13th APVRS CONGRESS 2019
of Asia-Pacific Vitreo-retina Society
RETINA CHINA 2020

November 22–24, 2019 Shanghai, China

ABSTRACT BOOK

HOSTS:

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FREE PAPERS

Eye Trauma, Emergencies & Infections

Nov 23, 2019 (Sat) 08:30 - 10:00

Venue: Session Room 5

Anterior Segment OCT in Open Globe Injury: Novel Non-invasive Tool for Identifying Occult Scleral Tear and Intraocular Foreign Body

*First Author: Bhavik **PANCHAL***
*Co-Author(s): Navya **CHERUKURI**, Avinash **PATHENGAY***

Purpose: To evaluate the role of anterior segment optical coherence tomography (AS-OCT) as a non-invasive tool in open globe injuries to identify occult scleral tears and anteriorly located intraocular foreign bodies.

Methods: All patients with penetrating type open globe injuries, with suspected occult scleral tear were evaluated using AS-OCT. A 12 mm radial scan at the center of the cornea, a 6 mm radial scan, and a line scan at the suspected area of scleral tear were performed. Ultrasound biomicroscopy (UBM) was used as an additional tool to confirm the diagnosis. Subsequently, the patients underwent wound exploration and scleral tear repair. The video of the scleral tear repair was analyzed for the location of the scleral tear and subsequently matched with AS-OCT findings.

Results: A scleral tear was diagnosed in all 4 patients with suspected scleral tears. The conjunctiva was seen as a superficial hyperreflective layer. Underneath this superficial layer, a discontinuity was noted in the form of a hyporeflective area, and this was diagnosed to be a s`cleral tear. The intraocular foreign bodies were identified as a dense hyperreflective area with back shadowing. The location of foreign bodies was intrascleral, behind the iris, and in the anterior chamber within the fibrin. A complete correlation was noted with the UBM and the intraoperative surgical procedure.

Conclusions: AS-OCT can be successfully used as a non-invasive imaging modality in the management of an open globe injury to identify occult scleral tears and anteriorly located intraocular foreign bodies. This tool can offer diagnostic information useful for surgical planning.

Nov 23, 2019 (Sat) 08:30 - 10:00

Venue: Session Room 5

Management of Postoperative Endophthalmitis in the Modern Era

*First Author: Lawrence **IU***
*Co-Author(s): Mary **HO***

Purpose: To investigate the characteristics and long-term outcome of postoperative endophthalmitis after cataract operations in Hong Kong.

Methods: Medical records of all cases of postoperative endophthalmitis after cataract operations treated in a tertiary hospital in Hong Kong between 2010 and 2018 were reviewed retrospectively. All cases with presenting visual acuity (VA) of hand-movement or better received intravitreal antibiotics. Vitrectomy was performed when VA on presentation or after intravitreal antibiotics became light-perception.

Results: A total of 17 cases with a median follow-up time of 24 months were included. The mean age of patients were 76 ± 14 years. They presented on average 6.9 ± 3.8 days after cataract operations. The median presenting VA was hand-movement (range = 20/60 to light-perception, 1st quartile = hand-movement, 3rd quartile = hand-movement). Bacterial growth was identified in 13 cases, of which the majority was Staphylococcus (62%), followed by Streptococcus (15%). Thirteen cases required vitrectomy. One case required evisceration. The median overall final VA was 20/80 (range = 20/30 to no-light-perception, 1st quartile = 20/60, 3rd quartile = 20/120). Final VA ≥ 20/120 occurred in 76.4% cases.

Univariate linear regression analysis showed that complicated cataract operation and Streptococcus were significantly associated with poor final VA (P = 0.016 and P < 0.001 respectively). Multivariate linear regression analysis showed that Streptococcus was the only factor significantly associated with poor final VA (P = 0.003).

Conclusions: A large proportion of postoperative endophthalmitis achieved good final VA after treatment. Infectious organism of Streptococcus was significantly associated with poor visual outcome.

Intraocular Inflammation, Uveitis & Scleritis

Nov 24, 2019 (Sun) 14:30 - 16:00

Venue: Session Room 5

Detection of Serum Anti-retinal Antibodies in the Chinese Patients with Presumed Autoimmune Retinopathy

*First Author: Huiyang **ZENG***

Purpose: To explore the presence of serum anti-retinal antibodies (ARAs) in Chinese patients with presumed autoimmune retinopathy (AIR).

Methods: Twenty-three Chinese patients with presumed AIR, disease controls including 40 RP patients, 22 bilateral uveitis patients, 18 acute zonal outer occult retinopathy (AZOOR) patients, and 30 healthy donors were included. Serum samples of all the subjects were obtained and analyzed for presence of 4 ARAs including recoverin, α-enolase, carbonic anhydraseII (CAII), and collapsin response mediated protein (CRMP)-5 by Western bolt assay.

Results: ARAs were present in the serum of either presumed AIR patients, disease control or healthy donors. One or more ARAs were present in the 78.2% of presumed AIR, while they were indicated in the 35.0% of RP patients (P < 0.01) and 33.3% of healthy donors (P < 0.01). The prevalence of ARAs in the bilateral uveitis and AZOOR was 63.3% and 100%, respectively. Positive rate ofα-enolase antibody present in the presumed AIR, disease control, and healthy donors was 73.9%, 47.5%, and 33.3% respectively. Positive rate of CAII antibody present above groups was 52.1%, 50%, and 33.3% respectively. Recoverin antibody seemed to be specifically present in the serum of patients with cancer-associated retinopathy.

Conclusions: Presence of serum ARAs including recoverin, α-enolase, CAII, or CRMP-5 in the Chinese patients with presumed AIR occurred significantly more often than RP patients and healthy donors. Seropositivity of ARAs had diagnostic value for the presumed AIR, but mere presence was not sufficient for the diagnosis due to identification of them in the healthy controls and other retinal diseases.

Nov 24, 2019 (Sun) 14:30 - 16:00

Venue: Session Room 5

Outcomes of Patients on Second-line Anti-tubercular Therapy for Rifampin Resistance Detected Using rpoB Gene Sequencing

*First Author: Nitin **KUMAR***
*Co-Author(s): Aniruddha **AGARWAL**, Reema **BANSAL**, Vishali **GUPTA**, Kusum **SHARMA***

Purpose: To describe the clinical features and outcomes in patients of intraocular tuberculosis (IOTB) receiving second-line anti-tubercular therapy (2L-ATT).

Methods: Patients diagnosed with IOTB and detected to have mutations in rpoB gene (for rifampin resistance) on sequencing (analysis of vitreous fluid) were retrospectively studied (n = 11 eyes, 7 patients; 2 males, 5 females).

Results: All received first-line ATT and corticosteroids with recurrent inflammation and were initiated on 2L-ATT for a minimum of 1 year. Two patients had choroidal granulomas, and 5 had serpiginous-like choroiditis. At presentation, best corrected visual acuity (BCVA) was 1.2 ± 1. Despite therapy, 4 patients required systemic azathioprine and 1 methotrexate. Intravitreal dexamethasone implant/methotrexate was given in 4 eyes. At

53.8 ± 29 months follow-up, quiescence was achieved in all. Final BCVA was 1 ± 0.9.

Conclusions: Patients with IOTB and rifampin resistance required long-term therapies with 2L-ATT and additional systemic/local immunosuppression to achieve remission. Data on intraocular tuberculosis patients with rifampicin resistance is limited. The study aimed to re-explore the role of second-line ATT and the need of immunosuppression in IOTB patients. It adds to the current knowledge that immunosuppression is required for disease remission.

