainstem Tumor Surgery

First Author: Shao-chun CHEN
Co-Author(s): Yu-hsun CHUANG

Purpose: We report a case of applicating small incision of modified Nishida's procedure and unilateral medial rectus muscle recession for bilateral horizontal muscle palsy after brainstem surgery.

Methods: A case report.

Results: Before surgery, the patient had about 45 prism diopter monocular esotropia OS in the primary procedure. The horizontal movement was limited OU. The vertical eyeball movement was normal. The forced duction showed mild limitation OS in adduction. After a small incision of modified Nishida's procedure OS and medial rectus muscle recession 6mm OS, the primary position became ortho alignment.

Conclusions: The modified Nishida's

procedure could help a lot for muscle palsy and is easily performed. By application of small incision wound of modified Nishida's procedure, the patient could receive a great outcome on the same day after the operation.

Surgical Outcomes of Congenital Paralytic Strabismus: A Case Series

First Author: Teguh SETIAWAN
Co-Author(s): Liana EKOWATI, Arnila Novitasari SAUBIG

Purpose: Paralytic strabismus is defined as nerve paralysis in the muscles responsible for eyeball movement for any reason, resulting in limited eye movement. Each case of congenital paralytic strabismus caused by third, fourth, and sixth cranial nerve palsy will be reported in this study.

Methods: Three patients were referred for congenital paralytic strabismus. Each case has different cranial nerve palsy. One patient represents the third cranial nerve palsy, as well as the fourth and sixth cranial nerves palsy represented by one patient, respectively. Every patient is given a surgical procedure that is specific to their abnormalities. We evaluate the outcomes of surgery beginning on the first day, one week, and one month after surgery to determine the degree of deviation that remains in patients.

Results: This study included three patients, two females, and one male, varying ages from 13 to 29 years. Patients with third and sixth nerve palsies underwent recess and resect horizontal muscle surgery, while a patient with fourth nerve palsy underwent tuck procedure surgery. A patient with sixth nerve palsy has good results one month after surgery. In contrast, two remaining patients still have deviations one month after surgery and require additional surgery.

Conclusions: Surgical management of congenital paralytic strabismus in patients with third, fourth, and sixth nerve palsy is complex and challenging. Even though additional surgery is sometimes required, patients achieve optimal results when appropriate and stepwise surgical plans are followed.

Sutured Scleral-Fixated Posterior Chamber Intraocular Lens in Children under the Age of 9 with Congenital Ectopia Lentis

First Author: Xuyun MENG
Co-Author(s): Yiyue JIA, Xia LI, Cao XI, Du YI

Purpose: To report the visual acuity outcomes and complications of sutured scleral-fixated posterior chamber intraocular lens in children under 9 years old with congenital ectopia lentis.

Methods: 27 children (50 eyes) with congenital ectopia lentis were included in this study. The mean age at surgery was 60.8±22.5months (range, 32-100). Patients underwent lens extraction, anterior vitrectomy and sutured scleral-fixated posterior chamber intraocular lens (IOL). The implanted IOL included the use of rigid poly methyl methacrylate (PMMA) IOL (CZ70BD, n=39) and foldable IOL (SA60AT, n=9, and LI61SE, n= 2). The outcome measures used to assess the benefits were uncorrected visual acuity (UCVA), best-corrected visual acuity (BCVA), refraction, intraocular pressure and any associated complications. Median follow-up was at 32.0 months (range, 1-130).

Results: After surgery, the median UCVA (1.30 VS 0.40 logMAR) and BCVA (0.82 VS 0.15 logMAR) improved significantly. The median absolute spherical values decreased considerably (9.00 VS 0.75 D). The median astigmatism was lower in foldable IOL

compared to rigid PMMA IOL (1.0 VS 2.5 D), but neither the UCVA nor BCVA was significantly different. Postoperative complications included pupillary capture in 4 eyes, IOL decentration in 4 eyes, choroid edema in 1 eye and subretinal hemorrhage in one eye. The rate of secondary surgery was 8%, caused by IOL decentration of IOL haptics which was broken and suture degradation.

Conclusions: Sutured scleral-fixated posterior chamber IOL provided good visual outcomes in children under 9 years of age with congenital ectopia lentis. Although there were some risks of secondary surgery, the complications were acceptable.

Ten Years Follow-Up of Bilateral Congenital Lens Subluxation in Two Siblings

First Author: Wan-ju CHEN

Purpose: Congenital lens subluxation is usually associated with genetic diseases, of which Marfan syndrome is most common. Herein, we presented a case report of two siblings both with bilateral congenital lens subluxation, but in different severity. Vision profile and ocular characteristics were recorded during 10 years follow-up period.

Methods: A case report and literature review.

Results: The sister and brother at 3 and 2 years old were brought to the clinics. After bilateral congenital lens subluxation was noted in the siblings, they were referred to the pediatric department, where general physical examination, serial metabolic screening, and cardiac echocardiography did not reveal any abnormal findings. Their family history was only positive for an aunt who had aortic aneurysm. The sister had a more subluxated lens, which symmetrically shifted to the right side. The brother had a milder asymmetrically superortemporal shift of the lens in both eyes. They both received optical correction to avoid amblyopia. The best-corrected visual acuity of the sister was 20/40 in both eyes, and that of the brother was 20/25 in the right eye and 20/40 in the left eye. Besides lenticular astigmatism subluxation, keratometry revealed corneal astigmatism was up to -4.75 and -4.25 diopters (D) in the right and left eye of the sister, -0.75 D and -3.0 D in the right and left eye of the brother. The corneal astigmatism was noted to respond to the severity of the shift of the lens.

Conclusions: Treatment for bilateral congenital lens subluxation can be challenging. Prompt referral to a pediatrician is essential.

The Effect of Education Seminars on Pediatric Vision Screening in Primary Care Settings

First Author: Soner GUVEN

Purpose: The primary aim of this study was to assess the practice behaviors of physicians on pediatric vision screening (VS) in primary care settings in Turkey and compare the groups in respect of previous education on VS.

Methods: All physicians working in the primary care settings of [redacted] province of Turkey were directly administered a 24-item questionnaire at planned education seminars. The groups were compared according to a history of VS education (Group 1) and no history of VS education (Group 2). The self-reported questionnaire results were analyzed statistically.

Results: A total of 124 of 453 physicians completed the survey with a response rate of 27.3%. VS was reported to be performed as recommended by 70.2% of the participants.

The physicians in group 1 were significantly older (P<0.05) and more experienced (P<0.05) than those in group 2. Group 1 performed the red reflex (RR) test significantly more frequently (P<0.05) and referred the patients to an ophthalmologist less frequently than group 2 (P<0.05). Regression analysis revealed that age (P<0.05) and previous education (P<0.05) were the independent factors for visual acuity and RR testing, respectively. Practice-related factors were the most commonly reported barriers to VS in primary care settings.

Conclusions: Although there is a high rate of reported full adherence to the recommendations for pediatric VS, it seems to be more likely to be performed insufficiently. Practice-related barriers should be handled by publicly available education materials (e.g. YouTube videos). VS education should be added at an earlier stage of medical training programs.

The Efficacy of NeuroVision Correction Technology to Improve Vision in Amblyopia

First Author: Sheesham SINGH
Co-Author(s): Pushkar BHADANI, Rituparna GHOSH, Damaris MAGDALENE, Arijeet ROY

Purpose: To evaluate the efficacy and safety of NeuroVision correction technology to improve visual acuity in patching resistant amblyopic eyes.

Methods: This prospective study comprised of 45 cases between 8 and 48 years of age, of which 39 had amblyopia associated with refractive error, three due to visual deprivation, two had nystagmus and one had strabismus. All had undergone patching therapy prior to NeuroVision therapy. The main outcome measures were distance best corrected visual acuity (BCVA).

Results: All eyes had improvement in BCVA. At the baseline examination, the mean distance BCVA in study patients was 0.54 logMAR. At the completion of treatment, the mean BCVA had improved to 0.32 logMAR. The p value was 0.000215 which is statistically significant.

Conclusions: Evidence suggests NeuroVision treatment is safe and improves BCVA in amblyopic patients not responding to the traditional patching therapy.

Topical 0.05% Cyclosporine for Symptomatic, Corticosteroid-Resistant Corneal Subepithelial Infiltrates Secondary to Adenoviral Keratoconjunctivitis in a School-Aged Child: A Case Report

First Author: Pei-tzu KUAN
Co-Author(s): Chia-yi LEE

Purpose: To review the literature and report our clinical experience of topical 0.05% Cyclosporine for symptomatic and corticosteroid-resistant corneal subepithelial infiltrates (SEIs) in a patient with previous adenoviral keratoconjunctivitis.

Methods: A case report.

Results: An 8-year-old girl was presented to our clinic by her parents with redness of the left eye and eye-rubbing. She received topical corticosteroid in the acute stage of conjunctivitis for two weeks. After three months, she came back to our clinic presenting progressive glare, foreign body sensation, mild photophobia, and blurred vision in her left eye, with best-corrected visual acuity (BCVA) 20/25. On slit-lamp examination, there were numerous discrete, small, round and grayish sub-epithelial lesions scattered all over the cornea with the visual axis involved. Topical corticosteroid (0.1% fluorometholone)

4 times a day was restarted for SEIs treatment. However, topical corticosteroid was discontinued after a 4-week duration due to no improvement in clinical presentations. We administered topical 0.05% cyclosporine 4 times a day then decreasing SEIs was observed. The total duration of topical 0.05% cyclosporine use was four months. No side effect other than burning sensation was noticed while instilling the eye drops. The SEIs fully disappeared eventually, and she gained two lines of Snellen BCVA after the treatment. There was no recurrence six months after we discontinued the treatment.

Conclusions: Topical 0.05% Cyclosporine seems to be a safe, effective, and well-tolerated alternative agent for treatment in patients with SEIs secondary to adenoviral keratoconjunctivitis that are resistant to or have undesired side effects from topical corticosteroid eye drops.

X-Linked Ocular Albinism Type 1 and Associated Microstructural Characteristics in Taiwan

First Author: Min-hsiu SHIH
Co-Author(s): Fu-chin HUANG

Purpose: The aim was to demonstrate the results of genetic analysis of X-linked ocular albinism type 1 in southern Taiwan and to reveal associated microscopic characteristics of retinal pigment epithelium in vitro.

Methods: Non-albinotic males presenting with X-linked infantile nystagmus due to high-grade (grade 4) foveal hypoplasia were probands. The genetic study included a mutation analysis of G protein-coupled receptor 143 (GPR143) and four-point-one (4.1), ezrin, radixin, moesin domain-containing 7 (FRMD7). Human retinal pigment epithelium cell line ARPE-19 was cultivated in DMEM used pyruvate in combination with 1% fetal calf serum. Vector pcDNA6 V5-His-GPR143 was used as control and to create mutation. Transfected ARPE-19 cells were examined by transmission electron microscopy.

Results: Genetic analysis revealed that all families had normal FRMD7 genes; ten families had a missense variant at exon 5 of GPR143 (c.593T>G)(X:9714149 A/C) and a large deletion at exon 2 (g.9624_10625del 1002bp) of GPR143 was found in the eleventh family. The fundus pictures and the iris colors varied considerably among the probands sharing the same mutant. After being transfected with GPR143(c.593T>G) for two days, ARPE-19 cells exhibited several enlarged multi-lamellar bodies, the precursors of melanogenesis, which were not found in controls.

Conclusions: These findings showing mutation of GPR143 confirmed the patients with high-grade foveal hypoplasia as X-linked ocular albinism type 1 (XLOA1) in all these families. Various ophthalmic manifestations were noticed in those sharing the same mutant. ARPE-19 is a feasible model to confirm genotype-phenotype relationship of XLOA1. Missense mutation c.593T>G is not benign since it interferes in melanosome biogenesis.

Refractive Surgery

3Z App: Building a Machine Learning Based Software, Guiding and Redefining Contoura Vision Surgery Planning

First Author: Reshma RANADE
Co-Author(s): Mathew FRANCIS, Sneha GUPTA, Ritika MULLICK

Purpose: To analyze visual acuity outcomes, depth of focus and safety, efficacy after

myopic CONTOURA laser situ keratomileusis (LASIK) planned using a novel topography derived analysis nomogram based on refractive cylinder and measured cylinder.

Methods: All consenting patients in age group of 18-35 years with maximum spherical equivalent up to -11D and astigmatism <3.5D planned for myopic CONTOURAÒ LASIK were included. Patients with CCT<480µm were excluded. UDVA, CDVA, ocular aberrations using iTrace aberrometer and corneal tomography using Pentacam and Topolyzer Vario were assessed pre-operatively and divided into 3 groups based on the difference between subjective and Topolyzer cylinder. Group 1 (72 eyes) and 2 (78 eyes) patients underwent topography guided treatment, group 3 (32 eyes) patients underwent wavefront optomized treatment on WaveLight EX500. Postoperatively at 3 months, UDVA and iTrace aberrometry were performed.

Results: Preoperatively, the spherical errors of the 3 groups were similar (p=0.17). Cylindrical errors were significantly different between the 3 groups (p<0.001). Postoperative UDVA of 20/12.5 and 20/16 was obtained in 10% (p=0.003) and 75% (p<0.001) of the eyes, respectively. 75% of the eyes gained 1 line or more on Snellen's chart. LORMS was significantly different in group 3 (p<0.01). Other ocular aberrations remained unchanged during accommodation irrespective of the study groups (p>0.05).

Conclusions: The use of this simple nomogram for eyes with discrepancy between the subjective and Topolyzer cylinder showed excellent distant vision outcomes.

A Comparative Study on Clinical, Refractive and Visual Outcomes following Surface Ablation and Flap Based Procedures for Myopia

First Author: Meenakshi RAVINDRAN

Purpose: A prospective comparison of standard refractive, clinical and visual outcomes following surface ablation and flap-based procedures for Myopia. Clinical Outcomes include documentation of the Pain and visually significant symptoms at 1 and 6 months post-op. Refractive outcomes include documentation of eyes within +/- 0.5 D of target refraction at 6 months post-treatment visual outcomes include documentation of eyes with UCVA of 20/20 at 6 months post-treatment, documentation of pre and post-treatment contrast sensitivity, and pre and post-treatment ocular aberrations.

Methods: Prospective, comparative and non-randomized study of 18 months on 285 eyes of patients aged 18- 40 years, mild-moderate myopia and stable refraction for 1 year. Post-operative assessment for pain, visual acuity, refraction, spherical equivalent, slit-lamp examination, contrast sensitivity, higher order aberration and presence of visually significant clinical symptoms.

Results: 143 eyes underwent Femto LASIK, 142 Eyes underwent PRK. PRK group had pain on the first post-operative day. LASIK group showed faster, painless visual recovery. Both groups had targeted refraction within +/- 1.0 D except for 1 eye in the PRK group. No difference in stability of refraction or clinically significant regression in either group was noted at 6 months with a comparable MRSE. LASIK group showed faster recovery in achieving UCVA 6/6 immediately after surgery. Better contrast sensitivity was seen in the PRK group. Post-operative HOA was more in the LASIK Group.

Conclusions: Femto LASIK and PRK were almost comparable in terms of visual, clinical and refractive outcomes. However HOA was more in the LASIK group.

A Comparative Study on Incidence of Posterior Vitreous Detachment after Microkeratome-Assisted LASIK and Femtosecond -LASER Assisted LASIK: An Ultrasound-Based Study

First Author: Meenakshi RAVINDRAN

Purpose: To study the development of posterior vitreous detachment (PVD) in patients undergoing Microkeratome assisted LASIK or Femtosecond laser-assisted LASIK using ultrasound B -scan. To evaluate and compare the incidence of PVD following microkeratome-assisted LASIK or femtosecond laser-assisted LASIK in post-operative period at 1 week and 1 month, and in simple, moderate and high myopia. To recognize patients with complaints of floaters in the follow-up period.

Methods: A prospective, non-randomized, comparative, hospital-based study of 10 months recruitment period and 1-month follow-up on patients attending cornea clinic, aged 18-40 years undergoing microkeratome-assisted LASIK or femtosecond laser-assisted LASIK for myopia of -0.5D to -10D having stable refraction for at least one year. Patients did not use soft contact lenses for 1 week and rigid contact lenses for 2 weeks. Patients with systemic and ocular abnormalities and pregnant women were excluded.

Results: Of 138 eyes, 64 and 74 eyes were in microkeratome and femtosecond laser groups respectively. No PVD was found in either of the groups with follow-up at 1 week and 1 month. At 1 week and 1 month post-operative period, none of the patients complained about floaters. Post-operative visual acuity and change in axial lengths in both the procedures had similar outcomes.

Conclusions: The study did not demonstrate any difference between both procedures with respect to safety, visual outcomes, vision quality posterior segment complications, change in axial length. No case complaints of floaters and none demonstrated PVD on ultrasound B scan at 1 week and 1 month.

Assessing Clinical and Molecular Outcomes of Prophylactic Thermal Pulsation Therapy on Ocular Surface Health Post-Refractive Surgery

First Author: Divya TRIVEDI
Co-Author(s): Pooja KHAMAR, Swaminathan SETHU

Purpose: To study the effect of ocular surface signs, symptoms and tear fluid composition following prophylactic thermal pulsation therapy (TPT, LipiFlow) prior to refractive surgery.

Methods: Patients with/without mild-moderate evaporative dry eye disease or meibomian gland dysfunction undergoing refractive surgery included. Group 1 patients received TPT prior to LASIK (n=15; 30 eyes) and Group 2 patients did not (n=15; 30 eyes). Clinical parameters, Ocular Surface Disease Index (OSDI), Schirmer's test (ST1,2), Tearfilm Break-Up Time (TBUT), meibography, tear film interferometry, and tear fluid were obtained 1 and 3 months post-operatively. Tear soluble factor profile measured by multiplex ELISA using flow cytometry.

Results: Improvement in post-surgical ST1, TBUT, OSDI observed in Group 1 subjects during the 3-month follow-up. The fold difference (3-month follow-up compared to

basal) in tear inflammatory factors IL8, MCP1, CXCL10, NGAL and MMP9/TIMP1 ratio, also found to be lower in Group 1.

Conclusions: TPT (LipiFlow) prior to refractive surgery improved post-surgical ocular surface signs, symptoms and reduced tear inflammatory factor profile, thus suggesting the plausibility of reduced post-operative complications like dry eye.

Clinical Trial Results of Laser Scleral Microporation in Presbyopic Eyes

First Author: Robert ANG
Co-Author(s): Brad HALL, Annmarie HIPSLEY, Mitchell JACKSON

Purpose: To evaluate visual benefit of laser scleral microporation (LSM) in presbyopic eyes.

Methods: Scleral microporations were created in critical zones in four quadrants using an Er:YAG laser to improve pliability and biomechanical efficiency of the accommodative apparatus for 14 patients. Patients were over 40 years of age with demonstrated loss of accommodative ability. Visual outcomes were assessed using the Early Diabetic Retinopathy Study (EDTRS) logMAR charts with and without correction at distance, 60cm and 40cm.

Results: LSM provided improved uncorrected monocular UDVA, UIVA, UNVA from 0.02, 0.20 and 0.47 preoperatively to -0.03, 0.01 and 0.18 at 6 months respectively postoperatively. Distance corrected intermediate and near visual acuity (DCIVA, DCNVA) improved from 0.19 and 0.46 to -0.01 and 0.16 respectively postoperatively with no reduction in distance vision. Spherical equivalent of the manifest refraction was not significantly different from 0.16D (SD 0.28D) preoperatively to 0.29D (SD 0.22) six months postoperatively. Refractive power required to read letters at the logMAR 0.00 level dropped from 2.06D (mean) to 1.07D (mean) at 6 months post-operatively.

Conclusions: Early clinical trial results suggest LSM to be a safe and effective procedure for restoring range of visual performance in presbyopes. Early results also suggest that LSM can improve intermediate and near visual acuity without touching the visual axis and without comprising distance vision. Data collection is ongoing.

Comparison of Clinical Outcomes of Two Corneal Topography-Guided Platforms on Virgin Eyes

First Author: Li LI
Co-Author(s): Zheng WANG

Purpose: The purpose of this study was to compare clinical outcomes between corneal-wavefront-guided (CWG) laser in situ keratomileuses (LASIK) by AMARIS 1050S and corneal-topography-guided (CTG) LASIK by WaveLight EX500.

Methods: This prospective and pseudo-randomized study included 266 patients who received binocular similar LASIK surgery; only data relating to right eyes were selected for analysis. A total of 134 patients underwent CWG-LASIK to correct ametropia (myopia or myopic astigmatism) and whole corneal high-order aberrations using the AMARIS ORK-CAM platform (AMARIS group). A total of 132 patients received CTG-LASIK using the WaveLight EX500 platform (EX500 group). Visual acuity, refractions, and corneal higher-order aberrations (HOAs) were assessed preoperatively and 3 months postoperatively.

Results: A total of 75.6% of patients gained

more than 1 line of uncorrected distance visual acuity (UDVA) compared to preoperative corrected distance visual acuity (CDVA) of the EX500 group; the rate of the AMARIS group was 70.1%. Postoperative spherical aberrations and vertical comas of the EX500 group were lower than those of the AMARIS group. Increases of spherical aberrations and comas in the EX500 group were lower than those of the AMARIS group. Postoperative contrast sensitivity was higher than preoperative contrast sensitivity in both groups.

Conclusions: Both WaveLight corneal topography-guided LASIK and AMARIS corneal wavefront-guided LASIK showed excellent refractive and visual outcomes, while the EX500 group showed minimal changes in wavefront aberrations compared to the AMARIS group.

Correlation between Corneal Curvature and Optical Zone Centration: Effect on Astigmatism Correction and Higher-Order Aberrations in SMILE and LASIK

First Author: Kelvin WAN
Co-Author(s): Tommy CHAN, George CHENG, Yan WANG

Purpose: To determine the correlation between anterior corneal curvature and optical zone centration as well as its impact on aberration profiles in SMILE and LASIK.

Methods: 78 eyes of 78 patients treated with SMILE (45 eyes) and LASIK (33 eyes) were included. The centration of the optical zone was evaluated on the instantaneous curvature difference map between the preoperative and 3-month postoperative scans using a superimposed set of concentric circles. The correlation between optical zone decentration and anterior keratometry values was evaluated. The effect of optical zone decentration on vector components of astigmatic correction and induction of higher-order aberrations (HOA) was assessed.

Results: The mean decentration distance was 0.21 ± 0.11 mm for SMILE and 0.20 ± 0.09 mm for LASIK (p=0.808). There was a significant correlation between anterior keratometric astigmatism and decentration distance (r=0.653, $p < 0.001$) for SMILE but not for LASIK (r = - 0.264, p=0.138). Astigmatic correction was performed in 67 eyes. Optical zone decentration and the vector components of astigmatic correction were not correlated ($p \geq 0.420$). Significant correlation was demonstrated between the decentration distance and the induced total coma (SMILE: r = 0.384, p = 0.009; LASIK: r = 0.553, p = 0.001) as well as the induced total HOA (SMILE: r=0.498, p = 0.001; LASIK: r = 0.555, p = 0.001).

Conclusions: Anterior corneal astigmatism affected the treatment centration in SMILE but not LASIK. Subclinical decentration was associated with the induction of total coma and total HOA, but it did not affect the lower-order astigmatic correction.

Intraoperative Suction Loss in SMILE: Rescue Techniques

First Author: Manpreet KAUR
Co-Author(s): Farin SHAIKH, Jeewan TITIYAL

Purpose: To describe the management of suction loss during small incision lenticule extraction (SMILE) and their outcomes.

Methods: Prospective case series of four eyes with intraoperative suction loss during SMILE. In case 1, suction loss occurred at the beginning of the procedure before starting laser application. The conjunctiva was entrapped in the suction ring prohibiting

adequate build-up of required suction pressure. The patient was counseled, re-docked and re-treated uneventfully in the same sitting. In case 2, suction loss was observed after 10% of lenticule cut. SMILE was abandoned and flap-based ablative procedure was performed. In case 3, lenticule cut and lenticule side-cut were completed uneventfully and suction loss was observed during cap cut. Eye was re-docked and laser application continued from point of suction loss in rescue mode. Case 4 had double partial peripheral suction loss beyond the treatment zone during lenticule side cut and cap side-cut, leading to eccentric lenticule and cap side-cuts. Lenticule extraction was uneventful.

Results: Lenticule could be successfully extracted in all cases. Increased micro-adhesions were present in case 2 due to repeat docking. All cases achieved 20/20 visual acuity.

Conclusions: Intraoperative suction loss during SMILE may be frequently encountered due to uncooperative patients or an inexperienced surgeon. The management depends on the stage of suction loss and optimal visual and anatomical outcomes can be achieved.

Long Term Clinical Effect of Artisan Iris-Claw Phakic Intraocular Lens Corrected High Myopia

First Author: Jianhui PAN
Co-Author(s): Xia LI, Xuyun MENG, Min LV

Purpose: To evaluate the long term clinical effect of artisan iris-claw phakic intraocular lenses (IC-PIOLS) for the correction of high myopia.

Methods: This was a retrospective cases study. The data of 19 patients (38 eyes) who underwent the artisan IC-PIOLS implantation correcting high myopia in the ophthalmology department from 2005 to 2013 years were collected with the follow-up time longer than 5 years.

Results: The median UCVA was 1.30logMAR(0.05) (0.70logMAR~1.70logMAR) before surgery, and significantly improved to 0.22logMAR (0.6) (0logMAR~1.7logMAR) at the final follow-up. The preoperative ocular axis with the median 28.89mm (27.40~32.11mm) was shorter than the final follow-up, increasing to 30.27mm (27.44~33.26mm) . The ACD at the final follow-up comparing to preoperation was shorter from 3.15±0.47mm to 2.55±0.40mm (P = 0.01). The median corneal endothelial cell density at the final follow-up was 1, 898. 25 cells/mm2. Among them, there were 3 eyes less than 1,000cells/mm2 (7.9%), 8 for 1,000cells/mm2~ 1500cells/mm2 (21. 1%). Postoperative complications included 10 eyes (26.3%) intraocular lens dislocation, 3 eyes (7.9%) corneal endothelial decompensation, 1 eye (2.6%) cataract formation. Eleven eyes (28.9%) required secondary surgery including intraocular lens dislocation occurred in 10 eyes,3 eyes explantated for corneal endothelium decompensated and 1 for cataract formation.

Conclusions: Even though long-term clinical effect of Artisan iris-claw phakic intraocular lenses (IC-PIOLS) for the correction of high myopic is still good and stable. Loss of corneal endothelial is the most important factor to be concerned.

Long-Term Evaluation of Implantable Collamer Lens for the Correction of Myopia after Excimer Laser Corneal Refractive Surgery

First Author: Yuexi CHEN
Co-Author(s): Qizhi ZHOU

Purpose: To evaluate the long-term clinical outcome of Implantable Collamer Lens (ICL) for correcting myopia after excimer laser corneal refractive surgery.

Methods: A retrospective study. 8 eyes of 5 patients with myopia after excimer laser were selected for ICL implantation. Uncorrected Visual Acuity(UCVA), best-corrected visual acuity (BCVA), spherical equivalents (SE), intraocular pressure (IOP), corneal endothelial count (CCD), central corneal thickness (CCT), axial length (AL), vault and anterior chamber parameters were collected before and at 1 day, 1 month, 3 months, and last visit after ICL implantation. The mean follow-up period was 33month±13 month (range, 1.5 to 4y).

Results: Before the ICL, the mean UCVA was 0.95±0.29, and the mean SE was -4.64D±2.51D（range,-2.13D to -8.75D）. At the last visit, the mean UCVA was significantly better than preoperative UCVA（t=4.876,p＜0.05）, with 50% of eyes within0.5 D/1.0D of SE. The safety index was 0.92±0.30 and the effective index was 0.74±0.39. The final follow-up was compared with preoperative: UCVA was increased, anterior chamber volume was reduced, and anterior chamber angle(ACA) was narrowed, the difference was statistically significant (t=4.876, -5.808, 4.403, p<0.05). There were no significant changes in BCVA, AL, IOP, CCD, corneal Keratometry(K), CCT and anterior chamber depth(ACD) (t=-2.080, -2.460, -1.994, 0.184, 1.316, 0.831, -1.513, P>0.05). The mean vault at the last visit was 615.25um±397.8um(range,200um to1220um). No serious complications were observed.

Conclusions: The safety and efficacy of ICL in the correction of myopia after excimer laser corneal refractive surgery are remarkable. However, its long-term stability needs further observation.

Novel Collagen Imaging using Ultra-High Resolution Polarization Sensitive Optical Coherence Tomography in Healthy, Suspect and Keratoconus Corneas

First Author: Ritika MULLICK
Co-Author(s): Raghav NARASIMHAN, Rahul PATIL, Rohit SHETTY

Purpose: To assess distribution of collagen in healthy and keratoconus (KC) corneas, and correlate with early disease-related changes in the distribution of collagen in suspicious corneas, with the help of custom built ultra-high-resolution polarization sensitive OCT (PS-OCT).

Methods: 50 healthy corneas, 50 keratoconus, 35 suspicious corneas were imaged prospectively using ultra-high resolution PS-OCT. Suspicious corneas were diagnosed clinically (slit lamp, corneal tomography and corneal biomechanics). PS-OCT studies birefringence of collagen fibres to assess distribution of collagen in corneal stroma which is subnormal in ectatic corneal disorders. 2 measures of collagen fibre distribution-phase retardation (PR) and axis orientation (AO), evaluated at each pixel of an OCT B-scan and histograms were analysed.

Results: PR and AO histograms of healthy corneas matched with the in-situ distribution of human donor corneas measured ex-vivo in earlier studies. In KC corneas, there was a marked reduction in the number of pixels with PR <25 degrees, with a concomitant increase

in the number of pixels with AO <0 degrees ($p<0.001$). Histograms of some suspect corneas matched those of the healthy corneas ($n=10$, $p>0.05$), while the remaining ($n=25$, $p<0.01$) had unique distribution that was different from those of KC corneas.

Conclusions: Novel PSOCT imaging identified the differences in collagen distribution between healthy and KC corneas. The asymmetric fellow corneas revealed a unique distribution of collagen, indicating early changes, before their topographic manifestations in these eyes. PS-OCT by imaging the collagen can help diagnose KC even in corneas with normal/suspicious topography and can serve as an excellent screening modality for early diagnosis of KC and in refractive surgery screening to prevent post-LASIK ectasia.

Presbyopic Corneal Laser Surgery

First Author: Klaus DITZEN

Purpose: To evaluatedifferent laser operations for corneal change in Presbyopia. Monovision, CustumQ-aspheric, Multifocal PRK/LASIK, PAC LASIK, Aspheric PRK/LASIK, (Laser Blended Vision=Presbyond), FS Intracore Procedure.

Methods: Laser Blended Vision = Presbyond, 18 myopic, 23 hyperopic eyes were operated with the laser blended vision type. The operation was done with CarriazoMicrokeratome (Schwindt) and the Excimer-Laser MEL 80 (Carl Zeiss Meditec).

Results: Good stability, safety, predictability were seen. Evaluation time was one year.

Conclusions: Of all the PresbyLASIK procedures laser blended vision should be the most favorable.

Repeatability of Novel Hybrid Imaging System: Pentacam AXL Wave with Topography and Aberrometry in Normals vs Keratoconus and Post Cross-Linked Patients

First Author: Priyanka SATHE
Co-Author(s): Gairik KUNDU, Reshma RANADE, Divya TRIVEDI

Purpose: To assess repeatability of Pentacam AXL Wave system (Oculus, Wetzlar, Germany) in measuring flat keratometry (fKm), thinnest corneal thickness (TCT), steep keratometry (sKm), corneal aberrations and total aberrations in normals versus keratoconus (KC) and post cross-linked patients.

Methods: 100 eyes each of normals, keratoconus and post cross-linked patients underwent three consecutive scans on the Pentacam AXL Wave machine, performed by a single operator. Within-subject standard deviation (Sw), test–retest repeatability (TRT), and coefficient of variation (COV) for assessing repeatability and Bland-Altman plots for the agreement between the mean measurements of each machine were examined.

Results: The COV of steep keratometry was 0.6-1.9, TCT was 0.1-3.4, higher order aberrations (HOA) was 20.5-32.4 in normals as compared to keratoconus where the COV was higher than normals, sKm was 1.2-3.9, TCT was 0.4-4.6 and HOA was 19.6-39.2. Post cross-linked eyes had the highest COV and poorer repeatability with COV for sKm of 1.2-4.6, TCT was 0.3-5.7 and HOA was 18.5-42.3. Thus, in normals, the repeatable range for steep keratometry, TCT and HOA was 0.1-0.5D, 8-10um, +0.21-+0.51, respectively; in KC eyes, it was 0.2-0.7D, 7-12um, +0.17-+0.61, respectively, and in post cross-linked eyes, it was 0.1-0.8D, 7-15um, +0.2-+0.75, respectively.

Conclusions: Pentacam AXL Wave, a new tool incorporating aberrometry into existing topographer, showed repeatable measurements in normals and keratoconus patients. However, its repeatability alters in post cross-linked eyes significantly. Thus, it is important to understand the repeatability range of instruments and understand how it can vary from normals to keratoconic to post cross-linked eyes for better patient management.

The Role of Patient Personality Traits in Planning for Laser Refractive Surgery

First Author: Christine LAM
Co-Author(s): Tommy CHAN, Kendrick SHIH

Purpose: In this study we aim to investigate the personality traits of consecutive patients undergoing laser refractive surgery and compare them to age- and education-matched individuals who opt not for the procedure.

Methods: 100 consecutive subjects interested in laser refractive surgery (LASIK or SMILE) and 75 age and education level-matched subjects not interested in refractive surgery were recruited between November 2018 to October 2019. The 175 subjects were asked to provide demographic details and undergo a 44-item Big Five Inventory Questionnaire. In the end, 168 completed questionnaires were analyzed (93 refractive surgery patients, 68 controls). A single surgeon was responsible for conducting the preoperative consultation to all 100 patients before making the final decision for refractive surgery.

Results: Differences in personality traits were found between subjects undergoing laser refractive surgery (LASIK/SMILE) and those not interested in refractive surgery. In aspects of extraversion, agreeableness, conscientiousness and openness, the two groups performed similarly except for neuroticism, which was significantly higher in the refractive surgery group ($p < 0.05$). Comparing between LASIK (78 subjects) and SMILE (15 subjects) groups, neuroticism was higher in the SMILE group (p 0.08).

Conclusions: It is important for the refractive surgeon to be mindful of the higher levels of neuroticism trait in refractive surgery patients compared to age and education matched controls when setting expectations preoperatively and managing postoperative outcomes.

Visual and Refractive Outcomes and Complications of Customized PRK Plus Accelerated CXL in Early KCN versus Customized LASEK in Myopic Subjects

First Author: Seyed HASHEMIAN

Purpose: To compare the safety, efficacy, stability and predictability of wavefront guided PRK plus accelerated CXL in early KCN with customized LASEK in patients with low myopia.

Methods: Thirty-nine eyes of 39 patients with stable early keratoconus and 44 eyes of 44 patients with myopia were included. After 6.0 months uncorrected (UDVA) and corrected (CDVA), distance visual acuity, refractive outcomes and complications were evaluated.

Results: At six months UDVA, CDVA and refractive error improved significantly in both groups ($P<0.05$). Mean SE refraction improved from -2.39 D to -0.13 in KCN group and from -2.28 D to +0.06 in LASEK group. Mean cylinder improved from -1.35 to -0.54 D and -0.84 to -0.04 D respectively. Nine eyes (23.1%) in KCN group that developed corneal haze at 2 months postoperation improved at 6.0 months post-op. Sixteen eyes (41%) in KCN group gained 1-4 lines of UDVA. The

safety and efficacy index were 1.10, 1.00 and 98.1%, 100% in KCN and LASEK groups respectively.

Conclusions: The visual and refractive outcomes of wavefront-guided PRK plus accelerated CXL in stable early KCN are promising and comparable with customized LASEK in normal myopic subjects. Both techniques appear safe and effectively improved the UDVA, CDVA and refractive error.

Retina 1 (Medical - diabetes)

Apolipoprotein Profiles in Subjects with and without Diabetic Retinopathy

First Author: Yao NIE
Co-Author(s): Xinyuan ZHANG

Purpose: To investigate the effects of dysregulated lipid and apolipoprotein profiles in the occurrence and severity of diabetic retinopathy (DR) and test the hypothesis that altered serum level of apolipoproteins has synergistic effects with that of dyslipidemia on DR.

Methods: This cross-sectional study consists of 147 patients with type 2 diabetes mellitus (DM). The patients were categorized into non-DR (DM), non-proliferative DR (NPDR), and proliferative DR (PDR) groups. Blood biochemistry profile including serum levels of fasting glucose, HbA1c, lipid profile [total cholesterol (TC), Triglycerides (TG), high and low-density lipoprotein (HDL-C and LDL-C)] were estimated. Apolipoproteins (AI, AII, B, CII, CIII, E) was evaluated by protein chips.

Results: No significant differences were detected in the duration of hypertension, age, and gender between the three groups. The serum level of apo CIII in the NPDR group (P=0.005) and PDR group (P=0.002) was significantly higher than that in the DM group. LDL-C was statistically higher in the NPDR group (P=0.039) and PDR group (P=0.000) than those in the DM group. A significant difference was found of TC in the NPDR and PDR group (P=0.001) than that in the DM groups. Multivariate logistic regression showed that hemoglobin and Apo CIII are dependent risk factors for the occurrence and progression of DR.

Conclusions: TC, LDL-C and Apo CIII are risk factors and associated with the severity of DR. Crosstalk of hyperglycemia and dyslipidemia contributes to the occurrence and progression of diabetic retinopathy.

Application of Morphological Changes in Diabetic Macular Edema during Anti-VEGF Therapy via AI Quantitative Segmentation

First Author: Kang WANG
Co-Author(s): Luping WANG, Yang YANG

Purpose: The study aims to find a surrogate morphological biomarker to predict the prognosis of the DME patients' anti-VEGF therapy, through investigating the OCT morphological changes of CMT, volume, the area of introretinal fluid (IRF), the area of subretinal fluid (SRF) by AI automatically segmentation.

Methods: The retrospective horizontal cohort enrolled 22 clinically significant macular edema (CSME) patients. OCT was used to scan 25 horizontal lines near the fovea, and the Ping An AI model was used to automatically segment the lesions for each of their 3 follow visits. All patients received three anti-VEGF intravitreal injections. We collected the CMT and macular retinal volume on the thickness

map of the Heidelberg OCT, using the AI model to auto-segment the lesions. Besides we calculated the IRF and SRF areas of the macular fovea in the EDI deep scan mode.

Results: The IRF in the retina of DME patients decreased during the anti-VEGF treatment, and their BCVA improved. There are modest correlations between CMT, the average retinal volume of the macular and BCVA. Whereas the IRF area is correlated with BCVA. During the treatment, only the change in IRF area was positively correlated with the change in BCVA.

Conclusions: This study confirms that the IRF area can be regarded as a more sensitive predictive biomarker. These can be used to measure the volume of lesions by the density of OCT, which provides the more accurate evaluation for DME patients, and provides a theoretical basis for novel AI model development.

Bilateral Isolated Sixth Cranial Nerve Palsy after Intravitreal Ranibizumab Injection: A Rare Complication

First Author: Cheau Wei CHIN
Co-Author(s): Hayati ABDUL AZIZ, Francesca VENDARGON

Purpose: To report a rare incidence of bilateral isolated sixth cranial nerve palsy following intravitreal ranibizumab injection.

Methods: A 68-year-old gentleman who has right centrally-involved diabetic macular edema (DME) presented with binocular diplopia and squint six days after his first dose of intravitreal ranibizumab injection. His pupils were equal and reactive to light with no relative afferent pupillary defect. Hirschberg test revealed bilateral esotropia at primary gaze, while ocular motility exam showed bilateral abduction deficit. Bilateral lateral rectus palsy was further confirmed with Hess test. Other neurological examination was negative.

Results: Infective, infiltrative, and inflammatory causes were excluded by normal blood investigations. Space occupying lesion was ruled out by CT (computed tomography) brain. Given the recent history of intravitreal ranibizumab injection, we diagnosed him with bilateral sixth cranial nerve palsy secondary to microvascular complications likely attributed to ranibizumab. He was immediately referred to the medical team for optimization of his premorbid and commencement of aspirin. Upon one-week follow-up, he showed improvement in terms of best-corrected visual acuity and bilateral lateral rectus function.

Conclusions: To the best of our knowledge, this is the first report that describes bilateral isolated sixth nerve palsy following ranibizumab injection. Although intravitreal ranibizumab injections are generally well-tolerated, they may contribute to a rare systemic adverse event, such as bilateral sixth cranial nerve palsy which warrants co-management with the medical team.

Changes in Neuroretinal Response Measured by Multifocal Electroretinogram in Malaysian Diabetic Patients without Retinopathy

First Author: Rupini YOGESVARAN
Co-Author(s): Mae Lynn BASTION, Hanizasurana HASHIM

Purpose: To determine changes in neuroretinal response of diabetic patients with no retinopathy using a multifocal electroretinogram (mfERG) in Malaysian population.

Methods: Each eye of 31 type 2 diabetic

patients with no retinopathy was tested and compared with each eye of another 31 healthy subjects of similar age. All participants were subjected to full ophthalmic examination and mfERG. The N1-P1 amplitude, P1 implicit time responses were compared amongst both groups. Spearman's correlation was used to assess the relationship between mfERG responses of diabetic patients with HbA1c level and duration of diabetes.

Results: There was a significant reduction of average N1-P1 amplitude ($p<0.001$) and significant delay in average P1 implicit time ($p<0.001$) of the diabetic patients in comparison to the control group. The average N1-P1 amplitude of the diabetic patients was 40.5 ± 14.3 nV/deg2 and the control group averaged at 76.3 ± 12.8 nV/deg2 while the average P1 implicit time among the diabetic patients was 36.1 ± 2.8 ms and the average of the control group was 34.7 ± 1.2 ms. Among the diabetic subjects, there was a significant negative correlation between the average N1-P1 amplitude and HbA1c levels ($r=-0.5$, $p=<0.001$) and a positive correlation between the average P1 implicit time and HbA1c levels ($r=0.1$, $p=0.443$).

Conclusions: There is a significant reduction in N1P1 amplitude and prolongation of P1 implicit time among Malaysian Type 2 diabetic patients without retinopathy in all retinal areas. This emphasizes the value of mfERG as a tool to aid in developing remedial measures to halt the development of diabetic retinopathy.

Diabetic Macular Ischemia Correlation of Findings in OCT and OCTA

First Author: Ahmed ALKALIBY

Purpose: To how much degree does OCT and OCTA correlate in diabetic macular ischemia? To correlate the findings of optical coherence tomography (OCT) and optical coherence tomography angiography (OCTA) in diabetic patients with macular ischemia.

Methods: A cross sectional study of 30 eyes (including 20 eyes of 20 diabetic patients who were diagnosed of macular ischemia by FFA and 10 control eyes of healthy subjects matched for age and sex). Using FFA, macular ischemia was defined as enlargement or irregularity of FAZ or the presence of areas of capillary dropout. The OCT and OCTA imaging were performed using DRI OCT Triton, Swept source OCT (Topcon Corp., Japan).

Results: A negative correlation between CFT and SCP FAZ area, no correlation between CFT and other OCTA parameters of macular ischemia. No correlation SFCT and any OCTA parameters of macular ischemia. A statistically significant correlation was found between the 2 parameters used to evaluate macular ischemia (SCP and DCP), but no statistically significant correlation was found between parameters of SCP and those of DCP.

Conclusions: OCTA was able to detect macular ischemia in all patients and in some cases macular ischemia was more evident on OCTA. OCTA parameters used in this study to evaluate the degree of macular perfusion were found to have a statistically significant difference between both groups, indicating the ability of OCTA to detect and quantify macular ischemia.

Efficacy and Safety of Intravitreal Brolucizumab in Treatment of Recalcitrant Diabetic Macular Edema: A Retrospective Case Series

First Author: Debdulal CHAKRABORTY
Co-Author(s): Subhendu BORAL, Arnab DAS, Tushar Kanti SINHA

Purpose: To evaluate efficacy, safety and morphological response of brolucizumab in recalcitrant diabetic macular edema.

Methods: Retrospective analysis of 9 consecutive eyes of recalcitrant diabetic macular edema receiving intravitreal brolucizumab on pro-re-nata basis. Main outcome measures were mean change in best-corrected visual acuity (BCVA), intra-retinal-fluid (IRF), subretinal-fluid (SRF), central-subfield thickness (CSFT), from baseline to weeks 4, 8 and 12.

Results: Mean number of previous anti VEGF injection was 16.5±4.34. Mean BCVA at baseline was 0.44±0.1, improving to 0.3±0.1 (P=0.009, 95% CI: 0.04 - 0.23), 0.29±0.1 (P=0.005, 95% CI: 0.05 - 0.24) and O.30±0.1 (P=0.009, 95% CI: 0.04 - 0.23) at 4, 8 and 12 weeks respectively. At 12 weeks, 77.8% (7/9) had improved vision and vision was maintained in 22.2% (2/9) eyes. CSFT at baseline was 390.5±24.8, decreasing to 283.8±14.8, (P<0.001, 95% CI: 86.2- 127.1), 284.1±11.2 (P<0.001, 95% CI: 86.2 – 127.1) and 309.5±20.1 (P<0.001, 95% CI: 58.4 – 103.5) at 4, 8 and 12 weeks respectively. On qualitative analysis, resolution of SRF and IRF was observed in 77.8% (7/9) and 66.7% (6/9) at 4 weeks with 22.2% (2/9) and 33.3% (3/9) showing reduction in SRF, IRF respectively. At 8 weeks no SRF and IRF was noted in 77.8% (7/9). However, at 12 weeks 55.6% (5/9) showed absence of SRF and IRF while in 45.4% (4/9) increase of SRF and IRF was noted. There were no serious ocular or systemic side effects identified.

Conclusions: Brolucizumab appears to be an effective anti-VEGF for management of diabetic macular edema in the short term.

Efficiency of Intravitreal Ranibizumab in Diabetic Retinopathy: Monthly vs Pro Re Nata vs Treat and Extend

First Author: Avantika SRIVASTAVA
Co-Author(s): Avik DEY SARKAR, Suman DAS, Payel KHATUA, Sanchari SARKAR

Purpose: To compare macular thickness (MT) in patients with non-proliferative diabetic retinopathy (NPDR) with clinically significant macular edema (CSME) after receiving intravitreal ranibizumab following monthly, pro re nata (PRN) protocol and treat and extend (T&E).

Methods: 81 patients were selected with NPDR with CSME. Visual acuity and fundus examination was recorded on first visit and follow-ups using Snellen's chart, slit lamp with +90D double aspheric lens respectively. Then a baseline central macular thickness (CMT) was measured to confirm the diagnosis of CSME using a spectral domain optical coherence tomography (SD-OCT) machine. All the patients were divided into 3 groups (A, B and C) of 27 patients each. Group A was posted for monthly intravitreal ranibizumab, Group B was posted to be given the same according to PRN protocol while Group C received T&E protocol. Subsequent CMT was measured on each follow up for the 6 months after last injection.

Results: In Group A, the change in MT was 206.74±73.25µm. Group B had a change in MT of 123.59±63.05µm and in Group C it was 194.07±66.16µm. The average injections required for PRN was 6.2; for T&E was 5.03; for monthly it was 9.

Conclusions: The change in MT was more for Group A following monthly protocol than in PRN group (p=0.012). T&E was superior to PRN as well (p=0.036); while there was no significant difference between monthly group and T&E group (p=0.85).

Expanding the Phenotype of Mucopolysaccharidosis Type 2 Retinopathy

First Author: Tanya KOWALSKI
Co-Author(s): Heather MACK, Jon RUDDLE, Gerard DE JONG

Purpose: To report retinal findings in three male patients with mucopolysaccharidosis type 2 (MPS 2, Hunter syndrome) receiving human recombinant idursulfase enzyme replacement therapy.

Methods: Three males aged between 18 and 20 years who had received enzyme replacement therapy for between 10 and 12 years, with good compliance and no infusion-related reactions, were examined clinically and underwent optical coherence tomographic (OCT) scanning of the retina and electroretinography (ERG).

Results: The mean visual acuity was 77 letters (6/9.6+2, range 70-84) in both eyes. All patients had clinically unremarkable anterior segment and fundus examinations. OCT scanning showed in all patients thickening of the external limiting membrane with hyperreflectant material in at least one eye. One patient had bilateral foveoschisis. ERG was normal in two patients, but it showed a negative response in the patient with foveoschisis.

Conclusions: These three patients with MPS 2 receiving idursulfase treatment have subfoveal deposition of hyperreflectant material despite good compliance and good tolerance of the standard dose of enzyme therapy for this disorder. One patient has developed foveoschisis and negative ERG suggesting abnormality of inner retinal function. Further studies are required to determine the nature of the material, the incidence and the effect of treatment on these findings in patients with MPS 2.

Intravitreal Bevacizumab versus Combination of Intravitreal Bevacizumab and Laser Photocoagulation for the Treatment of Diabetic Macular Edema

First Author: Shally BISWAS
Co-Author(s): Mujtahid Mohammad HOSSAIN, Dipak NAG

Purpose: To assess the efficacy of intra-vitreal injection of bevacizumab versus combination therapy of intra-vitreal injection bevacizumab and laser photocoagulation in the treatment of diabetic macular oedema.

Methods: Longitudinal type of observational study was conducted over 60 (sixty) eyes of sixty diagnosed patients of diabetic macular oedema. Selected patients underwent detailed ophthalmic and systemic examination & investigation. They were grouped into group A (who were treated by intra-vitreal injection of bevacizumab) and group B (who were treated by combination therapy of intra-vitreal injection bevacizumab and laser photocoagulation). All the baseline data and outcome data were recorded in a pre-designed data collection sheet.

Results: The mean age of the study subjects of group A was 52.53±12.11 (SD) years and group B was 52.10±11.45 (SD) years (p=0.43). Among the study subjects, 16 were male and 14 were female in group A, in group B 17 were male and 13 were female in number (p=.07). Statistical analysis comparison of mean BCVA

between two groups at final follow-up was significant (p=0.002). The mean baseline CMT were 434.83±78.38 (SD) micron (μ) in group A and 430.47±65.22 (SD) micron (μ) in group B, it was 397.57±73.22 (SD), 353.56±89.20(SD) and 347.83±114.40 (SD) in group A and 363.56±69.15(SD), 289.48±54.13(SD) and 274.70±47.50(SD) in group B during 1st, 2nd and 3rd follow-up respectively. Statistical analysis comparison of mean CMT between two groups at final follow-up was significant (p=0.002).

Conclusions: The difference in mean BCVA and mean CMT was significant statistically between the two groups during the final follow-up at the end of 6 months.

Knowledge, Attitude and Practice on Diabetic Eye Diseases among Health Care Professionals in Nepal

First Author: Eli PRADHAN
Co-Author(s): Sanyam BAJIMAYA, Sushma DUWAL, Sanjita SHARMA, Mohan SHRESTHA, Raba THAPA

Purpose: Awareness of diabetic retinopathy amongst, MD general practice and emergency medicine (MDGP), midlevel ophthalmic professionals (MLOP) and allied health professionals (AHP) is a major factor for the prevention of diabetes-related ocular complications. This study was conducted to evaluate the knowledge, attitude and practice (KAP) regarding -diabetes mellitus (DM) and diabetic retinopathy (DR) among health care professionals treating diabetic patients.

Methods: A close-ended questionnaire was administered before and after the training program of diabetic retinopathy to the health care professionals as pretest and post-test questionnaires. It comprises 18 questions in 3 sections on KAP in regards to DM and DR.

Results: There were a total 78 participants, with GP, 39; MOLP, 5 and AHP, 34 respectively. All of the participants (100%) were aware of the fact that diabetes can affect the eye and can cause impairment in vision and accept that diabetes patients should be sent for ophthalmic evaluations with the majority of them advocate for the immediate evaluation after the diagnosis. Most of them had better knowledge of DR management, being 27% more after the training. They strongly believe that the early treatment of DM prevents or delays diabetic retinopathy, which is increased by 20 % post-training. There is improvement of concept of early referral for eye check-up after the training and also performing ophthalmoscopy in the practice to check for diabetic retinopathy changes.

Conclusions: The study shows a good level of diabetic retinopathy awareness and knowledge with relatively positive attitudes toward the importance of diabetes care after the training.

OCT Biomarkers in DKD Patients with Center-Involving DME

First Author: Nikhil GOPALAKRISHNAN
Co-Author(s): Abhijith KUMAR, Shankar PRASAD, Shailaja SHENOY

Purpose: The interplay between anemia, diabetes mellitus (DM), diabetic retinopathy (DR) and diabetic kidney disease (DKD) is well known. This study aims to understand the effect of anemia and DKD on diabetic macular edema (DME) using spectral-domain optical coherence tomography.

Methods: A single-center cross-sectional observational study in patients of DKD diagnosed with centre-involving DME, aged over 18 years. Laboratory parameters were analysed against features of ophthalmic examination and OCT biomarkers to look for

any association.

Results: The data of 29 patients (89.1% male [n=26], 10.3% female [n=3]) was analysed. Mean age of 56.06 years and mean duration of DM of 11.69 years were noted. Prevalence of anemia by severity was 31% mild[n=9], 48.2% moderate[n=4] and 6% severe[n=2]. The presence of cystoid abnormalities (82.7% , n=22) was found to be associated directly with HbA1c (p=0.018). Diffuse retinal thickening (DRT) seen in 89.6% [n=26] was significantly associated with hemoglobin (p=0.029), urea (p=0.011), creatinine (p=0.013) and sodium (p<0.01). Central subfield thickness (CST) was found correlating negatively with HbA1c (p=0.0093). The presence of proteinuria was found to be associated with the disorganization of retinal inner layers (DRIL) (p=0.0202) and the extent of DRIL showed association with proteinuria and serum sodium levels. Serum creatinine also showed association with the fusiform shape of DME (p=0.0165).

Conclusions: The presence of significant correlations (p<0.05) between routine laboratory tests and OCT features shows the need to identify such non-invasive biomarkers to improve patients outcomes in systemic conditions like DM and its complications over time.

Optical Coherence Tomography Biomarkers as Functional Outcome Predictors in Diabetic Clinically Significant Macular Edema Treated with Subthreshold Micropulse Laser

First Author: Hiu Ping Frank LAI
Co-Author(s): Pui San CHAN, Anthony Chuk Him LAI, Robert LAM, Susanna TSANG, Tiffany WOO

Purpose: To investigate the value of optical coherence tomography (OCT) biomarkers in predicting the 6-month and 12-month visual response of clinically significant macular edema (CSME) to macular micropulse laser treatment.

Methods: This was a single-center, retrospective cohort study. A total of 74 eyes from 55 patients treated with subthreshold micropulse laser for CSME were included. The baseline OCT scans were evaluated for subretinal fluid, size and location of cystoid changes, inner segment-outer segment continuity, quantity and location of hyperreflective foci (HRF), and epiretinal membrane. The best-corrected visual acuities were recorded at 6 and 12 months post micropulse laser. Correlations between OCT features and visual outcomes were analyzed.

Results: The presence of subretinal fluid (odds ratio [OR], 3.427; 95% confidence interval [CI], 1.036-11.335; p = 0.037) was predictive of 2-line improvement in logMAR scale at 6 months after treatment with micropulse laser. The presence of outer retinal layer (ONL) cysts larger than 100µm (OR, 5.250; 95% CI, 1.100-25.056; p = 0.025) and presence of inner nuclear layer (INL) cysts (OR, 4.940; 95% CI, 1.473-16.565; p = 0.006) were predictive of 2-line improvement in logMAR scale at 12 months after treatment with micropulse laser.

Conclusions: Certain OCT features are useful in predicting the treatment response of CSME to subthreshold micropulse laser. The presence of subretinal fluid, presence of ONL cysts larger than 100µm and presence of INL cysts are predictive of better visual outcome after micropulse laser.

Pachydrusen

First Author: Xinyuan ZHANG

Purpose: Pachychoroid diseases are defined as a focal or diffuse thickening and dysfunctions

of the choroid. Pachydrusen is a relatively new concept which has been drawn much attention in recent years. This study aims to characterize the properties of pachydrusen in comparison with the classic drusens and to further analyze the specific choroidal morphology.

Methods: Swept-source OCT (SS-OCT), color fundus photos, fluorescence agiography and indocyanine green angiography examinations were applied for all the enrolled patients. Choroidal morphology under the pachydrusen was analyzed using OCT B-scans and en face images (9mm X9mm).

Results: 100% pachydrusen were identified by color fundus photos and SS-OCT. Most pachydrusen (90%) were located para- or peri-foveally in the retina. OCT B-scan found that pachydrusen were located at the area of a dilated Haller vessel (pachyvessel) which was verified by en face images.

Conclusions: Choroidal changes under the pachydrusen showed increased Haller's layer thickness with an attenuated choriocapillaris layer. The association between pachydrusen and polypoidal choroidal vasculopathy (PCV) is warranted to further research to verify.

Prevalence and Progression of Diabetic Retinopathy in Pregnancy with Pre-Gestational Diabetes in a Tertiary Care Center in India

First Author: Shagufa JAMAL
Co-Author(s): Suchitra DASH, Prangya PANDA

Purpose: To evaluate the prevalence, associated risk factors and clinical course for diabetic retinopathy (DR) in pregnant females with pre-gestational diabetes mellitus (DM).

Methods: This ambispective observational cohort study was carried out in a tertiary care center. Only pregnant females with pre-gestational diabetes were included in the study. After obtaining due consent and relevant history, comprehensive ocular examination, fundus photography and assessment of systemic parameters was done in each of the three trimesters and at three months post-partum. Statistical analysis of the compiled data was carried out.

Results: Out of the total 44 females included in the study, only 6 were found to have DR. 3 had Type 1 DM and 3 had Type 2 DM. The prevalence of DR was 13.6%. The mean age of patients with DR was 31.88 years. The mean duration of DM in patients with DR was 10.5 years, with this correlation being statistically significant (p=0.0015). Among the systemic parameters, diastolic blood pressure in 2nd and 3rd trimester (p=0.0014 and 0.0052 respectively) and HbA1c showed statistically significant correlation with the presence of DR. The rate of progression or worsening was 66.66%, where most of these patients were on insulin therapy. No case of spontaneous post-partum regression was seen.

Conclusions: Pregnant females with long duration of pre-gestational DM should be monitored closely with proper ante-natal care including strict control of blood pressure and HbA1c to avoid vision threatening complications. Patient should be followed up till retinopathy stabilization. Specific guidelines should be developed for management of DR in pregnancy.

Prevalence of Vitreomacular Interface Disorders in Proliferative Diabetic Retinopathy

First Author: Aidi LIN
Co-Author(s): Haoyu CHEN, Xinyu LIU, Honghe XIA, Anlin ZHANG

Purpose: To investigate the prevalence

and risk factors of vitreomacular interface disorders (VMID) in proliferative diabetic retinopathy (PDR). The impacts of VMID on the intraretinal structure and visual acuity were also evaluated.

Methods: The macular optical coherence tomography (OCT) scans of 493 eyes from 378 PDR patients were retrospectively reviewed to detect VMID, including vitreomacular adhesion (VMA), vitreomacular traction (VMT), epiretinal membrane (ERM), lamellar hole-associated epiretinal proliferation (LHEP) and macular hole (MH). The associations between VMID and the baseline factors, intraretinal structure, and visual acuity were analyzed.

Results: The prevalence was 78.9% for ERM, 13.4% for VMT, 4.8% for MH, 2.2% for LHEP and 2.0% for VMA respectively. Fibrovascular proliferation (FVP) was positively associated with MH (OR=8.029, p=0.005), VMT (OR=3.774, p<0.001) and ERM (OR=2.305, p<0.001). High-risk PDR was another risk factor of ERM (OR=1.846, p=0.020). Female gender was positively associated with MH (OR=3.836, p=0.031), while vitreous hemorrhage was the protective factor of MH (OR=0.344, p=0.028). Eyes with VMID showed more frequent macular cysts, retinoschisis and tractional retinal detachment with poorer visual acuity (p≤0.014).

Conclusions: The prevalence of VMID was considerably high in PDR, and the FVP was the risk factor of this entity. VMID affected both intraretinal structure and visual acuity, and should be considered in the management of PDR patients.

Reduced Expression of Erythropoietin after Intravitreal Ranibizumab in Proliferative Diabetic Retinopathy Patients

First Author: Jing FENG
Co-Author(s): Li CHEN, Fuxiao LUAN, Yong TAO

Purpose: To evaluate the expressions of erythropoietin (EPO) and vascular endothelial growth factor (VEGF) in the vitreous and fibrovascular membranes (FVMs) of proliferative diabetic retinopathy (PDR) after the intravitreal injection of ranibizumab (IVR) and further explore the relationship between EPO and VEGF.

Methods: The concentrations of EPO and VEGF levels in the vitreous fluid were measured in 35 patients (24 PDR and 11 non-diabetic patients) using enzyme-linked immunosorbent assay. The patients were divided into three groups: PDR with IVR (IVR group) before par plana vitrectomy (n=10), PDR without IVR (non-IVR group) (n=14) and a non-diabetic group (n=11). Fluorescence immunostaining was performed to examine the expressions of VEGF, EPO and CD105 in the epiretinal membranes.

Results: The PDR eyes of non-IVR group had the highest vitreous VEGF and EPO levels compared to the non-diabetic group (both P<0.001). Both the VEGF and EPO levels in the IVR group were significantly lower than the non-IVR group (P=0.004 and P=0.04, respectively). Yet the EPO level in the IVR group was significantly higher than that in the non-diabetic group (P=0.001). The expressions of EPO, VEGF and CD105 were significantly reduced in FVMs in the IVR group compared with the non-IVR group. The receiver operating characteristic curve of the EPO and VEGF levels were 0.951 and 0.938 in the PDR group.

Conclusions: Both of the VEGF and EPO

level were significantly increased in PDR patients, which have equal diagnostic value in the prediction of PDR. IVR could reduce the EPO level, but not enough to the normal level.

Spatial Distribution of Diabetic Capillary Non-Perfusion

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Co-Author(s): Pasha ANVARI, Maryam ASHRAFKHO-RASANI, Abbas HABIBI, Reza MIRSHAHI, Hamid RIAZI-ESFAHANI

Purpose: To evaluate the distribution of capillary non-perfusion (CNP) in superficial and deep capillary plexuses (SCP and DCP) in eyes with diabetic retinopathy (DR).

Methods: In this retrospective case series, macular optical coherence tomography angiography (OCTA) images were obtained from eyes with DR without diabetic macular edema. The area of CNP in SCP and DCP was delineated using an automated approach after excluding the foveal avascular zone and major retinal vessels. The distribution and spatial correlation of the CNP in each layer were analyzed.

Results: Forty-three eyes of 27 patients with diabetic retinopathy with a mean age of 59.10± 9.05 years were included. The mean CNP area in SCP was statistically significantly higher than DCP (0.722± 0.437 mm2 vs 0.184± 0.145 mm2, respectively, P<0.001). There was a statistically significant association between mean BCVA (0.28±0.21 logMAR) and CNP area in DCP (P=0.01). After automated subtraction of CNP areas in DCP from SCP, 25.43±15.05 % of CNP areas in the DCP had co-localized CNP areas in SCP. The CNP percentage was statistically significantly different between the concentric rings on the foveal center, both in SCP and DCP (both P<0.001) showing a decreasing trend from the outer ring toward the center.

Conclusions: In DR, SCP is more ischemic than DCP. This is in contrast to the previously described oxygenation dependent ischemic cascade following acute retinal vascular occlusions. This study provides further insight into the retinal ischemia in DR.

The Effect of Insulin on Response to Intravitreal Anti-VEGF Injection in Diabetic Macular Edema

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Purpose: Insulin has proven to be one of the most widely used anti-glycemic agents in all forms of diabetes mellitus (DM). Interestingly there are several reports of increased risk of diabetic macular edema (DME) with the use of insulin therapy in T2 diabetics, and consequently, this may have an impact on response to anti-vascular endothelial growth factor (anti-VEGF) injection, the standard of care for DME. The aim of the present study was, therefore, to assess whether insulin therapy impacts DME response to anti-VEGF therapy in T2DM.

Methods: This was a retrospective multi-center analysis of de-identified data. The final 12 months' best-corrected visual acuity (BCVA), central macular thickness (CMT), and cumulative injection number were compared between the insulin and the oral hypoglycemic agent (OHA) groups.

Results: A total of 198 patients (Insulin=137, OHA=61) were analyzed. The mean final BCVA improved in both the insulin (p=0.006) and the OHA group (p=0.258). There was a similar improvement in the final mean CMT in

each of the treatment groups (Insulin=p<0.001, OHA=p<0.001). At the end of 12 months, the two treatment groups were comparable in their final BCVA (p=0.302), final CMT (p=0.760) and the cumulative injections received (p=0.512). The results were comparable between the two groups when stratified by baseline vision (p>0.05) and baseline HbA1c (p>0.05).

Conclusions: Our study showed that insulin therapy is not associated with sub-optimal vision or CMT outcomes. Since insulin helps in better glycemic control, it might even be positively associated with a better anti-VEGF response in the long run.

The Efficacy and Complication of Intravitreal Dexamethasone Implant in Diabetic Macular Edema: Novel Use as a Primary Treatment Modality

First Author: Saloni GUPTA
Co-Author(s): Om Prakash ANAND, Shailender CHAUDHARY, Nabeel FIROZ, Mitali JHAMB

Purpose: This study investigates an intravitreal dexamethasone implant, its efficacy and complications in patients of diabetic macular edema.

Methods: A prospective, interventional study involving 30 patients with diabetic macular edema (DME). Patients with DME in both eyes who were pseudophakic, with a visual acuity of 6/12 or less and a central corneal thickness of 300 microns or more on OCT in both eyes were included. Primary efficacy variables were best-corrected visual acuity(BCVA), central macular thickness (CMT), and intraocular pressure (IOP), noted for both eyes at baseline, and the eye with larger numerical value of CMT on OCT was taken as case, and fellow eye was taken as control. The patients were followed up and parameters noted at one week, one month and three months following the implant injection.

Results: Baseline parameters were comparable. Eyes receiving implant had a significant improvement (p<0.001) in BCVA and gained a mean of 6.10 letters on Snellen chart while control group lost a mean of 4.47 letters over three month period. Also, there was consistent increase in difference between the CMT values of case and control eyes throughout the observed three months because of significant reduction in CMT in eyes receiving the implant and progressively increasing CMT in control eyes. The mean difference in IOP between two groups over three-month follow-up was 1.50, which statistically significant but clinically well within normal physiological range.

Conclusions: The study concluded that intravitreal dexamethasone implant is an effective treatment for DME, and it has a statistically significant and clinically meaningful effect on BCVA and CMT.

Therapeutic Effect of Simultaneous Intravitreal Dexamethasone and Aflibercept for Diabetic Macular Edema

First Author: Tai-chi LIN
Co-Author(s): Yu-chien CHUNG, Tsui-kang HSU, Hsin-wei HUANG, Yi-ming HUANG, Po-chen TSENG

Purpose: To report the effect of simultaneous intravitreal dexamethasone and aflibercept for diabetic macular edema.

Methods: This open-label, multicenter, consecutive case series included 102 eyes of 81 patients with diabetic macular edema. Patients were divided into two different subgroups at the ophthalmologist's discretion: the control group consisted of 50 eyes treated with aflibercept alone; the combination group

consisted of 52 eyes treated with simultaneous dexamethasone implant and aflibercept injection. Primary endpoints were changes in best-corrected visual acuity (BCVA) and central retinal thickness (CRT) from baseline to month 6. The secondary endpoint was the interval of retreatment.

Results: Baseline BCVA increased and CRT reduced at 6 months in both groups. Pseudophakic eyes in the combination group had a significantly greater BCVA improvement compared with the phakic eyes (p=0.031). The total number of intravitreal treatments was fewer in eyes treated with combination therapy than those with aflibercept alone (1.56±0.54 vs 4.04±1.26, p<.0001), with a mean retreatment interval of 3.66±0.69 months.

Conclusions: Our study demonstrated the therapeutic effect of simultaneous intravitreal DEX and aflibercept for DME in improving BCVA and reducing CRT for a significant treatment interval.

To Relate Fundus Changes Associated with Diabetes with Different Stages of Nephropathy

First Author: Saloni GUPTA
Co-Author(s): Sahil AGRAWAL, Nabeel FIROZ, Mitali JHAMB, Aniket RAI

Purpose: The current study aimed to investigate whether microalbuminuria or moderately decreased glomerular filtration rate (GFR) is a better predictor for the development and progression of retinopathy in type 2 diabetic patients.

Methods: Type 2 diabetic patients without cardiovascular diseases, malignancy, pregnancy, and acute intercurrent illness were enrolled between 1 August 2001 and 31 December 2002. All participants provided their detailed medical history and underwent an eye fundus examination. They were followed up in outpatient clinics, and serum creatinine, urinary albumin-to-creatinine ratio (UACR), and retinal photographs were followed up annually until 31 December 2009. The primary outcomes were development and progression of diabetic retinopathy and nephropathy. The secondary outcomes were cardiovascular events and all-cause mortality.

Results: Among 487 participants, 81 subjects had normoalbuminuria and moderate renal impairment (baseline eGFR 30–59.9 mL/min/1.73 m2), and 106 subjects had microalbuminuria and baseline eGFR $60 mL/min/1.73 m2. Patients with microalbuminuria and eGFR $60 mL/min/1.73 m2 had a significantly greater risk for development and progression of diabetic retinopathy (HR 3.34 [95% CI 1.04–10.70]) compared with those with moderate renal impairment and normoalbuminuria after multivariate adjustment. Risks for renal outcome, cardiovascular events, and all-cause mortality were not significantly different between the two groups.

Conclusions: Microalbuminuria has a greater impact on predicting the development and progression of diabetic retinopathy compared with moderate decline in GFR among type 2 diabetic patients.

Unique Case of Choroidal Detachment after Intravitreal Razumab

First Author: Remya PAULOSE

Purpose: The purpose of this report was to describe a case of choroidal detachment after an uneventful intravitreal injection of razumab using a 30-gauge needle in diabetic macular edema.

Methods: A 65-year-old woman presented with worsening of vision in the right eye for 2 weeks following an uneventful intravitreal razumab injection for diabetic macular oedema. Her vision had dropped to 20/100 from baseline 20/40. Anterior segment was normal and intraocular pressure was 15 mm Hg. Clinical diagnosis of the right eye choroidal detachment (CD) was made.

Results: The occurrence of CD following intravitreal anti-VEGF injection is a very rare entity.1 Although the pathogenesis is unknown, it could be attributed to the inflammatory reaction of the anti-VEGF agent. Medical management with topical steroids and cycloplegic resulted in complete resolution of choroidal detachment. Since the choroidal detachment involved 2 quadrants temporally, it seemed prudent to withhold further injections till the detachment subside.

Conclusions: This case highlights the importance of close follow-up of patients who undergo intravitreal injections. Its presence may be overlooked, if a proper funduscopy is not performed prior to each injection.

Usher Syndrome with Juvenile Cataract

First Author: Bramantya PRATAMA
Co-Author(s): Nadia DEWI, Mirza METITA, Safaruddin REFA

Purpose: Usher syndrome is a genetic disorder characterized by retinitis pigmentosa and congenital sensory neural hearing loss. This study reports a rare case of usher syndrome with juvenile cataract.

Methods: Diagnosis was based on history taking, ophthalmology examination, and ear, nose & throat examination.

Results: A 23-year old male came to the ophthalmology outpatient clinic complaining of bilateral blurry vision, especially at night and a narrowed visual field since 12 years ago. The patient experienced a gradually worsening vision followed by a whitish appearance in the left eye. The patient has been deaf-mute since birth. Three family members from his paternal line exhibited the same symptoms. The patient's best-corrected visual acuity was 0,4 for the right eye and hand movement on the left. Slitlamp examination reveals cataractous lens found in both eyes. Posterior segment examination showed bone spiculae appearance at peripheral area in both eyes. Right eye Humphrey Visual Field testing showed tunnel vision. Macular Optical Coherence Tomography showed macular edema in the right eye and macular thinning in the left. Examination by Ear, Nose & Throat Department showed a sensorineural hearing loss and no difficulties with balance.

Conclusions: The symptoms and the pedigree supports type II usher syndrome. Early detection and rehabilitation are important to preserve residual vision in this case. Rehabilitation that can be done in this patient is braille training, glasses to improve the patient's vision & hearing aids for social functions.

Visual Field Defect in Diabetes Mellitus Patients with or without Diabetic Retinopathy

First Author: Rajneel BHATTACHARJEE
Co-Author(s): Rajneel BHATTACHARJEE, Namrata SHREE

Purpose: The aim of the study is to assess the visual field defect in diabetes mellitus with or without diabetic retinopathy.

Methods: The study was conducted in six months on a number of diabetic patients with or without diabetic retinopathy. Patients

with diabetic retinopathy were graded and compared. Diabetic patients without diabetic retinopathy were also compared with normal healthy subjects. Using automated perimetry the subjects were tested. Diabetics tested within the same time period were included in the study. Subjects with major systemic illnesses other than diabetes were excluded from the study.

Results: There was no significant visual field defect between diabetic patients without diabetic retinopathy and normal healthy subjects. The visual field defect was found to be more strongly associated with the severity of retinopathy rather than the duration of diabetes.

Conclusions: Diabetic patients without diabetic retinopathy do not have significant visual field defects. There was a significant defect in visual fields in diabetic patients with retinopathy and is related to the severity of retinopathy and duration of diabetes.

Retina 2 (Medical – other)

A Glimmer of Hope: Bilateral Terson's Syndrome in a Child with Promising Results following Surgical Intervention: A Case Report and Long Term Follow Up

First Author: Thanura HEWAGE
Co-Author(s): Sriharanathan POOPALARATNAM

Purpose: This report describes a child with bilateral Terson's syndrome and subsequent surgical management with visual rehabilitation and its long term follow up results.

Methods: A retrospective case report of 10 month old child with bilateral Terson's syndrome following fall of a coconut on her head and its subsequent ocular management and outcome up to her age of 4 is presented.

Results: Ocular management started after 2 months of treatment at neurosurgical unit for left frontal subdural hemorrhage, bilateral frontal subarachnoid hemorrhage. Preliminary examinations revealed negative hope for surgical intervention such as bilateral dense vitreous hemorrhage, unseen retina, and sluggish pupillary reactions and non-recordable VEP. Surgery was planned following parents consent. Both eyes went 23G lens sparing vitrectomy, at one month gap starting from right eye. Following uneventful surgery intensive visual rehabilitation done. Over four years follow up BCVA improved from bilateral NPL to right 6/18 and left HM without long term complications of surgery such as cataract and glaucoma.

Conclusions: Studies have shown no difference in final visual acuity between patients who were conservatively managed and those who underwent PPV. However, visual recovery was more rapid in the vitrectomized patients. Patient is a young child who is having higher risk of stimulus deprivation amblyopia. So early surgical intervention was done which lead to progressive improvement of vision on left eye.

A Life Saved Warned by a Rare Monocular Purtscher's Retinopathy

First Author: Sree Shantha Kumaran S.MAGENDRAN
Co-Author(s): Ng SOK LIN, Boon Hooi TAN

Purpose: We report a rare case of Purtscher's retinopathy related to seat belt injury following motor vehicle injury.

Methods: A case report.

Results: A 40-year-old female was referred for left eye sudden reduced vision immediately

after motor vehicle accident. There was no direct ocular trauma and no loss of consciousness. She was a front seater with her seat belt fastened. She was otherwise stable systemically and sustained only left pinna laceration and submandibular injury. Ocular assessment noted visual acuity of 6/6 right eye and 6/60 left eye. Anterior segment was unremarkable bilaterally. Left funduscopic assessment revealed multiple cotton wool spot and Purtscher's fleckens over the peripapillary region and posterior pole. Splinter hemorrhages noted inferotemporally to optic disc with swollen macula. Right eye fundus noted to be normal. A posteroanterior view chest X-ray was ordered as to exclude compressive thoracic injury due to ocular findings. Unexpectedly, air under diaphragm was detected from the X-ray and she was immediately referred for intra-abdominal injury. An emergency exploratory laparotomy with limited right hemicolectomy and double barrel stoma was proceeded by surgical team for traumatic mesenteric injury with descending colon transection. Operation was successful. Her vision has regained to 6/9 after 2 weeks. Optical coherence tomography of macula at 6 months post trauma revealed macular atrophy. To date, treatment for Purtscher's retinopathy is still indefinite. We opted for conservative treatment in her case.

Conclusions: We highlight that ocular findings with Purtscher's retinopathy should alarm the clinician to scrutinize for life threatening injury in all trauma patients.

A Series of Unfortunate Events: A Case of Sympathetic Ophthalmia in Young Patient with Mooren Ulcer (MU)

First Author: Mohd Hasif MUSTAFA
Co-Author(s): Wan Haslina HALIM, Norshamsiah MD DIN, Ayesha MOHD ZAIN, Meng YONG

Purpose: To report a case of sympathetic ophthalmia (SO) in a patient with Mooren ulcer post corneal patch graft surgery.

Methods: A case report.

Results: A 34-year-old man with a history of bilateral alternating eye redness, more frequent in the right eye for 3 years. On presentation, he complained of right eye redness, discomfort and watery discharge. His best-corrected visual acuity (BCVA) was 6/12 (OD) and 6/6 (OS). There was inferior corneal thinning with limbal involvement from 4 to 8 o'clock and sealed cornea microperforation with iris plug. The eye was normotensive with normal fundus. All infective and inflammatory markers investigation was negative. Diagnosis of bilateral Mooren ulcer was made. He was started on pre-operative oral prednisolone prior to right inferior lamella keratoplasty. Two weeks later, he complained of bilateral eye reduce vision with photophobia. BCVA was 6/60 (OD) and 6/36 (OS). The examination revealed right corneal graft melting and bilateral progressive anterior chamber(AC) inflammation. Bilateral serous retinal detachment was noted. Initial diagnosis of multifocal central serous retinopathy(CSR) secondary to systemic steroid was made, thus all oral steroid was withheld. However, the patient subsequently developed worsening panuveitis. Additional investigation showed negative result. His final diagnosis was revised as bilateral SO. He received intravenous methylprednisolone(IVMP) for 3 days followed by oral prednisolone. Resolution of subretinal fluid was observed with BVCA improvement. Improvement of cornea graft melt and AC inflammation was also noted.

Conclusions: SO is a rare complication of corneal graft surgery and is usually induced

by a history of trauma. Diagnosis of SO in eyes with bilateral progressive panuveitis and history of microperforation should be entertained.

Acute Retinal Necrosis? Or Ocular Toxoplasmosis? Intraocular Fluid Test Tells You the Truth

First Author: Fuxiao LUAN

Purpose: To report a previous case of acute retinal necrosis syndrome (ARN), and then diagnosed with ocular toxoomiasis by intraocular fluid test. This report aims to provide certain clinical experience and guidance for the diagnosis and treatment of infectious eye diseases such as ocular toxoomiasis.

Methods: The main reason of the patient was that the visual acuity of the left eye had decreased for more than 2 months, and it became worse for 1 week. Physical examination: Vision: OD 0.8, OS 0.05. OS: corneal KP (+), Tyn (+), floating cell> 50/ vision, moderate glass turbidity, gray-white lesions, vascular white sheath on the upper retinal fundus. Previous history: The left eye was diagnosed with ARN two months ago. Wide-angle fundus photography, OCT examination, intraocular fluid detection were performed.

Results: The test results of intraocular fluid and serum showed: intraocular fluid: toxoplasma IgG 320.24 IU/ml, serum toxoplasma IgG 158.27 IU/ml, Goldmann-Witmer coefficient: 81.32. Combined with clinical manifestations and intraocular fluid test results, the diagnosis of ocular toxoomiasis was clear. Sulfamethoxazole and trimethoprim were given orally. After two months' treatment, the visual acuity of the left eye improved to 0.5, the anterior chamber and vitreous inflammatory reaction was significantly reduced compared with the previous, and the area of the gray-white lesions on the upper retina was significantly reduced.

Conclusions: Ocular toxoplasmosis is relatively rare, and the clinical manifestations are easy to be confused with viral retinopathy such as ARN or other infectious retinopathy, so the reasonable use of intraocular fluid detection is meaningful.

Bilateral Sequential Central Retina Artery Occlusion (CRAO) in Ocular Toxoplasmosis: S Case Report

First Author: Noor Amalina SAIDI
Co-Author(s): Henry Qi Zhe NGOO, Nurul Farah Huda SHAHRUDIN, Tuan Mohd Amirul Hasbi TUAN PAIL, Wan Norliza WAN MUDA, Shawarinin JU

Purpose: To report a case of bilateral sequential CRAO in a healthy young gentleman secondary to Toxoplasmosis.

Methods: A case report.

Results: A 41-year-old gentleman with underlying adult-onset asthma not on medication and chronic active smoker presented with sudden onset of right eye painless vision loss associated with prolonged fever, chills and rigors. Fundus examination showed a cherry-red spot with few cotton wool spots. Vital signs were normal. Systemic investigations including infective and connective tissue disease screening were all negative except for Toxoplasma IgM. Magnetic Resonance Imaging (MRI) brain was normal. The patient was treated as right eye CRAO secondary to Toxoplasmosis hence Tablet sulfamethoxazole/trimethoprim was commenced, unfortunately, it was withheld as the patient developed an allergic reaction. Four months later, he presented with similar

symptoms over the left eye with sudden onset painless vision loss. Fundus examination showed typical cherry-red spots with sclerosed vessels and cotton wool spots. However, both eyes did not show typical fundus signs of ocular Toxoplasmosis. The patient subsequently started on tablet clindamycin. Upon the last review, his right eye showed improvement in vision from hand movement to 6/7.5 while his left eye began to show improvement of vision from hand movement to 2/60. Optical coherence tomography (OCT) showed bilateral retina thinning.

Conclusions: Manifestation of Toxplasmosis may vary, it can be manifested as CRAO despite no typical fundus picture of ocular Toxoplasmosis. Hence Toxoplasmosis infection should not be excluded in the case of young CRAO.

Bilateral and Multiple Central Serous Chorioretinopathy in Post COVID-19 Infection: A Rare Case Presentation

First Author: Mohd Alif W MOHD
Co-Author(s): Nur Athirah ADNAN, Maya Sapira HANAPI, Shatriah ISMAIL, T NORINA

Purpose: To report a unique case of post-coronavirus disease (COVID-19) infection presented with bilateral and multiple central serous chorioretinopathy (CSCR).

Methods: A case report.

Results: A 38-year-old gentleman with no comorbidity was diagnosed with COVID-19 infection after swab test COVID-PCR was positive. He was administered intravenous antibiotics and steroids during his 9-day stay at the hospital. The steroid was changed to oral upon discharge from the hospital with a slow tapering dose over a 2-week duration. He presented to us on day 24 of illness COVID-19 infection with bilateral eyes worsening central vision loss of 6 days duration. There was no eye pain, eye redness, or any history recent of ocular trauma. Upon examination, the vision was 6/12 and 6/6 for his left eye and right eye respectively with an absence of relative afferent pupillary defect. Bilateral anterior segment examinations were unremarkable. Fundus examination revealed bilateral and multiple localized areas of serous retinal detachment of the macula. Optical coherence tomography of the macula showed serous detachment with multiple areas of pigment epithelial detachment. His oral steroid was slowly tapered then stop to avoid COVID-19 infection sequelae. He was prescribed topical nepafenac 0.1% three times daily for bilateral eyes and advised for lifestyle modification and stress management.

Conclusions: Steroid administration in the treatment of COVID-19 is a risk factor for CSCR, including the stressful condition for those who acquired the disease. Physicians should be aware of this side effect and early referral to ophthalmologist for treatment is needed.

Biomarkers Predicting Complete Polypoidal Lesion Regression

First Author: Colin TAN

Purpose: To evaluate the potential predictors of complete polypoidal lesion regression (CPREG).

Methods: In a 24-month, multicenter study, 322 patients diagnosed with symptomatic polypoidal choroidal vasculopathy were randomized 1:1 to receive ranibizumab 0.5 mg + verteporfin photodynamic therapy (n=168) or ranibizumab 0.5 mg monotherapy (n=154). The presence and size of polypoidal lesions were assessed using indocyanine green

angiography (ICGA) by the Fundus Image Reading Center at baseline, months 3, 6, and 12. Predictors of CPREG at month 12 were studied by backward selection multiple logistic regression using demographic, functional, anatomic, and angiographic parameters in two separate models that used either the baseline predictors or on-treatment predictors at month 3.

Results: Baseline ICGA characteristics were comparable between both treatment groups. At month 3, 71.4% of patients treated with combination therapy achieved CPREG and the rates were stable at months 6 and 12 (71.3% and 69.7%, respectively). In the ranibizumab monotherapy group, the proportion increased from 23.3% at Month 3 to 28.0% and 33.8% at months 6 and 12, respectively. Treatment with combination therapy (odds ratio [OR] 4.64 [baseline model] and 2.25 [month 3 model]), absence of pulsation of nodule at baseline (OR 2.62), and presence of CPREG at month 3 (OR 6.6) were associated with a higher probability of CPREG at month 12.

Conclusions: At month 12, treatment with combination therapy was associated with a higher probability of achieving CPREG than ranibizumab monotherapy. The results contribute to the further understanding of the response of PCV-associated polypoidal lesions to ranibizumab with or without vPDT.

Brilliant Blue G Toxicity in Macular Hole Surgeries: A Report on Combined Phototoxicty and Dye Induced Macular Damage

First Author: Mudit TYAGI
Co-Author(s): Rajeev REDDY

Purpose: Vitrectomy with brilliant blue G (BBG) assisted internal limiting membrane (ILM) peeling is the standard operational technique in macular hole surgeries. However, BBG dye, though considered safe and nontoxic, can also occasionally lead to macular toxicity. This study aims to describe the clinical features and characteristics of four eyes who developed macular toxicity after surgery for macular hole.

Methods: Retrospective review of all consecutive cases of macular toxicity after ILM peeling. All cases were reviewed, their operative surgical notes were retrieved and analyzed. The ILM was stained twice during surgery with prolonged intraoperative surgical time.

Results: All four cases had a prolonged surgical time and the ILM was stained twice during surgery in all cases. The area of macular toxicity was corresponding to the area of ILM peeling which had been exposed to repeat staining by BBG dye. At the end of one month, all four cases had foveal thinning along with choriocapillary atrophy. The mean BCVA was 20/80 before surgery and the final mean visual acuity was <20/800.

Conclusions: This report highlights the occurrence of macular and choriocapillary atrophy due to prolonged focal endoillumination and the increased risk of toxicity with repeated dye staining.

CRAO in an Asymptomatic COVID Positive Pregnant Woman

First Author: Sameera V V

Purpose: We report a case of central retinal artery occlusion (CRAO) in an asymptomatic COVID positive pregnant woman.

Methods: A 23-year-old pregnant Primipara woman presented with sudden decreased vision in her right eye. She had a pale retina with cherry red spot in macula consistent with

CRAO. Ocular massage, AC paracentesis were tried on the first visit followed by topical IOP lowering agents. Thrombolytics were contraindicated as she was in 24 weeks gestation. An extensive workup was performed to determine any other hypercoagulable state other than pregnancy. All test results were within normal limits except for her SARS COVID test (positive). She was totally asymtomatic for COVID infection. D dimer levels were later tested which was at borderline levels. Her visual acuity improved from finger counting 1 metre to 20/200 over 2 months.