Neuroscience, Stem Cells & Regenerative Medicine

Nov 24, 2019 (Sun) 10:15 - 11:45

Venue: Session Room 6

Generation of Patient-specific Induced Pluripotent Stem Cells and Retinal Organoids with Novel RPE65 Mutations

*First Author: Xiufeng **ZHONG***
*Co-Author(s): Guanjie **GAO**, Guilan **LI**, Guangjin **PAN**, Pangfeng **WANG**, Qingjiong **ZHANG***

Purpose: RPE65-associated Leber congenital amaurosis (LCA) is one of highly heterogeneous, early-onset, severe retinal dystrophy. Their pathogenicity has not been directly clarified due to a lack of diseased cells. This study aimed to produce RPE65 patient-specific retinal tissues for study of molecular mechanisms and cell therapy.

Methods: Urine cells from a patient carrying 2 novel RPE65 mutations were collected, expanded, and then reprogrammed into hiPSCs. The identifiable hiPSCs colonies were picked up, cultured in mTeSR1 and subjected to stringent characterization. The procedure for inducing patient hiPSCs into retinal organoids was based on our published protocols (Zhong X, Nature Communications 2014; Li G, Stem Cells International 2018).

Results: LCA patient hiPSCs with 2 novel RPE65 mutations c.200T>G and c.430T>C were generated. They presented typical morphological features with normal karyotype, expressed pluripotency markers, and developed teratoma in NOD-SCID mice. Moreover, the patient hiPSCs were able to differentiate towards retinal lineage fate and self-form retinal organoids with layered neural retina. All major retinal cell types including photoreceptor and retinal pigment epithelium (RPE) cells were also acquired overtime. Compared to healthy control, RPE cells from patient iPSCs had lower expression of RPE65.

Conclusions: This study provided valuable patient-specific, disease targeted retinal organoids containing photoreceptor and RPE cells, facilitating the study of personalized pathogenic mechanisms of disease, drug screening, and cell replacement therapy.

Nov 24, 2019 (Sun) 10:15 - 11:45

Venue: Session Room 6

Protective Effect of Chemokine CXCL12 on Rat Retinal Ganglion Cells Cultured with High-glucose Environment and Related Mechanism

*First Author: Yuqing **LAN***
*Co-Author(s): Yifan **LIN**, Rui **ZENG***

Purpose: To investigate the protective effect of chemokine CXCL12 on rat retinal ganglion cells (RGCs) under high-glucose environment and its regulation of NMDA receptor 2B (NR2B), so as to find a way to the early therapy of diabetic retinopathy.

Methods: In vitro, RGCs were isolated and purified from rat retina. After culture for 12 hours, rat RGCs were divided into 3 groups: the control group, the high-glucose group, and the CXCL12 group. Survival rate of RGCs in each group was evaluated by CCK-8 test after treatment for 48 hours. And the expression of NR2B and NMDA receptor 1 (NR1) was tested by qPCR and flow cytometry.

Results: Cultured RGCs presented the red fluorescence of TUB3, and the purity was 93%. CCK-8 test results indicated that the survival rates of RGCs in the high-glucose

groups and the CXCL12 group were greatly decreased than that in control ($P < 0.01$), and the CXCL12 group shows higher survival rate than the high-glucose group ($P < 0.05$). Both in mRNA and protein levels, compared with the control group, the expression of both NR2B and NR1 upregulated significantly of both the high-glucose group and the CXCL12 group ($P < 0.01$), and the expression of NR2B in the CXCL12 group was lower than that in the high-glucose group ($P < 0.01$). But there is no significant difference in the expression of NR1 between the high-glucose group and the CXCL12 group.

Conclusions: CXCL12 shows the protective effect of RGCs under a high-glucose environment, and the mechanism of this effect probably is downregulating the expression of NR2B.

Nov 24, 2019 (Sun) 10:15 - 11:45

Venue: Session Room 6

Single-cell RNA-seq Analysis Maps Early Development of Mouse and Human Retina

*First Author: Xi **CHEN***
*Co-Author(s): Shanshan **LI**, Yanling **WANG**, Ran **YOU**, Lu **ZHAO***

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 ciliary marginal zone cells and fate-deciding RPCs, and then down to 3 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.

Nov 24, 2019 (Sun) 10:15 - 11:45

Venue: Session Room 6

The Effect of Apolipoprotein A-1 Mimetic Peptide D-4F on Reducing Leakage Blood-retina Barrier in apoA1 Knock-out Mice Oxygen-induced Retinopathy Model

*First Author: Kunyi **SU***
*Co-Author(s): Andina **HU**, Jie **HU**, Zheng **LI**, Lin **LU***

Purpose: To investigate the effect of apolipoprotein A-1 (apoA1) mimetic peptide D-4F on reducing retinal microvascular leakage and inhibiting retinal neovascularization in apoA1 knock out (-/-) mice OIR model under the hypoxia environment.

Methods: apoA1 -/- mice were divided into 3 groups : ① apoA1 -/- (blank control) ; ② apoA1 -/- + OIR; ③ apoA1 -/- OIR+D-4F (60 mg/kg). The experiments were performed as: ① Fundus photography (observe vascular form) ; ② Fundus fluorescence angiography (FFA) (observe vascular leakage); ③ Retinal stretched preparation in mice (IB4 staining) (observe the size of the non-perfusion area); ④ HE staining (observe the number of vascular endothelial nuclei breaking through the internal limiting membrane). Results were analyzed by

AngioTool, GraphPad Prism 6 and SPSS 22 (One-way ANOVA).

Results: ① Fundus photograph showed no influence happened on the main blood vessels after intraperitoneal injection with D-4F, ② FFA showed D-4F group had decreased non-perfusion areas with less fluorescence leakage (P vessels percentage area = 0.0206 < 0.05, P Mean E Lacunarity = 0.0021 < 0.01). ③ IB4 staining indicated D-4F group had decreased retinal nonperfusion areas and neovascularization (P nonperfusion area ratio = 0.0066 < 0.01). ④ HE staining showed the endothelial cells of D-4F group were fewer than apoA1 -/- mice OIR model (PEC < 0.0001).

Conclusions: High-density lipoprotein (HDL) with its main components --apoA1, have the effects of anti-atherosclerosis, reversing cholesterol transport, anti-oxidation, etc. D-4F can help apoA1 -/- mice OIR model to reduce the leakage of the blood-retina barrier and inhibit neovascularization.

Ocular Imaging

Nov 24, 2019 (Sun) 10:15 - 11:45

Venue: Session Room 6

Automated and Interpretable Diabetic Retinopathy Identification by a Deep Learning Algorithm Based on Lesion Detection

*First Author: Yuelin **WANG***
*Co-Author(s): Youxin **CHEN**, Dayong **DING**, Weihong **YU**, Xirong **LI***

Purpose: To establish a deep learning method for detecting diabetic retinopathy (DR) related lesions in color fundus images, and to automatically grade DR based on the lesion detection results.

Methods: A set of 22,939 color fundus images of diabetic patients were manually annotated with DR-related lesions by 45 licensed ophthalmologists. Eligible images were split at random into a training set and a validation set. A deep learning lesion detection model was trained to detect common lesions of DR, and automatically grading DR images. Another fundus image-based deep learning model was also trained as a control group. A test set of eligible images from 565 consecutive clinical fundus images were also established to compare the diagnostic consistency and calculated the sensitivity and specificity of identifying referable DR, defined as moderate NPDR and above, of the 2 models.

Results: The lesion-based referable DR identification model obtained a sensitivity of 0.957, a specificity of 0.938, a weighed kappa of 0.815, and an area under curve of 0.982, while the image-based model were 0.938, 0.928, 0.807, and 0.982, respectively. The 2 models have similar diagnostic accuracy, but the former provides detailed lesion information. The precision and recall (sensitivity) of the lesion detection model was as follows: preretinal hemorrhage, 0.909 and 0.683, hard exudate, 0.874 and 0.561, vitreous hemorrhage 0.846 and 0.500, neovascularization 0.837 and 0.457, cotton wool spots, 0.801 and 0.632, fibrous proliferation, 0.780 and 0.800.