Results: This case suggests that CRAO can occur in asymptomatic COVID patients as well. The pregnancy and COVID-19 associated coagulopathy acted as a double edged sword resulted in microvascular thrombosis.

Conclusions: CRAO can occur in asymtomatic COVID patients. Caution should be maintained in pregnant women.

Central Serous Chorioretinopathy due to COVID-19: A Case Report

First Author: Hafiz GAHRAMANOV
Co-Author(s): Firuza HASANOVA, Gurban ISMAYILOV, Lana YUSIFOVA, Gabil ZULFIYEV

Purpose: To assess the role of the Covid-19 infection in the development of CSCR.

Methods: A 57-year-old female, Caucasian, applied to our clinic again with complaints of distortion and blurred vision in the right eye 7 weeks after uncomplicated Phaco+IOL. 6 weeks after surgery she developed Covid-19 infection (positive PCR test). During the examination: vis OD-0.2, Amsler Grid test-positive, OCT reveals subretinal fluid and detachment of neurosensory epithelium, CMT-422mkm, fundus-cellophane maculopathy. She was given NSAID, dorzolamide and sedative therapy.

Results: Quick visual improvement was registered after 2 weeks (negative PCR test): vis OD-0.5, CMT-262 mkm (OCT), Amsler grid test-relatively positive. After 3 weeks: vis OD-0.9, Amsler grid-negative, OCT-subretinal fluid had resolved. Resolving of subretinal fluid and complete visual improvement in such a small time probably is the result of the quick treatment of the Covid-19 infection.

Conclusions: Psychological stress is the most important factor in the development of the CSCR. The Covid-19 pandemic exacerbated deterioration of general living conditions, including the presence of a “fear of death” in people with disease. The clinical case we studied shows a direct or indirect effect of Covid-19 infection in the formation of the CSCR. But this is first clinical case of CSCR we have observed in our clinic during a pandemic which has relationship with Covid-19. We leave the results to your discretion.

Choroidal Neovascularization Secondary to Central Serous Chorioretinopathy in a 32-Year-Old Male: A Case Report

First Author: Bea Therese BASCO

Purpose: To report a case of a 32-year-old Filipino male who complained of blurring of vision of both eyes with no known co-morbidities.

Methods: A case report.

Results: A young adult patient, with no known comorbidities, diagnosed with type 1 choroidal neovascularization secondary to central serous chorioretinopathy was reported. The patient presented with a one-year history of blurring of vision and scotoma of the left eye, which soon involved the right eye. The patient sought

a consultation with an ophthalmologist, and he was given nepafenac which did not improve his symptoms. The persistence of his symptom prompted consultation at our institution. On initial consultation at our ambulatory care services, there was metamorphopsia in both eyes, and scotoma in the right eye; on dilated fundus exam, it showed multiple pinpoint yellowish lesions seen at the fovea in both eyes and the retina seems to be elevated involving the central macula. Fluorescein angiogram and OCT-macula were requested, and it was signed out as acute multifocal central serous chorioretinopathy, right eye; chronic central serous chorioretinopathy with secondary choroidal neovascularization, left eye. The patient is for intravitreal injection of Anti-VEGF in his left eye. However, the patient is currently financially constricted and the injection was not done.

Conclusions: Choroidal neovascularization secondary to central serous chorioretinopathy in young adult patients is not common. The presence of CNV complicates the diagnosis but is crucial since it affects the management of the patient.

Chronic Post-Operative Endophthalmitis (CPE) after Cataract Surgery

First Author: Patricia Abigail LIM

Purpose: To present a case of chronic post-operative endophthalmitis.

Methods: A case of a 56-year-old Filipino, female with no known co-morbidities came in due to blurring of vision of the right eye with associated eye pain. The patient underwent cataract surgery several weeks before the consult. On initial consult, the patient presented with hyperemic conjunctiva, ciliary injections, clear cornea, no keratoprecipitates, deep chambers, a note of occlusio pupillae with the presence of fibrous membranes on top of the lens and pupil border B-scan was done showing endophthalmitis on the right eye. The patient underwent vitreous tap with intravenous antibiotics followed by Synechiolysis + Total Capsulectomy + Pars plana vitrectomy.

Results: Five weeks post-operatively, the patient showed marked clinical improvement.

Conclusions: Chronic post-operative endophthalmitis is an infectious disease that occurs at least six weeks post-surgery, more often than not after cataract surgery. Diagnosis heavily relies on culture as well as clinical picture. In cases like ours where culture has no yield, CPE must not be dismissed as about half of the CPE cases yield no culture results. New guidelines dictate the value of early vitrectomy in accelerating infection clearance. In cases where immediate surgery is not an option, and culture results are not yet available, empiric intravitreal antibiotics may offer help in treating CPE. Overall, while rare, CPE is a devastating complication of cataract surgery, early recognition and accurate diagnosis may be tantamount to saving a patient's eyesight.

Clinical Profile of Retinal Astrocytoma in Tuberous Sclerosis

First Author: Hitesh YADAV
Co-Author(s): Tushar KUMAR, Shireen PANDEY

Purpose: Retinal astrocytoma is a characteristic manifestation of tuberous sclerosis. This study was designed to study the clinical profile of retinal astrocytoma and its relevance in the diagnosis of tuberous sclerosis.

Methods: This is a retrospective observational study. All patients who reported to a tertiary eye center in India and who was diagnosed

to have retinal astrocytoma were included in the study. Ophthalmic examination included refraction, slit lamp examination and dilated fundus examination. Ultrasound and optical coherence tomography were used for characterization of retinal lesions. Patients having no subependymal tubers on neuroimaging were excluded from the study.

Results: Fifteen eyes of 12 patients were studied with 10.75 years as mean age of presentation. 58% of patients reported for retinal examination for other reasons and were eventually diagnosed as tuberous sclerosis based on characteristic retinal astrocytoma. Systemic features were present in 25% of patients only with seizures as the most common manifestation. Cutaneous features were present in 41% of patients with Ash leaf macules as the most common feature. 62% of eyes had multiple lesions with extramacular as the most common site of location. Non mulberry type was the most common type of lesion. Retinal disorganization and NFL elevation were the most common OCT features of retinal astrocytoma. USG of the lesions shows high surface reflectivity with back shadowing. Six patients, who had longer follow up, had no new lesions or increase in size of lesions.

Conclusions: Retinal astrocytoma is an indispensable clue to the early diagnosis of tuberous sclerosis when systemic and cutaneous features are absent.

Combined Central Retinal Artery and Vein Occlusion following Trabeculectomy

First Author: Albert John BROMEO
Co-Author(s): Patricia GRULLA-QUILENDRINO, Sweet Jorlene LERIT, Edgar LEUENBERGER, George Michael SOSUAN

Purpose: To describe the clinical findings, diagnosis, and management of a rare case of combined central retinal artery and vein occlusion following trabeculectomy.

Methods: A case report.

Results: We present the case of a 47-year-old hypertensive male who underwent trabeculectomy for advanced glaucoma in his right eye. At 3 weeks postoperatively, he presented with a drop in visual acuity to light perception with a spike in intraocular pressure. On examination, there was increased bleb vascularity as well as rubeosis. Fundoscopy as well as fluorescein angiography and optical coherence tomography revealed findings consistent with both central retinal artery occlusion and central retinal vein occlusion. The patient underwent panretinal photocoagulation and intravitreal anti-VEGF injection on the right eye. The vision improved to hand motions and there was resolution of rubeosis. Retinal vascular events may occur as rare complications of glaucoma procedures due to various factors, including exacerbation of ischemia in patients with pre-existing vascular comorbidities, toxic effect of mitomycin-C, and decompression retinopathy. Combined central retinal artery and vein occlusion (CCRAVO) is a rare retinal vascular disease with findings consistent with both central retinal artery occlusion (CRAO) and central retinal vein occlusion (CRVO). Neovascular glaucoma can occur as a sequalae of the ischemic process in the retina. Despite treatment, there is a poor visual prognosis, with the affected eye usually becoming blind from optic atrophy and neovascularization.

Conclusions: CCRAVO can occur as an uncommon complication of glaucoma filtering

surgery, particularly in patients with pre-existing cardiovascular conditions. Despite aggressive treatment, the visual prognosis is usually poor.

Effect of Dexamethasone Implant on Macular Perfusion using OCT Angiography in Retinal Vein Occlusion

First Author: Sherine DSOUZA
Co-Author(s): Thirumalesh MB, Hardik NANAVATI

Purpose: To study the effect of dexamethasone implant on macular perfusion using OCT-A in retinal vein occlusion (RVO).

Methods: Prospective, longitudinal study; 30 unilateral eyes with RVO with macular edema were treated with intra-vitreal dexamethasone with 3 months follow up. 4.5mm x 4.5mm macular OCT-A images were analyzed to observe changes in macular perfusion. The foveal avascular zone (FAZ), vascular density (VD) of superficial capillary plexus (SCP) and vascular density of deep retinal capillary plexus (DCP) were evaluated. Subjective observations were made to note for any structural changes.

Results: A mean improvement of 6.9 (±0.8) letters was noted after 3 months of follow up after a single intra-vitreal injection. No significant change was noted in the FAZ of superficial capillary plexus ($p>0.05$). Statistically significant change in FAZ and deep capillary plexus ($p<0.05$) was observed. No significant change was noted in the VD ($p>0.05$) in superficial and deep capillary plexus. There was no statistical co-relation between improvement in vision with FAZ and VD. En-face images of OCT-A showed increase in vascular tortuosity in 25 of 30 patients and an increase in hyper-reflective spots observed subjectively.

Conclusions: Micro-vascular changes can be quantitatively and subjectively evaluated by using OCTA for the patients with RVO. Ozurdex™ had a significant effect on treatment of RVO with macular edema with significant visual improvement. FAZ of DCP showed statistically significant improvement. However, FAZ of SCP did not show statistical improvement. The vascular density of SCP and DCP had no significant difference. Structural changes occur in the SCP and DCP as a recovery in RVO.

Efficiency of Intravitreal Ranibizumab in Choroidal Neovascularization: Monthly versus Pro Re Nata versus Treat and Extend Protocol

First Author: Payel KHATUA
Co-Author(s): Suman DAS, Sanchari SARKAR, Avantika SRIVASTAVA, Sanjay THAKUR

Purpose: To compare macular thickness (MT) in patients with choroidal neovascularization (CNV) after receiving intravitreal ranibizumab following monthly, pro re nata (PRN) and treat and extend (T&E) protocol.

Methods: A prospective cohort study was conducted among 63 patients diagnosed with CNV. All patients underwent thorough clinical evaluation with measurement of visual acuity using Snellen's chart, fundus examination using slit lamp and +90D double aspheric ens, baseline MT. All patients were divided into three groups with 21 patients in each and treated with intravitreal ranibizumab as per monthly, PRN and T&E protocol respectively. MT was measured pre-operatively and post-operatively for 9 months using spectral domain optical coherence tomography.

Results: Among 63 patients, the decrease in MT for monthly, PRN and T&E protocol were 159.90±96.27µm, 91.33±59.75µm and

118.52±44.66µm respectively. Average number of injections in monthly, PRN and T&E protocol were 8, 6.14 and 5.87 respectively. The decrease in MT was statistically more significant in monthly dosage than both T&E (p=0.01) and PRN (p=0.0005). The average improvement in visual acuity in monthly protocol was 4.23 lines, that in PRN protocol was 3.17 lines and 2.98 lines in T&E in Snellen's chart.

Conclusions: Intravitreal ranibizumab used according to monthly protocol was found more efficient than T&E followed by PRN protocol for CNV.

Efficiency of Intravitreal Ranibizumab in Retinal Vein Occlusion: Monthly vs Pro Re Nata vs Treat and Extend Protocol

First Author: Sanchari SARKAR
Co-Author(s): Suman DAS, Payel KHATUA, Avantika SRIVASTAVA, Sanjay THAKUR

Purpose: To compare pre-injection and post-injection central macular thickness (CMT) values amongst patients with retinal vein occlusion (RVO) being treated with intravitreal ranibizumab (IVR) as per monthly, pro re nata (PRN) and treat and extend (TE) protocol.

Methods: 81 patients with RVO were enrolled in a prospective cohort study and divided in 1:1:1 ratio randomly, where group A received IVR monthly, group B and C group received it as per PRN and TE protocol respectively. All the patients were subjected to routine ophthalmological examination with special emphasis on BCVA assessment (Snellen's chart) and fundus evaluation with slit lamp biomicroscopy (+90D), followed by spectral domain-optical coherence tomography analysis to determine the disease activity in terms of degree of macular edema measured as CMT and to capture the presence or absence of qualitative parameters (i.e., intraretinal cystoid fluid and subretinal fluid) at every visit for a period of 2 years.

Results: The mean decrease in CMT in group A was 205.37±193.18µm, while in group B and C were 159.44±108.92µm and 171.26±94.36µm respectively. Here mean decrease in CMT in group A (p=0.003) and C (p=0.006) were statistically significant.

Conclusions: Monthly protocol of IVR (group A) proved to be the most efficient regime showing maximum reduction in CMT after 6 month follow up, which is statistically significant (A vs B: p=0.000004, A vs C: p=0.02, B vs C: p=0.002).

Evaluation of Vascular Endothelial Growth Factor Levels in Tears and Serum among Diabetic Patients

First Author: Wen Jeat ANG
Co-Author(s): Norfadzillah ABDUL JALIL, Zunaina EMBONG, Raja Norliza RAJA OMAR

Purpose: The aim of this study was to evaluate the levels of VEGF in tears and serum amongst type 2 diabetes mellitus patients.

Methods: A comparative cross-sectional study was conducted between August 2016 and May 2018 involving type 2 DM patients with no DR, non-proliferative DR (NPDR), and proliferative DR (PDR). Tear samples were collected using no.41 Whatman filter paper (Schirmer strips) and 5 mL blood samples were drawn by venous puncture. VEGF levels in tears and serum were measured by enzyme-linked immunosorbent assay.

Results: A total of 88 type 2 DM patients (no DR: 30 patients, NPDR: 28 patients, PDR: 30 patients) were included in the study. Mean tear VEGF levels were significantly higher in the NPDR and PDR groups (114.4 SD 52.5 pg/

mL and 150.8 SD 49.7 pg/mL, respectively) compared to the no DR group (40.4 SD 26.5 pg/mL, $p < 0.001$). There was no significant difference in the mean serum VEGF levels between the three groups. There was a fair correlation between serum and tear VEGF levels ($p = 0.015$, $r = 0.263$).

Conclusions: VEGF levels in tears were significantly higher amongst diabetic patients with DR compared to those without DR and were significantly associated with the severity of DR. There was a fair correlation between serum and tear VEGF levels. Detection of VEGF in tears is a good non-invasive predictor test for the severity of DR. A large cohort study is needed for further evaluation.

Exogenous Testosterone Use and Central Serous Chorioretinopathy: A Case Report

First Author: Michele TEY
Co-Author(s): Nor Azita AHMAD TARMIDZI, Hamisah ISHAK, Daphne Ai-lin TEH

Purpose: To report a case of central serous chorioretinopathy (CSCR) associated with long-term exogenous testosterone therapy.

Methods: A case report.

Results: A 52-year-old transgender male patient presented to our eye clinic complaining of central scotoma in the right eye for one week. He was otherwise well and had no other eye complaints. His visual acuity in the right eye was 6/15 and 6/9 in the left eye. An optical coherence tomography (OCT) of the right eye demonstrated sub-retinal fluid and detachment of the neurosensory retina from the retinal pigmented epithelium at the sub-foveal area. He reported no other known risk factors for CSCR including psychosocial stress, steroid treatment, traditional medications, infection, tobacco use, alcohol consumption or pregnancy. He however reported taking exogenous testosterone via intramuscular injection (IM) for the past 5 years. He has been self-administering IM testosterone enanthate 200mg (1ml) every 1-2 weeks with no proper follow-up. His testosterone level was 1500ng/dL (normal reference 264-916ng/dL). Fluorescein fundus angiography (FFA) guided argon laser was performed to the leakage site and the patient tapered down his IM testosterone due to the possible association with his eye symptom. Six weeks after the laser therapy, his right eye vision improved to 6/9 and there was resolution of sub-retinal fluid.

Conclusions: Exogenous testosterone may be associated with the development of CSCR and this should be explored during history taking.

Exploration of Intraocular Pressure after Intravitreal Anti-Vascular Endothelial Growth Factor Injection

First Author: Zulfikar HASAN
Co-Author(s): Kamrul HASAN, Billal HOSSAIN

Purpose: Intravitreal anti-VEGF injection is a frequently performed procedure for various retinal diseases. The purpose of the study was to explore variation of intraocular pressure after intravitreal anti-VEGF injection.

Methods: This was a prospective interventional study in which intravitreal anti-VEGF injection was given due to various retina diseases as diabetic macular edema, macular edema due to branch or central retinal vein occlusion, choroidal neovascularization. The follow-up period was 3 months. Intraocular pressure was measured by using the Goldmann applanation tonometry before the intravitreal injection, at 24 hours after the administration of the anti-VEGF agent and at

1, 4 weeks and 3 months.

Results: 128 eyes of 105 patients received an average of 3 intravitreal injections. The mean baseline intraocular pressure was 14.00 mm Hg; 19.00 mm Hg at 24 hours; 17.00 mmHg at 1 week, 14.50 mmHg at 4 weeks and 16 mmHg at 3 months after the administration of the anti-VEGF agent. 7 eyes required long-term topical hypotensive treatment. Raised intraocular pressure was related to increased frequency of treatment. There were no significant differences in mean IOP depending on the anti-VEGF (bevacizumab or ranibizumab) agent used.

Conclusions: Intravitreal treatment with anti-VEGF agents produces a transient increase in intraocular pressure, predominantly immediately following administration, without causing long term increased intraocular pressure.

Factors Affecting Compliance to Intravitreal Anti-Vascular Endothelial Growth Factor Therapy in Indian Patients with Retinal Vein Occlusion, Age-Related Macular Degeneration and Diabetic Macular Edema

First Author: Dr.Aditya KELKAR
Co-Author(s): Jai KELKAR

Purpose: To evaluate the rate of compliance and the reasons for loss to follow up in Indian patients with diabetic macular edema(DME), age-related macular degeneration(AMD) and retinal vein occlusion (RVO) being treated with anti vascular endothelial growth factor (VEGF) therapy.

Methods: This was a retrospective single-center study. Patients with DME, AMD or RVO were eligible if they initiated anti-VEGF therapy between January 2013 and December 2017. Patients' data were obtained from hospital electronic records, including the number of injections received, visits, details of follow up, missed appointments and reasons for loss to follow up(>365 days)

Results: A total of 648 patients were eligible for the study, of which 334(51.54%) patients were lost to follow-up. Overall, 343(64.96%) were males and the mean (SD) age was 66.40 (7.44) years. A total of 376 (58.0%) patients had a history of diabetes and 364 (56.2%) patients had a history of hypertension. Further, 127 (38.0), 112 (33.5), and 95 (28.4) had DME, AMD, and RVO respectively and were lost to follow up. Most commonly reported reason for loss to follow up was "non-affordability" (n = 120; 41.1%) followed by "no improvement in vision" (n = 83; 28.4%). "No improvement in vision" (42.2%) and "non-affordability" (37.5%) were higher among patients with DME. No association was found in gender and treatment wise distribution of reasons for loss to follow up

Conclusions: Results showed that half of the patients with DME, AMD, and RVO were lost to follow-up to intravitreal anti-VEGF therapy, and the most common factors were "non-affordability" and "no improvement in vision."

Fluid Biomarkers of Optical Coherence Tomography for Visual Outcome in Polypoidal Choroidal Vasculopathy

First Author: I-hsin MA
Co-Author(s): Yi-ting HSIEH

Purpose: To investigate the associations between fluid accumulation at different locations and visual outcome in polypoidal choroidal vasculopathy (PCV).

Methods: Patients of PCV patients treated with aflibercept and/or photodynamic therapy

(PDT) were retrospectively enrolled with different baseline biomarkers on optical coherent tomography. The best-corrected visual acuity (BCVA) and optical coherence tomography (OCT) examinations at baseline and 3, 6 and 12 months after treatment were collected. The correlations between visual outcomes and fluid biomarkers including intraretinal fluid (IRF), subretinal fluid (SRF), serous pigment epithelium detachment (PED) and hemorrhage were analyzed.

Results: Ninety-one eyes of 91 patients were included in this study, including 65 eyes receiving intravitreal aflibercept monotherapy and 26 receiving ranibizumab and adjunctive PDT. Intraretinal fluid (IRF) was significantly associated with poor vision at 3, 6 and 12 months, and hemorrhage was associated with poor vision at all time points ($p < 0.05$ for all). No fluid biomarkers were associated with good vision after any time point. No fluid biomarkers at 3 months after the loading treatment were predictive for visual outcomes at 12 months.

Conclusions: Fluid accumulation serves as a surrogate for visual prognosis after treatment. Although treatment improves vision, the initial presentation of the disease marks future potential. We demonstrated that all sub-retinal, intra-retinal and sub-retinal pigment epithelial fluids have a negative impact on visual outcomes.

Herpes Simplex Virus Creeping from Within

First Author: Andrew LOW
Co-Author(s): Ee Ling ANG, Rhuen Chiou CHOW, Nurliza KHALIDDIN, Yoon Kee LAI

Purpose: Acute retinal necrosis (ARN) is devastating and associated with significant ocular morbidity. Herein, we report two cases of ARN complicated with rhegmatogenous retinal detachment (RRD) in immunocompetent patients caused by herpes simplex virus (HSV).

Methods: A retrospective case report.

Results: A 52-year-old man presented with acute panuveitis, occlusive vasculitis, and retinal detachment. His vision was no perception to light. Intravenous (IV) methylprednisolone was commenced but ceased three days later after aqueous tap polymerase chain reaction (PCR) confirmed HSV-1. Despite ongoing IV Acyclovir, he developed panvasculitis in the contralateral eye with diminished vision (6/9 to 6/24) after eight days. He was switched to Foscarnet in view of possible resistance. However, he deteriorated further with the emergence of retinitis and RRD. This was successfully treated with vitrectomy, intravitreal foscarnet, and oil tamponade. His final vision remains poor at 2/60. The following case is a 23-year-old girl who presented with acute panuveitis and vasculitis in her only eye. Her vision was 6/36. The fellow blind eye suffered a penetrating injury. IV methylprednisolone was given for possible sympathetic ophthalmia, but vitritis worsened. The diagnosis was revised to ARN, which responded well to systemic acyclovir. Unfortunately, she required two vitrectomies later for RRD, then macula hole. Following the second surgery, she developed HSV-2 acute anterior uveitis, confirmed with aqueous PCR and treated accordingly with systemic Acyclovir. Her final vision is 1/60.

Conclusions: Our cases highlight the rapidly destructive nature of ARN, resulting in grim outcomes. Clinicians must beware of bilateral and recurrent disease when facing this challenging disease.

Inter-Eye Comparison of the Extent of Retinal Vascularization and Angiographic Findings following Unilateral Bevacizumab Therapy on Asymmetric Retinopathy of Prematurity

First Author: Sadık BAYRAMOĞLU

Purpose: To compare retinal vascularization progression rate, final retinal vascularization, and fluorescein angiography findings in infants who received intravitreal bevacizumab (IVB) treatment in one eye and spontaneously regressed the other eye.

Methods: Thirty eyes of 15 infants who underwent IVB in one eye due to asymmetric retinopathy of prematurity, who had pre-treatment fundus photographs and fluorescein angiography (FA), and who did not receive additional treatment until FA were included in the study. Horizontal disc diameter (DD), optic disc to fovea distance (FD), and the length of temporal retinal vascularization (LTRV) distance were measured on recorded pre-treatment and FA session images.

Results: The mean ages of treatment and FA were postmenstrual ages of 40.38 ± 3.35 and 68.72 ± 10.52 weeks, respectively. The pre-treatment LTRV/FD ratio was 3.10 ± 0.40 in the treated group and 3.26 ± 0.43 in the untreated group ($p = 0.053$). The final LTRV/FD ratio was 4.23 ± 0.38 in the treated group and 4.33 ± 0.36 in the untreated group ($p = 0.286$). Staining of the vessels, hyperfluorescent focus, and irregular branching of the vessels were similar between the groups, respectively ($p = 1.000$; $p = 0.250$; $p = 0.625$).

Conclusions: Vascular progression rate and angiographic findings were similar between the treated eyes and the non-treated eyes. Our study supports that anti-VEGF therapy does not cause cessation in the outgrowth of retinal vascularization, and the incompletion of retinal vascularization is due to the nature of the disease.

Laser Photocoagulation Alone as an Effective Treatment for Primary Retinal Vasoproliferative Tumors

First Author: Fang-yi TSAI
Co-Author(s): Ling-ing LAU, Chien-liang WU

Purpose: To report the treatment of laser photocoagulation alone for primary retinal vasoproliferative tumors with good response.

Methods: A retrospective case series.

Results: Three patients of retinal vasoproliferative tumors were included in this series. The average age was 38.8 years old (range, 30-45 years old) and the female to male ratio was 1:2. No patient had other systemic disease or ocular history before. Full fundus examination and fluorescein angiography both confirmed the diagnosis. All lesions were located from the temporal to the inferior-temporal periphery. Among the patients, one had focal exudation and subretinal fluid around peripheral tumors, one had mild vitreous and preretinal hemorrhage near the lesion, and the other has no other complication. There were also a lamellar hole in one case and macular epiretinal membrane in another. Laser photocoagulation was applied to the lesions and the surrounding vessels. The average treatment of laser was 3.3 sessions (range, 1-5 sessions). All lesions showed total regression or gliotic change at the end of treatment without other complications. Final visual acuity ranged from 0.2 to 1.0. The mean follow-up period was 28 months (range, 3-46 months).

Conclusions: Laser photocoagulation as a monotherapy was effective in the treatment of

retinal vasoproliferative tumors in selective cases. All cases in our series showed total regression or gilotic change of the lesions at the end of treatment. The visual prognosis depends on the macula condition and can vary widely.

Novel Technique of a Low Cost Video Indirect Ophthalmoscope

First Author: Ashish AHUJA

Purpose: We aim to make a low-cost optical system including the camera to be used to convert a regular indirect ophthalmoscope (I.O) into a video I.O.

Methods: We have made a prototype of a low-cost video indirect ophthalmoscope (I.O.) using an I.O., telephoto lens and a small spy camera (Mini Wireless HD 1080P SPY Hidden Camera Wifi Module video recorder) which can either be mounted on a uni ocular eyepiece of the I.O. or using a beam splitter as well. We also used butter paper over the light source to create a diffuse illumination.

Results: We obtained good resolution of images using this technique of the posterior pole as well as the peripheral retina and the data can be directly viewed via an application using the smartphone which can be transferred via wifi. The device cost is Rs 4000. We can record high-definition videos or capture still images using this technique. Other applications for such retinal imaging would be for training purposes in OPD or in operating rooms in which medical students may view the surgery on a screen through the perspective of the surgeon and an additional advantage is the ability to record audio narration while examining patients.

Conclusions: This device can be used for documentation purposes, tele ophthalmology, patient and physician education purposes.

Occlusive Retinal Vasculitis Secondary to Systemic Lupus Erythematosus Retinopathy in a 23-Year-Old Male: A Case Report

First Author: Niña Angelica SIOSON
Co-Author(s): Michael FERNANDEZ

Purpose: To report a case of a patient who developed Occlusive Retinal Vasculitis secondary to Systemic Lupus Erythematosus Retinopathy.

Methods: A descriptive case report.

Results: We herein report a rare case of a 23-year-old male who was initially diagnosed with systemic lupus erythematosus and developed vaso-occlusive retinopathy.

Conclusions: Occlusive Retinal Vasculitis is a rare manifestation of SLE Retinopathy. Once it develops, it is important to screen for the presence of active systemic disease. Several irreversible complications ranging from vision loss to death may ensue if this is left unevaluated and untreated. Systemic control of SLE is crucial in the management of SLE Retinopathy. Visual recovery is infrequent and prevention of further vascular events is the target of therapy.

Ocular Ischemic Syndrome: A Rare Case Report

First Author: Rituparna GHOSH
Co-Author(s): Harsha BHATTACHARJEE, Arijeet ROY, Sheesham SINGH

Purpose: To report a case of ocular ischemic syndrome (OIS), a rare ocular compensated condition.

Methods: A 58 year old male presented with painful, sudden onset of diminished vision in left eye. In history taking patient has informed about associated disease like hypertension and diabetic mellitus. On ocular examination, left eye severe diminished vision, exotropia, pupillary reaction fixed dilated pupil, conjunctiva congested, corneal edema, neovascularisation of iris, intraocular pressure 74mm Hg is noted. On fundus examination, right eye anterior segment normal but moderate diabetic retinopathy is noted and in left eye showed disc pallor in hazy media. Carotid duplex doppler study of carotid arteries shows bilateral atherosclerotic changes in carotid arteries with type 3 plaque in the left common carotid artery causing approx 56% of luminal narrowing. Subsequently RE panretinal photocoagulation has been done and in left eye Ahmed valve implant has been done.

Results: OIS can cause ocular morbidity if it is untreated.

Conclusions: As it is an ocular emergency condition, we have to treat it aggressively as it can progress to a life threatening condition.

Optical Coherence Tomography Angiographic Biomarkers in a Bimonthly Maintenance Dosing Aflibercept for Choroidal Neovascularization Secondary to Age-Related Macular Degeneration

First Author: Eung-suk KIM
Co-Author(s): Kiyoung KIM, Jong Beom PARK, Seung Young YU

Purpose: To prospectively investigate long-term functional and anatomical outcomes of fixed intravitreal aflibercept regimens in patients with choroidal neovascularization (CNV) using quantitative analysis based on swept-source optical coherence tomography angiography (SS-OCTA).

Methods: A total of 33 CNV patients were enrolled for this prospective study. Initially, regimens of three monthly intravitreal injections and five intravitreal injections fixed every two months were done. Functional and anatomical outcome investigations were then performed every one week following intravitreal injection. Analysis of the 33 eyes with follow-up for 50 weeks were prospectively done for BCVA (ETDRS), structural OCT biomarkers as central subfield thickness (CST), 5 mm pigment epithelial detachment (PED) volume, quantitative OCT angiographic biomarkers as CNV area, vessel density (VD), and vessel length density (VLD).

Results: Average baseline age and BCVA was 72.38±8.82 and 50.27±23.57, respectively. There was a significant correlation between VD decrease after the loading phase and final BCVA (r=-0.820, p=0.004). Additionally, there was a significant correlation between the final BCVA change and VLD change after the loading phase (r=-0.726, p =0.017), and CST change after the loading phase (r=-0.862, p=0.001). In terms of anatomical outcomes, the CNV area at the final visit (r=-0.743, p=0.009), the final VD change (r=0.648, p =0.043), and VLD decrease after the first injection were related to final CST. As a result of multiple linear regression analysis, VLD decrease after the first injection was statistically associated with final CST (p=0.029).

Conclusions: A fixed 2 month aflibercept regimen improved both functional and anatomical outcomes in AMD patients at 50 weeks. Moreover, quantitative OCT angiographic biomarkers can be used for AMD evaluation.

Optical Coherence Tomography Angiography Evaluation of the Parafoveal Vasculature and its Relationship with Ocular Factors

First Author: Isaac CHAY
Co-Author(s): Srinivas SADDA, Colin TAN

Purpose: To determine the size of the superficial and deep foveal avascular zone (FAZ) in healthy adults using optical coherence tomography angiography (OCTA), and to ascertain the effects of demographic and ocular parameters on the FAZ.

Methods: In a prospective cohort study of 170 eyes, healthy volunteers underwent OCTA scans. The FAZ from 3mm x 3mm scans was independently graded using the ImageJ software. The effect of central retinal thickness (CRT), axial length (AL) and spherical equivalent were analyzed using multiple linear regression analyses.

Results: The mean age was 22.7 years (21 – 30, SD± 1.5), with mean spherical equivalent of -4.3 D. The mean CRT was 260.6 µm (220 µm – 301 µm, SD ± 16.6). Mean superficial FAZ area was 0.25 mm2 (0.04 mm2 – 0.48 mm2) while mean deep FAZ area was 0.38 mm2 (0.12 mm2 – 0.66 mm2). The deep FAZ was significantly larger than the superficial FAZ ($p<0.001$). Females had a larger superficial (0.28 mm2 vs. 0.22 mm2, $p<0.001$) and deep FAZ (0.41 mm2 vs. 0.36 mm2, $p=0.006$). On univariate linear regression, both superficial and deep FAZ area had significant correlations with CRT, sex, AL and spherical equivalent, but not with age. By multiple linear regression analysis, superficial and FAZ area varied significantly with CRT ($p<0.001$) and sex ($p<0.001$).

Conclusions: Both the superficial and deep FAZ size varies significantly among healthy young adults. Factors such as CRT, sex, and spherical equivalent influence the size of the FAZ, and should be accounted for when assessing whether the FAZ appears abnormal.

Oral Eplerenone in Acute Central Serous Chorioretinopathy: A Newer Approach

First Author: Avik DEY SARKAR
Co-Author(s): Ajoy DEY SARKAR, Pratiroop GANGOPADHYAY, Sanchari SARKAR, Sanjay THAKUR

Purpose: To assess the efficiency and safety of oral eplerenone in the treatment of acute central serous chorioretinopathy (CSCR).

Methods: Among 162 patients with CSCR, 81 received oral eplerenone (Group A) and 81 received placebo multivitamin medication (Group B). The BCVA and CMT was measured at initiation of treatment and after every 4 weeks till 3 months. A serum potassium was done at the beginning and on each follow-up.

Results: The change in CMT in Group A was 278.85±60.18, 328.28±63.31, 360.72±67.11 respectively in the 1st, 2nd and 3rd months of follow-up. While the change in CMT in Group B was 206.9±50.83, 240.02±54.34, 278.25±52.43 respectively in the 1st, 2nd and 3rd months of follow-up. The average improvement in BCVA in Group A was 3.45, 5.12 and 6.05 lines and in group B was 2.72, 3.83, 4.21 lines in the 1st, 2nd and 3rd months of follow up. Only 3 (3.7%) in Group A progressed to chronic CSCR while 14 (17.3%) patients progressed to chronic CSCR in Group B. The increase in serum potassium at the end of 3 months of therapy with oral eplerenone in Group A was 0.62±0.27mg%. While there was no significant change in serum potassium in Group B throughout the study period.

Conclusions: Thus, oral eplerenone significantly decreased CMT in comparison to placebo (p=0.002) and improved BCVA (p=0.021) in patients with acute CSCR. Patients with eplerenone have shown lesser propensity of progressing towards chronicity. However, it caused a significant increase in serum potassium (p=0.035).

Outcomes of Managing Polypoidal Choroidal Vasculopathy Cases at a Referral Centre in Southern China

First Author: Nishant Vijay RADKE
Co-Author(s): Chen LIZHEN, Snehal RADKE, Yuan YE

Purpose: To evaluate the outcomes of management of polypoidal choroidal vasculopathy (PCV) cases by a single surgeon from a referral centre in southern China.

Methods: Cases managed by only 1 VR surgeon were selected. At least 1 year follow-up was needed for inclusion in study. Predominantly 4 treatment groups were made: 1. Photo-dynamic Therapy (PDT) group - including PDT with anti-vascular endothelial growth factor (A-VEGF) and A-VEGF injection with intra-vitreal (I/V) gas injection and deferred PDT. 2. I/V A-VEGF monotherapy. 3. I/V A-VEGF + I/V Gas + pars-plana vitrectomy (PPV) 4. I/V A-VEGF + I/V Gas. Continuous variables were evaluated with students t test and inter-group comparison of means was done with ANOVA test. Diagnosis was confirmed using indocyanine and fundus-fluorescein angiographies and OCT was used with color fundus images for serial follow-ups.

Results: Out of all the new cases receiving A-VEGF injections, nearly 29% of patients were having neovascular age-related macular degeneration. Nearly 21% from this subset had PCV. Lesions were found to be inactive in almost 56% cases and regressed in 22%. Comparison of monotherapy and PDT groups revealed statistically insignificant differences in parameters of mean age, pre-treatment visual acuity (VA) and post-treatment VA. F value was not statistically significant in ANOVA test.

Conclusions: The sample size is small and although improvement in terms of function and structure was noted, the differences were not statistically significant. Larger sample size evaluation would be helpful. Real world practice may not always mirror randomized clinical trials.

Panretinal Photocoagulation for Acute Retinal Necrosis Syndrome

First Author: Shanshuang DU
Co-Author(s): Rongle ZHOU

Purpose: To describe effect of panretinal photocoagulation for acute retinal necrosis syndrome in a case with over 2-year follow-up.

Methods: A 62-year-old man presented with decreased visual acuity and floaters in his right left eye for 10 days. Anterior segment biomicroscopy revealed anterior chamber reaction (2+ cells, 2+ flare), and anterior vitreous reaction (2+ cells). Fundus examination revealed retinal whitening, mainly temporal peripheral, with associated vascular involvement and constriction in the right eye. A diagnosis of acute retinal necrosis was made. Varicella-zoster virus (VZV) was found by anterior humor testing. Anti-virus treatment was performed including intravenous injection and intravitral injection of ganciclovir weekly. To give intravitreal injection or not was on basis of result of anterior humor testing (level of VZV and interleukin-8, IL-8). Photocoagulation was performed every two weeks according to the manifestion

of fundus for 2-3 months until panretinal photocoagulation was completed.

Results: The visual acuity afer treatment was 20/40 and maintained during a follow-up of 25 months. No retinal hole, vitreous traction or retinal detachment was found. His contralateral eye was normal.

Conclusions: Panretinal photocoagulation might be effective for acute retinal necrosis, combined with anti-virus therapy, with a fine prognosis, which needs further large-sample research.

Paracentral Acute Middle Maculopathy: A Sign of Deep Retinal Ischemia

First Author: Andrea SILITONGA
Co-Author(s): Heri PURWOKO, Sindy SEMBIRING, Christina BANGUN

Purpose: To describe the various spectrum of paracentral acute middle maculopathy (PAMM).

Methods: Observational case series, 5 eyes of 5 patients with acute PAMM. Demographic characteristics and data regarding underlying disease, presenting visual acuity (VA) and ophthalmic examination results were recorded.

Results: The mean age of patients was 58.2 (range, 37-73) years. Hypertension was found in all patients, one patient had diabetes mellitus, and one patient had dyslipidemia. Except for one patient diagnosed with isolated PAMM, other patients had signs of retinal vascular disease such as central retinal artery occlusion, branch retinal vein occlusion and Purtscher-like retinopathy. All cases had finger counting VA. Spectral domain optical coherence tomography (SD-OCT) showed hyperreflective band in the inner nuclear layer (INL) in 2 patients, and in the inner and middle retinal layer (3 patients). Different patterns of PAMM including globular and fern-like were observed in en face OCT. Decreased vascular density in deep capillary plexus (DCP) was found in OCT-angiography. One patient had persistence of PAMM despite treatment with anti-vascular endothelial growth factor (anti-VEGF). Patient with isolated PAMM had final VA of 20/40 and paracentral scotoma, while in the remainder, vision loss persisted with macula atrophy.

Conclusions: PAMM is a sign of retinal ischemia especially deep capillary plexus. The retinal ischemic cascade of PAMM in its mildest form showed good prognosis. However, with increasing severity it may progress to infarct all the inner retina layer, resulting in guarded visual prognosis. Persistence of PAMM despite treatment might be a sign of unresolved retinal/macular ischemia.

Peripapillary Microvasculature Dropout Changes after Vitrectomy in Epiretinal Membrane via Swept-Source OCT Angiography

First Author: Seung Young YU
Co-Author(s): Eung-suk KIM, Kiyoung KIM, Kyungwoo YOON

Purpose: Changes in blood vessels around the optic disc before and after total vitrectomy in patients with epiretinal membrane were analyzed using swept source optical coherence tomography angiography (SS-OCTA).

Methods: A retrospective study included in 31 eyes of 31 patients diagnosed with epiretinal membrane evaluate retinal microvascular vessels density around the optic disc through SS-OCTA. Superior, inferior, nasal, and temporal quadrants of the 0.75mm-thickness circular ring image around the optic disc was obtained from 6mm x 6mm and 15mm x 9mm

SS-OCTA images. Microvascular vessels density was calculated by Matlab.

Results: A total of 31 patients (mean age: 67.75±6.92 years) were distributed in 8 males and 23 females. Before and 6 month and 1 year after surgery were compared, respectively. One year after surgery, the superficial and deep plexus microvascular drop out significantly increased on the superior, temporal, inferior side, respectively. One year after surgery, choriocapillary and choroid microvascular drop out significantly increased on the temporal side, respectively.

Conclusions: In patients diagnosed with epiretinal membrane, repetitive SS-OCTA through long-term follow-up can be used as a non-invasive test for analyzing the peripapillary microvascular changes after surgery.

Peripapillary Retinal Astrocytoma: A Case Report

First Author: Ting-yu WU

Purpose: To report a case of peripapillary retinal astrocytoma with visual field defect.

Methods: A case report.

Results: The 53-year-old man came to our clinic due to increased floaters in his left eye. A small peripapillary tumor was found incidentally during fundus examination. Color fundoscopy showed a whitish-yellow well-defined tumor at the naso-lower margin of the optic disc. The tumor was hyper-autofluorescent and hyper-fluorescent in fluorescein angiography. The optical coherence tomography showed a choroidal tumor with retinal edema but no moth-eaten pattern was found. B-scan revealed no signs of calcification. The visual field of the left eye showed an upper defect near the blind spot. Retinal astrocytoma was diagnosed clinically without systemic diseases. Regular follow-up was suggested because no clinical symptom or vision-threatening complication was noted.

Conclusions: Retinal astrocytoma is a rare and often benign tumor and seldom causes visual disturbance. The treatment is usually regular observation.

Pigmented Focal Scleral Nodule

First Author: Christopher GO
Co-Author(s): Adrian FUNG, Adrian MOK

Purpose: To report a case of the focal scleral nodule (FSN) with atypical features on multi-modal imaging including pigmentation and hypoautofluorescence.

Methods: Multimodal imaging was used to determine the characteristics of this lesion.

Results: A 61-year-old asymptomatic diabetic woman was referred following an incidental finding of raised fundus lesion in her right eye. Fundus examination of the right eye showed a 3mm diameter partially pigmented circular lesion located at the superior margin of the optic nerve head. The lesion was partially hypoautofluorescent on fundus autofluorescence. EDI-OCT demonstrated a dome-shaped elevation of the lesion within the sclera, with overlying choroidal thinning.

Conclusions: Features in this case that are consistent for FSN include its solitary nature, peripapillary location, slight elevation, size around 1-disc diameter and scleral thickening and choroidal thinning on EDI-OCT. However, the pigmentation within our lesion is a novel finding in FSN that has not been described before. Encountering a pigmented lesion raises the possibility of other differentials including choroidal naevi, choroidal melanoma and congenital hypertrophy of retinal pigmented

epithelium (CHRPE). However, these lesions are quite different from our case. It is likely that our case was a typical FSN that then became pigmented, with melanosomes involving the flanges of the lesion where thin choroid remains. The aetiology of FSN remains elusive. This case will be followed up long term to identify changes in its nature, particularly the pigmentation. The understanding that FSN can be partially pigmented may eventually help unravel the origins of this poorly understood lesion.

Prevalence of Retinopathy of Prematurity Associated with High Risk Pregnancy: A Retrospective Cohort Study in a Tertiary Care Hospital

First Author: Mahesh CHATTOPADHYAY
Co-Author(s): Jayeeta MAZUMDER

Purpose: To establish association between retinopathy of prematurity and high risk pregnancy which may be preventable.

Methods: The retrospective cohort study was performed between 1st April 2019 to 31st April 2020. All viable babies were screened for ROP as per norms and on discretion of pediatrician. Mother's pregnancy history was asked by questionnaire method and discharge certificate. All Statistical Analysis Plan will be done using IBM SPSS (Statistical Package for the Social Sciences).

Results: Among 289 babies of 240 mothers, 215 babies were suffering from ROP during our initial examination. Study revealed that in Caesarean section the relative risk (RR) of developing ROP was 1.25. ROP has more male predilection with a RR of 1.1. Diabetes mellitus (RR=1.35), maternal hypertension (RR=1.17), multiple pregnancies (RR= 1.1). Multiple pregnancy with assisted pregnancy (RR=1.23) were significantly associated with ROP. Sepsis during labor had no association with ROP (RR< 1). Maternal anemia, thyroid disorder, cardiovascular disorder, late marriage yield inconclusive results because of small sample size. The relative risk of developing ROP between exposed group (babies' whose mother have positive high-risk pregnancy) and non-exposed group (not associated with any high-risk pregnancy) was 1.14 and prevalence was 74.58%.

Conclusions: More prevalence was noted in multiple pregnancy (triplets>twins), gestational diabetes mellitus, assisted pregnancy, maternal hypertension. Risk of higher stage of ROP was present with combination of risk factors. Hence screening plays dogmatic role in prevention of ROP.

Progressive Outer Retinal Necrosis (PORN) Presenting as Cytomegalovirus (CMV) Retinitis in a Filipino Male

First Author: Maria Giselle DY
Co-Author(s): Jessica Marie ABAÑO, Kristine PORMIDA

Purpose: To present unusual clinical findings of PORN in a Filipino male.

Methods: A case report.

Results: This is a case of a 47-year-old Filipino male diagnosed with human immunodeficiency virus (HIV) infection, with a CD4 count of 25 cells/uL, who consulted at our clinic due to a nine-month history of bilateral blurring of vision. Physical examination showed corrected visual acuity (VA) of 20/63 on both eyes (BE), minimal anterior chamber (AC) inflammation, moderate vitritis, and multiple diffuse opaque yellowish plaques along the retinal periphery sparing the retinal vessels showing "cracked mud" appearance. The patient was assessed

to have progressive outer retinal necrosis (PORN) hence intravenous (IV) acyclovir was initiated and vitreous tap done which yielded cytomegalovirus (CMV) infection. Acyclovir was then shifted to IV valganciclovir and serial intravitreal ganciclovir injections were given to BE. During the course of management, highly active antiretroviral therapy (HAART) was also initiated. The patient's VA improved to 20/50 on the right and remained stable at 20/63 on the left with significant resolution of AC inflammation, marked decrease in vitritis and progressive scarring of the yellowish plaques in the peripheral retina. The patient was maintained on valganciclovir 450mg/tablet two tablets daily after the induction phase and was monitored closely.

Conclusions: Although rare, CMV has been implicated as an etiologic cause of PORN however there is limited literature on such cases. This case showed that diagnostic tests to identify the etiologic agent outweigh the presenting clinical features and results of such tests are important bases for management of this sight-threatening disease.

Purtscher–Like-Retinopathy in Pre-Eclampsia with Intrauterine Death

First Author: Pooja KOTHARI
Co-Author(s): Dr Mrs Kiran BHANOT, Nawab Zishan Farooqui FAROOQUI, Sunita MANJHU

Purpose: To describe a rare case of Purtscher-like-retinopathy in pre-eclampsia with intrauterine death.

Methods: An observational case report. Clinical examination and investigation of bilateral blindness in pre-eclampsia with intrauterine death.

Results: We report a case of Purtscher-like retinopathy leading to bilateral blindness in a 27-year-old pre-eclamptic patient with sudden painless profound vision loss after worsening of pre-eclampsia followed by Intrauterine death (IUD). Fundus examination showed multiple white retinal exudative patches around the disc and macula. Fundus fluorescein angiography (FFA) showed hypofluorescence at the macula and macular ischemia. Ocular coherence tomography (OCT) showed inner hyperreflectivity suggestive of ischemia with outer hyporeflectivity suggestive of retinal edema. Posterior Sub tenon (PST) injection of Triamcinolone acetate showed poor visual recovery.

Conclusions: Pre-eclampsia with unknown factor probably led to compromised optic nerve microvasculature autoregulation further aggravated by IUD resulting in Purtscher-like-Retinopathy. No effective treatment is known. Partial recovery reported with high doses of Intravitreal steroids.

Relationship of Vitamin D and Interleukin-6 in Posterior Segment Diseases of the Eye

First Author: Pranav KANSAL
Co-Author(s): Farheena KULSOOM, Simi Zaka Ur RAB

Purpose: To study the plasma levels of interleukin-6 (IL-6) and vitamin D in posterior segment diseases of the eye.

Methods: TThis study was conducted on 93 patients. Institutional ethical committee clearance was obtained before the start of the study. Patients were segregated in group A (n=60) – comprising of patients with diseases of the posterior segment of the eye, and group B (n=33) – comprising of age and gender-matched healthy controls. Exclusion criteria: Any systemic inflammatory disease, any autoimmune disease, history of retinal laser

photocoagulation, any intraocular surgery or use of corticosteroids or oral vitamin D supplementation in the past 3 months. Fasting blood samples were collected and plasma was separated by centrifugation. IL-6 and vitamin D estimation was done using enzyme-linked Immuno Assay (ELISA) kits. Statistical analysis was done using SPSS 21.0 for Windows software. P-value <0.05 was taken as significant.

Results: Plasma vitamin D (ng/ml) concentration was found to be significantly lower in the diseased participants (group A) as compared to healthy controls (group B) (16.79 ± 5.29 vs 24.87 ± 6; p<0.001). Plasma IL-6 (pg/ml) concentration was found to be significantly higher in the diseased participants (group A) as compared to healthy controls (group B) (1.91 ± 2.35 vs 0.89 ± 0.24; p=0.017).

Conclusions: Vitamin D was found to be significantly decreased whereas IL-6 was found to be significantly increased in posterior segment diseases as compared to healthy controls. Thereby, indicating possible inflammatory pathogenesis in these diseases. Vitamin D levels were negatively correlated with IL-6 levels.

Retinal Nerve Fiber Layer Thickness in Parkinson's Disease

First Author: Pratiroop GANGOPADHYAY
Co-Author(s): Debabrata DAS, Avik SARKAR, Avantika SRIVASTAVA, Sanjay THAKUR

Purpose: To determine the retinal nerve fiber layer (RNFL) thickness changes in patients with Parkinson's disease (PD) and its correlation with severity and duration of disease.

Methods: RNFL thickness was assessed in 42 PD patients and 50 healthy age matched controls using a spectral domain optical coherence tomography machine from January 2019 - December 2019. Severity of PD was determined using Unified Parkinson Disease Rating Scale (UPDRS) and duration of bradykinesia and tremor was noted. Where possible, we obtained the UPDRS score upon diagnosis of PD in a new patient before initiation of therapy, while for patients already on drug therapy with no prior UPDRS scores available, we had to rely on the "off scores" for the "motor examination" section.

Results: The average RNFL thickness in PD patients was 82.06±19.36µm which was significantly thinner the healthy controls which was 95.75±23.27µm (p=0.026). There was significant decrease in RNFL in all quadrants in the PD patients (P<0.001). RNFL thinning was found to be directly related to Modified Hoehn and Yahr Staging (UPDRS V) and Schwab and England Scale (UPDRS VI) while there was no relation to UPDRS I to IV. It was also directly related to duration of bradykinesia (p=0.003) and tremor (p=0.0007).

Conclusions: There was significant RNFL thinning in patients with Parkinsonism in comparison with healthy controls which was directly related to severity and duration of disease.

Retinal Vessel Caliber Relationship with Arterial Stiffness Parameters and Nocturnal Blood Pressure Dipping Status in Essential Hypertension

First Author: Soner GUVEN
Co-Author(s): Mehmet Fatih BULUCU, Ali Hakan DURUKAN, Kenan SAGLAM, Abdullah Burak UYGUR

Purpose: The primary aim of this study was to compare retinal vessel caliber (RVC) with both arterial stiffness (AS) parameters and nocturnal

blood pressure dipping status (DS) in essential hypertension (EH).

Methods: Retinal vessel diameters were measured via retinal fundus photography in 101 patients with EH and 31 sex-age matched healthy controls. Anthropometric measurements and venous blood samples for biochemical tests were obtained from all subjects. AS parameters of carotid-femoral pulse wave velocity (cfPWV), augmentation index (Aix) and central aortic pressure (CAP) were assessed via non-invasive TensioClinic arteriograph system. DS was evaluated with 24-hour ambulatory blood pressure measurements. Baseline characteristics, AS parameters, nocturnal DS of hypertensive patients were compared with healthy individuals according to RVC with statistical tests.

Results: Hypertensive group had significantly higher heart rates (p:0.023), AS parameters (PWV (p:<0.001), CAP (p:<0.001)), fasting glucose (p:0.028), creatinine (p:0.046), triglyceride (p:0.045), uric acid (p:0.014) and microalbuminuria (p:0.004) values than healthy controls. Although significant positive linear correlations between duration of hypertension with PWV (p: 0.024), Aix (aortic) (p: 0.005) and Aix (brachial) (p: 0.013) were detected, no significant differences were found in regard of AS parameters and nocturnal DS compared to RVC between EH patients and control subjects.

Conclusions: Our results failed to show significant correlations between RVC with AS parameters and nocturnal dipping status in EH. Further prospective studies are warranted to reach a consensus on the clinical significance of RVC measurements in EH.

Safety of Examination and Management Procedures in Premature Infants

First Author: Tariq ALI
Co-Author(s): Ferdous Akhter Jolly JOLLY

Purpose: To describe adverse events (AEs) and noteworthy clinical or ocular findings associated with retinopathy of prematurity (ROP) evaluation and management procedures.

Methods: Descriptive analysis of pre-defined AEs and noteworthy findings reported in a prospective observational cohort study of infants' birth weight <2000 grams and gestational age <35 weeks who had ROP screening and management consisting of binocular indirect ophthalmoscopy, intravitreal injection anti-vascular endothelial growth factors and laser indirect ophthalmoscopy. We compared respiratory support, nutrition, number of apnoea, bradycardia or hypoxia events 12 hours before and after ROP visits.

Results: There were total 726 infants, mean BW 951 g and mean gestational period 29 weeks. Type I ROP was in 61 babies, aggressive posterior ROP was diagnosed in 22 babies. Injection anti-VEGF (Avastin) was given in 10 babies, combined injection Avastin and laser indirect ophthalmoscope (LIO) was done in 32 babies and only laser was done in 56 babies. No serious AEs, only 20 AEs reported during ROP screening (0.03%). One eye of a baby with only injection developed choroidal infarction, 5 babies had pale optic disc and attenuated vessels 3 months after injection in babies with combined injection and laser. AEs like apnoea, bradycardia, tachycardia and hypoxia were reported in 12 infants during LIO.

Conclusions: ROP screening and management like intravitreal anti-VEGF injection and laser are very safe procedures. As there are incidences of apnoea, bradycardia and tachycardia, all the procedures should be performed with great caution in presence of a

neonatologist equipped with the facilities to resuscitate the babies in emergency situations.

Seven-Year Results of Combined Treatment for Polypoidal Choroidal Vasculopathy: Verteporfin Photodynamic Therapy and Intravitreal Anti-Vascular Endothelial Growth Factor

First Author: Junwoo LEE
Co-Author(s): Eung-suk KIM, Kiyoung KIM, Seung Young YU

Purpose: To evaluate the 7-year efficacy of photodynamic therapy (PDT) combined with intravitreal injection of anti-vascular endothelial growth factor (anti-VEGF) in patients with polypoidal choroidal vasculopathy (PCV).

Methods: We retrospectively reviewed 31 eyes of 30 patients with naïve PCV who were treated with PDT combined with anti-VEGF injection and followed up for 84 months. Best-corrected visual acuity (BCVA), optical coherence tomography findings, angiographic findings, and the number of treatments were investigated.

Results: The mean baseline BCVA was 0.59±0.37 logMAR, 0.31±0.24 logMAR at 12 months ($p<0.001$ vs. baseline) and 0.63±0.59 at 84 months. The mean BCVA was significantly improved up to 12 months and then improvement slowly decreased over 84 months. At 84 months, the mean BCVA was improved in 8 eyes (25.8%), stable in 15 eyes (48.4%), and decreased in 8 eyes (25.8%). The mean central foveal thickness (CFT) was 343.0 ± 121.0 μm at baseline, and the final CFT at 84 months was 255.6 ± 108.4 μm ($p=0.006$ vs. baseline). Multiple regression analysis showed a mean number of anti-VEGF treatments ($p = 0.001$) was associated with improved long-term visual outcomes in PCV.

Conclusions: Significant visual improvement by combined PDT and anti-VEGF injection was maintained up to the third year of initial treatment; however, absolute improvement decreased after the first year. After 84 months, 74.2% of patients with PCV showed stable or improved BCVA. The number of anti-VEGF antibody injections was significantly associated with long-term visual outcomes.

Solar Retinopathy Revealing Psychiatric Disorder in a Patient with History of Sungazing

First Author: Nurnadia KAMARUDDIN
Co-Author(s): Mae Lynn BASTION, Amelia LIM

Purpose: To present a rare case of solar retinopathy in a patient who indulged in sun gazing as part of psychiatric disorder manifestation.

Methods: A case report.

Results: A 31-year-old single man was brought in by his sister to the eye clinic complaining of reduced vision in both eyes for 2 weeks duration. He had no known medical illness and denied ocular trauma, taking recreational drugs or performing welding procedure. The vision was 6/12 OU. There were reddish circumscribed macular lesions at the fovea, with loss of outer retinal layers which was confirmed by optical coherence tomography. Further history found out that he had been practicing sun gazing for the past few months, especially during work. He spent 5 minutes of sun gazing several times within a day. He felt spiritually well for practicing sun gazing. Hence it became his routine habit for the recent 1 month. Diagnosis of solar retinopathy was made. Social history from his sister revealed that his mood has been low, depressed and sometimes he was seen talking alone for the past 2 years. He denied performing sun

gazing for ritual or religious purposes. He was then referred to the psychiatric team for co-management and was educated for eye care protection.

Conclusions: Sungazing leading to solar retinopathy is an irreversible condition. This practice could be a manifestation of psychiatric disorder. Therefore, ophthalmologists play a pivotal role in assessing the social history thoroughly to rule out psychiatric disorder.

Superselective Triple-Drug Intraarterial Chemotherapy in Retinoblastoma

First Author: Ankita AISHWARYA
Co-Author(s): Santosh HONAVAR

Purpose: To assess the outcomes in retinoblastoma (RB) treated with triple-drug intraarterial chemotherapy (IAC).

Methods: Retrospective interventional study of 145 eyes of 112 RB patients from 2013 to 2019 treated with super-selective triple-drug (topotecan, carboplatin and melphalan) IAC.

Results: The mean age was 22.8months with a mean follow-up of 42.1 months. Of 126 treatment-naïve eyes, ICRB groups were A (n=0), B (n= 10), C (n=16), D (n=59), and E (n=41). Primary IAC was provided in 92 eyes and secondary IAC in 53 eyes, with local consolidation in 128 (88%). Groups B and C showed 100% regression, with maximum reduction in tumor volume after IAC cycle 1 and maximum calcification seen after IAC cycle 3. Complications following IAC included vitritis in 4 (2.7%), sterile inflammation in 2 (1.4%) and ptosis in 1 (0.7%). Eye salvage was achieved in all in groups B and C, 54 (92%) in group D and 22 (54%) in group E. Three of 19 (16%) enucleated eyes in group E had histopathological high-risk factors, prompting adjuvant IVC. None developed systemic metastasis.

Conclusions: Triple drug superselective IAC is remarkably effective in groups B-D RB, while modest success is possible in group E.

The Gap to Bridge-ROP Awareness in Ophthalmologists and Pediatricians in South India

First Author: Bindiya C

Purpose: To assess the awareness among pediatricians and ophthalmologists about retinopathy of prematurity (ROP).

Methods: We conducted a questionnaire-based cross-sectional study in Pondicherry and surrounding districts of Tamilnadu. The doctors were asked to fill either hard copies or google forms circulated through Whatsapp or email.

Results: 152 pediatricians and 157 ophthalmologists participated in the study. Most of them knew about the risk factors of ROP [Prematurity (95%,$p<0.01$), low birth weight (84%,$p<0.01$)], screening guidelines ($p<0.01$), composition of dilating drops (78%,$p<0.01$) and treatment modalities [laser (91%,p,<0.010), anti VEGF (80%,$p<0.01$), surgery (55%,$p=0.04$)]. 93% have an established referral facility. Association was found between fields of practice, educational qualification, experience and knowledge about ROP.

Conclusions: The majority of them know the science of ROP. Close coordination between pediatricians and ophthalmologists is needed to improve the service delivery of ROP.

To Study the Effect of Intravitreal Ozurdex Implant in Cases of Retinal Vein Occlusion

First Author: Saloni GUPTA
Co-Author(s): Om Prakash ANAND, Shailender CHAUDHARY

Purpose: Our study investigates an intravitreal dexamethasone implant (Ozurdex) and its efficacy and complications in patients of retinal venous occlusion.

Methods: A prospective, interventional study involving 30 patients with retinal venous occlusion. Patients diagnosed with RVO who had vision loss of at least 2 lines on the Snellen chart and increased central macular thickness on OCT were included in the study. All the parameters BCVA, CMT, IOP were noted at baseline for the affected eye. The patients were followed up at 1 month, 2 months and 3 months following the implant into the vitreous cavity and all the parameters were recorded for affected eyes at each visit.

Results: Baseline parameters were comparable between the groups. Eyes receiving the implant had a statistically significant improvement ($p<0.001$) in BCVA on the Snellen chart over the three month period. There was also a constant decrease in macular edema and the mean difference value of CMT between baseline and 1 month, 2 months and 3 months were also found to be statistically significant. Also, a comparison of IOP between two-time points was done, between baseline and 1 month,2 months, 3 months, the mean difference value in IOP was also found to be significant but clinically well within normal physiological range.

Conclusions: The study concluded that intravitreal dexamethasone implant is an effective treatment for retinal venous occlusion, and it has a statistically significant and clinically meaningful effect on BCVA and CMT. However, it may be associated with a significant rise of IOP but it is well within physiological range.

Two Brothers: Spinocerebellar Ataxia Presenting as Bull's-Eye Maculopathy

First Author: Elyse Dorothy ANSELMO
Co-Author(s): Godard ARTAJOS, Manuel Benjamin IBANEZ, Erika Jean SALVAME

Purpose: To report a case of spinocerebellar ataxia presenting as cone/cone-rod dystrophy.

Methods: A case report.

Results: A 21-year-old male consulted for bilateral progressive blurring of vision for 5 years, with concomitant motor incoordination and speech difficulty. He reported no comorbidities and similar conditions in three generations. His best-corrected visual acuity is 20/200 for the right eye and 20/160 for the left, with bilateral central metamorphopsia. Farnsworth color test revealed tritan and deutan defects. Fundus examination showed macular mottling with ring-like hypopigmentation in bull's-eye pattern bilaterally, seen in blue light autofluorescence as a ring of hyperuatofluorescence. Fluorescein angiography showed window defects at the central macula. Macular optical coherence tomography showed thinning and loss of photoreceptors more concentrated foveally. Neurologic findings included dysmetria, ataxia and unremarkable neuroimaging. The diagnosis was Spinocerebellar Ataxia type 7 and genetic counseling and work-up were done, with physical, occupational and low vision therapy. Screening of his brother revealed similar cone/cone-rod dystrophy with mild dysmetria, and genetic work-up was also done.

Conclusions: Spinocerebellar ataxia (SCA) is a rare neurodegenerative disorder characterized by incoordination and dysarthria, with cone/cone-rod dystrophy in Type 7 SCA. This case highlights the importance of recognizing the association of cone/cone-rod dystrophy with ataxia, since SCA exhibits genetic anticipation, wherein each generation has earlier disease onset and more rapid progression. The diagnosis of SCA due to the cone/cone-rod dystrophy in one brother was crucial in the early diagnosis of his sibling. Though no definitive management is available, early therapy may delay the progression of this debilitating disease.

Vascular Biomarkers in Retinitis Pigmentosa: An Optical Coherence Tomography Angiography Based Study

First Author: Akhila SRIDHARAN
Co-Author(s): Sherine DSOUZA, Nivedita GOVINDASWAMY, Thirumalesh M B, Ram SNEHITH

Purpose: To study the effect of neurodegeneration on the underlying vasculature, to determine the vascular density of retinal and choroidal circulation in retinitis pigmentosa (RP) and its correlation with age matched controls using OCTA and to correlate with various retinal layers.

Methods: 28 eyes with RP and 26 eyes of age matched controls were enrolled in this cross-sectional study. Using DRI OCT TRITON PLUS 12 mm radial swept source OCT scans and 4.5*4.5mm OCTA centred on fovea was obtained. Quantification of OCTA parameters in superficial, deep layer by local fractal analysis was done. The foveal avascular zone (FAZ) was quantified. The OCT indices which included the retinal thickness (RT), RNFL, GCL, GCL++, choroidal thickness (CT) derived from automated segmentation algorithm.

Results: Superficial vessel density was significantly lower (p=0.005) in RP (21.9% vs 27.8%) compared to normal in temporal region alone. In the deep layer, total vessel density were significantly higher (p<0.001) in normal compared to RP (38.7% vs 25.3%). However, FAZ area did not vary significantly between the groups (p=0.73, 0.896 vs 0.954). The vessel area of choriocapillaries was similar (p=0.08) in normal and RP (40.8% vs 40.3%). Whereas, the average vessel count was significantly higher (p<0.001) in normal group (100) compared to RP (61). RT, CT, GCL+, GCL++ was significantly lower (p<0.001) in RP (209.93, 164.51, 40.68, 68.55) patients compared to normal group (268.87, 292.7, 68.68, 105.73).

Conclusions: Retinitis pigmentosa is an inherited retinal disorder in which the degeneration of photoreceptors and the RPE may have triggered the attenuation of microvasculature which indicates that OCTA with OCT is a good evaluatory tool to identify and quantify the neuronal and vascular degeneration and may help in classifying the disease severity.

Visual Outcomes of Polypoidal Choroidal Vasculopathy Subtypes

First Author: Colin TAN

Purpose: Polypoidal choroidal vasculopathy (PCV) has high prevalence among Asians, with variable clinical course and visual prognosis, suggesting the existence of clinical subtypes. We describe a novel classification system for PCV and correlate it with long-term visual outcomes.

Methods: Study of 107 consecutive patients with PCV presenting over a 24-month period. Patients were imaged using confocal scanning laser ophthalmoscopy fluorescein angiography

(FA) and indocyanine green angiography (ICGA). Color fundus photographs and angiograms were graded independently by two ophthalmologists. The diagnosis of PCV was made using standardised diagnostic criteria. The angiographic features were used to classify the PCV cases, and this was correlated with clinical presentation and visual acuity (VA) for 5 years.

Results: Of the 107 patients, significant FA leakage was observed in 57 patients (53.3%). Patients with FA leakage had significantly worse LogMAR VA at all time points compared those without leakage (LogMAR 1.04 vs. 0.32 at 5 years, $p<0.001$), and experienced higher rates of moderate visual loss (60% vs. 0%, $p<0.001$). Those without FA leakage experienced higher rates of good visual acuity (≥20/40) (74.4% vs. 19.6%, $p<0.001$) at all follow-up visits.

Conclusions: We have established a novel classification system for PCV using FA and ICGA features. The visual outcomes vary with subtype, demonstrating that PCV consists of distinct, previously unrecognized, clinical subtypes instead of a single disease entity as originally believed. This classification system has potential application in clinical practice and multicenter randomized trials.

Retina 3 (Surgical)

27-Gauge Vitrectomy Combined with Dexamethasone Implant for Secondary Macular Pucker

First Author: Yuanfei ZHU
Co-Author(s): Tieying ZHAO

Purpose: To investigate the effectiveness and safety of dexamethasone implant (Ozurdex) combined with 27-gauge vitrectomy surgery for secondary macular pucker.

Methods: In this non-randomized, retrospective study, 5 eyes of 5 patients with secondary macular pucker were enrolled. Patients underwent 27-gauge vitrectomy with macular pucker removal and injection of 0.7mg dexamethasone implant. Best-corrected visual acuity (BCVA), central retinal thickness (CMT) measured by spectral-domain optical coherence tomography (SD-OCT), and intraocular pressure, lens opacity were evaluated at baseline, 1-month and 3-month.

Results: At a mean follow-up of 3.76 months, BCVA significantly increased from 0.1±0.17 to 0.4±0.07 (P=0.00096), mean central retinal thickness decreased significantly from 665.8±129.9um to 418.2±22.7um (P=0.0000), and intraocular pressure changed insignificantly (P=0.258). No obvious lens opacity changes or other complications were observed.

Conclusions: 27-gauge vitrectomy surgery combined with dexamethasone implant is effective and safe in the treatment of secondary macular pucker. Further investigation is needed.

A 2-Year Retrospective Review of Idiopathic Macular Hole Surgery

First Author: Tinesh THAMOTARAN
Co-Author(s): Jane FOO, Kwong KIU, Qi NGOO, Azhany YAAKUB

Purpose: To describe and analyze the anatomical and visual function outcome of macular hole surgery for idiopathic macula surgery.

Methods: This is a retrospective study of idiopathic macular hole surgery for the year 2019 and 2020. The surgery was done by a single surgeon. The secondary cause of macula

hole was excluded. All patients underwent combined phacoemulsification and intraocular lens with pars plana vitrectomy, ILM peeling and gas tamponade.

Results: A total of 20 eyes were included in our study. The mean age of patients was 63 years old ± 6.97 years with the range between 41 to 73 years old. There were 10 males (50%) and 10 females (50%). Staging of macula hole prior to surgery was stage 2- 5 eyes (25%), stage 3 – 4 eyes (20%) and stage 4 - 11 eyes (55%). The epiretinal membrane was present in 3 eyes(15%). Anatomical closure was achieved in 75% (15 eyes) and the remaining 25 % (5 eyes) were remained open. Mean pre-operation visual acuity was logMAR 1.31 and mean post operation visual acuity was logMAR 0.81. Visual improvement of two or more lines in best-corrected visual acuity was observed in 14 eyes (70%), no improvement in 4 eyes (20%) and worsening in 2 eyes (10%).

Conclusions: Pars plana vitrectomy and ILM peeling are effective in achieving hole closure and improving the visual acuity of patients with macular hole. The outcomes of macular hole surgery mostly rely on the stages and duration of the macular hole.

An Economic Analysis of Vitrectomy Probe Utilization in Vitreoretinal Procedures: A United States Provider Perspective

First Author: Richard KARA
Co-Author(s): Nicole FERKO, Elizabeth PERSAUD, Daniel SON, Imran SYED

Purpose: Current vitrectomy probes on the market are associated with inefficient vitreous removal and long vitrectomy times. This economic analysis modeled how the introduction of the HYPERVIT® Dual Blade Vitrectomy Probe impacts procedure time and costs from a US hospital perspective.

Methods: A 1-year economic model assumed 252 procedure days per year and 10 vitrectomy procedures per day. In current practice, probe utilization was 50% for a 7,500 cuts per minute (CPM) probe and 50% for a 10,000 CPM probe. In future practice, utilization was 100% for the optimized HYPERVIT® 20,000 CPM probe. Analyses for 25+ and 27+ gauge probe options were included. Average vitrectomy procedure durations were estimated from the literature, and probe vitrectomy time was estimated from flow rates. The utilization of scissors was estimated from observational data. Costs from an outpatient provider perspective included devices (vitrectomy probe, scissors), labor (anesthesia technician, nurse/technician), and facility overhead costs. Device costs were based on 2020 list prices, and other costs were informed by national data or literature. Costs from the literature were inflated to 2020 US dollars.

Results: HYPERVIT® reduced procedure time by 10.9% to 14.5%, and potentially allowed 309 to 427 additional procedures to be performed per year, depending on probe gauge. Scissor use was reduced by 33%. Cost savings of $81 to $136 per procedure or $204,753 to $341,560 over 1 year were predicted.

Conclusions: The gains in procedure time and associated cost savings (reduced scissor, labor, and facility costs) were predicted to offset the cost of the optimized probe.

Blister Like ROP: An Atypical and Severe Form of Retinopathy of Prematurity

First Author: Deeksha KATOCH
Co-Author(s): Atul ARORA, Mangat DOGRA, Ramandeep SINGH

Purpose: To describe an atypical and severe form of posterior retinopathy of prematurity (ROP).

Methods: Retrospective observational case series. Medical records of infants with atypical posterior ROP configurations presenting between September 2018-June 2020 were reviewed. Baseline characteristics, disease morphology, intervention done and final outcome were analysed.

Results: Twenty two eyes of 11 patients with ROP were included. The mean gestational age was 29.75± 2.05 (28-33 wks) and mean birth-weight was 1335± 307.62 (900-1800gm). The mean age at presentation was 38.88 ± 2.8 (35-43 wks). All infants had received oxygen supplementation of some kind. Respiratory distress, sepsis and blood transfusion were other risk factors. All eyes had fibrovascular proliferation over the disc and in the peripapillary region. Three eyes progressed rapidly to stage 5 without intervention. 4 eyes received laser photocoagulation (LP) alone, 2 underwent LP and intravitreal ranibizumab (IVR), 4 eyes received LP followed by vitreous surgery (VS), 9 eyes received LP, IVR and VS. 10/22 eyes (45.5%) showed disease regression out of which 7 were those that received multimodal treatment (LP, IVR, VS).

Conclusions: A rare, atypical and rapidly progressing form of ROP in which fibrovascular proliferation occurs over the optic disk and peripaillary retina is described. Multimodal treatment comprising laser photocoagulation, intravitreal Anti-VEGF therapy and early vitrectomy is required in such complex cases. Eyes receiving anti-VEGF therapy seem to do better as compared to those not receiving anti-VEGF therapy.

Clinical Spectrum of Combined Hamartoma of Retina and Retinal Pigment Epithelium: A Case Series

First Author: Aniket RAI
Co-Author(s): Manabjyoti BARMAN

Purpose: Combined hamartoma of retina and retinal pigment epithelium (CHRRPE) has been described by Gass as a congenital hamartomatous malformation involving retina, retina pigment epithelium, and overlying vitreo-retinal interface. It is a rare intraocular finding that is described as a unilateral, focal, nodular, jet black lesion which occur at or near the macula. Based on the location and the common clinical characteristics, Gass classified combined hamartoma into 4 anatomically based groups: papillary, peripapillary, macular, or peripheral. Establishing the size and extent of a tumour is particularly important when it encroaches on the macula, as the degree of macular involvement is highly related to its visual impact. Clinically, the boundaries of combined hamartomas can be hard to distinguish. Surgical removal remains controversial, visual improvement has been reported in younger patients although in older patients there was no improvement. We present a case series of clinical spectrum of the disease with varied presentation which came to our OPD and the management of the same depending on the age and location.

Methods: An observational study.

Results: Structural improvement post surgery although no functional improvement.

Conclusions: In conclusion, selected patients with combined hamartoma of retina and retinal pigment epithelium can benefit from pars plana vitrectomy with membrane peeling at a appropriate time which can result in improved retinal architecture and visual acuity.

Comparative Assessment of Ergonomic Experience operating with Heads-Up Display and Conventional Surgical Microscope in Posterior-Segment Surgeons

First Author: Hang CHENG
Co-Author(s): Margaret AINSLIE-GARCIA, Justis EHLERS, Nicole FERKO

Purpose: Musculoskeletal pain issues are prevalent in ophthalmic surgeons and can impact surgeons' well-being and productivity. Consideration is important for posterior-segment surgeons who hold non-neutral postures during lengthy surgeries that are known to result in cumulative strain. Heads-up displays (HUD) may reduce ergonomic stress compared to conventional microscopes. This study compared the ergonomic experience between HUD and conventional optical microscope in the operating room (OR), as reported by a sample of posterior-segment surgeons in the United States.

Methods: An online questionnaire was distributed to a sample of surgeons with experience operating with HUD. The questionnaire captured surgeon-specific variables, the standardized Nordic Musculoskeletal Questionnaire, and custom questions comparing HUD and conventional microscope.

Results: Descriptive analysis was conducted on responses from 37 posterior-segment surgeons with a mean 14.0 years of practice and 2.3 years using HUD. Most surgeons agreed or strongly agreed that HUD reduced the severity (64%) and frequency (63%) of pain and discomfort, improved posture (73%) and improved overall comfort (77%). 51% of respondents believed the conventional microscope had a negative impact on their health. Of respondents who experienced headaches (n=14) or pain/discomfort during operation (n=29), 36% reported improvement in headaches and 76% reported feeling less pain/discomfort since using HUD in the OR, respectively.

Conclusions: This study indicates that heads-up display may be an important tool for wellness in the operating room as it can benefit posterior-segment surgeons across several ergonomic measures. Future studies with objective ergonomic assessment and a larger sample size would be useful to further validate these findings.

Comparison of the Intraocular Pressure Control Performance with 27 Gauge Dual-Cutting and Previous Generation Single-Cutting Beveled Vitrectomy Probes

First Author: Valeri KOLESNITCHENKO
Co-Author(s): Vara WUYYURU, Ying ZHU

Purpose: To evaluate intraocular pressure (IOP) control performance of 27 Gauge (Ga) dual- and single-cutting beveled vitrectomy probes under different settings.

Methods: 27 Ga dual-cutting 20K cuts-per-minute (cpm) and single-cutting 10K cpm beveled vitrectomy probes were driven by a dual-pneumatic vitrectomy system with IOP control to aspirate solution in an eye model. Six samples were tested under core duty cycle and vacuums of 250 mmHg and 650 mmHg. Cut rates ranged from 2,500 cpm to 10,000 cpm for 10K probes and from 2,500 cpm to

20,000 cpm for 20K vitrectors.

Results: Without IOP compensation, 27 Ga 20K probes' IOP was similar for all cut rates. IOP ranged from 22.71 ± 0.30 mmHg to 22.81 ± 0.37 mmHg for 250 mmHg, and 7.93 ± 0.46 mmHg to 8.33 ± 0.32 mmHg for 650 mmHg. 10K probes' IOP ranged from 25.47 ± 0.38 mmHg to 27.46 ± 0.43 mmHg for 250 mmHg and 16.14 ± 0.77 mmHg to 19.30 ± 0.77 mmHg for 650 mmHg. When IOP control was enabled, IOP levels for 10K and 20K probes were similar and both had no significant difference under different cut rates. IOP of 20K probes at maximum cut rate obviously increased to 29.24 ± 0.75 mmHg for 250 mmHg, and 27.42 ± 2.64 mmHg for 650 mmHg compared to the result without the system's IOP intervention.

Conclusions: 27 Ga dual-cutting 20K cpm vitrectomy probes provide a more constant IOP level compared to single-cutting 10K cpm vitrectors under different cut rates without IOP compensation.

Correlation between Electroretinogram and Visual Prognosis in Metallic Intraocular Foreign Body Injury

First Author: Xiaoting MAI
Co-Author(s): Haoyu CHEN, Jialin CHEN, Yuting GONG, Hongjie LIN, Fangyi LING

Purpose: To investigate the correlation between electroretinogram (ERG) and visual outcome in eyes with metallic intraocular foreign body (IOFB) injury.

Methods: Cases with metallic IOFB injuries with preoperative ERG from January 2008 to May 2020 were reviewed retrospectively. Five ERG responses were recorded, including rod response, maximal response, oscillatory potentials, cone response and 30-Hz flicker. The results were compared between affected and contralateral eyes. All patients received surgery to remove IOFBs. The correlation between amplitudes, implicit times, and grades of ERG with final best-corrected visual acuity (BCVA) was analyzed.

Results: A total of 33 eyes of 33 patients were included. The eyes with IOFB had generally delayed implicit time and reduced amplitude in all waves. The maximum change was found in oscillatory potentials S3 and N1 (0.42 ± 0.42 and 1.95 ± 1.97 of the fellow eyes respectively, $p<0.05$). All amplitudes were negatively correlated with the final BCVA (rs: -0.676 to -0.459, all $P < 0.05$). In contrast, all implicit times were positively correlated with final BCVA, although some of them were not statistically significant (rs: 0.035 to 0.687). Among them, oscillatory potentials P3 has the highest correlation coefficient (rs = 0.687, $P<0.001$). All grades of ERG waves were statistically correlated with the final BCVA (rs: -0.596 to -0.664, all $p<0.001$).

Conclusions: ERG can be used to assess the visual outcome in metallic IOFB injury after surgery. Oscillatory potentials provided the most significant responses.

Experience with Pneumatic Retinopexy with Subretinal Fluid Drainage: A Three-Year Report

First Author: Saurabh DESHMUKH
Co-Author(s): Krati GUPTA, Surpriya HAWAIBAM, Diva MISRA, Ronel SOIBAM

Purpose: To assess the efficacy of the pneumatic retinopexy (PR) with subretinal fluid drainage (SRF) for the treatment of bullous rhegmatogenous retinal detachment (RRD) and compare it against scleral buckling (SB) over a long period of three years.

Methods: A total of 42 cases were enrolled in the study after following the strict inclusion criteria. One specific inclusion criterion was bullous RD where the retinal surface could not be reached with scleral indentation, suggesting an unsuitable candidate for cryoretinopexy and laser retinopexy. So, in these cases, PR with SRF drainage was done.

Results: This study, first of its kind in India, was done over a period of three years. Of the 42 cases, redetachment was seen in four cases, one was due to missed break and three were due to new break formation. Statistical analysis showed the efficacy of PR with SRF drainage to be equal to SB.

Conclusions: PR with SRF drainage provides a cost-effective method for treatment of bullous RRD.

Factors Associated with Maintenance of Visual Gains Post-Diabetic Vitrectomy

First Author: Evelyn TAI
Co-Author(s): Abdah Khairiah CHE MD NOOR, Shatriah ISMAIL, Yee Cheng KUEH, Zamri NOORDIN, Edwin PHENG

Purpose: To evaluate the factors associated with the maintenance of visual gains post vitrectomy for sequelae of proliferative diabetic retinopathy.

Methods: This was a retrospective analysis of pars plana vitrectomy indicated for sequelae of PDR from 1 Jan 2012 to 31 Dec 2016 in a tertiary hospital in Malaysia. Data collected included patient demographics, baseline visual acuity and post-operative best-corrected logMAR visual acuity up to the last available follow-up date. An improvement of at least 0.3 logMAR post-vitrectomy was considered visual gain. Multiple logistic regression was used to determine the factors associated with maintenance of visual gains post-vitrectomy.

Results: A total of 164 medical records fulfilled the inclusion and exclusion criteria. The mean patient age was 52.68 years (SD=10.32). Approximately 75% (119 patients) had visual improvement post-vitrectomy. Of these, 75% (89 patients) retained their vision at 1-year post-op. Factors significantly associated with sustained visual gains were younger age (OR 0.962, p = 0.031), absence of post-operative tractional retinal detachment and absence of post-operative neovascular glaucoma (OR 0.42, p = 0.022, OR 0.22, p = 0.022 respectively) and pre-operative indication for surgery. Patients who underwent vitrectomy for isolated persistent vitreous hemorrhage had 4 times higher odds of sustained visual gains compared to those with concomitant retinal detachments (OR 3.8, p = 0.038).

Conclusions: Vitrectomy for persistent vitreous haemorrhage in younger patients is associated with preserved visual acuity at one year. Post-operative tractional retinal detachment and neovascular glaucoma are associated with reduced odds of maintaining post-op visual gains.

Flow Dynamic Comparison of 25G Dual Blade versus Single Blade Vitrectomy Cutters

First Author: Vara WUYYURU
Co-Author(s): Abolfazl IRANNEJAD, Sina MAMOURI, David STEEL, Sonalee TAMBAT

Purpose: Leverage micro-particle image velocimetry (PIV) experiments and computational fluid dynamics (CFD) simulation models to define and compare sphere of influence (SOI) extent and pulsatile motion around vitrectomy probes.

Methods: The micro-PIV experiments and simulation models of three probes, namely, 25+™ Advanced UltraVit™ 10,000 cuts per minute (cpm), 25+™ HyperVit™ 20,000 cpm flat and beveled tips were used to compare flow velocity around the probe tip at applied vacuum of 650 mmHg and 50/50 duty cycle settings. Further CFD simulations were conducted with matched flow rates to compare performance.

Results: The micro-PIV results indicate a higher fluctuation magnitude for the 10K single-blade bevel probes as compared to the 20K dual-blade probes. Both 20K probes, beveled and flat tips, demonstrated similar behavior. The intensity of velocity fluctuations in CFD simulations was significantly reduced for both for 20K dual blade compared to 10K single blade cutters. In addition, under matched-flow, the maximum SOI size of 20k dual cutting probes was smaller compared to that of 10K single-blade probes.

Conclusions: Micro-PIV experiments and CFD simulations were used to compare flow dynamics in the nearfield of the vitrectomy probe tip. The flow performance of 25 gauge dual cutting 20K probes had more stable aspiration. The 20K probes showed a smaller SOI compared to 10K probes under matched-flow conditions. Simulations may help surgeons better understand differences in probe performance and optimize instrument selection.

Gender Relationship with Laser Retinopexy for Retinal Breaks: A Retrospective Analysis

First Author: Syed HUSSAIN
Co-Author(s): Irfan JEEVA, Siddiqui M A REHMAN

Purpose: To explore the relationship of gender with laser retinopexy for retinal breaks in Pakistani population.

Methods: A ten-year retrospective study including all consecutive patients who underwent laser retinopexy, between January 2009 and December 2018. Patients were identified through the coding system of the hospital. Structured proforma was used to collect information. All patients who underwent laser retinopexy for retinal tear or high-risk retinal degeneration (such as lattice degeneration) were included. Eyes with a history or treatment of retinal detachment in the index eye were excluded. Data were analyzed with Statistical Package for the Social Sciences (SPSS) version 23.0. Descriptive statistics were used to explore the relationship between gender and patients undergoing laser retinopexy. A p-value of < 0.05 was considered significant.

Results: We Identified 12,457 patients who underwent various laser procedures. YAG laser, laser PI, laser trabeculoplasty were all excluded. A total of 3,472 patients' files were reviewed for the study, out of which 958 patients met the inclusion criteria. There was a slightly higher male preponderance (53.87 %). The mean age was 43.99±15.377. For exploratory analysis, participants were divided into different age groups as: < 30 (24.16%); 31-40 (16.59%); 41-50 (19.45%); 51-60 (26.40%); and >60 (13.49%). Bilateral laser retinopexy was performed in 48.12 % of patients; 24.79 % and 27.13 % of patients underwent laser retinopexy for the right and left eyes respectively.

Conclusions: The ratio was not significantly different from the prevalence of retinal tears and retinal detachment in the general population, which has a slightly higher male preponderance. In our study, there was no gender bias in patients undergoing laser retinopexy.

Influence of the COVID-19 Pandemic Lockdown on Primary Retinal Detachment Practice Patterns and Visual and Anatomic Outcomes: A Multicenter, International Experience

First Author: Isabella LOH
Co-Author(s): Quan HOANG, Jesse JUNG, Young RETINA FORUM

Purpose: To determine COVID-19's impact on the management and outcomes of primary rhegmatogenous retinal detachment (RRD) in North America during the lockdown and after.