Conclusions: Based on lesion detection, an automated and interpretable DR screening model with an acceptable diagnostic accuracy and referral value was established.

Nov 24, 2019 (Sun) 10:15 - 11:45

Venue: Session Room 6

Deep Learning on Optical Coherence Tomography Angiography in Diabetic Retinopathy

*First Author: Akitaka **TSUJIKAWA***
*Co-Author(s): Shin **KADOMOTO**, Yuki **MURAOKA**, Akihito **UJI***

Purpose: To investigate the effect of deep learning (DL) on optical coherence tomography angiographic (OCTA) eye images of patients having diabetic retinopathy.

Methods: Macular OCTA images were obtained from 112 eyes (108 patients) with various retinal diseases using a HS100 (Canon Inc., Tokyo, Japan) spectral-domain OCTA device. For each

subject, we obtained a single image (original image), a 10-frame-averaged OCTA image (averaged image) and an image using built-in DL software (DL image). Peak signal-to-noise ratio (PSNR) of the original image and DL image was measured by means of the averaged image as a reference.

Results: The image quality was significantly higher in the averaged images and DL images, compared with that of the original images. The image acquisition times for the original images, averaged images, and DL images were 4.2 ± 0.7 s, 56.7 ± 3.1 s, 5.4 ± 0.7 s, respectively. Therefore, images obtained using DL were acquired in significantly shorter times compared to the averaged images ($P < 0.001$), and the PSNRs of the DL images (17.0 ± 1.3 dB) were significantly higher than those of the original images (14.3 ± 1.2 dB, $P < 0.001$). Both averaged images and DL images obtained from eyes of patients having diabetic retinopathy allow us to clearly examine microaneurysms, capillary dropout, and retinal neovascularization.

Conclusions: The application of DL resulted in superior image quality, and a significant impact on image acquisition time was also confirmed. Additionally, retinal capillary changes associated with diabetic retinopathy can be effectively detected using DL within a short acquisition time.

Ocular Oncology & Pathology

Nov 23, 2019 (Sat) 08:30 - 10:00

Venue: Session Room 5

Combined Intra-arterial Chemotherapy and Intravitreal Melphalan for the Treatment of Advanced Unilateral Retinoblastoma

*First Author: Tingyi **LIANG***
*Co-Author(s): Xunda **JI**, Peiquan **ZHAO***

Purpose: To evaluate the efficacy and safety of combined intra-arterial chemotherapy (IAC) and intravitreal melphalan (IVM) for the treatment of advanced unilateral retinoblastoma.

Methods: This retrospective study involved 30 consecutive eyes from 30 Chinese patients with advanced unilateral retinoblastoma. All patients were initially treated with IAC combined with IVM. The clinical status and complications were recorded at each visit.

Results: The International Intraocular Retinoblastoma Classification groups were D in 23 eyes and E in 7 eyes. All eyes showed severe cloud vitreous seeds at the first visit. The mean number of IAC cycles and intravitreal injections were was 3.2 (range, 3 - 4) and 6 (range, 1 - 14), respectively. The median follow-up time was 29 months (range, 7 - 36 months). Treatment success with regression of the retinal tumor and vitreous seeds was achieved in 29 of 30 eyes (96.7%). Globe salvage was attained in 93.3% (28/30) eyes, and enucleation (n = 2) was performed due to neovascular glaucoma and persistent vitreous hemorrhage. Complications included retinal pigment epithelium (RPE) atrophy (n = 13; 43%), mild lens opacity (n = 7; 23%), vitreous hemorrhage (n = 5; 17%), and rhegmatogenous retinal detachment (n = 1; 3%). No extraocular tumor extension or metastasis.

Conclusions: Combined IAC and intravitreal melphalan are effective and safe for the treatment of advanced unilateral retinoblastoma.

Nov 23, 2019 (Sat) 08:30 - 10:00

Venue: Session Room 5

Systematic Identification of Oncogenic Pathways Associated with the Clinical Outcomes of Uveal Melanoma

*First Author: Yongjoon **KIM***
*Co-Author(s): Christopher **LEE**, Sung Chul **LEE***

Purpose: Recent experimental studies have reported roles for the PI3K-AKT-MTOR, Hippo-YAP, and MAPK pathways in terms of the tumorigenesis of uveal melanoma (UM). However, much less is known about the associations between oncogenic pathway activities and clinical outcomes.

Methods: We analyzed updated follow-up survival and RNA-seq data on 80 UM patients of The Cancer Genome Atlas (TCGA) cohorts. The enrichment scores for 189 oncogenic signatures (MSigDB, Broad institute) were calculated to estimate oncogenic pathway activities in the 80 UM samples via Gene Set Variation Analysis (GSVA). Patients were divided into those with high and low oncogenic signatures (n = 40 per group) based on the enrichment scores. The effects of each oncogenic pathway on the clinicopathological and prognostic features of UM were evaluated.

Results: We identified 30 oncogenic signatures that were significantly associated with tumor-specific survival. The MTOR pathway [MTOR signature, hazard ratio (HR) 10.54, P < 0.0001)] was most significantly associated with survival, followed by the MAPK pathway (KRAS signature, HR 6.97; MEK signature, HR 3.75) and the Wnt/Beta-catenin pathway (LEF1 signature, HR 3.66; BCAT signature, HR 3.34). The YAP signature (HR 0.84, P = 0.674) was not significantly associated with survival. A high MTOR signature was significantly associated with the epithelioid cell type, large tumor size, and BAP1 mutation; a low MTOR signature was associated with mutations in SF3B1 and EIF1AX.

Conclusions: Our results enable a better understanding of the oncogenic pathways associated with UM, and offer therapeutic insights into the condition.

Other (General Ophthalmology)

Nov 22, 2019 (Fri) 10:15 - 11:45

Venue: Session Room 5

Effects of Breathing Meditation on Pupillary Reflexes and Macular Vascular Perfusion in Normal Eyes

*First Author: Huimin **YU***
*Co-Author(s): Xufang **SUN***

Purpose: Breathing meditation is indicated to have the antihypertensive effects of slow and deep respiration by increasing baroreflex sensitivity. The aim of this study was to evaluate the potential influence of breathing meditation on ocular indicators, thus evaluating whether it could be a nonpharmacological therapy for retinal vascular diseases.

Methods: This before-after study included 50 eyes in 34 healthy people that were taught to do breathing meditation for 15 minutes. Before and after intervention, we carried out optical coherence tomography angiography (OCTA) of macular area and pupil light and dark adaption examination.

Results: After breathing meditation, systolic pressure (P < 0.0001), diastolic pressure (P = 0.0002), and heart rate (P = 0.0343) decreased. Pupillary diameter is reduced after breathing meditation in 0 cd/m^2 (P < 0.0001), 1 cd/m^2 (P < 0.0001), 10 cd/m^2 (P < 0.0001), and 100 cd/m^2 (P < 0.0001). In pupillary reflexes, amplitude (APC) (P < 0.0001) and velocity (VPC) (P = 0.0281) of pupil contraction also decreased. Besides, breathing meditation decreased ocular perfusion pressure (OPP) (P < 0.0001). While using OCTA examination, the parafoveal vascular density is increased in superficial layer (P = 0.0025) and deep layer (P = 0.0010) of the retina, but there is no significant difference in vascular density of central fovea (P > 0.05).

Conclusions: The hypotensive effect of breathing meditation is verified, and sympathetic nerve activity reduction may also exist in normal eyes. Breathing meditation may have a parasympathetic-dominant influence on the intrinsic muscles controlling pupillary diameter and vascular beds within the retina and choroid. Further investigations need to be carried out to determine whether breathing meditation could benefit retinal diseases.

Nov 22, 2019 (Fri) 10:15 - 11:45

Venue: Session Room 5

Refractive Error After Intrascleral IOL Fixation Induced by IOL Tilt and Decentration

First Author: Teruaki ***TOKHISA***
Co-Author(s): Hideo ***KOHNO****, Tadashi* ***NAKANO****, Akira* ***WATANABE****, Tomoyuki* ***WATANABE***

Purpose: To investigate the relationship between the refractive error of intraocular lens (IOL) after flanged intrascleral IOL fixation, IOL tilt, and decentration.

Methods: A total of 57 eyes of 55 consecutive patients who underwent flanged intrascleral IOL fixation with double-needle technique in May 2017 to June 2019 at the Jikei University Hospital were studied retrospectively. The mean axial length was 25.23 mm. They were imaged using CASIA2 (TOMEY) and IOL tilt, decentration, and anterior chamber depth (ACD) were quantified after operation at least 1 month later. The correlation between refractive error, the IOL tilt, and decentration were assessed.

Results: The mean refractive error was -0.93 ± 1.80 D (range,-10.42-0D). The mean postoperative IOL decentration was 0.51 ± 0.32 mm (range, 0.08 - 1.74 mm). The mean IOL tilt was 10.0 ± 8.0° (range, 0.7 - 35.8°) to the topographic axis. Additionally, the direction of tilt was binding sites of optic and haptics. No correlation was detected between the IOL decentration and refractive error (P = 0.07). No correlation was found between the IOL decentration and IOL tilt (P = 0.12). The IOL tilt had a strong negative correlation with refractive error (P < 0.0000001). The refractive error also correlated with postoperative ACD (P = 0.015).

Conclusions: The IOL tilt after flanged intrascleral IOL fixation may cause myopic shift.

Pediatric Retina

Nov 23, 2019 (Sat) 08:30 - 10:00

Venue: Session Room 5

A Comparative Study in Multiple-Factor Analysis of Retinopathy of Prematurity Requiring Single or Multiple Anti-VEGF Treatments

First Author: Enzhong ***JIN***
Co-Author(s): Xiaoxin ***LI****, Hong* ***YIN****, Mingwei* ***ZHAO***

Purpose: Anti-VEGF treatment is the latest applied treatment that could be used in retinopathy of prematurity (ROP) patients. The demographic and treatment data of ROP patients requiring single or multiple intravitreal injections of anti-VEGF agents were compared.

Methods: A consecutive case series of ROP treated with single or multiple anti-VEGF treatments were retrospectively studied. All patients were followed up for longer than 6 months. The primary outcome was the associated factors for eyes/infants that required multiple treatments. The secondary outcomes were the average treatment frequency for ROP infants and the final regression of disease.

Results: A total of 158 eyes (81 patients) with ROP were included. NInety-two eyes (49 patients) received single anti-VEGF treatment, and 66 eyes (34 patients) received multiple treatments. For the multiple treatments group, 3 eyes received pars plana vitrectomy (PPV), and 1 eye received laser treatment. Among the single treatment group, the mean gestational age, birth weight, and postmenstrual age at initial treatment for the infants were, respectively. For the multiple treatments group, 10 eyes had AP-ROP, these were, respectively. 2/92 and 10/66 eyes had AP-ROP for single and multiple treatment groups. All the included infants received an average of (1.7 ± 1.05) injections. The regression of plus disease occurred for all eyes excepted 3 eyes that required PPV.

Conclusions: The lower gestational age and birth weight were risk factors for ROP that required multiple treatments. No more than

2 injections were required for most ROP treatments.

Nov 23, 2019 (Sat) 08:30 - 10:00

Venue: Session Room 5

Corneal Topographic Study on the Development of Anterior Ganglion After Laser Treatment for Retinopathy of Prematurity

*First Author: Xianlu **ZENG***
*Co-Author(s): Guoming **ZHANG***

Purpose: To observe the changes of the optic nodes of children with retinopathy of prematurity (ROP) after photocoagulation with laser.

Methods: Cross-sectional, case-control study. A total of 25 ROP children aged 3 - 12 years with an average age of 5.56 ± 2.48 years were collected after laser treatment. Meanwhile, a total of 23 children aged 3 - 12 years with an average age of 5.61 ± 2.58 years were collected as the control group. Two groups of male to female ratio in children: ROP group 16/9, 16/7, controls performed best corrected visual acuity (BCVA) inspection, statistical analysis when converted to logMAR visual acuity. Sirius three-dimensional sectional corneal topography and anterior segment analysis and diagnosis system were used to measure the development data of the anterior segment of children in each group (such as: HVID, corneal thinnest point radius, corneal thinnest point thickness, CCT, AD, anterior chamber volume, etc.).

Results: Data of anterior ganglion development of the 2 groups were compared: HVID, radius of the thinnest point of cornea, thickness of the thinnest point of cornea, AD and volume of anterior chamber of the ROP group and the control group were statistically significant ($P < 0.05$).

Conclusions: Postoperative corneal horizontal diameter was relatively small in children, the thinnest point of the cornea was remote from the pupil, the thickness was relatively thin, the anterior chamber depth was relatively shallow, and the volume was relatively small.

Nov 23, 2019 (Sat) 08:30 - 10:00

Venue: Session Room 5

Correlation Between Visual Function and Macular Morphological Characteristics Evaluated by SD-OCT in X-linked Retinoschisis

*First Author: Baoyi **LIU***
*Co-Author(s): Yu **XIAO**, Honghua **YU**, Xiaomin **ZENG***

Purpose: The aim of the study was to use the spectral-domain optical coherence tomography (SD-OCT) to reveal morphological changes in the macula, and to evaluate the correlation between visual acuity and morphological characteristics in patients with X-linked retinoschisis (XLRS).

Methods: Seventy-two eyes of 39 patients with XLRS were included. The foveal thickness (FT), central subfield thickness (CST), macular volume (MV), the area of macular schisis cavity (AMS), ellipsoid zone (EZ), and interdigitation zone (IZ) were measured by SD-OCT. Correlations between these structural properties and best corrected visual acuity (BCVA) were analyzed.

Results: The SD-OCT images showed that macular schisis cavities were present in all 72 eyes (100%) and peripheral retinoschisis were present in 34 eyes (47.2%). Macular schisis cavities were seen in multiple retinal layers and predominantly in the inner nuclear layer (100%). The logMAR BCVA was significantly correlated with CST ($r = 0.717$, $P < 0.001$) and AMS ($r = 0.475$, $P < 0.001$) rather than with FT or MV. The photoreceptor defects were correlated with logMAR BCVA (EZ, $r = 0.563$, $P < 0.001$; IZ, $r = 0.391$, $P = 0.001$).

Conclusions: SD-OCT revealed various retinal splitting changes in patients with XLRS. The macular schisis was most frequently seen in the inner nuclear layer. The CST, AMS, and photoreceptor defects might be indicators for evaluating the macular and the visual function.

Nov 23, 2019 (Sat) 08:30 - 10:00

Venue: Session Room 5

Multicentral Prospective Randomized Controlled Trial of Intravitreal Injection of Conbercept Versus Ranibizumab for Retinopathy of Prematurity

*First Author: Guoming **ZHANG***
*Co-Author(s): Honghui **HE**, Ruyin **TIAN**, Song **TANG**, Zhenquan **WU***

Purpose: To compare the recurrence rate and surgical complications of retinopathy of prematurity (ROP) among patients treated with intravitreal injection of conbercept (IVC) or ranibizumab (IVR) in 6 months.