Methods: 259 patients with RRD repair from 3/16/20-6/30/20 were followed >90 days. Patients treated during or after regional shelter-in-place orders were divided into 'lockdown' and 'post-lockdown' groups respectively. Outcome measures included practice patterns associated with RRD repair, single surgery anatomic success (SSAS), and best-corrected visual acuity (BCVA).

Results: 169 eyes and 92 eyes were included in the lockdown and post-lockdown groups respectively. SSAS at post-operative month (POM)3 was 82%, while final anatomic success was 99%. POM3 SSAS was significantly higher in lockdown compared to post-lockdown (85% versus 75%, p=0.042). POM3 BCVA for the entire cohort significantly improved from baseline LogMAR (1.0±1.1 to 0.54±0.64, p<0.001). In multivariate regression analysis, eyes repaired post-lockdown had 21.87-days longer symptoms (p=0.008); were 5.7 percentage-points (%p) less likely COVID-19-positive (p=0.034); 15.0%p less likely to use perfluoropropane (C3F8) versus sulfurfluorhexafluoride (SF6) during vitrectomy repair (p=0.034); 14%p less likely to achieve POM3 SSAS (p=0.015); more likely to have post-operative proliferative vitreoretinopathy (PVR, +11%p, p=0.020) and epiretinal membrane (ERM, +12%p, p=0.024). COVID-19-positive patients were 62%p more likely to undergo pneumatic retinopexy (p=0.01).

Conclusions: Patients who underwent RRD repair post-lockdown were less likely COVID-19-positive but experienced a longer delay before diagnosis, leading to more postoperative complications like PVR and ERM, and lower SSAS. During the lockdown, vitreoretinal surgeons utilized longer-acting C3F8 gas tamponade, perhaps to provide more stability given the uncertain lockdown duration.

Intraocular Pressure Compensation Performance for 25 Gauge Dual-Cutting and Single-Cutting Beveled Vitrectomy Probes Comparison

First Author: Valeri KOLESNITCHENKO
Co-Author(s): Vara WUYYURU, Ying ZHU

Purpose: To understand intraocular pressure (IOP) compensation performance for 25 Gauge (Ga) dual- and single-cutting beveled vitrectomy probes under different system settings.

Methods: 25 Ga 20K cuts-per-minute (cpm) and 10K cpm vitrectomy probes were driven by a vitrectomy system with IOP control to aspirate in an eye model. Six samples were tested under the core duty cycle and varying vacuums. Both system IOP compensation enabled and disabled settings were used.

Results: Different from the results of 10K probes without IOP compensation, changing the cut rate did not generate a significant difference for 20K probes. 20K probes' IOP at maximum cut rate was 21.96 ± 0.6 mmHg for 250 mmHg, and 7.47 ± 0.98mmHg for 650 mmHg. When IOP control was enabled, IOP levels for 20K probes and 10K probes

were similar and not significantly influenced by cut-rate changes. 20K probes' IOP at maximum cut rate increased to 32.32 ± 1.07 mmHg(47% improvement) for 250 mmHg, and 37.12 ± 4.04 mmHg (397% improvement) for 650 mmHg compared to result without IOP compensation.

Conclusions: 25 Ga dual-cutting 20K cpm vitrectomy probes have a more constant IOP when cut rate changes without IOP control compared to the previous generation single-cutting 10K cpm vitrectomy probes. Using IOP compensation can help surgeons to keep the eye at stabilized IOP ranges during aspiration of 25 Ga dual-cutting 20K cpm vitrectomy probes and maintain the efficiency of aspiration.

Macular Buckling versus Pars Plana Vitrectomy in a 62-Year-Old with High Myopia

First Author: Juan Miguel SISON
Co-Author(s): Michael FERNANDEZ

Purpose: This is a case of a known high myopic with myopic foveoschisis, initially presenting with blurring of vision, who developed recurrent macular hole retinal detachment after multiple pars plana vitrectomies. In such cases, macular buckling, although rarely done, may need to be revisited as an option of management.

Methods: Descriptive case report.

Results: We herein report a case of a 62-year-old female who is a known high myopic with myopic foveoschisis who subsequently developed macular hold retinal detachment. She underwent pars plana vitrectomy two times, but with recurrence of the macular hole, and retinal detachment. Hence macular buckling was contemplated.

Conclusions: Myopic foveoschisis with macular hole retinal detachment is quite rare and associated with a worse prognosis. Pars plana vitrectomy has since become the standard management by many. However, in cases where there is recurrent retinal detachment and hole formation, especially in the presence of scleral ectasia, pars plana vitrectomy may not be sufficient enough and macular buckling may need to be revisited.

Mechanism and Prognostic Indicators for Explosion-Related Eye Trauma: Eye Injury Vitrectomy Study

First Author: Kang FENG
Co-Author(s): Zhi Zhong MA

Purpose: To explore the clinical features, surgical interventions, prognosis of injured eyes following explosion, and to develop the risk factors for poor prognosis.

Methods: A nested case-control study. To the date of 31 December 2018, 99 explosion-related eye-globes were selected from the Eye Injury Vitrectomy Study database, which is a multicenter prospective cohort study that began in 1990s. All cases selected underwent vitreoretinal surgery or enucleation, and were followed up for at least 6 months. Clinically meaningful preoperative variables and outcomes were used to develop logistic regression models.

Results: The unfavorable outcomes were defined as silicone oil-filled eyes, phthisis bulbi, enucleation, and anatomically restored eyes of which the final BCVA is worse than initial vision after 6 months of follow-up. The proportion of unfavorable outcomes were 92.0%, 60.9%, and 66.7% in large festive fireworks, detonator, and beer bottle groups respectively. The anatomic and visual outcomes of injured eyes with combined

injury of blast wave and projectile were worse than that of ruptured eyes (Fisher's exact = 0.041). The extrusion of iris/lens (OR = 3.20, P = 0.015), PVR-C (OR = 6.08, P = 0.036), and choroid damage (OR = 5.84, P = 0.025) are independent risk factors of unfavorable prognosis for explosion-related eye trauma.

Conclusions: The extrusion of iris/lens, PVR-C, and choroid damage are the independent risk factors for unfavorable outcomes in explosion-related eye trauma. There is a unique injury mechanism in explosion-related eye trauma.

Metallic Double Penetrating Injury

First Author: Jayson SO
Co-Author(s): Fatima REGALA, Erika Jean SALVAME, Jocelyn SY

Purpose: To present a case of metallic double penetrating globe injury.

Methods: A case report.

Results: This is a case of a 20-year-old male who sustained a metallic double penetrating injury of the right eye entering through the 4 o'clock limbus and exiting through the posterior pole one disc diameter inferonasal to the optic nerve head. The foreign body lodged just posterior to the globe and inferonasal to the orbital optic nerve which was confirmed through computed tomography scan. Immediate management was a repair of the corneo-scleral laceration and intravitreal injection of vancomycin and ceftazidime. On the first post-operative day, visual acuity was 20/50 and fundus exam revealed vitreous hemorrhage and choroidal rupture. The patient underwent barrier laser photocoagulation surrounding the exit wound and 360 degrees of the retina. On the 10th hospital day, visual acuity dropped to hand movement and vitreous hemorrhage was bleached with difficulty of visualization of the retina. On the 60th post-operative day, the patient underwent timely pars plana vitrectomy and debulking of the chorio-retinal granuloma seen intraoperatively. Final visual acuity 20/32. The patient is monitored for ocular siderosis.

Conclusions: Double penetrating injuries lodging in the intraconal space require a multi-subspecialty approach. Inert foreign bodies located posterior to the globe may not always be sight-threatening and the option to observe and monitor is valid. Timely management increases prognosis and started with immediate prevention of endophthalmitis and retinal detachment. However, with retained intraconal foreign bodies, monitoring for long-term complications are warranted.

Nanophthalmic Uveal Effusion Syndrome: Multimodal-Image Presentation and Surgical Management

First Author: Rongle ZHOU
Co-Author(s): Huping SONG

Purpose: To describe the clinical presentation, with a multimodal-imaging method and surgical management of uveal effusion syndrome in a female patient with nanophthalmos.

Methods: A 45-year-old woman presented with decreased visual acuity in her left eye for half a month. Fundus examination revealed nonrhegmatogenous retinal detachment and choroidal detachment. Ultrasound examination confirmed bilateral nanophthalmos (Axial length was 18.63mm for the right eye and 18.70mm for the left eye). Fundus fluorescence angiography (FFA), ultra widefield fundus imaging, fundus autofluorescence (FAF), optical coherence tomography (OCT), color doppler ultrasonography, ultrasound

biomicroscopy (UBM), magnetic resonance imaging were performed. Partial thickness scleral windows and sclerectomy were performed.

Results: After the surgery, intraocular pressure remained stable and the patient recovered premorbid vision. During follow-up, the patient's vision remained stable.

Conclusions: Uveal effusion syndrome can be managed effectively by partial thickness scleral windows and sclerectomy with improvement and maintenance of visual acuity.

Post-Traumatic Polymicrobial Endophthalmitis with Corneal Ulcer: There can be Light at the End of the Tunnel

First Author: Yi Wen LIM
Co-Author(s): Tengku KAMALDEN, Sujaya SINGH, Rukumani Devi VELAYUTHAN

Purpose: To present a rare case of good visual outcome following fungal (Trichoderma) and bacterial (Bacillus cereus) co-infection in post-traumatic polymicrobial endophthalmitis.

Methods: A case report with literature review.

Results: Post-traumatic exogenous polymicrobial endophthalmitis has been reported to occur between 5.3% to 47.6% of open globe injuries. This condition often poses a management challenge in identifying causative virulent organisms and administering appropriate targeted therapies. More often, the eye affected has a grim prognosis with very poor visual outcome, potentially resulting in complete loss of vision. Trichoderma spp fungus is a rare cause of infective keratitis and there are no reports linking it to endophthalmitis. Conversely, there are well-documented reports of Bacillus cereus endophthalmitis, often resulting in a poor visual outcome. This has not been reported. Fungal and bacterial co-infection are uncommon and may cause severe loss of vision. We present a case of good visual outcome following Trichoderma endophthalmitis with Bacillus cereus co-infection in a patient who developed with penetrating ocular trauma who developed infective keratitis. We review the literature on polymicrobial endophthalmitis including organisms, management and visual outcome.

Conclusions: The challenge in managing post-traumatic polymicrobial endophthalmitis lies in eradicating the causative organisms effectively. This case illustrates the importance of identifying the causative organisms early and appropriate targeted treatment. Despite being often associated with poor prognosis, similar co-infections may result in good visual outcomes when early and aggressive targeted treatment is administered.

Postoperative Head Positioning after Macular Hole Surgery: A Meta-Analysis

First Author: Patricio Lorenzo CRUZ
Co-Author(s): Anjanette Pauline ONG

Purpose: To assess the effect of a non-facedown head position following macular hole surgery on the rates of macular hole closure.

Methods: A meta-analysis. A literature search was done using the PubMed database. The inclusion criteria were that participants were diagnosed with macular holes and underwent pars plana vitrectomy, ILM peeling, and intraocular gas tamponade; that the studies compared a postoperative facedown position to a nonsupine head position; that the studies used anatomic macular hole closure rates as the outcome; and that the methodology was prospective. Retrospective studies, and studies

with significant differences between groups were excluded.

Results: Meta-analysis of the overall macular closure rates showed a significantly higher rate of closure in patients who maintained a postoperative facedown position than those who maintained a nonsupine position (OR 2.54, 95% CI 1.35-4.78, P=0.004). A significantly higher rate of macular hole closure was also noted in patients with macular holes of >400 μm that maintained a facedown position than those who did a nonsupine head position (OR 1.51, 95% CI 1.51-6.79, P=0.002). For patients with smaller macular holes of <400 μm however, there was no difference in closure rates was noted (OR 1.32, CI 0.39-4.49, P=0.66).

Conclusions: The results of the study show that a facedown position during the postoperative period after achieves a higher rate of macular hole closure, especially in patients with macular holes larger than 400 μm. A facedown position in patients with smaller macular holes of less than 400 μm on the other hand may be unnecessary and provides no added benefit.

Prognostic Factors and Long-term Outcomes of Eye-Globe Perforation: An Eye Injury Vitrectomy Study

First Author: Kang FENG
Co-Author(s): Zhi Zhong MA

Purpose: To delineate anatomic and visual outcomes of injured eye globes with perforating, and to develop the prognostic indicators for perforating eyes.

Methods: The case series study, from a multicenter prospective cohort database. To the date of 31 December 2018, 63 perforating globes were selected. All cases underwent vitreoretinal surgeries or enucleations, and were followed up for at least 6 months. Demographic characteristics, basic examination for traumatized eyes, and intraocular tissue damages were recorded by surgery-in-chief. At the follow-up visit, the best-corrected VA, intraocular pressure, the intraocular tamponade material, retinal anatomic outcome of eye-globes, and phthisis or enucleation were evaluated.

Results: Fifty injured eyes (79%) were caused by sharp objects and 13 eyes (21%) were injured by missiles. Twenty-two injured eyes can be anatomically restored with a final vision of more than 4/200 through vitreoretinal surgery. The PVR-C (OR = 5.67, P = 0.01), area of retinectomy more than 2 times of optic disk (OR = 5.16, P = 0.04), and macular damage (OR = 6.38, P = 0.01) were correlated with unfavorable outcomes.

Conclusions: The injured eyes with perforation can be saved through vitreoretinal surgery, the PVR-C, retinectomy more than 2 times of optic disk, and macular damage were independent risk factors for poor long-term prognosis.

Scleral Buckling on an 18-Year-Old High Myopic Asian Male with Traumatic Retinal Detachment, Retinoschisis and RPE Detachment

First Author: Michael FERNANDEZ

Purpose: To report a case of an 18-year-old high myopic male with traumatic retinal detachment and retinoschisis who underwent scleral buckling.

Methods: A case report.

Results: This is a case of an 18-year-old Filipino high myope male who had a history of trauma to his right eye while playing

basketball causing blunt trauma and sudden blurring of vision. This led to consultation with an ophthalmologist wherein the requested fundus photo showed diffuse subretinal hemorrhage from 12 o'clock to 10 o'clock. OCT of the macula was then requested which showed a large hyporeflective subretinal space with a splitting of the outer retinal layers and RPE detachment. After 2 weeks from the initial consultation, the patient went to our institution for another opinion where he presented clinically as shallow retinal detachment from 12 o'clock to 10 o'clock with resolution of the subretinal hemorrhage noted previously. No obvious break was noted. The patient underwent scleral buckling hoping it would address the retinal detachment and retinoschisis with RPE detachment. Intraoperatively, a retinal break was noted at 1 o'clock position. Post-operatively, the retinal became flattened with best-corrected visual acuity of 20/200. On OCT of the macula, there was no more splitting of the retinal layers and RPE detachment however, there was still a small hyporeflective space seen subfoveally. Carbonic anhydrase inhibitors were prescribed. Three months post-op, there was resolution of the subfoveal fluid and now with BCVA of 20/125.

Conclusions: Scleral buckling can be used to treat traumatic retinal detachment with retinoschisis and RPE detachment.

Short Term Double Tamponade with Perfluoro-n-Octane Liquid and Silicon Oil in Complicated Vitrectomies: A Study

First Author: Durgesh KUMAR
Co-Author(s): Pankhuri JOHARI

Purpose: To evaluate the use of double endotamponade with perfluoro-n-octane liquid (PFCL) and silicon oil (SO) in vitrectomies for complex retinal detachments having inferior tears and advanced PVR changes requiring relaxing inferior retinotomies.

Methods: In 30 months 18 patients with mean age 56 years were operated and having achieved retinal flattening following vitrectomy procedures and fluid air exchange, partial filling with PFCL, additional filling with SO and endolaser was done. In complex vitreoretinal surgical procedures, requirement of tamponade for breaks and retinotomies in inferior half of retina was observed and successfully done. Post operatively (PO) prone positioning not needed. During 4th PO week PFCL was exchanged with SO and final SO removal (SOR) done at 4-6 months. Cases were followed for 3 months post SOR.

Results: Successful retina reattachment achieved in 16 out of 18 cases (or 88.9%). Complications seen were IOP rise in 27.8%, macular thinning in 22.2%, inferior retinal atrophy in 38.9%, EMM/ERM in 33.3% and fibrinous reactions in 11.1% cases.

Conclusions: Double tamponade with PFCL-SO exchange in complicated vitrectomies with inferior breaks and retinotomies is safe and effectively giving freedom from prone positioning in aging patients.

Spontaneous Suprachoroidal Hemorrhage in Hypertensive Urgency: A Case Report

First Author: Nur Atiqah HASAN
Co-Author(s): Haslina MOHD ALI, Muharliza MUSA, Mushawiahti MUSTAPHA

Purpose: To report a rare case of spontaneous suprachoroidal hemorrhage in a hypertensive urgency patient.

Methods: A case report.

Results: A 73-year-old gentleman with diabetes mellitus and uncontrolled hypertension presented with sudden profound painful vision loss. No history of ocular trauma or surgery prior. Visual acuity was only light perception and the intraocular pressure (IOP) was 68mmHg. Anterior segment showed angle closure with no fundus view and B scan revealed near kissing suprachoroidal hemorrhage. Systemic examination showed high blood pressure (BP) of 196/106mmHg and no other significant neurological deficit. His blood investigation revealed normal coagulation profile. He was admitted for IOP and BP stabilization, in which maximum medical IOP lowering agents were commenced (oral acetazolamide 250mg QID, oral glycerol 30mg TDS and maximum topical antiglaucoma eyedrops) and his BP was controlled with 2 anti hypertension. He subsequently underwent drainage of suprachoroidal hemorrhage. Despite good IOP control achieved post operatively, his vision remained poor (light perception).

Conclusions: A spontaneous suprachoroidal hemorrhage in elderly patient with hypertensive urgency warrants early detection to prevent disastrous sequelae.

Subretinal Cannula: Wriggling Out of It!

First Author: Yusra ASAD
Co-Author(s): Avnindra GUPTA, Ritesh NARULA, Lalit VERMA

Purpose: To highlight the nightmare problems faced when a cannula ends up subretinally during a vitreoretinal surgery and suggest measures on how to wriggle out of it!

Methods: A 49-year-old male presented with dimunition of vision in his right eye for 6 months. Left eye examination was unremarkable. Right eye examination revealed evidence of anterior uveitis (posterior synechiae, pigment on surface of early cataractous lens, small irregular pupil, 2+ flare). BCVA: 6/60 in the right eye, 6/6 in the left eye. Indirect Ophthalmoscopy: predominantly nasal retinal detachment in the right eye. Vitreoretinal surgery was planned. On the operating table, 23G pars plana ports were made with confirmation of the intravitreal position of infusion cannula. Upon starting vitrectomy, it was realized that retinal detachment had become total bullous detachment and subretinal endolight cannula at 2 O'clock. The endolight port was shifted to 12 o'clock, surgery continued with difficulty. PFCL was injected, membrane dissection continued as far as possible with absurd placement of ports. Further, upon attempting to settle the retina with a fluid-air exchange, it was noticed that the infusion port had gone subretinal as well with air filling up subretinally. The infusion port was then shifted. Subretinal air was evacuated, air-fluid drainage was done followed by silicone oil injection. Multiple breaks present from before and some made iatrogenically were lasered along with peripheral retinal ablation.

Results: Postoperatively patient has a settled retina with BCVA of 6/60.

Conclusions: It is imperative to maintain calm, minimize instrument entry and exit, do not try to push through shift ports where possible and proceed slowly.

Treatment Outcomes of Polypoidal Choroidal Vasculopathy Associated Sub-Macular Hemorrhage with a Modified Technique

First Author: Nishant Vijay RADKE
Co-Author(s): Chen LIZHEN, Snehal RADKE

Purpose: To study the outcomes of

management of sub-macular hemorrhage due to polypoidal choroidal vasculopathy (PCV) using a modified technique.

Methods: This is a retrospective cohort of 13 patients with sub-macular hemorrhage due to PCV who underwent treatment with the modified method. Cases presenting with extensive vitreous hemorrhage were excluded. After explaining the pros and cons of treatment options of conventional pneumatic displacement without vitrectomy and our technique, a special consent was obtained. Modified technique included a limited pars plana 1 port vitrectomy followed by injection of 0.4-0.6ml perfluoropropane (C3F8) and anti vascular endothelial growth factor (A-VEGF) 0.05ml intra vitreous. Prone position for 1-2 weeks was advised. PDT was done later when the sub-macular hemorrhage had been displaced. Fluorescein and indocyanine green angiographies (FA and ICGA), optical coherence tomography (OCT) and color fundus (CF) images were obtained in all except 3 cases who refused FA. Snellen's visual acuity was converted to LogMAR and students T test was used for analysis.

Results: Average pre treatment best corrected visual acuity (BCVA) for all patients was 1.5351875 and average BCVA post treatment at final assessment was 1.003875. The p value was statistically significant (0.0373). Breakthrough vitreous hemorrhage happened in 3 patients who needed complete PPV later. Subconjunctival haemorrhage was the commonest complication. No patient developed RD or endophthalmitis. 1 patient continued to worsen despite treatment.

Conclusions: The results of the modified technique in displacing sub-macular hemorrhage seem promising. Larger sample size and more trials could help refine this technique further.

Translational and Visual Sciences Research

Analysis of ECM Remodeling by Ripasudil Using 3D Cultured Trabecular Meshwork Model

First Author: Yuika OUCHI
Co-Author(s): Fumihito HIKAGE, Yosuke IDA, Kaku ITOH, Hiroshi OHGURO, Chiaki OTA

Purpose: Ripasudil, a glaucoma treatment, is the first ROCK inhibitor instillation, and its mechanism of lowering intraocular pressure is thought to reduce the resistance of the trabecular meshwork-Schlemm's canal. However, extracellular matrix (ECM) remodeling in the trabecular meshwork by Ripasudil has not yet been studied in detail. Therefore, we analyzed the ECM remodeling induced by Ripasudil by creating an organoid in 3D culture using human trabecular meshwork cells and applied it as a trabecular meshwork model.

Methods: Organoids were created from 20,000 human immortalized trabecular meshwork cells using the drop culture method (Ctrl group). The next day, 5 ng/ml TGF-β alone (TGF-β group), 10 μM Ripasudil alone (Rip group), both (TGF-β + Rip group) and 5 ng/ml TGF-β + 10 μM Y-27632 (TGF-β + Y-27632 group) was added and organoids were collected on the 6th day and the size was measured. Besides, gene expression levels of various collagens and Fibronectin were measured by quantitative PCR, and ECM in organoids was examined immunohistochemically.

Results: The size of the organoids was significantly smaller in the TGF-β group and significantly larger in the Rip group than in the Ctrl group. In addition, regarding ECMs surrounding the organoids, the TGF-β group

significantly increased COL1, COL4, COL6, and FN Compared with the Ctrl group. In addition, the TGF-β + Rip group and the TGF-β + Y-27632 group significantly reduced ECM deposition compared to the TGF-β group.

Conclusions: Ripasudil leads to attenuation of ECM deposition, such as COL1, in the trabecular meshwork model.

Antimicrobial Efficacy of Contact Lens Solutions Assessed by ISO Standards

First Author: Paul SHANNON
Co-Author(s): Monica CRARY, Cindy MCANALLY, Rhonda WALTERS

Purpose: The purpose of these studies was to assess the antimicrobial activity of commercially available multipurpose solutions (MPS) by International Standards Organization (ISO) 14729 and ISO 18259.

Methods: MPS containing dual-preservative systems, polyaminopropyl biguanide 0.00013%/polyquaternium 0.0001% (PHMB/PQ) and polyquaternium-1 0.001%/ myristamidopropyl dimethylamine (PQ/ ALDOX) 0.0006%, were evaluated. PHMB/ PQ and PQ/ALDOX solutions, prepared in test tubes and manufacturer lens cases, were inoculated with 105-106 of ISO microorganisms as well as Acanthamoeba trophozoites per ISO 14729 and ISO 18259. At the disinfection time (DT), ISO microorganisms were recovered using validated media and recovery methods.

Results: The dual-preservative system in PHMB/PQ was less efficacious than PQ/ ALDOX against Fusarium keratoplasticum in tubes (2.1 vs 3.7 log reduction [LR]) and lens cases (1.8 vs 4.4 LR). Similarly, PHMB/PQ was less efficacious than PQ/ALDOX against Candida albicans in tubes (3.2 vs 4.8 LR) and cases (1.4 vs 4.5 LR). PHMB/PQ was also less efficacious against Serratia marcescens in cases (3.8 vs 5.0 LR). PQ/PHMB had less efficacy than PQ/ALDOX against Acanthamoeba trophozoites ATCC 30461 (1.2 vs 3.2 LR) and ATCC 50370 (0.4 vs 2.2 LR). PHMB/PQ was less efficacious in the lens case vs test tubes for two microorganisms.

Conclusions: PQ/ALDOX was more efficacious against five of seven microorganisms, including two strains of Acanthamoeba. ISO 14729 and ISO 18259 are effective methods for evaluating the impact of test materials on antimicrobial efficacy of MPS against microorganisms known to cause microbial keratitis.

Association between Altered Intestinal Microbiome, Impaired Systemic and Ocular Surface Immunity and Impaired Wound Healing Response after Alkaline-Chemical Injury in Diabetic Mice

First Author: Kendrick SHIH
Co-Author(s): Yashan BU, Vishal JHANJI, Amy C.y. LO, Alex Lap Ki NG, Louis TONG

Purpose: To investigate the effect of sustained hyperglycemia on corneal epithelial wound healing, the ocular surface and systemic immune response, and microbiome indices in diabetic mice compared to controls after alkaline chemical injury of the eye.

Methods: Corneal alkali injury was induced in the eye of Akita mice and wild-type mice. The groups were observed at baseline as well as days 0, 3 and 7 after injury. Corneal re-epithelialization was observed under a slit lamp with fluorescein stain using a cobalt blue light filter. Tear samples were acquired with Schirmer's strip and tear cytokine and

growth factor levels were measured with protein microarray assay. Flow cytometry was conducted on peripheral blood samples to determine CD4 cell count. Fecal samples were collected. Gut microbiota composition and diversity pattern were measured using shot-gun sequencing.

Results: Akita mice had significantly delayed corneal wound healing compared to controls. This was associated with a reduction in tear levels of VEGF-A, CCL2, Ang2 and IGF-1 on days 0, 3 and 7 after injury. Furthermore, there was a lack of significant upregulation of peripheral blood CD4 cell count in response to injury in diabetic mice compared to controls. In response to injury, Akita mice also had a significant reduction in intestinal microbiome diversity indices compared to controls. Individually, at baseline, Akita mice had a significantly lower abundance of Helicobacter typhlonius and Firmicutes bacterium M10-2 compared with wild-type mice.

Conclusions: Intestinal microbial diversity and abundance patterns may account for observed differences in systemic and ocular immunity as well as cornea wound healing response.

Association of the FOXC1 Locus with Primary Open-Angle Glaucoma and Intraocular Pressure

First Author: Calvin PANG
Co-Author(s): Li Jia CHEN, Shiyao LU

Purpose: To evaluate the association profiles of the FOXC1 locus and its upstream regulatory element with primary open-angle glaucoma (POAG) and intraocular pressure (IOP).

Methods: We tested single marker associations of the single-nucleotide polymorphisms (SNPs) identified by genome-wide association study (GWAS), rs2745596, and 11 tagging SNPs covering the FOXC1 gene and its upstream regulatory element AL512329.2 with POAG in a Hong Kong Chinese cohort (N=1696). This cohort contained 577 control subjects, 560 high-tension glaucoma (HTG) and 559 normal-tension glaucoma (NTG). Logistic regression was used to test the genetic association adjusted by age and gender. Stratification analysis of HTG and NTG was conducted for estimating the SNP associations.

Results: A significant association of rs2745596-G was found with HTG (P=0.00089, OR=0.73), but not with NTG (P=0.55). A SNP, rs7750978, in the regulatory element was marginally associated with HTG (P=0.041, OR=0.83). In addition, the protective allele rs2745596-G was significantly associated with lower IOP in POAG patients (P=2.12x10-5, β=-1.43). SNPs rs2235716 (P=0.0061, β=-1.51) and rs2745596 (P=0.035, β=-2.61) in the FOXC1 gene were associated with IOP in the HTG cohort.

Conclusions: The effect of rs2745596 in HTG was confirmed in Chinese, being consistent with previous findings. A novel association between rs7750978 in the regulatory element and HTG was identified, indicating a potential direction for the downstream investigation. Further studies are warranted to validate the SNPs with marginal associations and explore the biological effects of both FOXC1 and AL512329.2 in POAG and IOP.

Autologous Iris Pigment Epithelial Cell Sheet Transplantation for Myopic Chorioretinal Atrophy: A Preclinical Study for a First-in-Human Clinical Trial

First Author: Tsutomu YASUKAWA
Co-Author(s): Yoshio HIRANO, Aki KATO, Hitoshi KUSANO

Purpose: Retinal pigment epithelium (RPE) is essential for the homeostasis of photoreceptor cells. In regenerative medicine, various methods have been tested to replenish RPE. Previous studies have evaluated the feasibility of transplantation of iris pigment epithelial (IPE) cell suspension instead of RPE cells to treat diseases related to RPE dysfunction. On the basis of the advantages of autologous, somatic cells, and cell sheet transplantation, we prepared a sheet of IPE cells for clinical applications. This study assessed the safety of an implanted IPE sheet and the stability of sheets during transportation and preservation.

Methods: IPE cells were isolated from the iris tissue and cultured. Then an IPE sheet prepared was implanted into the subretinal space of the right eye in 10 nude rats to evaluate potential adverse events. Moreover, the stability of sheets during transportation and preservation was assessed under the storage condition of 5 ± 3˚C.

Results: No adverse events were noted in the implantation site in nude rats. We also confirmed the stability of the IPE cell sheets after 17-hour land transportation and the favorable preservation stability up to 96 hours after filling and plugging.

Conclusions: IPE cell sheet transplantation had no adverse impacts on the eyes of nude rats. The IPE cell sheets could be stably preserved and transported. These results provided further credence to proceed to clinical applications of IPE cell sheet transplantation. A clinical trial is ongoing for autologous transplantation of IPE sheets by use of cells purified and cultured from patient-derived iris tissue.

Corneal Curvature-Associated MTOR Variant Differentiates Mild Myopia from High Myopia in Han Chinese Population

First Author: Xiang-ling YUAN
Co-Author(s): Shaowan CHEN, Tsz Kin NG, Lixia SUN, Riping ZHANG, Yuqian ZHENG

Purpose: To determine the correlation of genome-wide association study-identified corneal curvature (CC)-related gene variants with different severity of myopia and ocular biometric parameters in the Han Chinese population.

Methods: Total 2,101 unrelated Han Chinese subjects were recruited, including 1,649 myopia and 452 control subjects. Five previously reported CC-associated gene variants (PDGFRA, MTOR, WNT7B, CMPK1 and RBP3) were genotyped by the TaqMan assay, and their association with different myopia severity and ocular biometric parameters were evaluated.

Results: MTOR rs74225573 variant was found to be associated with mild myopia in male subjects (P = 0.010). Moreover, MTOR rs74225573 showed suggestive different frequencies (P = 0.021) between mild and moderate myopia. Critically, mild myopia subjects had significantly higher frequency in MTOR rs74225573 C allele than high myopia subjects (P = 0.003), especially in male subjects (P = 0.001, odds ratio (OR) = 0.49). High myopia subjects carrying MTOR rs74225573 C allele have significant flatter CC (P = 0.035) and longer corneal radius (P = 0.044) than those carrying TT genotype. In addition, joint additive effect analysis showed

that MTOR rs74225573 paired with PDGFRA rs2114039 (P = 0.009, OR = 4.91) or CMPK1 rs17103186 (P = 0.002, OR = 13.03) were significantly associated with higher risk in mild myopia.

Conclusions: This study revealed that male high myopia subjects are more prone to carry CC-related MTOR rs74225573 T allele, whereas mild myopia subjects are prone to carry the C allele. MTOR rs7422573 variant could be a genetic marker to differentiate mild from high myopia in risk assessment.

DUES Models of 3D Organoids from Human Orbital Fat Tissues

First Author: Kaku ITOH
Co-Author(s): Fumihito HIKAGE, Yosuke IDA, Hiroshi OHGURO, Chiaki OTA

Purpose: To elucidate the molecular etiology of deepening of the upper eyelid sulcus (DUES) induced by prostaglandin analogues (PGs), a 3-dimension (3D) tissue culture system was employed using human orbital fibroblasts (HOFs).

Methods: Effects of either 100 nM bimatoprost acid (BIM) or 100nM prostaglandin F2α (PGF2α) were examined upon adipogenesis of HOF 3D organoids. During adipogenesis, BIM and PGF2α organoid sizes, lipids stained by BODIPY, and expression of the extracellular matrix (ECM) by immunolabeling and/or quantitative PCR were compared.

Results: The size of the 3D organoids increased remarkably during adipogenesis, while such increases were significantly inhibited by the presence of PGs. Staining intensities by BODIPY and mRNA expression of PPARγ were significantly increased upon adipogenesis but were not influenced by the presence of PGs. Unique changes in ECM expressions observed upon adipogenic differentiation were significantly modified by the presence of PGs.

Conclusions: Our present study indicates that PGs have the potential to modulate ECMs' network within the HOF 3D organoids during adipogenesis. Thus, a 3D tissue culture system may be a suitable strategy toward understanding the disease etiology of DUES.

Genetic Investigation of Glaucoma-Related Variants and Peripapillary Retinal Nerve Fibre Layer Thickness in Children

First Author: Shiyao LU
Co-Author(s): Li Jia CHEN, Zhen Ji CHEN, Xiujuan ZHANG

Purpose: This study aimed to investigate the association between glaucoma-related variants and peripapillary retinal nerve fibre layer (p-RNFL) thickness in children, with further explorations by spatial, age and sex stratifications.

Methods: 2,878 schoolchildren aged between 6 and 9 years enrolled from the Hong Kong Children Eye Study. Single-nucleotide polymorphisms (SNPs) at loci including SIX1-SIX6, CAV1-CAV2, ABCA1 and near FOXC1 were genotyped. The association of each SNP with p-RNFL thickness (including global and sectoral thickness) were evaluated using multiple linear regression.

Results: SIX1-SIX6 rs33912345 (P=7.7×10-4) showed significant associations with temporal-inferior p-RNFL thickness. The C allele of rs33912345 was associated with a thinner temporal-inferior p-RNFL by an average of 2.44 μm. The association with temporal-inferior p-RNFL was the strongest in the 8-9 years age group for rs33912345 (P=5.2×10-

4). Both SNPs were significantly associated with temporal-inferior p-RNFL thickness in boys (P<0.0017), but not in girls (P>0.05). In contrast, rs12436579-C (β=1.66; P=0.0059), but not rs33912345-C (β=1.31; P=0.052) was nominally associated with a thicker nasal-inferior p-RNFL.

Conclusions: SNP rs33912345 at SIX1-SIX6 were associated with p-RNFL thickness in children, especially at the temporal-inferior sector, with age-dependent and sex-specific effects. Another variant in this locus rs12436579 was associated with nasal-inferior p-RNFL thickness. Our findings suggested a role of SIX1-SIX6 in RNFL variation during neural retina development in childhood.

Genotype-Phenotype Correlation Analysis on Chronic Central Serous Chorioretinopathy

First Author: Li Jia CHEN
Co-Author(s): Marten BRELEN, Zhen Ji CHEN, Shiyao LU, Danny Siu-chun NG

Purpose: To evaluate the correlation of genetic factors with different clinical manifestations of chronic central serous chorioretinopathy (cCSCR), including focal or diffuse leakage, pigment epithelial detachment (PED), and secondary choroidal neovascularization (CNV).

Methods: This study enrolled a total of 204 patients with cCSCR and 1380 unrelated controls from Hong Kong, China. All patients had undergone comprehensive ophthalmic examinations and were classified into three subgroups according to different criteria, including with focal or diffuse leakage, with or without PED, and with or without CNV. Nine single-nucleotide polymorphisms (SNPs) from six genes, namely CFH, ADAMTS9, NR3C2, VIPR2, TNFRSF10A and ARMS2, were selected from previous cCSCR genetic studies and genotyped by TaqMan assays. Association of each SNP with each subtype of cCSCR was analyzed and compared.

Results: Three SNPs in CFH (G allele of rs800292, T allele of rs3753394 and C allele of rs1329428) conferred risk to cCSCR with secondary CNV but protection to cCSCR without secondary CNV, with significant difference between the two subgroups: cCSCR with secondary CNV vs cCSCR without secondary CNV: P=0.0090, 0.0089 and 0.0085, respectively. SNP rs13278062 in TNFRSF10A was significantly associated with cCSCR with PED (P=0.00018) and focal leakage (P=0.00023), but not with their respective counterpart subtypes. Other SNPs did not show association with any subtypes.

Conclusions: Three SNPs in the CFH gene, rs800292, rs3753394 and rs1329428, are potentially genetic markers for differentiating between cCSCR with and without secondary CNV in southern Chinese. TNFRSF10A rs13278062 could be a genetic factor for cCSCR with PED and focal leakage.

Improved Automated Foveal Avascular Zone Measurement in Cirrus Optical Coherence Tomography Angiography Using the Level Sets Macro

First Author: Aidi LIN
Co-Author(s): Carol CHEUNG, Haoyu CHEN, Danqi FANG, Cuilian LI

Purpose: To evaluate automated measurements of the foveal avascular zone (FAZ) using the Level Sets macro (LSM) in ImageJ as compared with the Cirrus optical coherence tomography angiography (OCTA) inbuilt algorithm and the Kanno–Saitama macro (KSM).

Methods: The eyes of healthy volunteers were scanned four times consecutively on the Zeiss Cirrus HD-OCT 5000 system. The FAZ metrics (area, perimeter, and circularity) were measured manually and automatically by the Cirrus inbuilt algorithm, the KSM, and the LSM. The accuracy and repeatability of all methods and agreement between automated and manual methods were evaluated.

Results: The LSM segmented the FAZ with an average Dice coefficient of 0.9243. Compared with the KSM and the Cirrus inbuilt algorithm, the LSM outperformed them by 0.02 and 0.19, respectively, for Dice coefficients. Both the LSM (intraclass correlation coefficient [ICC] = 0.908; coefficient of variation [CoV] = 9.664%) and manual methods (ICC≥0.921, CoV≤8.727%) showed excellent repeatability for the FAZ area, whereas the other methods presented moderate to good repeatability (ICC≤0.789, CoV≥15.788%). Agreement with manual FAZ area measurement was excellent for both the LSM and KSM but not for the Cirrus inbuilt algorithm (LSM, ICC = 0.930; KSM, ICC = 0.928; Cirrus, ICC = 0.254).

Conclusions: The LSM exhibited greater accuracy and reliability compared to the KSM and inbuilt automated methods and maybe an improved and accessible option for automated FAZ segmentation.

Inhibition of Selective IKK-β Suppresses Both Onset and Progression of DR in Mouse Model

First Author: Soma SUZUKI
Co-Author(s): Fumihito HIKAGE, Haruka IDA, Yosuke IDA, Kaku ITOH, Hiroshi OHGURO

Purpose: The purpose of the present study is to evaluate the effect of selective IKK-β; inhibition by IMD-0354 on inflammation, apoptosis, and angiogenesis in diabetic retinopathy (DR).

Methods: Before and after diabetic retinopathy (DR), streptozotocin (STZ)-induced mice were systemically administered with IMD-0354 (30 mg/kg) daily for another 6 weeks. Effects of IMD-0354 were analyzed: (1) inhibition of nuclear factor-κβ (NF-κβ) activation, (2) retinal morphology, (3) apoptotic signaling by cleaved caspase-3, (4) retinal vascular permeability, (5) angiogenesis of the retina, and (6) retinal production of VEGF.

Results: Before and after diabetic retinopathy (DR), streptozotocin (STZ)- induced mice were systemically administered with IMD-0354 (30 mg/kg) daily for another 6 weeks. Effects of IMD-0354 were analyzed: (1) inhibition of nuclear factor-κβ (NF-κβ) activation, (2) retinal morphology, (3) apoptotic signaling by cleaved caspase-3, (4) retinal vascular permeability, (5) angiogenesis of the retina, and (6) retinal production of VEGF.

Conclusions: Systemic administration of IMD-0354 for 6 weeks to diabetic mice caused a significant reduction in the loss of retinal ganglion cells and apoptotic signaling, with preservation of retinal vascular integrity and suppression of retinal VEGF expression. When inhibition of NF-κβ activation treatment started after the onset of STZ-induced DR (week 10), IMD-0354 was still effective in preventing further DR progression while the vascular integrity was preserved.

Lycium Barbarum Polysaccharide Solution as a Novel Therapeutic Agent in the Prevention of Corneal Scarring

First Author: Kendrick SHIH
Co-Author(s): Vishal JHANJI, Sum Sum KWOK, Amy C.y. LO, Louis TONG

Purpose: To assess the effectiveness of Lycium barbarum polysaccharide in the prevention of corneal scarring and comparing it with dexamethasone solution.

Methods: Primary human corneal keratocytes of passages 3 to 6 were used for all experiments. Cells are pretreated with either LBP or dexamethasone solution for 24 hours and then TGFB1 for 48 hours and collected for experiments. Fibrotic protein analysis was done using immunofluorescence and western blot. The effect of LBP and dexamethasone on cell viability was assessed using the MTS assay. Inflammatory cytokine analysis was done using protein microarray and ELISA. The effect of LBP on wound healing was assessed using scratch wound assay.

Results: LBP significantly reduces the expression of fibrotic proteins such as α-SMA and extracellular matrix proteins like collagen type I and III which demonstrate its anti-fibrotic effects in the cornea. LBP has the added benefit of selectively affecting the viability of myofibroblasts while sparing the normal corneal keratocytes while DX solution significantly reduces the viability of both differentiated and undifferentiated keratocytes. IL-6 potentially mediates the therapeutic effect of LBP.

Conclusions: LBP is a potentially effective novel therapeutic agent in the prevention of corneal scarring. Further studies are needed to assess the underlying mechanism and pharmacological properties to facilitate the formation of a topical LBP solution for in vivo studies or clinical trials.

Microstructural Brain Changes and Sensory Substitution Performance in the Blind

First Author: Carlos PARRA
Co-Author(s): Kevin CHAN, Matthew MURPHY, Amy NAU, Zhe SUN

Purpose: To investigate changes in brain white matter (WM) microstructure secondary to blindness, and the associations with cross-modal sensory substitution (SS) performance.

Methods: We recruited 19 subjects, including congenital blind (CB): N=4, 2 males, 50.75±17.5 years; acquired blind (AB): N=6, 3 males, 43.33+17.1 years; and age-matched sighted controls (SC): N=9, 3 males, mean age 50.2+17.7 years. All of them right-handed and with no neurological disorders. Neither individual had prior experience with SS devices. We recorded reaction time and accuracy of visual-to-auditory SS task, following a brief 10-minute SS training. White matter integrity was studied with diffusion tensor imaging, acquired with a Siemens 3T MRI scanner, and processed with FMRIB's Software Library (FSL_v6.0.2). Group analyses of fractional anisotropy (FA) maps were conducted with FSL tract-based spatial statistics. FA from optic radiations (OR) was extracted using the Juelich Histological Atlas, and then correlated to SS behavioral scores.

Results: FA in the right OR of CB and AB was significantly lower ($p<0.01$, FWE-corrected) than that of SC. No significant difference was found either in the reaction time or accuracy among these three groups. FA in the right OR did not correlate significantly with behavioral performance in either blind group.

Conclusions: The statistically insignificant

effect of OR WM integrity on SS functional performance suggests that SS bypasses the bottom-up pathway between the eye and the visual cortex. Further studies with larger populations, functional MRI, and more comprehensive SS training may be relevant to explore the involvement of non-visual brain regions driving SS performance.