Methods: A multi-central, prospective, randomized controlled trial was applied from May 2017 to February 2019. Infants who were diagnosed with AP-ROP, Zone I or posterior Zone II treatment-requiring ROP by binocular indirect ophthalmoscope and RetCam3 were assigned to receive 0.25 mg IVC or 0.25 mg IVR monotherapy randomly. Thirty patients (60 eyes) underwent IVC, and 30 patients (60 eyes) received IVR. Recurrence rate, surgical complications, and fundus fluorescence angiography (FFA) were observed during the follow-up period for 6 months.

Results: A total of 10 eyes (16.67%) and 14 eyes (23.34%) developed recurrence in IVC and IVR groups. There was no significant statistical difference in the recurrence rate between the 2 groups (c2 = 0.417, P = 0.519). Gestational age (GA) at first injection were (34.60 ± 3.47) weeks and (35.14 ± 1.76) weeks in IVC and IVR groups, respectively. In recurrent cases, the mean ages at second treatment were (43.31 ± 3.85) and (43.43 ± 3.89) weeks in IVC and IVR groups, respectively. The periods between the two treatments were (8.71 ± 6.62) and (8.29 ± 2.56) weeks in IVC and IVR groups, respectively. All these results had no significant statistical difference between the 2 groups. There were no other complications in the 2 groups except for complicated cataracts in 3 eyes. Fluorescein leakage was observed in 10 recurrent eyes by FFA.

Conclusions: Both IVC and IVR are effective treatments for ROP. Conbercept is a new option for ROP treatment.

Nov 23, 2019 (Sat) 08:30 - 10:00

Venue: Session Room 5

The Associations Between Myopia, Time Spent Outdoors and Serum Vitamin D Status in Preterm Children With or Without a History of Retinopathy of Prematurity

*First Author: Hung-Da **CHOU***
*Co-Author(s): Kuan-Jen **CHEN**, Yih-Shiou **HWANG**, Chi-Chun **LAI**, Wei-Chi **WU***

Purpose: To analyze the associations among myopia, time spent outdoors, and serum vitamin D status in children with a history of preterm births and with or without retinopathy of prematurity (ROP).

Methods: Children born prematurely between 2010 and 2011 were enrolled to this cross-sectional study when they reached school-age. Cycloplegic refractions and ocular examinations were performed. The average time spent by the children outdoors were reported by their parents. Blood samples were gathered to determine serum 25-hydroxyvitamin D (25(OH) D) concentrations. Participants were divided to a myopic group and a nonmyopic group for comparison.

Results: Ninety-nine children with preterm births were enrolled and underwent analysis at a mean age of 6.8 years old. The average time spent outdoors was significantly higher in the nonmyopic group (0.9 ± 0.5 hours/day) than the myopic group (0.7 ± 0.3 hours/day) (P = .032). After multivariable adjustments, more time spent outdoors was correlated with a lower odds of myopia (odds ratio, 0.13 per additional hour of time spent outdoors per day; 95% confidence interval, 0.02 – 0.98; P = .048). Mean serum 25 (OH)D concentrations were similar between the myopic and nonmyopic groups and were not correlated with spherical equivalence power. Vitamin D insufficiency or deficiency was present in 57% of the participants.

Conclusions: Among preterm children with or without ROP, more time spent outdoors was associated with a lower odds of myopia. Serum 25 (OH)D concentrations were not associated with myopia, but 57% of the preterm children had insufficient levels.

Nov 23, 2019 (Sat) 08:30 - 10:00

Venue: Session Room 5

The Correlation Between RS1 Genotypes Mutation and Phenotypes of Congenital Retinoschisis Patients

*First Author: Qiaowei **WU***
*Co-Author(s): Baoyi **LIU**, Yu **XIAO**, Honghua **YU**, Xiaomin **ZENG***

Purpose: To investigate the correlation between mutation genotypes and phenotypes of X-linked retinoschisis (XLRS) patients.

Methods: A total of 33 male XLRS patients, 26 female carriers, and 100 normal subjects were enrolled in this study. All 33 XLRS patients were bilateral, which included 18 patients from 8 families and 15 sporadic patients. Among 66 XLRS eyes, there was microcystic-like foveal splitting in 49 eyes (74.2%), lamellar macular splitting in 43 eyes (65.2%), peripheral splitting in 32 eyes (48.5%), retinal detachment in 17 eyes (25.8%), and vitreous hemorrhage in 8 eyes (13.6%). Electroretinogram was performed on 42 eyes, which showed a decreased amplitude of b-wave. The 6 exons of the RS1 gene were amplified by a polymerase chain reaction and then directly sequenced. The correlation analysis was performed between mutation genotypes and phenotypes.

Results: There were 19 RS1 gene mutations including 6 novel mutations (P. Gly70Cys, P. Trpl12Arg, P. Arg156Trp, P. His2O7ProfsX56, P. Arg209AlafsX28, P. Cys223Tyr). There was no correlation between mutation genotypes and phenotypes ($\chi 2$ = 0.731, 3.438, 0.820, 3.208, 1.992; P > 0.05)

Conclusions: RS1 gene mutation is a major cause of XLRS. The RS1 mutation genotype is not correlated with phenotype, so the prognosis cannot be predicted by the genotypes.

Nov 23, 2019 (Sat) 08:30 - 10:00

Venue: Session Room 5

The Role of Apelin/APJ in a Murine Model of Retinopathy of Prematurity

*First Author: Jing **FENG***
*Co-Author(s): Li **CHEN**, Yanrong **JIANG**, Yong **TAO***

Purpose: The aim of this study was to investigate apelin and its potential neovascularization role in retinopathy of prematurity (ROP) along with the inhibitory effects of its antagonist.

Methods: We used an oxygen-induced retinopathy (OIR) mouse model to explore the progress of ROP. Apelin and angiotensin-1-like receptor APJ expression were examined in the retina using immunohistochemistry, quantitative PCR, and western blot analysis. Additionally, the retina was examined by whole-mount staining to evaluate the retinal vessel area, vessel density, capillary width, and the number and length of tip cells. The expression of the phosphorylated mTOR (p-mTOR), p-PI3K/Akt, and p-Erk signaling pathway was also evaluated using western blot analysis.

Results: Apelin promoted the development of superficial and deep retinal blood vessels, especially for tip cells during the physical development of retinal vessels. Additionally, apelin stimulated the density of the peripheral retinal zone vessels in ROP mice. The apelin and APJ expression levels significantly increased for the OIR model during their hypoxic phase. Next, we found that apelin mRNA levels in the ROP mice peaked at 6 h post-return to ambient conditions at P12, while the APJ mRNA levels peaked later at P17. Furthermore, the expression of p-mTOR, p-Akt, and p-Erk were all up-regulated in ROP mice while F13A suppressed them instead.

Conclusions: Our results strongly suggest that apelin/APJ signaling pathway is a key factor for hypoxia-induced pathologic angiogenesis, which is a very promising new target for the treatment of ROP.

Nov 23, 2019 (Sat) 08:30 - 10:00

Venue: Session Room 5

The Process of Retinal Vascularization in Retinopathy of Prematurity After Ranibizumab Treatment in China

*First Author: Qingyu **MENG***
*Co-Author(s): Yong **CHENG**, Jianhong **LIANG***

Purpose: To explore the process of retinal vascularization and risk factors for retinopathy of prematurity (ROP) treated with intravitreal ranibizumab (IVR) as monotherapy.

Methods: Infants with Type 1 ROP who received IVR as primary treatment from August 2014 to October 2016 at Peking University People's Hospital's Ophthalmology Department were included in the study. All eyes received 0.25 mg ranibizumab at initial treatment. Retinal vascularization was evaluated clinically. Potential risk factors were also recorded and examined.

Results: Retinal vascularization was completed in 126 eyes (62.7%), and retinal vascularization terminated in zone II and zone III in 16 eyes (7.9%) and 44 eyes (21.9%), respectively, after more than 1 year follow-up. In multivariate regression analysis, lower birth weight (BW), severity of ROP, and repeated injections were found to be risk factors for peripheral avascular area ($P < 0.05$).

Conclusions: In our retrospective study, 29.8% of the ROP eyes treated with ranibizumab have peripheral avascular area at the last follow-up. Lighter BW and the severity of ROP are risk factors. Furthermore, repeated injections also increase the risk of retinal peripheral avascular area remaining in ROP patients.

Nov 23, 2019 (Sat) 08:30 - 10:00

Venue: Session Room 5

Treatment Outcomes of Coats Disease: 4-year Retrospective Analysis

*First Author: Pallavi **SINGH***
*Co-Author(s): Vikas **KHETAN***

Purpose: To study the clinical profile, treatment, anatomical and functional outcomes of Coats disease in pediatric population.

Methods: Retrospective case series of 70 eyes of 65 patients, less than or equal to 16 years of age diagnosed as Coats disease clinically, angiographically, or both and treated by a single senior vitreoretinal surgeon in 4 years duration.

Results: Mean age of presentation was 6.65+/-4.07 years in 60 males (92.30%) and 5 females (7.70%). Bilateral disease was seen in 5, all were males. Most common symptom was squint (36.92%) followed by incidental finding (21.53%) of Coats disease. Nine (13.84%) patients were misdiagnosed, retinoblastoma being the most common diagnosis. Angiography was performed in 17 patients to confirm the diagnosis. Most common stage of presentation was 3b. Bilateral disease was asymmetrical. Children less than 5 years presented with more advanced disease. Treatment was given in the form of laser photocoagulation, cryotherapy, subretinal fluid drainage, scleral buckling, and observation depending upon the stage of presentation. Four patients progressed to advanced disease either with or without treatment. Follow-up visual acuity trend showed stable vision in stage 3a or less, whereas 3b and more showed worsening despite anatomical success.

Conclusions: Early diagnosis and treatment on the basis of clinical staging is pivotal in maintaining visual function. Cryotherapy and laser have good outcomes up to stage 3a. Surgical intervention should be reserved for selected cases. Massive exudations with retrolental retina have poorer outcomes despite intervention and are preferred to be best left

alone. Bilateral coats need longer follow-up to look out for possible systemic associations.

Retina (Medical)

Nov 24, 2019 (Sun) 10:15 - 11:45

Venue: Session Room 6

Assessing Long Term Safety of Voretigene Neparvovec in Patients with RPE65 Mutation-Associated Inherited Retinal Dystrophy: A Real-world Study Design

*First Author: Dominik **FISCHER***
*Co-Author(s): Andrea **SUHNER***

Purpose: Voretigene neparvovec (VN) is the first ocular gene therapy approved in multiple countries including the USA and EU for the treatment of patients with visual impairment due to confirmed biallelic RPE65 mutation-associated retinal dystrophy. The objective of this post-authorization, registry-based study was to collect long-term, real-world safety information in patients who received VN treatment.

Methods: This 5-year, observational, prospective, longitudinal, multicenter, safety registry study commencing November 2019 seeks to include a minimum of 40 consenting patients who have received VN in at least 1 eye. All patients treated with VN will be encouraged to participate to maximize data collection, including those patients treated with VN prior to the study commencement. Patients will be treated according to the local prescribing information and followed-up as per routine medical practice for 5 years post-VN administration. The primary objective is to collect all adverse events (AEs) of special interest as well as any other AEs and serious AEs. The secondary objectives will be to follow the pregnancy outcomes in patients (and female partners of patient) who received VN and to assess the visual function over time.

Results: The study will primarily report on safety outcomes. In addition, demographics, baseline ocular characteristics, surgical details from the subretinal injection procedure, and visual function over time as assessed per standard of care will be described. Initial treatment experience may be available by the end of 2019.

Conclusions: The long-term data from this study will help to characterize the safety profile of VN in a real-world setting.

Nov 24, 2019 (Sun) 10:15 - 11:45

Venue: Session Room 6

Automatic Grading System for Diabetic Retinopathy Diagnosis Using Deep Learning Artificial Intelligence Software

*First Author: Xiangning **WANG***

Purpose: To describe the development and validation of an artificial intelligence–based, deep learning algorithm (DeepDR) for the detection of diabetic retinopathy (DR) in retinal fundus photographs.

Methods: Five hundred fundus images, which had detailed labelling of DR lesions, were transmitted to be analyzed, including localization of the optic disk and macular, vessel segmentation, detection of lesions, and grading of DR. The multi-level iterative method of convolutional neural network and the strategy of enhanced learning were used to improve the accuracy of the system (DeepDR) for grading DR. Two thousand retinal fundus photographs and the public data sets were used to further train the software. The final grading results were tested based on the fundus images provided by the hospitals.

Results: Detection of microaneurysm, hemorrhage, and hard exudates had an accuracy of 99.7%, 98.4%, and 98.1%, respectively. The current algorithm accuracy was 0.96. A total of 20,000 fundus images were selected, and 7,593 photos of poor quality were excluded according to quality standards. Accuracy for accurate staging of fundus photos: accuracy was 0.9179, the F1 Score was 0.83743, the recall rate was 0.80584, and the area under the curve (AUC) was 0.9327.

Conclusions: This artificial intelligence–based DeepDR can be used with high accuracy for the detection of DR in retinal images. This technology offers the potential to increase the efficiency and accessibility of DR screening programs.

Nov 24, 2019 (Sun) 10:15 - 11:45

Venue: Session Room 6

Characteristic of Posterior Precortical Vitreous Pockets and Cloquet's Canal in Myopia by Swept-source Optical Coherence Tomography

*First Author: Xiangjun **SHE***
*Co-Author(s): Lijun **SHEN***

Purpose: To describe the morphological features of PPVPs (Posterior Precortical Vitreous Pockets) and Cloquet's canal in myopia using optical coherence tomography (OCT).

Methods: A total of 96 eyes of 51 volunteers (range, 5 - 18 years) were enrolled in this study and all individuals underwent OCT (Optovue Inc, Fremont, CA) examinations. By collecting PPVPs images, the width and height of PPVPs were measured, and the connections between PPVPs and Cloquet's canals were identified. The width, height of PPVPs, ratio of width/height and connections were compared in age, axial length, and myopia groups.

Results: PPVPs were identified in 89 of 96 eyes. Width of PPVPs was positively related with ages, especially in low to moderate myopia (P = 0.001). There were significant differences in height of PPVPs between refractive error groups from 9 to 14 years (F = 3.597, P = 0.005). The ratios of PPVPs width/height are significantly different between refractive error groups (F = 3.335, P = 0.041), (F = 3.335, P = 0.004). Twenty-two eyes (22.4%) were identified as a connection between PPVPs and Cloquet's. The connections began to increase with axial length from 5 to 8 years (= 6.775, P = 0.025).

Conclusions: PPVPs width is positively related with ages, especially in low to moderate myopia. The height of PPVPs reduced with myopia from 9 to 14 years. Horizontal and vertical imbalanced expansion of PPVPs was the main feature in myopia from 9 to 14 years. Connections between PPVPs and Cloquet's was associated with axial length extension from 5 to 8 years.