Next Generation Rapid Tear Diagnostic Kit for Refractive Surgery, Keratoconus and Dry Eye Disease

First Author: Ritika MULLICK
Co-Author(s): Arkasubhra GHOSH, Archana PADMANABHAN NAIR, Rohit SHETTY

Purpose: To develop a rapid, multiplexed diagnostic kit to evaluate the molecular levels in tears of patients undergoing refractive surgery, suspect keratoconus (KC) eyes and dry eye disease treatment (DED).

Methods: A total of 28 controls, 20 cases of keratoconus/post-refractive surgery ectasia, 30 cases of dry eye disease were measured. Tear samples using Schirmer's strips were added to the test cartridge and inserted into a laser-based detection platform to determine the concentration of the analyte on the basis of a standard curve.

Results: IL6, IL8, MMP9 were higher ($p<0.05$) in DED and KC. The LOX levels were lower ($p<0.05$) in cases of post-surgery ectasia (pre-op topography and biomechanics were normal). The multiplexed kit successfully detected all analytes demonstrating the highest fold change and significance. The data demonstrates that IL6, MMP9 and IL8 levels are detectable across the entire set of patient samples and show clear disease-based separation of values.

Conclusions: This can enable better patient care by predicting outcomes and customise treatments by clinician. The efficiency and short test duration can significantly assist the screening protocols in dry eye disease and refractive surgery to enable better patient satisfaction. The kit is a handy and non-cumbersome device for clinicians to use in their daily practice.

Prostaglandin F2 Agonist Suppress Adipogenesis in Three-Dimensional Organoids of 3T3-L1 Cell

First Author: Araya UMETSU
Co-Author(s): Fumihito HIKAGE, Haruka IDA, Yosuke IDA, Kaku ITOH, Hiroshi OHGURO

Purpose: To establish a deepening of the upper eyelid sulcus (DUES) model that can be induced by prostaglandin (PG) analogs, a three-dimension (3D) tissue culture was employed.

Methods: Upon adipogenesis of the 3T3-L1 organoid, the effects of either Bimatoprost acid (BIM-A), or PGF2α were examined. During the adipogenesis, organoid size, lipid staining by BODIPY and expression of the extracellular matrix (ECM) by immunocytochemistry and/or quantitative PCR were employed.

Results: The size of the organoid increased remarkably during the adipogenesis, while such increases were significantly or relatively inhibited by the presence of PGF2α or BIM-A. BODIPY positive lipid-laden cells significantly increased during the adipogenesis, while in contrast they were greatly suppressed by the presence of PGF2α. Characteristic and spatial changes in ECM expressions observed upon adipogenesis were greatly modified by the presence of PGs.

Conclusions: Our present study using a 3D tissue culture may be a suitable strategy toward understanding the disease etiology of DUES.

Retinal Nerve Fiber Layer Thickness in Patients with Anisometropic Amblyopia

First Author: Suman DAS
Co-Author(s): Pratiroop GANGOPADHYAY, Payel KHATUA, Sanchari SARKAR, Avantika SRIVASTAVA

Purpose: To compare the retinal nerve fiber layer (RNFL) thickness between the normal and amblyopic eye of anisometropic amblyopic patients.

Methods: A cross sectional study was conducted in a rural medical college among 63 patients with anisometropic amblyopia. Subjective refraction was done using trial set and Snellen's chart. The RNFL thickness was measured in the normal and amblyopic eye using spectral domain optical coherence tomography (OCT).

Results: The mean age of the rest 63 patients included in the analysis was 18±7.34 years. Of the 63 patients 37 were male and 26 were female. On basis of type of anisometropia, 51% had anisomyopia, 32% had anisohyperopia whereas last 17% of patients needed purely astigmatic corrections. On degree of anisometropia, 43% had anisometropia ranging from 2.75D-4.0D whereas patients with more than 4.0D of anisometropia were 26% and the rest of 31% had anisometropia less than 2.75D. The mean RNFL thickness was 81.49 ±12.08 µ in the amblyopic eye and 94.52 ± 10.09 µ in the healthy eye respectively. This was statistically significant. (p=0.000002). The RNFL thickness of the amblyopic and fellow eye in the superior quadrant were 91.07±20.38µ and 107.83±18.94µ, in the inferior quadrant were 99.43±20.07µm and 116.63±18.07µm, in the nasal quadrant were 72.37±17.24µm and 85.07±21.59µm and in the temporal quadrant were 68.87±11.29µm and 73.80±13.34µm.

Conclusions: There seems to be a significant decrease in RNFL thickness in the amblyopic eye compared to the normal eye.

The Assesment of Pupil Cycle Time in Patient with High Myopia

First Author: Gadis SATIVA
Co-Author(s): Fatimah Dyah Nur Astuti ASTUTI, Maharani CAHYONO

Purpose: To evaluate the value of Pupil Cycle Time (PCT) in patients with high myopia compared to patients without high myopia.

Methods: A cross-sectional study was conducted in the eye clinic of Doctor Kariadi Hospital Semarang. 20 eyes of patients with high myopia and 20 eyes of patients without high myopia were enrolled in this study. Both groups underwent ophthalmologic examinations include PCT assessment that was performed manually using slit lamp and stopwatch by a single observer, and expressed in milliseconds. Descriptive statistics were used for elaborating patients' baseline characteristics. The inferential statistic (Mann-Whitney test) were used to establish the difference between the two groups. Statistical significance was set at $p<0.05$.

Results: The median of ocular refraction in the high myopia group was -12.5 dioptr and in the control group was -0.75 dioptr. The median PCT in patients with high myopia was 1282 (1142-1469) ms, while patients without high myopia was 716.50 (700-753) ms. There was a significant difference in PCT between the two groups (p=0.000).

Conclusions: The PCT measurement in patients with high myopia was significantly

longer than patients without high myopia. This finding may suggest sensory damage in patients with high myopia.

The Effect of Irradiated Riboflavin on Human Tenon's Fibroblast: A Study on Cellular Viability

First Author: Wendy SEE
Co-Author(s): Lausanne CHUA, Fazliana ISMAIL, Visvaraja SUBRAYAN, Siti Hamimah SHEIKH ABDUL KADIR

Purpose: To determine the cellular viability's effect of irradiated riboflavin on human tenon fibroblasts, and to determine whether there is concentration-dependent and/or time-dependent effects of irradiated riboflavin to cultured human tenon fibroblasts.

Methods: Human tenon fibroblasts were propagated from the patient's tenon capsule under tenets of the declaration of Helsinki with the local ethical committee's approval. Cells were divided into control and treatment groups, consisting of 5 different concentrations (0.00156%, 0.003125%, 0.00625%, 0.0125%, 0.025%) of irradiated and non-irradiated riboflavin. After treatment for 24 and 48 hours, cellular viability was assessed by MTT 3-(4,5-dimethylthiazolyl-2)-2,5-diphenyl tetrazolium bromide assay. A triplicate of readings was taken. Data were presented as mean ± standard deviation of the triplicate.

Results: Irradiated riboflavin induced cellular death in human tenon fibroblast ($p<0.05$) as compared to the control group. On the contrary, non-irradiated riboflavin caused an increase in cellular proliferation ($p>0.05$). The anti-proliferative difference between irradiated and non-irradiated riboflavin was significant up to 48 hours ($p<0.05$). Irradiated riboflavin caused more human tenon fibroblast cell death at higher concentrations ($p<0.05$). There was no statistically significant difference between cells treated for 24 and 48 hours ($p>0.05$).

Conclusions: This is a pilot laboratory study demonstrating that irradiated riboflavin causes cell death in primary human tenon fibroblasts, in a concentration-dependent manner. The duration of treatment is not a significant factor for its effect. Further exploratory investigations should be performed to determine the mechanism of cell death. We postulate that apoptosis occurred in these cells when treated with irradiated riboflavin.

The Effect of Prostaglandin Analogues against 3D Organoids from Human Orbital Fibroblasts

First Author: Hanae ICHIOKA
Co-Author(s): Fumihito HIKAGE, Yosuke IDA, Kaku ITOH, Hiroshi OHGURO, Chiaki OTA

Purpose: To evaluate the effect of prostagrandin analogues against human orbital fibroblasts (HOFs), through a three-demensional (3D) culture system.

Methods: Effects of either 100 nM bimatoprost acid (BIM) or 100 nM prostaglandin F2α (PGF2α) were examined for the 3D organoids from HOFs. The size of BIM and PGF2α organoids were measured during cultivation and evaluated the expression of the extracellular matrix (ECM) by immunolabeling and quantitative PCR.

Results: The size of the 3D organoids became smaller with the presence of PGs. Unique changes in ECM expressions were also observed upon the presence of PGs.

Conclusions: Our present study suggests that PGs have the influence to regulate the expression of ECMs' network within the HOFs 3D organoids.

The Impact of Material Incompatibilities on Multipurpose Solution (MPS) Efficacy

First Author: Cindy MCANALLY
Co-Author(s): Monica CRARY, Paul SHANNON, Rhonda WALTERS

Purpose: International Standards Organization (ISO) 18259 requires manufacturers to evaluate the impact of contact lenses on MPS efficacy. The purpose of this study was to evaluate the impact of four commercialized contact lenses on the efficacy of six MPS using the manufacturer's lens cases.

Methods: Six MPS (PQ/ALDOX: polyquaternium-1 0.001%/myristamidopropyl dimethylamine 0.0006%, PQ/PHMB: polyquaternium 0.0001%/polyaminopropyl biguanide 0.00013%, PQ/ALEX: polyquaternium-1 0.0003%/alexidine dihydrochloride 0.00016%, PQ/ALEX/PHMB: polyquaternium 0.00015%/alexidine dihydrochloride 0.0002%/polyaminopropyl biguanide 0.00005%, PHMB-1: polyhexamethylene biguanide 0.0001%, and PHMB-2: polyhexanide 0.0001%) were evaluated with four brands of contact lenses per ISO 18259.

Results: PQ/ALDOX, PQ/ALEX, PQ/ALEX/PHMB, and PQ/PHMB exhibited ≥4.0 log reduction (LR) of Serratia marcescens at disinfection time (DT) across all lenses (AAL). PHMB-1 and PHMB-2 were least effective against S. marcescens with ≤3.1 LR at DT AAL. The efficacy of all MPS against Candida albicans was reduced AAL at DT compared to the control. PQ/ALDOX was most effective against Fusarium keratoplasticum at DT with >4.3 LR AAL. PQ/ALEX demonstrated ≥4.0 LR for 2 lenses at DT. PQ/PHMB and PQ/ALEX/PHMB were less effective with ≤3.0 and ≤2.4 LR at DT, respectively, AAL. PHMB-1 and PHMB-2 were the least effective against F. keratoplasticum with ≤1.2 LR at DT and were the only MPS with survivors at 7 days.

Conclusions: PQ/ALDOX was the only MPS that maintained efficacy against Fusarium across all lens types. This organism is of particular importance in light of previous outbreaks of Fusarium keratitis related to a previously marketed MPS containing alexidine.

VIDEOS

APPLYING BIG DATA, Artificial Intelligence And Telemedicine In Ophthalmology In The Era Of Covid-19

AI Rising: Artificial Intelligence for Glaucoma

First Author: Megha NAIR
Co-Author(s): Annamalai ODAYAPPAN, Shivraj TAGARE, Rengaraj VENKATESH

Purpose: To demonstrate the current applications of artificial intelligence in diagnosis of glaucoma. Demonstration of pilot projects for screening glaucoma in large population. Challenges faced and future of artificial intelligence in glaucoma.

Methods: Use of artificial intelligence in screening glaucoma.

Results: Artificial intelligence can help in faster screening of glaucoma, thus potentiating the process of diagnosing glaucoma by doctors and can help in initiating early treatment of the patient.

Conclusions: Artificial intelligence in glaucoma will potentiate the process of diagnosing glaucoma by doctors and can help in initiating early treatment of the patient.

Cataract And Cataract Surgery

A Huge Air Bubble in the Berger's Space during Cataract Surgery

First Author: Xiaogang WANG
Co-Author(s): Lin JIANG

Purpose: To describe an individual with a huge air bubble in the Berger›s space and the approach adopted for its management during cataract surgery.

Methods: We used a 26-gauge needle to puncture the posterior capsule and aspirate the gas bubble; however, this intraoperative strategy was considered inappropriate.

Results: The posterior capsule rupture (PCR) was detected during the OVD removal after successful air bubble aspiration. The IOL was tilted; the lens was repositioned into the sulcus. The patient's BCVA was 20/20 in the left eye (refraction prescription: -2.75 DS/-1.0 DCx 10º) 1 week following the operation.

Conclusions: Huge air/gas bubble in the Berger's space mainly results from zonular weakness of the eye. Recommended manipulations, such as self-absorption, PCCC, aspiration from pars plana, may be useful to treat such cases.

Bag Half Full Half Empty

First Author: Vivekanandan V R

Purpose: Iris suture fixation of intra ocular lens (IFIOL) was first described by Dr. McCannel in 1976. Double haptic iris fixation of IOL has numerous advantages over other

secondary IOL procedures. However it is not always necessary for double haptic fixation of IFIOL.

Methods: In certain situations, where there is partial capsular support or bag remnant, single haptic IFIOL can be done as we demonstrate the technique in this video with different scenarios.

Results: Post operatively, the visual outcomes were favourable with this technique with the IOL stable in long term followup of patients. This technique has also lesser post operative inflammation and is economical compared to other secondary IOL procedures.

Conclusions: Single haptic IFIOL is an innovative technique utilising the pre existing support, and can be done as a primary technique or a secondary procedure, is economical to the patient. This technique may be initially challenging but is a very attainable skill.

Capsulorrhexis in a Fibrotic Anterior Lens Capsule with a Calcified Plaque

First Author: Jayson SO
Co-Author(s): Dino RUIZ, Erika Jean SALVAME

Purpose: To present a case of a fibrotic anterior lens capsule with a calcified plaque.

Methods: A case report.

Results: This is a case of a 41-year-old male with long standing diabetes who has a bilateral white cataract with fibrotic anterior lens capsules and calcified plaques presenting with gradual and progressive blurring of vision. B-scan ultrasound of both eyes showed normal results. Patient underwent phacoemulsification of the right eye. Intraoperatively, after injection of the blue dye, increased pigmentation of the borders of the fibrotic calcified plaque was appreciated. Multiple attempts to create a capsulorrhexis using standard techniques was done without success. A cleavage plane was made to separate the anterior capsule from the calcified plaque. A pair of micro-scissors was used to dissect through the fibrotic anterior capsule and the capsulorrhexis was completed. Standard phacoemulsification with a small capsulorrhexis was done and a single piece foldable intraocular lens was placed. Relaxing incisions were made to prevent capsule phimosis. Diabetic retinopathy was managed. Final visual acuity 6 months post-operatively was 20/20 with a centered intraocular lens and minimal capsule phimosis.

Conclusions: Fibrotic anterior lens capsules with a calcified plaque in white cataracts may be detected preoperatively with high index of suspicion with the presence of risk factors and physical examination findings. There are several surgical techniques that may be used in a step-wise approach all aiming to bypass the calcified plaque. Techniques to improve surgical outcome of the patient should be tailor-fit and utilized maximally.

Comfort Meets Class: A 3D Solution for your Surgical Experience

First Author: Naren SHETTY
Co-Author(s): Aishwarya ., Luci KAWERI, Ravi KRISHNA, P.Rohitha Nayak NAYAK

Purpose: To compare outcomes, ease of visualization, and comfort of surgeon while performing phacoemulsification using the NGENUITY®3D system versus the standard operating microscope (SOM).

Methods: A prospective, randomized controlled study. An interim analysis of a large ongoing study, 123 eyes of 123 patients were operated, 64 using SOM and 69 using

the NGENUITY® 3D System by 5 surgeons. All patients between ages 40-70 with nuclear sclerosis grade 2 and above, undergoing cataract surgeries were included. Complicated and secondary cataracts were excluded. After routine surgery, "Surgeon's Comfort Score" was filled and compared. First postoperative day corneal edema and cells and flare were noted.

Results: The brightness and illumination of the surgical field of SOM were higher compared to NGENUITY® as experienced by all the 5 surgeons ($p<0.0001$). Comfort for surgeons for the surgical field of NGENUITY® was better compared to SOM ($p<0.05$). Neck comfort was better after the surgery while operating on NGENUITY® ($p<0.05$ for 3 of 5 surgeons). Ease of visualization of the steps of surgery was better using NGENUITY® but not statistically significant in the interim analysis. Post-operative corneal edema, cells, and flare were comparable.

Conclusions: Study shows that NGENUITY® system works well with lesser illumination providing better comfort to cataract surgeon and patient. Ease of visualization is better with more distance between surgeon and patient with NGENUITY® which helps in the COVID pandemic. It is also found to be a better teaching tool for fellows in our institute.

Demonstration of Challenges Faced while using Modified Capsular Tension Rings and Segments in Difficult Cataract Surgeries

First Author: Fathima A. ALLAPITCHAI
Co-Author(s): Mohideen ABDUL KATHER, Meenakshi RAVINDRAN

Purpose: To demonstrate the following cases: Case 1: microspherophakia, post trabeculectomy managed with phacoemulsification, capsular tension ring (CTR) and Ahmed capsular tension segments (CTS) fixated through Hoffman pocket. Case 2: ectopia lentis managed with Cionni capsular tension ring fixation and in the bag placement of IOL.

Methods: Case 1: The cataract extraction of left eye was done through temporal clear corneal tunnel using phacoemulsification. CTR was placed in the bag. Multi piece acrylic intraocular lens was placed in bag. To negate pseudophacodonesis Ahmed capsular tension segment were placed and fixated using 10-o polyprolene suture through Hoffman scleral pocket. Thereby conjunctiva was not disturbed in this post trabeculectomy case. Passing scleral fixation sutures without piercing capsular bag in microspheroophakia after CTR placement is challenging. This video demonstrates safe way to fixate CTS. Case 2: Case of ectopia lentis with 6-7 clock hours subluxation was managed with fixation of Cionni CTR with single loop using prolene suture was done and in the bag IOL placement was done.

Results: Case 1: Well centered IOL was achieved postoperatively in both the eyes of that patient. Same technique was done in other eye also. Best corrected visual acuity (BCVA) improved from OD 20/200, OS 20/250 to 20/20 and 20/25 respectively. IOL centration and BCVA are maintained during 27 and 11 months postop of right and left eye respectively. Case 2: Well centered IOL was achieved postoperatively. BCVA improved from 20/120 to 20/30. Same vision is maintained 24 months postoperatively.

Conclusions: Usage of capsular tension segments and modified CTR placement in cases of microspherophakia and ectopia lentis have provided well centered IOL postoperatively. Hoffman pocket would be more relevant in post-trabeculectomy cases

Dwarfed Iris Hooks to Minimize Iris Trauma during Cataract Surgery in Small Pupils

First Author: Jayaprasad BHASKARAN
Co-Author(s): Mini JAYACHANDRAN, Rani BALAMURALI, Smita NARAYANAN, Nisha PILLAI

Purpose: In this video we present modifications in the technique of using iris hooks, which will minimize postoperative iridocyclitis and leave behind a round reacting pupil.

Methods: The major contributors to sphincter and iris damage when using iris hooks for cataract surgery include 1. over stretching of the pupil to the limbus. This is not essential for phacoemulsification. A pupil of 5.5mm with a stretched pupillary margin will give good access to the lens and easily prevent iris damage by the phaco tip. 2. repeated shallowing and deepening of the anterior chamber will produce stretch damage to the sphincter at the points of hooking. This can be prevented by maintaining the AC with OVD during exchange of instruments. The shaft of the iris hooks rock against the the lid margins or medial canthus repeatedly. This trauma is transmitted to the other end of the hook and induces considerable trauma to the iris.

Results: Modifications in the technique of using iris hooks minimize postoperative iridocyclitis and leave behind a round reacting pupil.

Conclusions: Iris hooks when handled scientifically leave behind minimal trauma and inflammation.

Guide Marker for Capsulorhexis: An Indispensable Aid for Postgraduate Residents

First Author: Dr.monika KAPUR

Purpose: To define the use of modified bandage contact lens as a guide marker for performing continuous curvilinear capsulorhexis (CCC) by a first year postgraduate ophthalmology resident.

Methods: A perfect capsulorhexis is difficult to learn with a steep learning curve when performed free-hand especially by a first-year postgraduate ophthalmology resident. There is paucity of simple, single-use, easily portable, cost-effective and affordable devices designed especially for performing CCCs in a safe and reproducible way. In our technique, the bandage contact lens (BCL) is trephined using a 6mm corneal trephine. After topical or peribulbar block, the 6mm-guide marker (trephined BCL) is placed on the cornea. The CCC is then completed using the edge of the contact-lens as a guide for CCC.

Results: The technique was objectively evaluated using three variables: time, conformity and reposition. Mean time taken for rhexis completion was 78.6 ± 3.54 secs. For conformity, the rhexis area was divided into 8 quadrants. Mean quadrants not conformed were 1.35 but there was no incidence of rhexis extension and all surgeries were completed uneventfully. The repositioning rate i.e. the number of times the guide marker was repositioned during surgery was 35%.

Conclusions: CCC with contact lens guide marker is expected to yield better results in carrying out the procedure more accurately being closer to the target in terms of size, circularity and centration. This would eventually facilitate better surgical outcomes

and we recommend this to be applied as the standard protocol for first-year postgraduate ophthalmology residents performing the surgery.

Hypermature Intumescent Cataract in Advanced Keratoglobus: Surgical Implications

First Author: Bhupesh SINGH
Co-Author(s): Sudhank BHARTI, Neha BHARTI

Purpose: Keratoglobus is an extreme form of corneal ectasia that is rarely seen. There is a paucity of literature, which details the management of cataracts in these eyes. This case helps in better understanding of challenges of cataract surgery in keratoglobus.

Methods: We report a case of bilateral keratoglobus with intumescent hyper mature cataract in a 55-year-old female. Clinical examination showed the advanced nature of keratoglobus. There was generalized corneal bulging and global thinning. Corneal topography confirmed corneal thinning and ectasia. After thorough work up phacoemulsification was performed and IOL was implanted. IOL power calculation was a challenge along with intraoperative surgical difficulties.

Results: Successful planning of IOL power calculation and phacoemulsification was done by modifying the technique. A good surgical outcome was achieved in this case.

Conclusions: Preoperative planning, intraoperative surgical modifications, and post-op rehabilitation are the keys to achieve optimal outcomes without landing in complications and refractive surprises.

Improving Diagnostic Accuracy of Pre-Existing Posterior Capsular Defect in Congenital Cataract by using Morphologic and Biometric Testing

First Author: Madhusmita MAHAPATRA
Co-Author(s): Ankit AHIR, Nilutparna DEORI, Sakshi MISHRA, Riddhi RAICHURA

Purpose: Analysis of morphologic and biometric markers of preexisting posterior capsule defects in congenital cataract.

Methods: Children with congenital cataract were divided into study and control groups. Diagnostic signs were analyzed by 3 ophthalmologists. Parameters compared: keratometry, anterior chamber depth, lens thickness, vitreous chamber depth, axial length, corneal diameter and IOP. Predictors of preexisting posterior capsule defect were determined using univariate analyses.

Results: The study group had reduced lens thickness compared to control group. Verified by B-Scan USG, intra-operative finding of pre-existing PC dehiscence.

Conclusions: Lens thickness is a valuable predictor and presence of morphology is important indicator for pre-existing posterior capsule defect.

Intraoperative Optical Coherence Tomography Guided Management of Intumescent White Cataract

First Author: Manpreet KAUR
Co-Author(s): Farin SHAIKH, Jeewan TITIYAL

Purpose: To evaluate morphological characteristics and intraoperative dynamics of different types of white cataract using intraoperative optical coherence tomography (iOCT).

Methods: Eyes with white cataract undergoing phacoemulsification were evaluated.
The primary outcome measure was the classification of white cataract based on morphology and intraoperative dynamics on iOCT. The secondary outcome measure was rhexis-related complications.

Results: Two types of intumescent white cataracts were observed on iOCT. Type A had swollen hyperreflective stromal fibres beneath the anterior capsule with multiple intralenticular clefts in underlying cortex. On initiation of capsulorhexis, a cortical bulge was visualized in AC through the capsular opening without any fluid release, with an imminent risk of capsulorhexis extension. An iOCT guided bimanual aspiration of cortex was performed till intralenticular pressure (ILP) decreased and cortical bulge recessed. Type B cataract had large hyporeflective vacuoles beneath anterior capsule. Spontaneous slow release of turbid fluid was observed on initiation of capsulorhexis with decrease of ILP. iOCT aids in creation of an adequate-sized capsulorhexis in all cases with raised ILP without any capsular tears/extension. Phacoemulsification was uneventful in all cases.

Conclusions: Intumescent white cataracts have an increased risk of capsulorhexis extension and posterior capsular rupture. Intraoperative OCT allows on-table diagnosis and classification of raised intralenticular pressure and provides a real-time guide for successful management of these cases.

Laser-Assisted vs. Conventional Clinical Outcomes and Surgical Technique with Torsional Modality Leading to Low Endothelial Cell Loss

First Author: Yoshitaka OKA
Co-Author(s): Val INJEV, Noriyuki SASAKI

Purpose: To compare effects of femtosecond laser-assisted cataract surgery (FLACS) and manual phacoemulsification on cumulative dissipated energy (CDE), torsional amplitude (TA), and endothelial cell density (ECD).

Methods: Surgeries were performed using FLACS or conventional technique in patients with grade 2–4 cataracts. Visits included preoperative, surgery day, and 5 postoperative visits (days 1, 4–10, 20–40, 60–120, and 150–210). The primary endpoint was CDE. Secondary endpoints included ECD percent change at day 150–210 versus preoperative visit and average TA on surgery day. Exploratory endpoints included central corneal thickness (CCT) and best-corrected distance visual acuity (BCDVA). The superiority of FLACS to conventional technique was evaluated using t-tests based on a mixed model for repeated measures.

Results: The full analysis set included 53 eyes per group. FLACS versus conventional method had significantly lower mean CDE (0.213±0.334 versus 1.718±0.898, respectively; $P<0.0001$), demonstrating superiority of FLACS. Low endothelial cell loss (ECL) was achieved with both FLACS and conventional methods (1.5±5.6% and 2.7±5.2%; $P=0.260$). TA was significantly lower for FLACS versus the conventional method (19.6±16.0% versus 31.1±6.6%; $P<0.0001$). CCT was comparable for both methods at all visits except day 1; BCDVA was comparable for both methods at all postoperative visits.

Conclusions: FLACS achieved significantly lower CDE compared with the conventional method. Low ECL was achieved with both FLACS and conventional methods when using low phacoemulsification energy and selecting an efficient ultrasound tip and modality; proficient surgical technique and efficient use of fluidics and OVD can also contribute to low ECL.

MYX Technique: A Novel Approach for Scleral Fixated IOL Implantation

First Author: Karan BHATIA
Co-Author(s): Ruchita MANAKTALA, Nikunj TANK

Purpose: We describe an easy, fast, reproducible technique, the 'MYX' technique, which utilizes the advantages of both the Yamane and the X-NIT technique.

Methods: In the 'MYX' technique, the handshaking of the prolene haptic of a 3 piece PMMA IOL into the lumen of a 26-gauge needle is done externally (like in X-NIT technique), and the exteriorized haptic is cauterized to form a flange trans-conjunctivally, thereby, avoiding the scleral pocket tucking (like Yamane technique).

Results: Cost effective option with excellent surgical results. Easy for even anterior segment surgeons.

Conclusions: MYX technique achieves reproducible excellent outcomes with a short learning curve.

Man over Machine

First Author: Aditi GHOSH
Co-Author(s): Dr.Shivakumar CHANDRASEKARAN

Purpose: Due to an ever increasing demand of the patients for a 6/6 distance unaided vision, femto-second laser assisted cataract (FLACS) with toric intraocular lens (IOL) implantation has become very popular in the current times. Essentially it requires a compliant patient, a competent surgeon and an efficient machine for a successful surgery. A compromise on any of the above factors can affect the other two factors and lead to sub-optimal visual results. This video demonstrates formation of anterior lens capsular star with multiple radial extensions of the anterior lens capsule. It occurred simultaneously with the nucleotomy due to a fault in the femto docking machine, and how it was skillfully managed with a toric IOL implantation in the capsular bag.

Methods: The central ALC adhesions are made free with the help of a cystitome. A flap is raised from one of the quadrants and a larger capsulorhexis is made going beyond the existing radial extensions. At points where the capsulorhexis tends to extend, it is completed further with the help of a capsulorhexis forceps. A toric IOL is implanted in the capsular bag orienting it in the required axis under irrigation.

Results: It was possible to obtain an intact continuous curvilinear capsulorhexis (CCC) going beyond the radial extensions and thereby making a toric IOL implantation in the capsular bag possible.

Conclusions: So, it can be concluded, no matter how many recent advancements in cataract surgery be made, it is sometimes the man who wins over the machines.

MiWay: A New Hope

First Author: Vivekanandan V R

Purpose: Phacoemulsification in cases such as morgagnian cataract, hypermature cataract and phacolytic, phacomorphic glaucoma is associated with difficulties such as corneal endothelial damage, posterior capsular rupture, nucleus or cortex drop and zonular dialysis.

Methods: We had a double innovation to make phacoemulsification much more safer in cataracts such as these, which we demonstrate in this video. The first innovation, piggyback intra ocular lens (IOL), wherein

after draining the fluid, the nucleus is levitated and foldable IOL is implanted in the bag. The second innovation, MiLoop is used to divide the mobile nucleus into quadrants thereby reducing the phaco power needed and the risk of zonular dialysis.

Results: Post operative outcomes of the patients were much better with this technique compared to the traditional phacoemulsification, with lesser intra operative and post operative complications.

Conclusions: MiWay, piggyback IOL and MiLoop for morgagnian cataracts and phacolytic, phacomorphic glaucoma is a new, innovative and safer method of phacoemulsification.

Mission: Implausible - IOL in the Bag in a Case of PCR

First Author: Naveen GANGAPATNAM

Purpose: Posterior capsular rupture is one of the most dreaded complications in cataract surgery. It is complicated by the choice of where to place the intraocular lens (IOL).

Methods: The ideal scenario would be to place a three piece IOL in bag. Alternatively, if it is a small central posterior capsular rent (PCR), one can convert it into posterior capsulorhexis (PCC) and implant the IOL. However, a three piece IOL power may not always be available, and all PCRs can not be converted into PCC. In such cases, in this video we demonstrate different scenarios where single piece foldable IOL was successfully implanted in the bag following a PCR.

Results: Long term followup showed stable IOL with no decenteration and no complications where IOL in bag implantation was achieved.

Conclusions: 3 piece IOL in sulcus with optic capture is the ideal scenario for IOL implantation following a PCR. However in certain situations, single piece IOL can still be successfully implanted in the bag with good post op outcomes.

Peripheral Anterior Capsulotomy to Prevent Capsular Distention Syndrome

First Author: Smita NARAYANAN
Co-Author(s): Jayaprasad BHASKARAN, Mini JAYACHANDRAN, Rani BALAMURALI, Nisha PILLAI

Purpose: We describe a prophylatic peripheral capsulotomy created using a 26G capsulotomy needle to prevent early capsular bag distention syndrome.

Methods: Capsulear distention syndrome is a known complication in the immediate or delayed postoperative period following cataract surgery. This is more common in small rhexis and in sulcus fixated IOL with anterior optic capture where the retained OVD and BSS remain trapped behind an anteriorly displaced IOL in the bag. We describe a prophylatic peripheral capsulotomy created using a 26G capsulotomy needle to prevent this complication.

Results: All cases had successful prevention of this complication.

Conclusions: Peripheral anterior capsulotomy is a useful and simple surgical step that can prevent capsular bag distention syndrome, particularly in pseudoexfoliation syndrome where you do sulcus fixation of IOL with optic capture.

Scleral Fixation Intraocular Lens with Double-Needle Flanged Technique in Marfan's Syndrome

First Author: Stephanie Wing Ki YUK
Co-Author(s): Keith CHAN, Nicholas FUNG, Kendrick SHIH

Purpose: A majority of Marfan's syndrome patients suffer from lens subluxation. Intraocular (IOL) implantation can be a challenge in this group of patient due to inadequate capsular support. Various operative techniques have been reported in literature, including in bag, sulcus fixation, scleral fixation, iris fixation, and their outcomes are equivocal. In this video, we describe the use of the flanged haptic IOL fixation technique, first published by Yamane, in a Marfan›s syndrome patient. This spares the need of scleral flap and suture fixation and hence their associated risks.

Methods: A 34-year-old Chinese female with Marfan's syndrome presented with superiorly subluxed lens. Lensectomy was first performed with irrigation and aspiration, and capsule remnants were removed with cutter via anterior approach. Limited anterior vitrectomy was then performed. A 3-piece intraocular lens (IOL) was injected into the eye and positioned above the iris. Haptics were externalized using the double-needle technique with 27G needles, as first described by Yamane in 2014. Low temperature cautery was then used to create the terminal bulb for fixation.

Results: Post operatively, IOL was stable and centered, with manifest refraction of -1.50 / -0.50X120. Best corrected visual acuity (BCVA) was 0.8.

Conclusions: Consistent with other experiences with the Yamane technique, our result has demonstrated that it is an attractive technique of lens fixation in Marfan patient lacking zonular support. This sutureless technique is safe, effective, and without risk specific to other conventional lens fixation techniques e.g. glaucoma in iris fixated IOL, corneal decompensation in anterior chamber fixated lOL.

Sewing Needle Microcapsulotomy to Avert Argentinian Flag Sign

First Author: Rajendra Prasad PRASAD

Purpose: To describe an efficient new technique "Sewing Needle Micro Capsulotomy" to prevent Argentinian flag sign during capsulorrhexis in patients with intumescent pearly white mature cataracts.

Methods: In this technique, consonant to sewing needle in sewing machine system to sew on knit type fabrics a specially designed sewing needle microcapsulotome [Fig. 1] is used to puncture the stretched tight central anterior capsule. Unlike the linear cut produced with an ultra-sharp, stainless steel hypodermic needle or capsulorhexis forceps sewing needle capsulotome create a hole, similar to mini capsulorhexis with round continuous circular edge, without any discontinuity. Round hole micro capsulotomy do not tear away with the sudden out burst of intralenticular fluid and disruptive force generated by the stretched tight anterior capsule.

Results: Sewing needle microcapsulotomy technique was used to puncture the 0.06% trypan blue stained stretched tight anterior capsule prier to initiation of capsulorhexis in 120 eyes with white intumescent mature cataract over a period of 6 months at our centre. Circular round hole created with the microcapsulotome prevented Argentinian flag sign in 98.7% of eyes with simultaneous evacuation of intralenticular fluid. Capsulorhexis was then very simply and

successfully completed in 98.1% of cases with Utrata forceps in almost all the cases.

Conclusions: Sewing needle microcapsulotomy is the simplest of techniques, with unique physical property enabling us to successfully prevent Argentinian flag sign in intumescent mature white cataract with very little effort and much easier surgical maneuvers.

Surgical Management of a Uveitic Cataract from Old Anterior Uveitis with Crenated Capsule, Bussaca Nodules and Small Pupil

First Author: Jose Timothy Martin CHUA
Co-Author(s): Bryan Vincent MESINA

Purpose: The purpose of this video is to showcase the proper surgical technique in managing a total white uveitic cataract with bussaca nodules and small pupil. The ophthalmologist-in-training must be familiar in how to deal with such patients with complex uveitis cataracts as part of his or her arsenal. This will also demonstrate use of iris hooks during surgery and how to do continuous curvilinear capsulorhexis on a crenated capsule.

Methods: Surgery done was phacoemulsification with intraocular lens implantation, peripheral iridectomy, subconjunctival triamcinolone injection, right eye under local anesthesia. Viscodilation and iris hooks were used to enlarge the small pupil or better visualization. Trypan blue dye was used to stain the capsule for better visualization of the total white cataract. Iris hooks were used, avoiding the Bussaca nodules, for better visualization.

Results: Surgery was successful. The entire cataract was safely removed and preferred intraocular lens was placed in the bag. The patient had improvement of vision from «no hand movement and good light projection» to 20/70 in Snellen chart due to the crenated capsule which is to be addressed via Nd:YAG capsulotomy in the future.

Conclusions: Cataract surgery can prove difficult in patients with uveitic cataract which can have numerous complications. This surgical video shows the proper technique to address a small pupil, total white, uveitic cataract, crenated capsule and Bussaca nodules. With this knowledge, ophthalmologists and even those in training can be equipped to handle similar cases.

Tackling Hard Cataracts the MSICS Way

First Author: Aswin PR
Co-Author(s): Anju AJ, Shivkumar CHANDRASHEKHARAN

Purpose: Managing hard cataract by phacoemulsification is a challenge especially for beginners. The excessive energy used and weak capsular bag make it highly prone for intraoperative complications.

Methods: This video aims to provide tips and tricks on how to perform safe MSICS (manual small incision cataract surgery) in hard cataracts.

Results: With a well constructed sclero-corneal tunnel, adequately sized rhexis and careful nucleus delivery, MSICS can be a good technique in handling hard brunescent cataracts.

Conclusions: MSICS is a good alternative to phacoemulsification for tackling hard cataracts.

Use of Intracameral Adrenaline Solution with Low Parameters in Intraocular Floppy Iris Syndrome of Benign Prostatic Hypertrophy Patients on Oral Tamsulosin to Maintain Mydriasis and Iris Stability Intraoperatively

First Author: Arijeet ROY
Co-Author(s): Pushkar BHADANI, Dr Sangeeta KALITA, Sheesham SINGH

Purpose: To compare efficacy and safety of usage of intracameral adrenaline solution with low parameters versus iris hooks with Malyugin rings in intraocular floppy iris syndrome due to long term oral tamsulosin for benign hypertrophy of Pprostate.

Methods: 2 groups were assigned. After proper pre operative preparation and work up, 1 group was operated by using intracameral adrenaline solution with low parameters and other was treated using iris hooks with Malyugin ring. Video was documented to compare the outcome of two groups with multivariate analysis.

Results: Both the groups gave almost comparable results in terms of efficacy. With respect to safety of procedure, adrenaline solution with low parameters proved to be safer option than with iris hooks and Malyugin ring because there were sometimes complications like sphincter tear, corneal injury or difficult instrumentation.

Conclusions: After the operations were done study results were compared and it was found that in terms of efficacy and safety both the methods were comparable. Rather with usage of iris hooks and Malyugin ring intra operative pupil related complications were more sometimes, though less significant in a broader sense.

Waste Less: A Model for Green Cataract Surgery

First Author: Snigdha MISHRA
Co-Author(s): Dharshini VENKATESH, Rengaraj VENKATESH

Purpose: To show a way ahead for the world for practicing an environmentally sustainable surgical system by optimizing surgical resources.

Methods: Our hospital uses all pharmaceuticals, eye drops on multiple patients until the bottle is empty or until the end of the operating day. The phaco cassette and tubing which are usually discarded after every surgery in the west are instead used for the entire day. Our surgical system uses largely reusable instruments which are sterilised after every case in a 30-minute flash autoclave cycle. At the end of the operating day, these instruments are autoclaved for a full 1-hour cycle in the Central Sterile Supply Department (CSSD). The OR waste is segregated according to the designated international waste management guidelines along with the tiny bits of plastic, paper and metal. All of the OR's segregated waste goes to the waste disposal room, where it is either sent for incineration or for recycling based on type.

Results: For every phaco surgery, our hospital generates only 0.25 kg of waste compared to 2.25 kg generated in the USA. Also, a single cataract surgery in the UK emits 132 kg of carbon dioxide equivalents whereas in our hospital it is only 6 kg; which means that the carbon footprint is just 1/20th of that in the UK.

Conclusions: Our model has thus created an environmentally sustainable and efficient system without compromising the postoperative infection and complication rates which are equivalent to or better than western standards.

When Flags Meet: A Case of Argentinian Flag Sign in the Setting of Phacomorphic Glaucoma, Pathologic Myopia and Vitrectomized Eye

First Author: John Gabriel SALAS

Purpose: To present a case of Argentinian flag sign occurring in a vitrectomized patient with pathologic myopia and phacomorphic glaucoma, highlighting the approach and various challenges encountered.

Methods: A video presentation.

Results: A 37-year-old male, previously vitrectomized and known pathologic myope presented with phacomorphic glaucoma on the right eye (RE). Visual acuity was hand movement with good light projection, intraocular pressure (IOP) was 51mmHg. An intumescent lens is inherently at risk for a run-out capsulorrhexis. Meanwhile, a myopic eye and vitrectomized eye presents challenges in anterior chamber (AC) and capsular bag stability among other things (e.g. lens-iris diaphragm retropulsion syndrome). Pre-operative IOP control was achieved. Needle decompression was done, however, an Argentinian flag sign still occurred. Capsulorrhexis was completed and careful removal of lens material was done. Near the end of the case, a posterior capsule rent (PCR) was noted. A sulcus intraocular lens was implanted. Post-operative best corrected visual acuity (BCVA) was 20/63, which was his BCVA prior to cataract development.

Conclusions: An Argentinian flag sign may be prevented with adequate needle decompression of lens, use of adequate viscoelastic device, and double capsulorrhexis technique. The fluctuations in AC and capsular bag seen in myopic and vitrectomized eyes require careful removal of lens material. With a number of anticipated challenges for the case, a careful and thorough pre-operative planning is crucial in producing the best outcomes.

iOCT Guided Phacoemulsification in Posterior Polar Cataract: Elucidating Intraoperative Dynamics and Enhancing Safety?

First Author: Jeewan TITIYAL
Co-Author(s): Manpreet KAUR

Purpose: We evaluated the morphological characteristics and intraoperative dynamics of posterior polar cataract (PPC) using intraoperative OCT (iOCT).

Methods: Forty eyes with PPC undergoing phacoemulsification were evaluated. Primary outcome measure was morphology of PPC and intraoperative dynamics of posterior capsule (PC). Secondary outcome measure was PC rent.

Results: Three morphological variants of PPC were observed on iOCT: type I with intact PC and clearance between PC and opacity, type II with intact PC in periphery of opacity, shadowing and inability to detect PC in centre and type III with dense opacity, extensive shadowing and inability to delineate PC. In addition to hydrodelineation, hydrodissection was performed in all cases of type I PPC with no case developing PC dehiscence. In type II and III PPC, only hydrodelineation was performed; three cases developed PC dehiscence (type II-1 eye, type III-2 eyes).

Conclusions: iOCT-guided surgery helps elucidate intraoperative dynamics in PPC and assess real-time PC integrity. It characterizes high-risk morphological features, enables safe hydrodissection in a subset of PPC; however, iOCT does not decrease the incidence of PC dehiscence.

Cornea, External Eye Diseases and Eye Banking

A Next Generation CXL Calculator for Customizing Fluence Time for Crosslinking in Thin Keratoconic Corneas

First Author: Reshma RANADE
Co-Author(s): Abhijit SINHA ROY

Purpose: To evaluate the performance of NXT (new generation CXL for thin cornea) UV-A calculator which aids in customizing fluence to particular corneal thickness for crosslinking (CXL) in thinner corneas.

Methods: A prospective longitudinal study of 50 eyes of 50 patients with progressive keratoconus and mean thinnest corneal thickness (TCT) 400 µm were included. All the patients were subjected to corneal tomography, epithelial mapping (CSO MS39 ASOCT) and specular microscopy preoperatively and postoperatively. Mean corneal thickness after de-epithelialization was entered into custom-built web based calculator, to obtain the customized fluence time based on chosen UV power.

Results: Postoperatively no patient had loss of lines compared to pre-operative BCVA, no significant haze was noted on densitometry using Pentacam HR (p=0.14). Stability was established at 6 months. Preoperatively, the keratometry (KMax) was 60D+/-1.2 D. Post operatively, it was 59.5D+/-0.5D. Flat and steep K values were stable with no evidence of progression. There was a demarcation line seen at 3 months in 64% of patients at a depth of 295±71 µm. Cell density on specular microscopy was unchanged postoperatively (p=0.83). All patients were fitted with contact lenses at the end of 3 months and achieved a visual acuity of 20/20 or better.

Conclusions: NXT UV-A calculator aids in customizing fluence time for crosslinking in corneas <400 µm based upon the chosen UV power.

A Toolkit for Customization of Cornea in Post-Refractive Surgery Eyes undergoing Cataract Surgery

First Author: Saili GARGE
Co-Author(s): Luci KAWERI

Purpose: In post refractive surgery eyes, we come across irregular corneas which can be a source of disturbing symptoms like glare and haloes. These symptoms are compounded when the patient develops cataract making planning for cataract surgery a difficult task.

Methods: We attempt to demonstrate an algorithmic approach to treat these corneal imperfections using corneal tomography and ray tracing aberrometry prior to cataract surgery.

Results: By using a customized approach to each case, it was found that there was an improvement in both the uncorrected and best corrected visual acuity for all the patients along with improved visual quality and regularization of corneal topography.

Conclusions: Our algorithm helps in perfecting these imperfect corneas of post refractive surgery patients and thereby provides significant improvement in the quality of life for these patients.

Comprehensive Management of Long-Term Sequelae following Severe Ocular Alkali Injury

First Author: Ferdi KURNIAWAN
Co-Author(s): T.Budi SULISTYA, Ovi SOFIA

Purpose: The purpose of this case report is to explain the long-term sequelae of ocular alkali injury and its management with the main objective to maintain globe integrity.

Methods: The diagnosis is based on history taking and complete ophthalmology examination.

Results: A 42-year-old male was suffering from alkali injury in his left eye while working in a soap factory four hours before admission. Initial examination revealed 6/6 visual acuity for the right eye and 6/60 visual acuity and grade V of ocular chemical injury for the left eye based on Dua classification. Initial treatments include copious amounts of irrigation, and management of the acute phase to promote re-epithelialization, decrease inflammation, prevent infection, reduce sequelae, and prevent further damage. Two months after injury, there was severe anterior chamber inflammation followed by corneal micro-perforation, and we performed amnion membrane transplantation along with pericardial graft. Three months after injury, there were cicatricial entropion and symblepharon, and we performed anterior lamellar recession and symblepharectomy. Six months after injury, there was corneal perforation, and we performed fascia lata autograft procedure. Two weeks after the fascia lata autograft procedure showed that the integrity of the globe could maintain successfully.

Conclusions: This case report shows that early treatment and appropriate management of long-term sequelae following severe ocular alkali injury success to maintain the integrity of the globe.

Educational Video to Support Diagnosis of Herpes Simplex Keratitis

First Author: Maria CABRERA-AGUAS

Purpose: This video aimed to provide a guide to clinically diagnose the different types of herpes simplex keratitis (HSK).

Methods: This two-minute animated video was created using Animaker, an online do-it-yourself animation video website. A literature review was performed to establish the typical clinical feature of HSK. Clinical features of epithelial HSK, stromal HSK with and without ulceration, endothelial HSK, keratouveitis and neurotrophic keratitis were illustrated and explained in the video.

Results: There are different types of HSK depending on the layer of cornea infected by the virus. Epithelial keratitis was characterized by dendrites or geographic lesions. Stromal HSK by vascularization, scarring, lipid keratopathy with or without ulceration. Endothelial HSK by keratic precipitates with cornea edema. Keratouveitis by diffuse cornea edema, stromal keratitis, keratic precipitates and anterior chamber cells. Neurotrophic keratitis occurs after recurrent HSK episodes and ranges in presentation from irregular epithelial surface to large oval shaped ulcer with heaped borders.

Conclusions: This is a useful video for

trainees in ophthalmology to refresh their HSK diagnostic skills as HSK diagnosis is mainly based on features seen on clinical examination with the slip-lamp.

Educational Video to Support the Treatment of Herpes Simplex Keratitis

First Author: Maria CABRERA-AGUAS
Co-Author(s): Stephanie WATSON

Purpose: This short animated educational video was created to disseminate the treatment guideline for herpes simplex keratitis (HSK) developed by The University of Sydney, Save Sight Institute in collaboration with the Sydney Eye Hospital.

Methods: This five-minute animated video was created using Animaker, an online do-it-yourself animation video website. This guideline was based on published evidence and included treatment recommendations for epithelial HSK, stromal HSK with ulceration, stromal HSK without ulceration, endothelial HSK, keratouveitis, and HSK prophylaxis for adults. Recommendations for topical and systemic treatment for pediatric patients were also included.

Results: Adult treatment recommendations included topical aciclovir 5 times daily for 1-2 weeks or valaciclovir 500 mg twice daily for 7 days for epithelial HSK; stromal HSK with ulceration, valaciclovir 1g three times daily and topical steroid twice daily for 7-10 days, stromal HSK without ulceration, valaciclovir 500mg once daily and topical steroid 4-6 times daily tapered over 10 weeks; endothelial HSK, valaciclovir 500mg-1g once to three times daily and topical steroid 4-6 times for 7-10 days; keratouveitis, valaciclovir 1g three times daily and topical steroid 4-6 times daily for 7-10 days. For prophylaxis treatment, valaciclovir 500 mg once daily or aciclovir 400 mg twice daily for at least one year.

Conclusions: This is a useful video for consultants and trainees in ophthalmology to learn about the new HSK treatment guideline created at the Sydney Eye Hospital.

Everest of Corneal Surgeries: 6 Complex Procedures at Once

First Author: Karan BHATIA
Co-Author(s): Ruchita MANAKTALA, Nikunj TANK

Purpose: To demonstrate a very complex keratoplasty.

Methods: An 18 year old one eyed boy with adherent leucoma underwent 6 complex procedures (penetrating keratoplasty, IOL explantation, vitrectomy, synechiolysis, IOL implantation, pupilloplasty) all at once in a 2 hour long surgery.

Results: BCVA at 1 month was 20/200. The patient was extremely happy and saw colors for the first time in his life.

Conclusions: Corneal transplantation is a life changing procedure. It can be combined with multiple surgeries all at once to give better outcomes.

Keratoprosthesis in a Cicatricial Steven Johnson Syndrome in an African Patient

First Author: Aarti HEDA

Purpose: Steven Johnson syndrome is a serious disorder of the skin and mucous membrane which can lead to blindness in severe cases. Management of the acute phase aims at preserving the ocular surface. However, once the chronic stage sets in,

management becomes more challenging. I hereby would like to hightlight a 29 year old female with a fourteen year old history of Steven Johnson syndrome who presented to us with a vision of perception of light in both eyes and keratinization of the ocular surface.

Methods: She underwent implantation of keratoprosthesis in the left eye following which she regained 6/12 vision.

Results: With a strict and very vigilant post operative care, the patient has maintained the same visual acuity over past one year.

Conclusions: Keratoprosthesis is a good option for managing cicatricial Steven Johnson syndrome.

Out Goes the Graft: Intraoperative Challenges in DMEK and How to Tackle Them

First Author: Madhura CHANDRATREYA
Co-Author(s): Ann Divya JACOB

Purpose: To highlight the difficulties that may be faced intraoperatively by a novice surgeon during a DMEK procedure. Graft preparation and graft unscrolling and centering are the major rate limiting steps for majority of the surgeons in DMEK surgery.

Methods: Descemet membrane endothelial keratoplasty (DMEK) is the only surgical procedure that provides a true anatomic exchange of diseased endothelium and Descemet membrane with healthy donor tissue. This video takes you through the steps of DMEK procedure combined with phacoemulsification in a small pupil and the intraoperative difficulties faced by the operating surgeon who is novice to DMEK and suggests techniques to successfully manage and overcome the possible complications, and thereby bring about improvement in patients' visual outcome. The various steps in which a novice surgeon might face difficulties are tissue preparation, possibility of graft efflux while insertion, incorrect insertion of the graft, graft unfolding and possibility of rebubbling.

Results: Graft insertion was also found to be a rate limiting process as evidenced in this surgical video.

Conclusions: DMEK has a steep learning curve and requires surgical skills entirely different from DSEK. Every DMEK operation is an exercise in problem solving. Proper construction of surgical wound is essential for graft insertion and to prevent egress of graft outside the anterior chamber.

Patch Graft for Perforated Corneal Ulcer Secondary to Rheumatoid Arthritis

First Author: Aditya GHORPADE

Purpose: Corneal perforations are caused by an infectious or inflammatory process or stromal melting associated with immunologic disorder related ulcers. They require immediate attention and prompt management to prevent further ocular morbidity.

Methods: Treatment modalities are fibrin glue, AMG, patch grafts or keratoplasty. Patch grafts provide anatomical integrity in large perforations and also ensure complete eradication of infection, if present. Autoimmune diseases like rheumatoid arthritis demand further systemic control of the disease with immunosuppressants.

Results: We would like to present a case of peripheral corneal perforation secondary to rheumatoid arthritis managed with free hand semi circular banana shaped corneal patch graft. Post operative examination at 6 months showed well opposed graft host junction with maintained anterior chamber integrity and no

recurrence of PUK.

Conclusions: Corneal patch graft holds its place as a reliable stop-gap measure for further optical keratoplasty, considering faster restoration of anatomical integrity.

Scar TREK (Topo-Guided Regularization Enabled by PTK): A State-of-Art Customized Phototherapeutic Keratectomy to Remove Corneal Scar

First Author: Ritika MULLICK
Co-Author(s): Gairik KUNDU

Purpose: To describe outcomes of single step customized tissue sparing approach of topography guided removal of corneal epithelium with stromal ablation.

Methods: Ablation was planned after measuring horizontal and vertical dimensions of scar in 8 eyes with superficial stromal corneal scars of 4-6mm diameter. Anterior segment optical coherence tomography measured depth of scar. Customized trans epithelial phototherapeutic keratectomy (PTK) decentred to exact area of scar was performed with pupil tracking and cyclotorsion compensation. 0.02% mitomycin C was used depending on depth of lesion.

Results: After ablation, the mean maximum keratometry changed significantly from 48.95D to 45.1D. Mean uncorrected distance visual acuity improved from 0.73±0.13 logMAR to 0.15±0.1 logMAR. There was a reduction in corneal aberrometry on topography regularization of stromal surface with minimal hyperopic shift.

Conclusions: Scar TREK is novel form of customized PTK that appears to be a safe and viable technique with minimal induced refractive change to remove corneal scars. Scar TREK is tissue sparing and holds promise as an alternative in the management of superficial corneal scars, traditionally treated by conventional PTK.

Spontaneous Onset of Sclerocorneal Cyst in Patient with Spina Bifida

First Author: Jai KELKAR

Purpose: To introduce a novel technique for management of sclerocorneal cyst in a patient with spina bifida.

Methods: A 2 year old girl presented with swelling in nasal side of the right eye since birth, with medical history of lipomeningocele and spina bifida. Anterior segment examination showed subconjunctival cyst extending into anterior corneal stroma on nasal side, from 7 to 12 o›clock hour. Ultrasound biomicroscopy (UBM) showed fluid filled cystic lesion involving cornea, with no communication with anterior chamber. Examination under anesthesia revealed intrastromal sclerocorneal cyst over nasal half of the cornea. Cyst was drained and thorough wash of the cystic cavity with balanced salt solution (BSS) was done. Base and sidewalls of the cyst were scraped to remove epithelial cells. Conjunctiva around the cyst was dissected and anterior cyst wall measuring 2X12mm was excised. Under the guidance of intraoperative ocular coherence tomography (iOCT) bulky corneal tissue was removed using a crescent knife. Scleral lips were glued together using fibrin glue rather than deroofing, thus obviating the need for a donor scleral patch. Amniotic membrane was used to cover the bare sclera with fibrin glue. Conjunctiva was reposited over the amniotic membrane and closed with 8–0 ethicon sutures.

Results: The outcome was satisfactory and no recurrence in the cyst was noted at 6 months follow up.

Conclusions: There has been no documentation of sclerocorneal cyst in a patient of spina bifida, and the above mentioned technique shows satisfactory results.

The Chronicles of Chemical Injury: Goretex for Ocular Surface Reconstruction

First Author: Anitha VENUGOPAL

Purpose: To present the management of the chemical injury sequelae, in a twelve-year-old girl with Goretex, a polytetrafluoroethylene material to prevent the recurrence of symblepharon and its outcome.

Methods: Due to the extensive, actively progressing symblepharon involving the medial canthus and the cornea causing extraocular movement (EOM) restriction, amblyopia in a child with vision 3/60 was managed with excision of the symblepharon, amniotic membrane transplant, Goretex, and simple limbal epithelial cell transplant under general anesthesia.

Results: Postoperative was uneventful, with improvement in EOM. She is following up with us for the past two years without recurrence and the vision is improving with amblyopia therapy.

Conclusions: Goretex has been used widely in ophthalmology. It can be now used as a novel therapeutic option for preventing symblepharon too.

Topo-Guided Removal of Epithelium in Keratoconus: A Novel Tissue Sparing Customized Ablation

First Author: Sneha GUPTA
Co-Author(s): Gairik KUNDU

Purpose: In early keratoconus (KC) with adequate thickness, topo-guided photorefractive keratectomy (TPRK) with cross-linking (CXL) improves visual quality and regularizes the anterior corneal surface. It is inadvisable in thinner corneas, higher grades of KC and decentered cones, where stromal tissue ablation would be unacceptable to achieve a degree of regularization.

Methods: We devised a novel tissue saving approach: topo-guided removal of epithelium in keratoconus (TREK) and 100 keratoconic eyes underwent TREK. Epithelium thickness was measured using OCT and ablation depth was planned up to 25µ beyond the thinnest epithelial thickness. Ablation was centered over the area of highest steepening rather than corneal apex and executed on PTK-CAM module of the Schwind Amaris. This was followed by manual removal of surrounding epithelium over 7 mm area and accelerated CXL.

Results: The visual, keratometric and aberrometric outcomes were similar to TPRK.

Conclusions: Thus, TREK is a safe, effective and novel tissue sparing treatment in KC.

Evolving Academia, Research, Teaching And Education In Ophthalmology IN THE ERA OF COVID-19

Deciphering the Enigma of Astigmatism in Cataract Surgery

First Author: Shruti KOCHAR MARU
Co-Author(s): Neeraj ISRANI

Purpose: This video describes various scenarios and case-based approach to

determine the importance of controlling residual astigmatism to achieve good outcomes and happy patients.

Methods: The pace of innovation in cataract surgery is among the most rapid of any field of medicine. Despite so many advances, astigmatism is still troublesome after cataract surgery, as it can degrade visual acuity and compromise the performance of premium intraocular lenses. We tried to analyse various tricky situations encountered in day to day practice and provide solutions to overcome residual cylinder.

Results: Many variables can contribute to residual refractive cylinder after cataract surgery.

Conclusions: Recognizing that even low levels of postoperative astigmatism can affect visual results is the first and most important step in minimizing its impact.

UVIDGE Sterilization: Innovative Application of Ultraviolet Rays and Hydrogen Peroxide Vapor for Decontamination of Respirators during COVID-19 Pandemic

First Author: Bharat GURNANI

Purpose: To demonstrate the innovative application of ultraviolet rays and hydrogen peroxide vapor for decontamination of respirators during the COVID19 pandemic.

Methods: Old condemned refrigerators and freezer boxes (being airtight) and UV-C germicidal lamps are taken. The lamps are fitted inside the refrigerators along with reflecting mirrors. The reflecting mirrors reflect the UV-C rays and increase the efficiency of the sterilization process. The respirators are hung inside the UVIDGE with the help of copper hangars and H2O2 is sprayed over them. These are then sterilized inside the UVIDGE and the cycle takes around 20 minutes. These respirators can be sterilized for 5-6 times by this technique.

Results: When UV-C germicidal lamps come in contact with hydrogen peroxide droplet free hydroxyl (OH-) radicals are generated by the advanced oxidation process. These free radicals in turn destroy the microbes, viruses, and bacteria on the surface. These respirators are sterilized and can be reused by this technique.

Conclusions: This effective technique is economical and reusable and has prevented the shortage of disposable of masks during COVID 19 lockdown and is also a boon to prevent a shortage of masks in the future during the pandemic.

Glaucoma And Glaucoma Surgery

Limited Posterior Revision of Failed Trabeculectomy

First Author: Surinder PANDAV
Co-Author(s): Faisal TT, Tripti CHOUDHARY

Purpose: To demonstrate a novel surgical technique to salvage a failed trabeculectomy.

Methods: Step by step demonstration of the technique of salvaging a failed trabeculectomy. Previously failed trabeculectomy bleb is revised through a small (3-4mm) incision placed posterior to the failed bleb. The partial thickness scleral flap is identified and its edges lifted off the bed to re-establish aqueous flow.

Results: The procedure was done in 44 eyes with a cumulative success rate of over 80% at one year and about 70% at 3 years.

Conclusions: Limited posterior revision of failed trab may be tried before a second trabeculectomy or tube surgery.

Normative Data for Automated Perimetry in an Indian Population

First Author: Shruti KOCHAR MARU

Purpose: To formulate normative data and to increase domain knowledge of normative values for automated perimetry in Indian population of different age groups.

Methods: A cross-sectional study conducted on patients receiving outpatient care in a span of 3 years, which included 6586 healthy normal patients (13172 eyes) with vision 6/6 unaided or after refractive correction. The patients were tested with 30-2 SITA FAST threshold algorithm on Humphrey Field Analyzer Model no: 745i.

Results: Normative data was calculated on basis of age group ranging from 19-75 years in every decade. Normal values were formulated on basis of perimetry performed on normal patients.

Conclusions: This video presentation is an attempt to create a normative data which can then be fed in our machines on the basis of data formulated in an Indian population as the existing data is only from the European population. This will add value as well as increase the accuracy of perimetry in Indian eyes.

Phacoemulsification with Ahmed Glaucoma Valve in Place: A New Technique

First Author: Surbi TANEJA

Purpose: To demonstrate a technique to prevent blockage of Ahmed glaucoma valve during phacoemulsification.

Methods: Routine phacoemulsification in an eye with Ahmed glaucoma valve (AGV) in place can lead to blockage of the valve by nucleus material or viscoelastic or dye. This can lead to post operative intraocular pressure (IOP) peaks which can be disastrous for a glaucoma patient. After years of successful IOP control with valve, patient experiences raised IOP post cataract surgery and can have deterioration in glaucoma control. We performed a technique called «Angular rotation of Tube» in which we rotated the intraocular portion of the AGV tube with an iris hook into the angle by carefully creating an entry into anterior chamber at an acute angle to the tube.

Results: There was no blockage of the tube and the intraocular pressure post phacoemulsification remained within desired limit.

Conclusions: This technique can be done with ease in cases with Ahmed glaucoma valve in place requiring phacoemulsification. This helps to further maintain the intraocular pressure in glaucoma patients and prevent IOP peaks post cataract surgery.

Quantitative Assessment of Aerosols and Droplets from an Eye after Impact with an Air Puff during Non-Contact Tonometry Amidst COVID-19 Pandemic

First Author: Priyanka SATHE
Co-Author(s): Naren SHETTY, Dr.Sujani SHROFF, Abhijit SINHA ROY

Purpose: To assess and quantify aerosols generated during non-contact tonometry (NCT) and spread distance of the same.

Methods: This was an experimental study in which NCT was performed on eyes (n=8) of healthy human volunteers under normal settings, with a single and 2 drops of lubricant eyedrops. Any possible generation of droplets and aerosols was detected by using high-speed shadowgraphy, fluorescein analysis and frontal lighting technique after which mathematical computation of the droplet spread was performed.

Results: There was no droplet or aerosol production in natural settings. When 1 drop of lubricant was used before NCT, minimal splatter along with droplet ejection was observed. When 2 drops of lubricant were instilled, a significant amount of fluid ejection in a sheet form was observed that broke up into multiple droplets. Some of these droplets reverted to the tonometer. Droplet size measured ranged from 100 to 500 µm in diameter.

Conclusions: When NCT was performed in a natural setting, there was no droplet generation. However, NCT should be avoided in conditions with natural or artifical high-tear volume so as to preclude the risk of tactile contamination and droplet spread.

Retinal Detachment in a Child with a Glaucoma Drainage Device: Use the Implant!

First Author: Sushmita KAUSHIK
Co-Author(s): Deeksha KATOCH, Surinder PANDAV, Simar Rajan SINGH, Sagarika SNEHI

Purpose: Children with buphthalmos are at a greater risk of retinal detachment due to increased axial length and a stretched eye. Non-valved glaucoma drainage devices (GDD) are frequently used in children with refractory glaucoma. The large episcleral plates of these devices are usually placed under the recti muscles. Retinal reattachment surgery with a buckle and band in the presence of a large device placed at the equator is a tricky proposition. Through this video we will showcase a unique surgical procedure we thought of for fixing a detached retina in the presence of the large episcleral plate of a GDD.

Methods: A 6-year-old one-eyed girl with primary congenital glaucoma (PCG) presented with an inferior rhegmatogenous retinal detachment (RRD) in her only seeing eye. She had undergone implantation of an Aurolab aqueous drainage implant (AADI), a non-valved GDD, similar in design to the Baerveldt glaucoma implant, in the inferonasal quadrant two years back. Removal of the GDD to facilitate retinal re-reattachment surgery would be risky given advanced glaucoma and the inevitable subsequent IOP rise. We successfully managed her RRD with a 277 tire using the existing GDD plate›s segment as an explant.

Results: Three months later, her vision was 6/24, and IOP was 10.0 mm Hg without anti-glaucoma medications.

Conclusions: Rhegmatogenous retinal detachment (RRD) in eyes with a pre-existing GDD poses a unique surgical challenge. The episcleral plate of the AADI can be successfully used as a scleral buckle, obviating the need for subsequent interventions for IOP control.

Trabeculectomy Combined with Manual Small Incision Cataract Surgery: Need of the Hour in Developing Countries

First Author: Rekha KHANDELWAL
Co-Author(s): Madhavi BIJLANI

Purpose: To demonstrate trabeculectomy surgery with manual small incision cataract surgery (MSICS) in patients of advanced glaucoma with hard cataract in developing countries.

Methods: The video covers the step-by-step presentation of the basics of Moorfields› Safer Surgery System Trabeculectomy combined with MSICS. It also includes tips for the use of antimetabolites, flaps, punches, suturing techniques, Ologen implant, etc.

Results: This surgical technique helps to avoid complications and achieve target IOP with minimal risk to the patients of combined surgery for advanced glaucoma and hard cataract.

Conclusions: Advanced glaucoma presenting with the hard cataract is a major burden of blindness in developing countries like India. This video will improve the surgical skills and empower comprehensive ophthalmologists to understand the simple technique of combining trabeculectomy with MSICS.

Treat the Angle and Not the Individual

First Author: Saloni JOSHI
Co-Author(s): Usha TEJASWINI

Purpose: To create awareness about the treatment modalities in primary angle closure glaucoma.

Methods: Video presentation and editing.

Results: Not all patients with angle closure require laser peripheral iridotomy.

Conclusions: Not all patients with angle closure require laser peripheral iridotomy, and treatment should be customized to each individual.

Intraocular Inflammation, Uveitis And Scleritis

Removal of Intraocular Foreign Body in Anterior Chamber Angle Guided by Intraocular Endoscope

First Author: Michelle FAN
Co-Author(s): Lawrence IU, Simon KO, Callie KO

Purpose: To demonstrate the surgical technique of using an intraocular endoscope to visualize and guide removal of an intraocular foreign body (IOFB) embedded in the anterior chamber angle in a patient with diffuse corneal edema.

Methods: A patient presented with diffuse corneal edema after MRI brain. CT orbit suggested presence of a metallic IOFB in the inferior anterior chamber angle. However, corneal edema precluded detailed examination. Intraocular endoscope was used to assist IOFB removal.

Results: Intraocular endoscope used for endoscopic cyclophotocoagulation was inserted through a corneal wound opposite to where IOFB was suspected. The endoscope not only allowed us to identify the location of IOFB in the inferior anterior chamber angle but it also helped to visualize the adjacent ocular structure to minimize collateral damage during IOFB removal. Ophthalmic viscosurgical device was used to displace the IOFB centrally and it was removed with intraocular forceps.

Conclusions: Visualisation of IOFB could be difficult especially in patients with corneal edema and the IOFB embedded in the anterior chamber angle. Intraocular endoscope allows visualization of IOFB, assessment of surrounding ocular structures and enhances removal.

Miscellaneous

Double Trouble: A Tale of Two Intraocular Foreign Bodies

First Author: Remya PAULOSE

Purpose: Our report describes a unique case of a single penetrating wound with two metallic IOFBs, one of which would have been overlooked on a cursory clinical examination. It highlights the need for suspicion of additional foreign bodies even if one IOFB is clinically evident.

Methods: A healthy 24-year-old man presented urgently with a penetrating corneoscleral injury of the right eye following a reported history of a high-velocity projectile resulting from hammering a nail. Although a rosette cataract was present, the fundus could be visualized, showing a metallic IOFB embedded on the retina inferonasally. The macula showed a large retinal tear with an overlying hemorrhage. The patient underwent fundus photography and emergency CT scan as per institution protocol. To our surprise, CT imaging revealed two separate IOFBs in the inferonasal aspect of the right eye.

Results: After vitrectomy, the larger of the two IOFB was removed through a clear corneal incision, while a thorough search with scleral indentation localized the second IOFB in the peripheral retina close to the ora. The second one was removed in a similar manner.

Conclusions: To the best of our knowledge, this is a unique report of two metallic IOFBs from a single entry site caused by a hammering accident. This case highlights the need for suspicion and imaging for additional IOFBs in the event of high velocity projectile injuries, even when one IOFB is clinically evident.

Perorated Globe following Retrobulbar Anesthesia

First Author: Sriharanathan POOPALARATNAM

Purpose: To highlight a horrible accident during retrobulbar anesthesia by untrained hands.

Methods: A single case report.

Results: Perforated globe end up vitreous hemorrhage which was managed conservatively. Later phacoemulsification and foldable implant done under topical anesthesia. Post cataract surgery distant visual acuity was 6/6 but with distorted near vision. Funduscopy and OCT macula revealed significant epi-macular membrane which was handle by 27G trans-conjunctival vitrectomy (TSV) under sub Tenon anesthesia.

Conclusions: Administering retrobulbar anesthesia shouldn›t be taken lightly since it needs considerable skills and has got a steep learning curve. This technique need to be used selectively in era of modern ophthalmology. When it is done by freshers, must be done under supervision.

Neuro-Ophthalmology

Navigation Guided Orbital Optic Canal Decompression in Traumatic Optic Neuropathy: A Novel Approach

First Author: Kasturi BHATTACHARJEE
Co-Author(s): Harsha BHATTACHARJEE, Aditi MEHTA, Vatsalya VENKATRAMAN

Purpose: Traumatic optic neuropathy (TON) is a serious complication of craniofacial injury resulting in severe visual loss with minimal possibility of visual recovery. There are no conclusive guidelines available for the optimum management of TON, and various studies have suggested equivalent outcomes with observation, steroids, and surgical decompression. When surgery is planned, the trans-nasal endoscopic technique is conventionally utilized. We present a novel surgical technique of navigation-guided orbital optic canal decompression (NGOCD) for both direct and indirect TON. We discuss the benefits of an orbital approach to the optic canal and the precise intra-operative localization of the fractured optic canal with navigation guidance.

Methods: This video highlights the surgical technique of minimally invasive transcaruncular NGOCD. The authors report the postoperative visual outcome, changes in visual evoked potentials (VEP) and retinal nerve fiber layer (RNFL) thickness in 66 cases of TON, having a minimum follow-up of one year.

Results: Preoperatively, out of 66 eyes, 56 had a vision of no perception of light (NPL) and 10 had vision ≤20/200. All patients underwent NGOCD within 10 days to 3 months of presentation. At the one year follow up, 56 eyes showed an improvement in vision, out of which 22 eyes were ≥20/80. Eight eyes remained NPL. The mean preoperative VEP was 2.2±1.4 and postoperative was 4.4±2.8. There was an improvement in RNFL quadrantric thickness.

Conclusions: Good visual and optic nerve functional recovery is seen following the orbital approach of NGOCD. It can be offered as a tailored approach in patients with TON.

New Approaches To Patient Management And Dealing With Unmet Need In The Era Of Covid-19

Incremental Innovation in Operation Theatres

First Author: Megha NAIR
Co-Author(s): Shivraj TAGARE, Rengaraj VENKATESH

Purpose: Incremental innovations made to increase the efficiency of surgeon, improve the performance of surgeon, facilitate more comfortable environment for the patient during surgery, COVID-19 prevention and wet lab training for residents.

Methods: Use of simple materials to create multiple innovations for facilitating the surgical process.

Results: Improvement of the efficiency of surgeon, performance of surgeon, comfortable environment for the patient during surgery, COVID-19 prevention and wet lab training for residents.

Conclusions: These incremental innovations helped to increase efficiency of surgeon, improve the performance of surgeon, facilitate more comfortable environment for the patient during surgery, COVID-19 prevention and wet

lab training for residents.

The Cataract Splatter

First Author: Anuj SATIJA
Co-Author(s): Luci KAWERI, Naren SHETTY

Purpose: To establish surgeon safety, by quantifying the aerosols and droplets generated during phacoemulsification surgery, using high speed shadowgraphy in the COVID-19 era.

Methods: A laboratory design was set up for performing phacoemulsification on enucleated goat eyes and cadaveric human corneoscleral rims mounted on an artificial anterior chamber. Sculpt and quadrant removal mode with standard settings for were used on Visalis 100 (Carl Zeiss Meditec AG). 2.2 and 2.8 mm incisions were made and phacoemulsification was performed using titanium straight tips. The main wound incisions were made to fit the phacoemulsification tip with its sleeve. Aerosol and droplet generation was quantified using high speed shadowgraphy. The main outcome measures were, visualization of the aerosols and droplets and quantification of size along with calculation of their spread.

Results: No aerosol were generated during longitudinal phacoemulsification with a straight tip with peristaltic pump device in a closed chamber. Larger wounds showed a slow leak. When the phacoemulsification tip was completely exposed next to the ocular surface, atomization of balanced salt solution was observed. At such times, the normal droplet size was around 50 µm with a maximum spread was calculated to be 1.3m.

Conclusions: Phacoemulsification is a safe procedure to perform in the COIVD-19 era since there are no visible aerosols generated during microincision or standard surgery.

Ocular Imaging

Choroidal Thickness in Thyroid Associated Orbitopathy

First Author: Hiu Ping Frank LAI
Co-Author(s): Kelvin Kam-lung CHONG, Wai U IAO, Simon KO, Danny NG, Alvin YOUNG

Purpose: To investigate the choroidal thickness (CT) in patients with thyroid-associated orbitopathy (TAO).

Methods: This was a prospective multicenter cross-sectional study. CT of TAO patients and healthy subjects were measured with enhanced-depth imaging optical coherence tomography (EDI-OCT) at the subfoveal, macular and peripapillary regions. CT were compared between eyes with TAO and controls. Multivariate linear regression was used to evaluate the associations of subfoveal CT with systemic and ocular variables among TAO eyes.

Results: CT of eyes with TAO was significantly increased at the subfoveal region, 1 and 2mm from the fovea nasally, temporally, and superiorly, and 1mm inferior to the fovea (all $p < 0.05$). No significant difference was found in CT at 2mm inferior to the fovea ($p = 0.094$) and all four quadrants of the peripapillary region (superior, $p = 0.096$; nasal, $p = 0.732$, inferior, $p = 0.179$; temporal, $p = 0.052$). Among TAO eyes, thinner subfoveal choroid was associated with worsening exophthalmos ($p = 0.043$), poorer visual acuity ($p = 0.017$), increasing age ($p = 0.040$) and axial length ($p < 0.001$). There was no association between CT and clinical activity score ($p = 0.239$).

Conclusions: TAO patients showed thicker choroid than controls over the macular, but not the peripapillary regions. Thinner

subfoveal choroid was associated with worsening exophthalmos and poorer vision. EDI-OCT can monitor choroidal vascular changes associated with TAO and its complications.

Interpretation of MRI: The Eye Sees What the Mind Knows

First Author: Rolika BANSAL
Co-Author(s): Santosh HONAVAR, T.Siva SANKAR, Ravi VARMA

Purpose: In 1978, the advent of magnetic resonance imaging (MRI) was a remarkable volte-face in the world of diagnostics. Employing the phenomenon of nuclear resonance enables us to exploit the properties of differential protons in living tissue. The ability of providing higher and variable contrast and the absence of ionizing radiations, makes it superior to computed tomography (CT). Being the diagnostic tool of choice, it is an indispensable part of assessment of the location and characteristics of different ocular and orbital pathologies (vascular, inflammatory and neoplastic).

Methods: In this video, we shall be displaying the anatomical, clinical and radiological aspect of MRI with an overlap to make it easier to understand the implications of this miraculous invention.

Results: The intrinsic and extrinsic properties of MRI provide multi-parametric imaging, making it of paramount importance in ophthalmological evaluation. Also, MRI-dynamic color mapping provides non-invasive and quantitative assessment of soft tissues in motion. An in-depth knowledge of the basic principle and technique of MRI aids in diagnosing as well optimal planning of surgical interventions.

Conclusions: A good understanding of MRI analysis makes the ophthalmologists independent and helps in ruling out the differential diagnoses, exact extent and invasion, precise surgical planning and therefore, avoiding tragic outcomes.

Ocular Oncology And Pathology

Journey to the Centre of the Tumor

First Author: Mrittika SEN
Co-Author(s): Kaustubh MULAY, T.Siva SANKAR

Purpose: Pathology plays a very important role in the management of various ocular lesions. Biopsy of ocular and orbital tumors are performed for diagnosis, establishing the tumor margins, identifying high risk features, for the prognosis of the patient and to determine the need for adjuvant therapy. Ophthalmic biopsies can be of various types: excisional, incisional, punch, shave, multilevel, map and frozen sections. It is therefore important for ophthalmologists to understand the handling and processing of specimen and the specific tests to request for with good coordination with an ocular pathologist.

Methods: In this video we discuss about the specific indications of each of them and the various stages of processing through which a biopsy specimen passes, before it reaches the pathologist, including transportation and preservation, gross examination, pathological sectioning of the tissue, fixation in formalin, preparation of tissue blocks in paraffin, tissue slicing and preparation of slides, staining of slides with specific stains and quality control. Immunohistochemistry and molecular studies have additional role in the final diagnosis and management which will also be touched upon.

Results: A first person account of a tissue as

it is biopsied by a surgeon and then processed for histopathological examination. Each step of tissue processing is demonstrated highlighting their importance.

Conclusions: A good biopsy and meticulous pathological examination is the key to diagnosis and management of ocular tumors.

Ocular Surface Squamous Neoplasia: A 20-Year Review

First Author: Upeka NANAYAKKARA
Co-Author(s): Muhammad KHAN, Chameen SAMARAWICKRAMA

Purpose: Ocular surface squamous neoplasia (OSSN) encompasses epithelial dysplasias, conjunctival intraepithelial neoplastic lesions and squamous cell carcinoma, and is more common in regions with high sun exposure. There has been a recent shift towards the use of topical chemotherapy in the management of OSSN. This study aimed to evaluate the effectiveness of OSSN management and identify the recurrence rate over the past twenty years at a tertiary referral ophthalmology centre in Sydney, Australia.

Methods: Retrospective cross-sectional chart review of patients with OSSN from 2000 to 2020 at Westmead Hospital, Sydney, Australia. Patient characteristics, pre-treatment findings, treatment information and post-treatment clinical course were obtained retrospectively.

Results: There were 25 cases of OSSN, predominantly in males (80%) with a mean age at presentation of 71 years. Commonly affected sites were the limbus (64%) and bulbar conjunctiva (24%). Treatment regimens included various combinations of excision, cryotherapy and ocular chemotherapy (mitomycin-C or interferon-α2b). Adverse effects following treatment included irritation (4%), epiphora (4%) and endophthalmitis (4%). Recurrence occurred in 32% of cases. These patients were managed with excision, cryotherapy and mitomycin-C (50% of recurrences), biopsy and mitomycin-C (25% of recurrences), excision and cryotherapy (12.5% of recurrences) and excision and conjunctival autograft (12.5% of recurrences).

Conclusions: OSSN recurrence is a significant adverse outcome, which occurred most commonly following the excision, cryotherapy and mitomycin-C treatment regime. Study limitations include small sample size and use of retrospective data as older cases were managed purely surgically without adjunctive therapies, hence further prospective research is necessary.

Ophthalmic Epidemiology And Prevention Of Blindness

Help Me See. Low Vision Aids

First Author: Anitha TALUPULA

Purpose: To show the various low vision aids available and the benefits of each, and lacunae in utilization.

Methods: Video is based on clippings across the world, and incorporates various recent advances.

Results: Barriers in the utilization have been known and how to overcome each is told.

Conclusions: Low vision aids have maximum visual rehabilitation while they are underutilized; this video places emphasis on correct identification and usage of each which helps patients lead a better social life.

Orbital And Oculoplastic Surgery

A Needle in Time Saves Nine: Emergency Needle Decompression for Orbital Emphysema

First Author: Pallavi SINGH

Purpose: Orbital emphysema is a medical emergency and its immediate diagnosis and management are critical to prevent sight-threatening complications. We aim to describe a simple and effective way to treat the same in our video.

Methods: A 43-year-old gentleman presented with a history of trauma to the right eye with a fist, following which he was fine. Subsequently, he developed sudden onset diminution of vision associated with proptosis, pain, and limitation of ocular movements, following an episode of blowing his nose an hour later. Crepitations were present on palpation around the periocular area. A non-contrast computed tomography (NCCT) scan revealed a large air pocket in the superior orbital compartment. Direct needle drainage was performed using a 20-gauge needle attached to a saline-filled syringe with the plunger removed.

Results: Rapid release of air bubbles with prompt alleviation of pressure symptoms was observed.

Conclusions: We describe a minimally invasive procedure that can be safely performed by an emergency physician, once the orbital anatomy has been defined by CT scanning.

Evisceration by Equatorial Sclerotomy Technique

First Author: Ankita AISHWARYA
Co-Author(s): Santosh HONAVAR

Purpose: To discuss various techniques and principles of evisceration to restore volume and to prevent enophthalmos with emphasis on evisceration by equatorial sclerotomy technique.

Methods: We use the novel circumferential complete equatorial relaxing incision technique in this patient to allow a larger implant with anterior placement and thus preservation of orbital volume.

Results: This video demonstrates evisceration in a 39-year-old male with a painful blind eye following trauma by equatorial sclerotomy technique with good cosmesis.

Conclusions: It is a simple procedure that allows the placement of a stable and an optimally sized implant following evisceration in the setting of atrophic bulbi or phthisis bulbi.

Good Anesthetic for Good Aesthetic: Blocks in Oculoplasty

First Author: Marem CHRISTY

Purpose: To give an overview of the nerve supply of the orbit, the surface marking and the techniques of regional and nerve blocks in oculoplasty.

Methods: Anatomy of important landmarks, pathways of nerves in the globe and eyelids in relation to the blood vessels are first described. The appropriate drugs and methods of giving different regional and nerve blocks are demonstrated.

Results: Anatomy of the orbit and eyelid with their nerve supply is demonstrated. The important landmarks such as the supra-orbital notch, infra-orbital foramen are demonstrated. Drugs for local anesthesia such as lignocaine, bupivacaine and adjunctives such as adrenaline have been described in the video. And finally, the technique of regional anesthesia such as peribulbar and of nerve blocks, specifically of facial, frontal nerve and its branches, infraorbital, nasociliary, infratrochlear and dorsal nasal nerves with their application in ocular plastic surgery are demonstrated.

Conclusions: A good anesthesia not only makes the patient comfortable during a surgery but also has a huge impact on the post-operative recovery. The art of giving a good local anesthesia is to be learnt and practiced.

Let's not be Bad to the Bone

First Author: Riddhi RAICHURA
Co-Author(s): Rahul GOGOI, Ganesh Ch KURI

Purpose: To reconstruct the orbital floor, realign the vertical buttress and address the enophthalmos and blepharoptosis following midface fracture.

Methods: We discuss the preoperative assessment and second stage management of right sided midface trauma following a road traffic accident. The patient had undergone primary repair of zygomatic bone with partial realignment. Due to persistent enophthalmos and blepharoptosis, he presented to the oculoplastics department. The surgical approach was aimed at realignment of vertical buttress at the zygomaticomaxillary complex junction along with reconstruction of the orbital floor with titanium plates and porous polyethylene sheet implants using minimally invasive combination incisions including eyelid crease, transconjunctival and intraoral (Caldwell Luc) approaches.

Results: This was a second stage surgery with an acceptable cosmetic and functional outcome. The orbital floor repair corrected the enophthalmos and buttress alignment was restored post–operatively.

Conclusions: For fractures involving multiple facial bones, a carefully planned surgical intervention involving a team of doctors from various sub specialities is essential. A multidisciplinary approach with cosmetically hidden incisions can result in better functional and aesthetic outcome.

Limited Orbicularis Myectomy for Apraxia of Lid Opening: A Simplified Surgical Technique

First Author: Akshay NAIR
Co-Author(s): Vandana JAIN

Purpose: To describe a relatively simple, safe and reproducible technique of limited orbicularis myectomy for apraxia of lid opening (ALO).

Methods: ALO is characterized by the inability to initiate voluntary eyelid opening that usually needs surgery like orbicularis myectomy. This involves excision of the orbicularis muscle fibres, which helps in in overcoming levator palpebrae inhibition.

Results: Previously described techniques have involved aggressive approaches that involved excision of the pretarsal, preseptal and the orbital part of the orbicularis and other adnexal muscles: the procerus and corrugators. However, our technique involves a conservative approach with complete excision of the pre-tarsal and preseptal orbicularis; augmented with a limited blepharoplasty. The video includes step-by-step demonstration

of the identification the structures and tissue planes.

Conclusions: A limited orbicularis myectomy is a safe procedure that gives acceptable and predictable results in ALO.

Management of Delayed Orbital Fractures with Medial Canthal Dystopia and Canalicular Injury: Rise to the Challenge!

First Author: Henal JAVERI
Co-Author(s): Harsha BHATTACHARJEE, Suklengmung BURAGOHAIN

Purpose: To showcase the challenging surgical management of delayed multiple orbital fractures with lacrimal canalicular dissection and medial canthal dystopia. Two customised approaches for the repair of inferior medial canthal dystopia are also highlighted.

Methods: In this video, Case 1 was managed with placement of a medpor-titanium-medpor implant for the inferior and medial wall fracture, via a transconjunctival approach. The canthal dystopia was corrected by simply suturing the superior and inferior limbs of the medial canthal tendon, individually to the medial periosteum, giving a good postoperative outcome. Case 2 underwent a conjunctivo dacryocystorhinostomy (CDCR) with a mucous membrane graft. Canthal fixation with titanium mesh and screws was performed. Orbital floor was repaired with a medpor implant. The patient also had ptosis for which levator muscle re-insertion and plication was done.

Results: The structural, functional and cosmetic outcome was satisfactory, with the enopthalmos and canthal dystopia being adequately corrected and the lacrimal apparatus patency restored.

Conclusions: Orbital trauma can have a myriad of presentations. The orbital fractures and the medial canthal dystopia in both cases was managed successfully. The importance of a tailored approach with improvisation as needed is emphasised in this video. CDCR with mucous membrane graft serves as a successful biological simulation of the lacrimal drainage apparatus.

Management of Post Traumatic Eyelid Laceration Complicated by Orbital Myiasis: Our Experience

First Author: Rajendra MAURYA
Co-Author(s): Apjit KAUR, Virendra P SINGH

Purpose: Orbital myiasis is an uncommon ocular parasitic infestation. Post traumatic neglected wound, malignant lesions and immunocompromised status are common predisposing factors. We removed >100 live larvae of human botfly from infected periocular laceration of a drunken patient.