Nov 24, 2019 (Sun) 10:15 - 11:45

Venue: Session Room 6

Correlation Between Multiluminance Mobility Testing and Visual Function Tests in a Phase 3 Trial of Voretigene Neparvovec for Biallelic RPE65-mediated Inherited Retinal Disease

*First Author: Daniel **CHUNG***
*Co-Author(s): Jean **BENETT**, Katherine **HIGH**, Albert **MAGUIRE**, Stephen **RUSSELL***

Purpose: A post-hoc analysis from Phase 3 trial of voretigene neparvovec (VN) for biallelic RPE65-mediated inherited retinal disease evaluated the correlation between change in multi-luminance mobility testing (MLMT) performance and commonly used visual function tests, including full-field light sensitivity threshold (FST), Humphrey visual field (HVF) foveal sensitivity threshold, and HVF macula threshold.

Methods: Twenty-nine subjects (randomized, 2:1; original intervention [OI] group, 20 and delayed intervention [DI] group, 9) with RPE65 mutations received bilateral subretinal injections of VN (OI) and bilateral subretinal injections of VN after 1 year (DI). Subjects were tested for accuracy and speed at up to 7 standardized illumination levels on the MLMT (1 - 400 lux). The primary endpoint was change in bilateral MLMT score at 1 year. MLMT bilateral change score was reported as percentage of maximum achievable change score (%max). Pairs were represented as scatterplots with a Pearson correlation coefficient (PCC) to measure the linear relationship between the 2 variables.

Results: MLMT mean bilateral change scores were 1.9 and 2.1 levels for OI and DI subjects, respectively, at 1 year post-VN administration; 89% of DI subjects passed the MLMT at the lowest light level. Correlations between MLMT bilateral change score %max and FST, HVF foveal sensitivity, and HVF mean macula

threshold change were good (PCC: −0.74, 0.66, and 0.63, respectively; P < 0.001).

Conclusions: MLMT showed good correlation with FST, HVF foveal sensitivity threshold, and HVF macula threshold. Improvements in these variables may indicate greater retinal sensitivity to lower luminance levels after subretinal VN injection, thus increasing independent ambulation.

Nov 24, 2019 (Sun) 14:30 - 16:00

Venue: Session Room 5

Cytokine Profile Associated with Non-perfusion and Neovascularization on Ultra-wide Field Fluorescein Angiography in Proliferative Diabetic Retinopathy

*First Author: Jiwon **BAEK***

Purpose: To investigate the changes in aqueous inflammatory and angiogenic cytokine levels in association with nonperfusion area and neovascularization (NV) in proliferative diabetic retinopathy (PDR).

Methods: Prospective cross-sectional case series study. A total of 67 eyes of 42 patients with treatment naïve PDR without macular edema were enrolled. Ultra-wide field fluorescein angiography (UWFFA) was obtained in all patients. Nonperfusion area (NPA) and NV area (NVA) were measured at the peripheral retina and posterior pole in semi-automated manner. Aqueous cytokine levels were measured by multiplex bead assay.

Results: Peripheral NVA correlated with number of NVs correlated with (r = .266, P = .030). Aqueous levels of VEGF correlated with both peripheral and posterior pole NPA (r = .437 and .529, respectively. Both P < .001), while MCP-1 correlated with peripheral NPA only (r = .271, P = .026). IL-8 IL-10, MCP-1 and TNF-a correlated with number of NVs (r = .400, .347, .453, and .349, respectively. All P ≤ .004).

Conclusions: These findings support the role of different cytokines in the process of PDR. MCP-1, a chemostatic factor, was associated with NPA along with VEGF, suggesting that leukostasis is an important mechanism in enlargement of NPA. NVA was correlated with NPA, and the number of NV was associated with inflammatory cytokines.

Nov 24, 2019 (Sun) 14:30 - 16:00

Venue: Session Room 5

Diabetic Retinopathy (DR) Improvements with Intravitreal Faricimab in Patients with Diabetic Macular Edema (DME) in the BOULEVARD Trial

*First Author: Young Hee **YOON***
*Co-Author(s): Meike **PAULY-EVERS**, Jayashree **SAHNI**, Stefan **SCHEIDL**, Robert **WEIKERT**, Jeffrey **WILLIS***

Purpose: Faricimab, the first bispecific antibody designed for intraocular use, binds and neutralizes both angiopoietin-2 (Ang-2) and vascular endothelial growth factor-A (VEGF-A). Ang-2 promotes vascular destabilization, leakage, inflammation, and pericyte apoptosis under hyperglycemic conditions. This exploratory analysis of the phase 2 BOULEVARD trial of faricimab evaluated DR improvements in treatment-naïve patients with DME.

Methods: BOULEVARD (NCT02699450) was a phase 2, prospective, multicenter clinical trial that evaluated efficacy and safety of faricimab in patients with center-involving DME. Anti-VEGF treatment-naïve patients were randomized 1:1:1 to intravitreal faricimab 1.5 mg, faricimab 6.0 mg, or ranibizumab 0.3 mg, dosed every 4 weeks for 20 weeks. The primary efficacy outcome measure was mean best corrected visual acuity change from baseline at week 24. This analysis evaluated the proportion of patients with DR improvement on the Early Treatment Diabetic Retinopathy Study DR Severity Scale (DRSS) from baseline at week 24 in 168 anti-VEGF treatment-naïve patients.

Results: At baseline, DR severity was well distributed across treatment arms, with the majority of BOULEVARD patients having nonproliferative DR (DRSS 43/47/53). At week 24, 27.7% and 38.6% of patients receiving faricimab 1.5 mg and 6.0 mg, respectively, had ≥ 2-step DRSS improvement versus 12.2% with ranibizumab 0.3 mg.

Conclusions: Among treatment-naïve patients, a higher proportion of faricimab-treated patients achieved ≥ 2-step DR severity improvement at week 24 versus ranibizumab-treated patients. This finding highlights a potential role of simultaneous Ang-2/VEGF-A blockade in DME and DR, where the anti-inflammatory, anti-leakage, and vascular pericyte-stabilization properties of faricimab may result in better outcomes for this group of patients.

Nov 24, 2019 (Sun) 14:30 - 16:00

Venue: Session Room 5

Dual Inhibition of Ang-2 and VEGF-A with Faricimab in nAMD: Q16-week and Q12-week Dosing in the STAIRWAY Trial

*First Author: Gemmy **CHEUNG***
*Co-Author(s): Karen **BASU**, Susanna **GRZESCHIK**, Zdenka **HASKOVA**, Stefan **SCHEIDL**, David **SILVERMAN***

Purpose: Faricimab, the first bispecific antibody designed for intraocular use, simultaneously binds and neutralizes angiopoietin-2 (Ang-2) and vascular endothelial growth factor-A (VEGF-A). STAIRWAY (NCT03038880) assessed extended faricimab dosing at 16- (Q16W) and 12-week (Q12W) intervals in patients with neovascular age-related macular degeneration (nAMD).

Methods: STAIRWAY was a 52-week phase 2 study that enrolled treatment-naïve patients aged ≥ 50 years with nAMD and subfoveal choroidal neovascularization. Patients were randomized 2:2:1 to intravitreal faricimab 6.0 mg, Q16W or Q12W after every-4-week (Q4W) loading, or ranibizumab 0.5 mg Q4W. The primary objective was to evaluate the efficacy of faricimab Q16W and Q12W, assessed by best corrected visual acuity (BCVA; Early Treatment Diabetic Retinopathy Study letter score). Following disease assessment at week 24, faricimab Q16W–assigned patients without protocol-defined disease activity continued fixed Q16W dosing.

Results: STAIRWAY enrolled 76 patients with nAMD. A total of 65% (36/55) of faricimab-treated patients had no disease activity 12 weeks after their last loading dose. At week 52, faricimab Q16W flex–, faricimab Q12W–, and ranibizumab Q4W–treated patients gained 11.4, 10.1, and 9.6 letters, respectively, with 46.4%, 33.3%, and 37.5% of patients, respectively, gaining ≥ 15 letters from baseline. No new or unexpected safety signals were identified.