Methods: A clinical video of mechanical removal of >100 live maggots from a middle aged chronic alcoholic male patient who had a history of falling in trench in an intoxicated state. He presented to us with severe pain, itching and foul smelling blood mixed discharge from the neglected, lacerated wound involving right lower eyelid and lateral canthus. There were numerous freely crawling worms in ulcer crater. Oral ivermectin was given prior to removal of maggots. Maggots were removed mechanically with the help of forceps after immobilizing the larvae by putting 4% xylocain and mixture of chloroform plus turpentine oil (1:3) which blocked the spiracles of larvae. Regular wound debridement and dressing was done for five days. Routine topical and systemic antibiotics

and anti-inflammatory were administered. Secondary lid reconstruction was done.

Results: More than 100 live maggots were removed. Maggots were preserved in diluted formalin and sent to entomologists for scanning electron microscopic study. Maggots were identified as Dermatobia homni (human botfly).

Conclusions: Orbital myiasis can complicate the post traumatic wound. Mechanical removal after suffocating the maggots by using various chemicals is basic treatment. Educating the patients for early treatment, good wound hygiene and sanitation is important.

Optic Nerve Sheath Fenestration: Superomedial Lid Crease Approach-My Preference

First Author: Rohit SAIJU
Co-Author(s): Malita AMATYA, Prerana KANSAKAR

Purpose: To demonstrate a surgical technique of optic nerve decompression with upper eye lid crease approach. This video aimed to highlight the key steps of the surgical technique and show the sound clinical skills to complete a successful decompression of optic nerve in cases of idiopathic intracranial hypertension (IIH) management.

Methods: A surgical procedure is described to decompress the optic nerve in cases of raised perineural subarachnoid cerebrospinal fluid (CSF) pressure in IIH, cerebral venous sinus thrombosis, brain tumor causing raised intracranial pressure. There three surgical techniques described to decompress the optic nerve are medial transconjunctival approach, superomedial lid crease approach and lateral orbitotomy. In lid crease approach, through the medial half of upper lid crease incision a further dissection is performed to identify the optic nerve and a window is created on it to drain the CSF to release the perioptic nerve pressure.

Results: The early decompression of perioptic subarachnoid space with filtration of CSF through a newly created window will reestablish the axonal flow in optic nerve and will give a visual recovery in most of the cases. The chronic cases are not promising to recover the vision and visual field as there are permanent axonal damage occurred due to longstanding pressure on it.

Conclusions: This is an effective and elegant technique for the treatment of IIH with progressive vision loss. It is less time consuming and aesthetically well accepted. As there is no need of conjunctival peritomy and medial rectus muscle disinsertion, postoperative diplopia and strabismus do not occur.

Organic Intraorbital Foreign Body with Nasopharyngeal Extension

First Author: Jo MANIWAN
Co-Author(s): Franklin KLEINER, Elaine Marie OMANA, Patricia Anne TECSON, Ma.Regina Paula VALENCIA

Purpose: To present a case of teenage male who came in with an organic intraorbital foreign body with nasopharyngeal extension.

Methods: A case report.

Results: A 16-year-old male presented with a 2-day history of an impaled intraorbital foreign body on the right eye. The patient was involved in an altercation with 10 teenagers and mauled. He was stabbed on the right eye with a blunt wooden foreign body. He was immediately brought to a nearby hospital where first aid was done and cranial with orbital CT scan was done and revealed

the impaled wooden foreign body with nasopharyngeal extension. Upon examination, the patient presented with good visual acuity but limitation of extraocular eye movement of -3 adduction deficit and a -2 abduction deficit. The patient underwent emergency wound exploration with endoscopy-guided removal of intraorbital foreign body and conjunctiva and eyelid repair. The retrieved wooden foreign body measured 7.6cm which was longer than the estimated length. The patient was maintained on oral and topical antibiotics for 1 week. During 1 week post-op, the patient presented with full and equal extraocular movement, decreased chemosis and good VA of 20/20 on both eyes.

Conclusions: Surgical excision is attempted for all organic orbital foreign bodies (OrbFBs) because of their higher risk of inflammation and infection. Inorganic OrbFBs that are causing orbital complications should be removed. Posterior inorganic OrbFBs that are not causing complications are often observed.

Redesigning Life after the Loss: Creating a Realistic Eye

First Author: Fairooz Puthiyapurayil MANJANDAVIDA
Co-Author(s): Shaifali CHAHAR, Jibran MUNAVER

Purpose: To describe the conditions, indications, timing for intervention and appropriate management and technique of fabrication of customized ocular prosthesis (COP).

Methods: A qualitative study describing in-depth the technique of fabrication and fitting of COP along with patient experience.

Results: Congenital or acquired anophthalmia can not only lead to a visual handicap but also cause psychological devastation. Adequate and timely volume replacement by an oculoplasty surgeon and customized prosthesis by an ocularist can help overcome the social phobias that co-exist in these situations. Making the COP is an art requiring highly skilled acumen tailored to each socket. Ocular comfort and cosmesis achieved are far superior to the stock eyes previously used by these patients.

Conclusions: Eyes play a major role in facial aesthetics. Trauma or tumor may necessitate evisceration, enucleation or exenteration, leading to visual handicap and psychological devastation affecting the quality of living on a daily basis. An artificial replacement of the organ overcomes fear and insecurities improving overall personal development. Team of oculoplasty surgeon and ocularist plays a major role in rendering the social and psychological rehabilitation of these patients after the loss.

Sebaceous Gland Carcinoma of the Eyelid: Mind the Mimic, Recognize the Real

First Author: T.Siva SANKAR
Co-Author(s): Gaurav GARG

Purpose: Sebaceous gland carcinoma (SGCa) of the eyelid, a potentially fatal neoplasm, is notorious to be misdiagnosed as chalazion or blepharitis, resulting in delayed diagnosis and inappropriate management.

Methods: There are no established clinical criteria for a general ophthalmologist to differentiate it from simulating conditions. Intraepithelial spread is clinically difficult to recognize, thus the importance of wide excision with intraoperative margin control and conjunctival map biopsy as the treatment of choice. Wide excision leaves behind a large eyelid coloboma, which needs to be optimally reconstructed with due attention to the eyelid function and aesthetics.

Results: This video focuses on the varied spectrum of clinical manifestations of SGCa, its masquarades, clinical signs to differentiate simulating conditions, and the surgical algorithm for optimal management. Early diagnosis and protocol-based management can minimize the risk of local tumor recurrence and systemic metastasis in SGCa.

Conclusions: This video deals with how to diagnose sebaceous gland carcinoma clinically and differentiate it from simulating conditions. Further, it highlights the importance of protocol-based management including wide excision with intraoperative margin control and conjunctival map biopsy. Appropriate reconstruction technique can provide optimal cosmetic and functional outcome.

Secondary Repair of Upper Lid Laceration with Canalicular Laceration, Right: A Case Report

First Author: Alexander Gerard GUNGAB
Co-Author(s): Reynaldo JAVATE

Purpose: To demonstrate the ease, efficacy and safety of using a monocanalicular stent in repair of a transected canaliculus.

Methods: A case report of an 11-year-old male who had an upper lid laceration with canalicular laceration. A Masterka monocanalicular stent was used for repair of the canaliculus.

Results: This is a case of an 11-year-old male who sustained trauma to the right eye after accidentally hitting a metal clothes hanger while playing at a store which resulted to an upper lid laceration with canalicular laceration. Primary repair was done in a local clinic and was then seen at our institution 5 days post injury. A secondary repair was done using the “one stitch technique” by doing a single pericanalicular horizontal mattress suture which was described by Dr. Kersten and gives an anatomical success rate of 100% (Alam, 2017). A Masterka monocanalicular stent was used to bridge the transected canaliculus. The Masterka silicone tube with punctal fixation, pre-mounted on an introducer to facilitate insertion is placed within the lumens of the canaliculi to bridge the lacerated areas. Monocanalicular stents minimize the risk of injury to the intact canaliculus, compared to bicanalicular silicone stent. The Masterka needs no nasal recovery thus, making it a less traumatic procedure.

Conclusions: Intubation of lacerated canaliculi with a Masterka monocanalicular stent for canalicular repair was safe, effective and simple with minimal complications.

Single-Stage Multi-Layered Socket Reconstruction in a Case of Severely Contracted Socket

First Author: Shyam Sundar DAS MOHAPATRA
Co-Author(s): Ganesh Ch KURI, Aditi MEHTA, Vatsalya VENKATRAMAN

Purpose: To describe single-stage multi-layered reconstruction of severely contracted socket with contraction of all the three components (bony, soft tissue and mucous membrane) of the socket.

Methods: Computed tomography (CT) scan of the orbits with three dimensional (3D) reconstruction was performed to assess the bony orbit. Single-stage multi-layered reconstruction was performed to address contraction of all three components (bony, soft tissue and mucous membrane) of the socket. Bony contracture was addressed with orbital rim and malar advancement, soft tissue

contracture was addressed with temporalis muscle flap and mucous membrane contracture was addressed with amniotic membrane graft (AMG). Fornix forming sutures (FFS) were given. Conformer was placed and tarsorrhaphy was performed.

Results: At three months follow up, prostheses was well fitted. Superior sulcus deformity was noted, which was corrected using orbital fillers injection. At one year follow up, excellent symmetry was maintained with well fitted prosthesis with no superior sulcus deformity.

Conclusions: Severely contracted socket with contraction of all the three components (bony, soft tissue and mucous membrane) can be managed successfully by addressing contraction of all the three components with single-stage multi-layered reconstruction procedure. Single-stage procedure eliminates requirement of multiple, repeated surgical interventions, also provides excellent long term outcome.

Surgical Tissue Rearrangement: The Power of Z-Plasty

First Author: Joyeeta DAS

Purpose: The Z-plasty is one of the most elegant and incredibly effective techniques in plastic surgery. In this video, we will demonstrate the application of multiple Z-plasty in a unique way to manage a case of severe post-traumatic cicatricial lower lid ectropion.

Methods: This is a case of lower eyelid cicatricial ectropion with symblepharon and full-thickness lid defect in a 40 year old lady due to injury by a sharp object. On examination, her lower lid had a deep full-thickness cut that extends from lid margin to cheek up to mid nasolabial sulcus creating a deep scar band of approx 70 mm long. This case has been managed successfully by multiple Z-plasty with lid reconstruction under general anesthesia.

Results: The lid defect and cicatricial ectropion was nicely corrected with healthy healing flaps and there was no residual lagophthalmos.

Conclusions: Z-plasty is one of the most versatile techniques in reconstructive surgery and clear understanding of the principles of Z-plasty will allow the surgeon to apply this technique in a wide array of clinical scenarios.

Pediatric Ophthalmology And Strabismus

Iris Claw Lenses for Correction of Aphakia in Children

First Author: Mohammad MOSTAFA HOSSAIN
Co-Author(s): Mamunur CHOWDHURY, Quazi IFTEKHAR

Purpose: Surgical treatment of aphakia without capsular support in children particularly in uniocular aphakia and non-compliant patients.

Methods: A prospective interventional case series was undertaken on 28 eyes of 16 children with aphakia without capsular support who underwent iris-claw lens implantation through superior limbal incision by lens forcep and then positioned retropupillary by traditional enclavation of both haptics one by one into iris mid periphery posteriorly through paracentesis near 3 o›clock and 9 o›clock position by dialer or Sinskey hook from October 2014 to September 2019. A detailed record of visual acuity, slit-lamp examination and fundus evaluation was carried out. Patients

were followed up on regular basis.

Results: The study enrolled 28 eyes of 16 children. The age of patients ranged 5 to 10 years. Among them, 9 were male and 7 were female. Patients underwent posterior iris-claw lens implantation showed improvement in visual acuity from 1/60 preoperatively to 6/12 postoperatively. We encountered no postoperative complication. Amblyopia was a vision limiting factor.

Conclusions: Secondary iris claw IOL (posterior) implantation is a viable option to correct surgical aphakia in eyes without capsular support when noncompliance with spectacle and amblyopia are great concerns. However, with larger sample size and longer follow up further study is warranted.

Simulation of Complex Strabismus Surgical Procedures on Goat Eyes

First Author: Amar PUJARI
Co-Author(s): Swati PHULJHELE, Rohit SAXENA

Purpose: To describe the possibility of simulation of complex strabismus surgeries on goat eyes.

Methods: The goat eyes from a local slaughterhouse were bought with a large residual soft tissue around it. The eyes were inspected for globe integrity, muscle integrity and length and the globe tension. The included eyes were considered for superior oblique, inferior oblique and recti muscle surgeries.

Results: By simulating lateral rectus, inferior rectus and inferior oblique muscles, staged inferior oblique muscle surgeries (Fink's, Park's, Elliot and Nankin, total anterior positioning and antero-nasal trans positioning) were successfully simulated. Similarly, by simulating superior oblique and superior rectus muscles, superior oblique tuck, posterior tenectomy, loop tenotomy and Harada Ito procedures were simulated. Thirdly, by simulating horizontal and vertical recti muscles, half width and full thickness transposition were simulated (Knapp's procedure with augmentation and Nishida›s).

Conclusions: Complex surgical procedures of superior oblique, inferior oblique and recti muscle procedures can be successfully simulated on goat eyes.

Strabismus after Scleral Buckle

First Author: Deepti JOSHI
Co-Author(s): Krishnaprasad R

Purpose: To describe various shades of presentation, management and outcomesof strabismus surgery in patients with strabismus post scleral buckle surgery for retinal detachment.

Methods: This video highlights enhanced technique of strabismus management in 3 post scleral buckle patients in a tertiary eye care center in South India. 1 patient was managed conservatively with prisms, other 2 required surgery. Surgery in these patients requires extensive dissection with use of antimitotic agents owing to extreme adhesions. Hangback and adjustable sutures with conjunctival recession are of additional benefit. Outcomes were considered successful if there was ≤ 10 prism diopters (PD) residual horizontal and/or ≤ 4 PD residual vertical deviations. Statistical analyses were performed using Fisher›s exact test, Mann-Whitney test, and nominal logistic regression.

Results: The mean age of patients was 38.45 ± 18.12 years. Horizontal deviation was the commonest type. Success using our criteria of motor alignment was achieved in 2 of 3 eyes (33%). Scleral buckle removal did not

have any role in outcome post surgery. No retinal redetachments occurred after scleral buckle removal. 1 patient was managed conservatively with prisms, other 2 required surgery.

Conclusions: Management of nonresolving post scleral buckle strabismus is a challenge owing to distinct underlying mechanism. Management needs to be individualized and modified by using special aforementioned procedures to achieve successful motor alignment.

Refractive Surgery

AcuSimX: A Virtual Artificial Intelligence Platform to Predict Post-Refractive Surgery Corneal Stiffness

First Author: Pooja KHAMAR
Co-Author(s): Mathew FRANCIS, Abhijit SINHA ROY, Rohit SHETTY

Purpose: To demonstrate the accuracy of AcuSimX, a predictive tool based on inverse finite element method (iFEM) and artificial intelligence (AI), for estimating postoperative (POSTOP) corneal stiffness (CS) after SMILE, LASIK and PRK.

Methods: AcuSimX was used to construct patient specific iFEM model using the preoperative (PREOP) Corvis-ST (OCULUS Optikgerate Gmbh, Germany) deformation data, Pentacam HR tomography 3-D volume (OCULUS) and intended aspheric ablation profile. Using inverse methods, AcuSimX estimated the corneal biomechanical properties from the PREOP measurements. Then, AcuSimX was used to compute the POSTOP CS using the PREOP corneal biomechanical properties and surgical 3-D mesh models specific to a surgery. The computed CS was further refined using an in-built population database (300 eyes) of post-refractive surgery CS outcomes (SMILE, PRK and LASIK) and Lasso regression AI.

Results: The intraclass correlation (ICC) between measured and predicted POSTOP CS was 0.91 (LASIK=0.92, SMILE=0.91 and PRK=0.85). The difference between predicted and measured POSTOP CS was 4.02 [2.85, 5.2], 3.69 [2.36, 5.03] and 2.81 [1.16, 4.43] N/m for LASIK, SMILE and PRK, respectively. The ICC improved to 0.95 overall after Lasso regression based AI adjustment (LASIK=0.95, SMILE=0.93 and PRK=0.92). The AI also improved the difference to -0.27 [-1.25, 0.71], 0.27 [-0.87, 1.4] and 0.3 [-0.95, 1.55] N/m for LASIK, SMILE and PRK, respectively.

Conclusions: Overall, the excellent ICC (greater than 0.9 overall) demonstrated the accuracy of the predictions of POSTOP CS. This established AcuSimX as the first biomechanical simulation software for use in the refractive surgery clinics and may provide the means to avoid ectasia completely.

Arcuate Keratotomy in Femtosecond Laser-Assisted Cataract Surgery Made Easy

First Author: Kelvin WAN
Co-Author(s): Tommy CHAN, George CHENG, Vishal JHANJI, Alex Lap Ki NG

Purpose: We demonstrate our femtosecond laser-assisted arcuate keratotomy (FSAK) technique in cataract surgery patients.

Methods: A single reference mark is made anywhere along the limbus by a surgical assistant, which does have to be on the horizontal meridian. A corneal analyzer automatically calculates the angle between a

reference line drawn from this mark passing through the pupil center and the steep axis. The angle from this reference mark is used intraoperatively to locate the steep axis for FSAK, eliminating the error from tilted head posture during conventional axis marking under slit-lamp. A single arcuate keratotomy (AK) at 450um, 8mm arc diameter, with an arc length ranging from 30-80 degrees according to the preoperative keratometric astigmatism is made on the steep axis paired to the main phacoemulsification wound opposite.

Results: Using this standardized technique in 44 eyes of 44 patients, their mean preoperative corneal astigmatism reduced from 1.40 ± 0.66 diopters (D) to 0.74 ± 0.54 D at 2 years and 0.70 ± 0.50 D at 5 years postoperatively ($P < 0.001$). The postoperative corneal astigmatism, magnitude of error, and absolute angle of error were comparable between the 2 postoperative time points ($P \geq 0.609$). At the end of 5 years, 65% of the eyes were within 15 degrees of the preoperative astigmatic meridian.

Conclusions: Our combined phacoemulsification with AK using femtosecond laser technique is an easy, safe, and reproducible technique for the management of low-moderate corneal astigmatism in cataract surgery candidates, resulting in well-maintained stability at 5 years postoperatively.

Surgical Removal of Epithelial Ingrowth and Flap Revision of Post Traumatic Folded LASIK Flap

First Author: Aditya GHORPADE
Co-Author(s): Anitha VENUGOPAL

Purpose: Laser in situ keratomileusis (LASIK) is the most commonly performed refractive surgery. Though it yields miracles, it is amenable to traumatic flap displacement even after years. We describe a case of displaced and folded LASIK flap with epithelial ingrowth secondary to blunt trauma.

Methods: A 33 year old female patient came with a history of blunt trauma to left eye (LE) before 2 months. She had undergone LASIK in both eyes 10 years back. Best corrected visual acuity (BCVA) in LE was 6/18. Slit-lamp examination in LE showed vertically displaced, folded temporal edge of the LASIK flap with epithelial ingrowth in the visual axis.

Results: Since the ingrowth was increasing in the visual axis, surgical removal of ingrowth with flap ironing was done. Flap was secured with 10.0 monofilament interrupted nylon sutures. At 1 month, suture removal was done.

Conclusions: BCVA in LE was 6/9. Flap was opposed with no recurrence of ingrowth.

Retina 1 (Medical - Diabetes)

Long-Term Outcomes of Intravitreal Triamcinolone Acetonide at Appropriate Time during Pars Plana Vitrectomy in Proliferative Diabetic Retinopathy

First Author: Mengyu LIAO
Co-Author(s): Hua YAN

Purpose: To evaluate the long-term outcomes of intravitreal triamcinolone acetonide (TA) at appropriate time during pars plana vitrectomy (PPV) in patients with proliferative diabetic retinopathy (PDR), and to analyze the relative factors.

Methods: A total of 189 eyes (152 patients) underwent PPV for severe PDR were reviewed. An intravitreal injection of TA (IVTA) was performed during PPV in 118 eyes (PPV+IVTA group), and 71 eyes without

IVTA (PPV group). At the time just after most of the vitreous and proliferative membrane were removed, 0.1 ml TA (40mg/ml) injected into the vitreous cavity was performed in the PPV+IVTA group. All patients were followed up for at least 12 months. Visual outcomes and postoperative complications were recorded and compared between the two groups.

Results: IVTA was helpful in proliferative membrane peeling as well as hemostasis during PPV. In PPV+IVTA group, best corrected visual acuity had significant improved and the intraocular pressure was controlled well during follow-up. Incidence of early recurrent vitreous hemorrhage after PPV was significant lower in PPV+IVTA group (1.7%) than PPV group (9.9%) (P=0.028).

Conclusions: The appropriate time of IVTA during PPV can effectively improve the final visual outcomes, and prevent postoperative complications in patients with severe PDR.

Retina 2 (Medical – Other)

The Role of Dynamic (Video) Angiography in Diagnosis of Retinal Vascular Diseases

First Author: Kelvin LI
Co-Author(s): Isaac CHAY, Colin TAN

Purpose: This video discusses the utility of dynamic (video) angiography, specifically fundus fluorescein angiography (FFA) and indocyanine green angiography (ICG), in the diagnosis of retinal vascular diseases such as polypoidal choroidal vasculopathy (PCV).

Methods: Still images and dynamic FFA and ICG angiography were obtained from patients seen in our clinic for various retinal conditions such diabetic retinopathy, PCV and choroidal neovascularization. Characteristic features of each condition were noted and assessed on still and dynamic angiography.

Results: Dynamic FFA features of proliferative diabetic retinopathy were shown and the characteristic features of leakage and capillary fallout were demonstrated. Dynamic ICG angiography was also used to shown the filling of branching vascular network and pulsation of polyps. These features are not well appreciated on a still image.

Conclusions: Dynamic angiography gives the clinician a sequential view of the circulatory phase of the retinal vasculature and is therefore useful in the diagnosis of retinal vascular diseases by enhancing the diagnostic capabilities.

Retina 3 (Surgical)

A Light in the Dark: A Surgical Approach to Advanced Stage ROP

First Author: Kristine PORMIDA
Co-Author(s): Jocelyn SY

Purpose: To present a surgical approach of stage 5 ROP in a 4-month-old infant.

Methods: A case report.

Results: A 4-month old infant born at 32 weeks age of gestation with a birthweight of 2.14 kg was brought to our institution for ROP evaluation. On portable slit lamp examination, the right eye was minimally dilating (5mm) with a deep anterior chamber while the left eye was non-dilating with a shallow anterior chamber. Fundus examination on the right eye showed total retinal detachment with no view of the posterior pole while the left eye had poor posterior visualization. B-scan ultrasonography revealed anterior vitreous

opacities with close funnel anterior and posterior retinal detachment of both eyes. Thickened choroid was observed on the left eye. Due to high retinal detachment, the patient underwent scleral buckling, limbal lensectomy and vitrectomy, meticulous bimanual membrane peeling and segmentation, and sodium hyaluronate gel instillation of the right eye. 1 month post-operatively, there was visualization and flattening of the posterior pole but with persistent adherent membranes anteriorly.

Conclusions: Anatomical retinal reattachment rate in Stage 5 of ROP is usually low, hence remains a surgical challenging procedure to a vitreo-retina surgeon and a life-changing process to the patient. However, with the advancement in vitrectomy and a surgical combination technique of scleral buckling, cautious bimanual membrane peeling, and viscoelastic gel dissection and tamponade, better anatomical outcomes can be achieved. Long-term monitoring is still warranted to better evaluate its success rate and visual outcomes that can lead to a better quality of life for the child.

Analysis of Informative Clinical Features and Predictive Models of Visual Outcomes of Vitrectomy in Eyes with No Light Perception after Open Globe Injury

First Author: Hua YAN

Purpose: To report a novel predictive method on visual outcomes of vitrectomy for no light perception (NLP) eyes after open globe injury (OGI) by using machine learning (ML).

Methods: We systematically collected 459 cases of OGI with NLP vision in 14 involved medical centers in China from November 2009 to October 2020. Sixteen relevant clinical features including intraocular foreign body (IOFB) or not, perforating injury or not, total wound length (TWL), distance from the limbus to the most posterior of the full-thickness sclera wound (DLP), iris status, cornea status, aqueous humor status, lens status, vitreous status, time of vitrectomy, retinal residue, configuration of retinal detachment, retina status, retina reattachment, choroid reattachment, ciliary body status was analyzed.

Results: We achieved an area under the receiver operating characteristic curve (AUC) of 0.75 in the pre-operative model, and 0.90 in the intra-operative model, which was much higher than OTS (AUC=0.49). Moreover, we applied the SHapley Additive exPlanations (SHAP) method to analyze the feature contribution of models and found that purulent or prolapsed vitreous, DLP >8 mm, IOFB, and TWL >12 mm were leading contributors of bad visual outcome in the pre-operative model. Good retinal reattachment and retinal residue >80% were the first two contributors of good visual outcome in the intra-operative model. Surgery timing analysis revealed that vitrectomy performed during 7–14 days may obtain improved visual outcome.

Conclusions: The two predictive ML models provided an effective approach to assist ophthalmologists in evaluating the necessity of vitrectomy and better predict the clinical course of the injured eye.

Choroidal and Retinal Detachment Surgery of a Post Penetrating Keratoplasty Pathologic Myope Patient with Use of Intraoperative Intravitreal Methotrexate Infusion

First Author: Erika Jean SALVAME

Purpose: To present a complicated retinal surgery case from blunt eye trauma successfully managed with scleral buckling,

bimanual pars plana vitrectomy with intraoperative infusion of methotrexate.

Methods: A video presentation case report.

Results: This is a video case report of a 63 year old female high myope, post penetrating keratoplasty and pseudophakic on the left eye who had blunt eye trauma resulting to choroidal hemorrhage with retinal detachment. Choroidal hemorrhage was massive and allowed apposition of the detached retinal surface but resolved through systemic and topical steroid therapy. However, retinal apposition persisted forming a closed anterior retinal detachment with proliferative vitreoretinopathy. Patient underwent scleral buckling and bimanual pars plana vitrectomy with careful peeling of membranes. Intraoperative infusion of methotrexate was also done and silicone oil was injected at the conclusion of the retinal detachment surgery. Postoperatively, retina was attached and visual acuity improved to counting fingers from poor light perception, due to the macular chorioretinal atrophy from myopia.

Conclusions: This is a video presentation highlighting the surgical techniques used to have good postoperative outcomes. Challenges encountered included limited visualization due to the corneal opacity, choroidal detachment, dense membrane on the apposed retinal surface and the pathologic myopia. It also highlights the use of intraoperative methotrexate infusion in preventing postoperative proliferative vitreoretinopathy that may otherwise incur secondary retinal detachment. Traumatic eye injuries causing choroidal and retinal detachment in complicated eyes require calculated preoperative planning and synergistic operative steps to provide best anatomic and visual prognosis.

Iatrogenic Retinal Tear during PVR Surgery

First Author: Yusra ASAD
Co-Author(s): Avnindra GUPTA, Ritesh NARULA, Lalit VERMA

Purpose: To demonstrate formation of an iatrogenic tear as a potential complication in a vitreoretinal surgery and its management.

Methods: A middle aged man presented on the second post operative visit a week after undergoing a vitreoretinal surgery for retinal and choroidal detachment. Examination revealed a recurrent retinal detachment inferiorly with epiretinal/tractional membrane over the inferotemporal arcade for which a repeat surgery was planned. Intraoperatively, the peripheral retina was lasered further before removal of silicon oil. Thereafter, membrane dissection was initiated with attempts at lifting off an edge using a MVR (microvitreoretinal) blade. The rigidity of the underlying retina and its strong adherence to the membrane made the task more difficult. Diamond dusted scratcher, spatula and a forceps were then employed to attempt peeling off the membrane from the retinal surface but the force applied to achieve this caused a tear in the retina adjacent to the attachment of the said membrane. Bimanual technique under PFCL (perfluorocarbon liquid) was employed for further successful dissection of the membrane and the remaining subretinal fluid was drained from the retinal break. Fluid-air exchange followed by silicon oil reinjection was done and endolaser retinopexy of the retinal break and inferior retina completed with a resultant well attached retina.

Results: Well settled retina with a BCVA of 6/18 at 2 months postoperatively.

Conclusions: When dealing with strongly

adherent membranes, always test traction before pulling on them. If not separating easily, shift to atraumatic ways of separation. In case of an iatrogenic tear, treat like a pre-existent tear.

Intraoperative Ocular Coherence Tomography in Retinal Surgeries: The Third Eye

First Author: Dr.Aditya KELKAR

Purpose: To evaluate the usefulness of intraoperative ocular coherence tomography (iOCT) in various retinal surgeries.

Methods: An amalgamation of common cases encountered in retinal practice using the iOCT. Where, iOCT was used in intraoperative diagnosis, confirmation of diagnosis or as an additional technology in the course of surgery itself. Additionally, iOCT was also used for documentation of retinal surgeries as well as a teaching tool.

Results: Intraoperative OCT was very useful in confirming the diagnosis, such as in cases with vitreous hemorrhage where preoperative OCT is not possible. As well as in planning the further surgical steps, for better surgical outcome and avoiding re-surgeries. Also, acts as an additional tool in picking up subtle abnormalities, in cases such as retinal detachment cases with coexisting tiny macular holes. Additionally, provides vivid visualization of the dissecting planes as well as instrument tissue interactions. However, light scattering and shadowing effects were encountered at times hindering the visualization.

Conclusions: iOCT has found its place in retinal surgeon's tool box and works as a third eye, helping us see the unseen.

Inverted Internal Limiting Membrane Flap Technique for the Treatment of Large Idiopathic Macular Hole

First Author: Saurabh DESHMUKH
Co-Author(s): Krati GUPTA, Surpriya HAWAIBAM, Ronel SOIBAM

Purpose: To highlight the efficacy of inverted internal limiting (ILM) flap technique in the treatment of large idiopathic macular hole (MH). There is an increased risk of surgical failure in cases of large macular holes. They may remain open after 1 surgery. Some of these cases may remain flat-open after surgery. Flat-open macular holes are associated with limited visual acuity.

Methods: A 69-year-old female presented with diminution of visual acuity for 6 months. Fundus examination and optical coherence tomography revealed a large (628 microns) MH. She underwent 23-gauge pars plana vitrectomy with inverted ILM flap technique.

Results: At 3 months follow-up, her visual acuity improved to 20/40 with a U-shaped closure of the MH.

Conclusions: Vitrectomy with the inverted ILM flap technique seems to be a safe and effective surgery for large macular holes, improving both functional and anatomic outcomes.

Lens Sparing Vitrectomy in Stage 4B Retinopathy of Prematurity: A Novel 'All-Nasal' Approach

First Author: Simar Rajan SINGH
Co-Author(s): Mangat DOGRA, Mohit DOGRA, Deeksha KATOCH

Purpose: Stage 4B retinopathy of prematurity (ROP) can present with temporal tractional

retinal detachment approaching the retrolental space. Achieving the surgical objectives in these eyes using a conventional surgical approach usually requires lensectomy in most of the cases. We describe a novel 'all-nasal' approach for 25-gauge lens sparing vitrectomy in such eyes.

Methods: Examination under anesthesia was done before starting the procedure to know the extent of retinal detachment behind the crystalline lens. The surgeon sat on the nasal side of the eye to be operated with the operating microscope rotated and oriented accordingly. Infusion was placed along the horizonal between the supero-nasal and infero-nasal ports for the vitreous cutter and endoilluminator. Rest of the steps of surgery were performed in a standard fashion. The case was closed after a partial fluid-air exchange.

Results: Eight eyes with stage 4B ROP were operated with this approach. All surgical objectives could be achieved with this technique. Lensectomy could be avoided in 7 of the 8 eyes (87.5%). The central placement of the infusion canula facilitated better rotation of the globe during surgery. The shallow nasal bridge of the infant also helped in keeping the canula stable and away from the crystalline lens. However, temporal traction anterior to the equator may not be fully addressed by this technique.

Conclusions: All-nasal approach for LSV appears to be effective in avoiding lensectomy in select cases of stage 4B ROP with good anatomical outcomes.

Management of Advanced Proliferative Diabetic Retinopathy

First Author: Bhuvan CHANANA

Purpose: Surgical videos demonstrating management of advanced proliferative diabetic retinopathy with small gauge vitrectomy.

Methods: The posterior hyaloid phase in proliferative diabetic retinopathy (PDR) is usually thick, taut and firmly adherent to the underlying retina at multiple sites. Induction of posterior vitreous detachment (PVD) is often difficult due to strong attachments at the disc and areas of neovascularization, and frequent presence of vitreoschisis. Advances in vitreous surgery like micro incision vitrectomy systems, better viewing devices, and careful dissection techniques have made it possible to manage such difficult cases.

Results: Video clips demonstrating successful PVD induction in difficult situation, management of dense subhyaloid hemorrhage in PDR, dissection of thick and firmly adherent fibrovascular fronds in advanced end-stage PDR, and use of perfluorocarbon liquids (PFCL) during diabetic vitrectomy will be presented.

Conclusions: The posterior hyaloid phase in PDR is usually thick and firmly adherent to the underlying retina at multiple sites. However, with micro incision vitrectomy system, advanced instrumentation and careful dissection techniques, most of the cases can be managed successfully.

Microscope-Integrated Optical Coherence Tomography Guided Subretinal Surgery

First Author: Mohit DOGRA

Co-Author(s): Ramandeep SINGH, Simar Rajan SINGH

Purpose: Microscope-integrated optical coherence tomography (MiOCT) is a recent addition to the armamentarium of vitreo-retinal surgeons. Its role is well established

in retinal procedures, as has been shown by the DISCOVER and PIONEER studies. However, there are a few anecdotal case reports highlighting MiOCTs role in subretinal surgery.

Methods: We present three cases where MiOCT helped in intra-operative decision making and positively influenced the outcome.

Results: The first case had retained subfoveal PFCL where MiOCT helped to ensure complete removal by providing real time images. Second patient had a submacular hemorrhage that was managed with vitrectomy, subretinal air and tPA injection. MiOCT helped to localize the exact plane of insertion for the subretinal cannula and thus ensured correct delivery of tPA+air in the subretinal space. In the last case, MiOCT again ensured the correct plane from where subretinal biopsy was taken in a case suspected of having vitro-retinal lymphoma.

Conclusions: MiOCT helps in intra-operative surgical decision making thereby improving outcomes in select situations of subretinal surgery by providing real-time feedback to the operating surgeon.

Pars Plana Vitrectomy in Retinoschisis

First Author: Mohammad MALEK
Co-Author(s): Mominul ISLAM, Md Arif PATHAN, Mostafizur RAHMAN

Purpose: To demonstrate surgical management of retinoschisis in 2 cases by means of pars plana vitrectomy, one presenting with a vitreous hemorrhage and the other presenting with a retinal detachment.

Methods: 2 cases of retinoschisis managed surgically has been described. The first case (first video) was an eighteen month-old who presented with bilateral vitreous hemorrhage, which initially masked the retinoschisis. On clearing the hemorrhage, the schisis was apparent and the entire retina was ischemic. A thorough panretinal photocoagulation was done. Instead of trimming the schitic retina, the schitic retina was reattached with air fluid exchange and a short term silicon oil tamponade was given, which was removed one month later. The second case presented with a detachement, where a vitrectomy was done with triamcinolone assisted posterior vitreous detachment, removal of subretinal membrane and adherent vitreous with forceps, followed by fluid air exchange, and a thorough enodlaser and oil tamponade.

Results: In both cases, the retina is stable as of six month follow-up, with ambulatory vision restored in the eighteen month old, whose vision had dropped to FF only. The second case had a slight improvement of vision from hand movements to count fingers.

Conclusions: Retinoschisis cases are rare but can be managed well with pars plana vitrectomy, with good anatomical and functional results. Removal of the schitic membrane is not mandatory, as demonstrated by both cases where the membrane was left and a thorough endolaser performed.

Pars Plana Vitrectomy under Different Filters in a Case of Choroidal Rupture from a Metallic Double Penetrating Injury

First Author: Jayson SO
Co-Author(s): Jocelyn SY

Purpose: To present a case of metallic double penetrating globe injury.

Methods: A video/case report.

Results: This is a case of a 20-year-old male who sustained a metallic double penetrating

injury of the right eye entering through the 4 o'clock limbus and exiting through the posterior pole one disc diameter inferonasal to the optic nerve head. The foreign body lodged just posterior to the globe and inferonasal to the orbital optic nerve which was confirmed through computed tomography scan. Immediate management was repair of the corneo-scleral laceration and intravitreal injection of vancomycin and ceftazidime. On the first post-operative day, visual acuity was 20/50 and fundus exam revealed vitreous hemorrhage and choroidal rupture. Patient underwent barrier laser photocoagulation surrounding the exit wound and 360 degrees of the retina. On the 10th hospital day, visual acuity dropped to hand movement and vitreous hemorrhage was bleached with difficulty of visualization of the retina. On the 60th post-operative day, patient underwent timely pars plana vitrectomy and debulking of the chorio-retinal granuloma seen intraoperatively. Final visual acuity was 20/32. Patient is monitored for ocular siderosis.

Conclusions: Double penetrating injuries lodging in the intraconal space require a multi-subspecialty approach. Inert foreign bodies located posterior to the globe may not always be sight threatening and the option to observe and monitor is valid. Timely management increases prognosis and started with immediate prevention of endophthalmitis and retinal detachment. However, with retained intraconal foreign bodies, monitoring for long term complications are warranted.

Risk Factors for Band Keratopathy in Aphakic Eyes with Silicone Oil Tamponade for Open-Globe Injuries: A Multicenter Case-Control Study

First Author: Mengyu LIAO
Co-Author(s): Hua YAN

Purpose: To identify the risk factors for band keratopathy (BK) in aphakic eyes following vitreoretinal surgical treatment with silicone oil tamponade for open-globe injuries.

Methods: This was a multicenter, case-control study. A total of 100 patients (100 eyes) who underwent vitrectomy combined with silicone oil tamponade following open-globe injuries with aphakia were included and divided into two groups: BK and non-BK groups. Odd ratios (ORs) and 95% confidence intervals (CIs) were calculated. Restricted cubic splines with three knots at the 25th, 50th, and 75th centiles were used to model the association of silicone oil retention time with BK.

Results: The incidence of BK was 28% (28/100 eyes), of which 21 eyes had zone III open-globe injury (P=0.01). Silicone oil retention time was significantly longer in the BK group (13.96±10.71 months) than in the non-BK group (7.86±6.81 months, P=0.001). From the regression analysis, silicone oil retention time (OR=1.32; 95% CI: 1.06–1.21) and zone of injury (OR=6.88; 95% CI: 1.94–24.44) were significant risk factors for BK. From the restricted cubic splines of silicone oil retention time, there was a marked increase in the risk for BK at ≥10 months and a slow increase after 6 months, but almost stable within 4–6 months.

Conclusions: In eyes following vitreoretinal surgical treatment with silicone oil tamponade for open-globe injuries with aphakia, silicone oil retention time over 6 months and zone III injury were independent risk factors for BK. The risk of BK increases sharply after 10 months of silicone oil tamponade.

Sewing Machine Technique of Cyclodialysis Cleft Repair

First Author: Manisha AGARWAL

Purpose: To repair a 360 degree cyclodialysis cleft secondary to blunt trauma.

Methods: A 14 year old boy with diminution of vision in the right eye to 6/24, N24 following an injury with a badminton racket 4 months back. The applanation tonometry recorded an IOP of 2 mm of Hg in the right eye. There was a subluxated lens with an evidence of 360 degree cyclodialysis cleft on gonioscopy. There was hypotonus maculopathy with a hyperemic swollen disc. The boy underwent pars plana lensectomy and anterior vitrectomy and intraoperative gonioscopy to confirm the extent of the cyclodialysis cleft. This was followed by the sewing machine technique of repairing the cyclodialysis cleft using a 26 gauge needle, 30 gauge needle and 10-0 prolene suture.

Results: Follow up at 12 weeks the IOP was 18 mm of Hg and the best corrected visual acuity was 6/9, N6 with +11 D sphere correction.

Conclusions: This video shows the novel sewing machine technique of cyclodialysis cleft repair.

Sub-Tenon Urokinase and Perfluoropropane Endotamponade following Vitrectomy for Polypoidal Choroidal Vasculopathy Related Breakthrough Vitreous Hemorrhage

First Author: Snehal RADKE
Co-Author(s): Nishant Vijay RADKE

Purpose: To show efficacy of sub-tenon urokinase and perfluoropropane (C3F8) as endotamponade in vitrectomy for polypoidal choroidal vasculopathy (PCV) related breakthrough vitreous hemorrhage (VH).

Methods: Fundus imaging wherever possible using colour fundus images, optical coherence tomography (OCT) and B-scan ultrasonography was performed. Anti-vascular endothelial growth factor (A-VEGF) injection was given intra-vitreous 3-5 days prior to surgery. 0.2ml of reconstituted urokinase in combination with 0.05ml lignocaine was injected in sub-tenon space 1 day prior to surgery. A standard 3 port pars plana vitrectomy (PPV) was performed by the same surgeon, NR. Triamcinolone assisted vitrectomy was carried out. Endotamponade with C3F8 was used after clearing vitreous hemorrhage. A-VEGF injections were repeated in follow-up as deemed necessary.

Results: Case 1 had long standing dense and altered vitreous hemorrhage with long standing massive sub-retinal pigment epithelium (RPE) as well as pre-RPE hemorrhage. After 4 more intravitreous injections of A-VEGF, sub-retinal hemorrhage had cleared with subretinal fibrosis. VA improved from light perception to counting fingers close to face but patient experienced improvement in visual field. Case 2 had retinal detachment (RD) with sub-retinal hemorrhage and VH. VA improved from HM to 0.2.

Conclusions: Sub-tenon urokinase assisted vitrectomy and gas endotamponade resulted in acceptable structural and functional outcome. Small sample size is a limitation and larger sample studies might reveal more relevant information.

Treatment of Posterior Pole Perforating Ocular Injury without Suturing the Exit Wound

First Author: Hua YAN

Purpose: To summarize the clinical features of posterior pole perforating ocular injury (PPPOI), explore its management, and analyze the relative factors.

Methods: This study was conducted in 22 eyes of 22 patients who underwent vitrectomies for PPPOI from November 2010 to December 2019 in Tianjin Medical University General Hospital and Xiamen Eye Center. Demographic data, clinical findings, surgical procedures, and final outcomes were recorded. All patients underwent an emergency surgery to close the entrance wound, and vitrectomy was performed with an average of 9.8±5.3 days after initial surgery.

Results: In all 22 injured eyes, 11 (50%) were injured by iron plate, 4 eyes (18.2%) by iron dust, 2 eyes (9.1%) by iron nail, 1 eye (4.5%) by metal bullet, 1 eye (4.5%) by scissors, and 3 eyes (13.6%) were unknown. The best-corrected visual acuity (BCVA) improved in 14 eyes (63.6%), unchanged in 5 eyes (22.7%), and decreased in 3 eyes (13.6%) at final follow-up. Postoperative recurrent retinal detachment was found in 4 eyes (18.2%) which were successfully treated subsequently. Scar tissue with flat edge of attached retina exhibited around the posterior wound in all eyes without leakage and hypotony. The exit wound located at fovea (P=0.0000) and PVR (P=0.0001) were the risk factors for final vision.

Conclusions: Vitrectomy at the prompt time is an effective and safe method for PPPOI. Suturing of the small exit wound and laser photocoagulation is not necessary in patients with PPPOI. The final poor vision after vitrectomy is related to the exit retina site and PVR.

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