Conclusions: Faricimab Q16W and Q12W resulted in robust initial BCVA gains that were sustained throughout the study and comparable with ranibizumab Q4W. Combined Ang-2/VEGF inhibition shows potential for better outcomes for patients with nAMD through sustained efficacy. Two large, global, phase 3 trials (TENAYA: NCT03823287; LUCERNE: NCT03823300) to further investigate these results are ongoing.

Nov 24, 2019 (Sun) 14:30 - 16:00

Venue: Session Room 5

Efficacy and Safety of Brolucizumab Versus Aflibercept in Japanese Patients with Polypoidal Choroidal Vasculopathy: 96-week Results from the HAWK Study

*First Author: Tomohiro **IIDA***
*Co-Author(s): Gemmy **CHEUNG**, Divya **DSOUZA**, Adrian **KOH**, Won Ki **LEE**, Yuichiro **OGURA***

Purpose: HAWK (NCT02307682) was a prospective Phase III study investigating the efficacy and safety of brolucizumab versus aflibercept in the treatment of nAMD. PCV is a subtype of nAMD, particularly prevalent among Asians. Here we reported the 96-week results from Japanese patients enrolled in the HAWK study who were diagnosed with PCV at baseline.

Methods: Patients were randomized 1:1:1 to brolucizumab 3 mg (n = 358), 6 mg (n = 360), or aflibercept 2 mg (n = 360). After 3 loading doses, brolucizumab patients received 12-week dosing (q12w) with an option to adjust to 8-week dosing (q8w) at predefined disease activity assessment visits; aflibercept was dosed q8w.

Results: At screening, PCV was present in 89/154 (57.8%) of patients. Mean change in best corrected visual acuity (BCVA) (±SE) from baseline to Week 48 for brolucizumab 3 mg (n = 20), 6 mg (n = 39), and aflibercept (n = 30) were 11.4 (2.6), 10.4 (1.5), and 11.6 (1.4) EDTRS letters, respectively, and this was maintained to Week 96. Most eyes with PCV treated with brolucizumab 6 mg were maintained on a q12w dosing interval immediately following loading to Week 48 (76%) and Week 96 (68%). Eyes with PCV had decreased CSFT at Week 96. Compared with aflibercept, fewer eyes with brolucizumab 6 mg had fluid (intraretinal and/or subretinal or subretinal pigment epithelium) at Weeks 48 and 96.

Conclusions: Robust and consistent BCVA gains were observed with brolucizumab treatment across 96 weeks that were comparable with aflibercept. Majority of eyes treated with brolucizumab 6 mg were maintained on a q12w interval. Fewer brolucizumab 6 mg-treated eyes had fluid compared with aflibercept.

Nov 24, 2019 (Sun) 14:30 - 16:00

Venue: Session Room 5

Efficacy of Initial Versus Delayed Photodynamic Therapy in Combination with Conbercept in Patients with Symptomatic Polypoidal Choroidal Vasculopathy

*First Author: Zuhua **SUN***
*Co-Author(s): Yuanyuan **GONG**, Xiaoling **LIU***

Purpose: To compare the initial versus delayed photodynamic therapy (PDT) in combination with intravitreal injection of conbercept (IVC) in polypoidal choroidal vasculopathy (PCV).

Methods: This was a prospective, randomized, multicenter, 12-month trial (NCT02821520). Eighty-eight patients were randomized 1:1 into 2 groups. At baseline, patients in the initial combination group were treated with PDT and IVC within 1 week, while patients in the delayed combination group were treated with IVC only. PDT was administered pro re nata (PRN) from month 3 to 11 with the interval of less than 3 months, and IVC was administered PRN monthly from month 1 to 11 in both groups. The primary outcome was the mean change in best corrected visual acuity (BCVA) at month 12. Then, the proportion of polyps regression was assessed by indocyanine green angiography (ICGA).

Results: Forty-four patients were enrolled in each group. At month 12, BCVA improved 7.89 ± 10.79 and 7.78 ± 14.61 letters in initial and delayed group, respectively. The mean reduction of central retinal thickness (CRT) was 184.17 ± 86.61 μm and 116.56 ± 170.18 μm in initial and delayed group, respectively. The proportion of polyps had been total regression was 66.7 % and 57.1% in initial and delayed groups, respectively. There was no significant difference between the 2 groups (P = 0.973, P = 0.066, P = 0.586). The mean injection numbers were 3.52 ± 2.40 and 4.77 ± 2.75 in initial and delayed groups, respectively. There was a significant difference (P = 0.027).

Conclusions: Delayed PDT combination with the IVC group was similar to the initial combination group in the improvement of BCVA. But initial combination treatment can reduce the injection numbers.

Nov 24, 2019 (Sun) 14:30 - 16:00

Venue: Session Room 5

Efficacy of Intravitreal Aflibercept Administered Using Treat-and-extend Regimen over 2 Years in Patients with Neovascular Age-related Macular Degeneration: The ARIES Study Results

*First Author: Paul **MITCHELL***
*Co-Author(s): Frank G **HOLZ**, Philip **HYKIN**, Edoardo **MIDENA**, Eric **SOUIED**, Sebastian **WOLF***

Purpose: To assess whether intravitreal aflibercept (IVT-AFL) in an early-start, treat-and-extend (T&E) regimen (initiated after the first 8-week treatment interval) is non-inferior to a late-start T&E regimen (initiated at the end of Year 1) in treatment-naïve patients with neovascular age-related macular degeneration (nAMD).

Methods: ARIES (NCT02581891) was a multicenter, randomized, open-label, active-

controlled, parallel-group, Phase 4 study. All patients received 3 initial monthly doses of IVT-AFL (Weeks 0, 4, 8), followed by an injection at Week 16 and randomized 1:1 to early-start T&E (T&E regimen extended by 2 weeks or an initial 4-week interval [maximum 16 weeks]) or late-start T&E (IVT-AFL 2q8 regimen). The primary endpoint was change in best corrected visual acuity (BCVA) from randomization (Week 16) to Week 104. Here we present interim Week 52 results.

Results: At Week 16, 271 patients were randomized to an early- or late-start T&E regimen. At Week 52, the absolute BCVA letter score change (68.0 vs 71.5 Early Treatment Diabetic Retinopathy Study [ETDRS] letters), from randomization (+1.3 vs +1.9), from baseline (+7.8 vs +10.2 ETDRS letter difference), mean number of injections (7.2 vs 8.0), proportion maintaining visual acuity (98.5% vs 97.8%), and decrease in mean central retinal thickness (160 vs 178 µm) were similar in patients on the early- and late-start T&E regimens, respectively. The safety profile was consistent with previous studies.

Conclusions: Outcomes of early-start T&E IVT-AFL regimen are similar to those with a late-start approach over the first year of treatment for nAMD. The observed reduction in injection number after the initial dose is clinically relevant.

Nov 24, 2019 (Sun) 14:30 - 16:00

Venue: Session Room 5

Fibrosis and HRM Changes in Treated Neovascular Age-related Macular Degeneration: Findings from Multimodal Imaging of the IVAN Clinical Trial

First Author: Luping ***WANG***
Co-Author(s): Usha ***CHAKRAVARTHY****, Frank G.* ***HOLZ****, Tim* ***KROHNE****, Alyson* ***MULDREW****, Tunde* ***PETO***

Purpose: To better understand the evolution of fibrosis during anti-VEGF treatment, we explored its relationships with CNV subtype, the presence, severity, and location of hyperreflective material (HRM) and tear of the retinal pigment epithelium by conducting a revised grading of the image repository in the IVAN trial.

Methods: In the subset of the IVAN trial (n = 135) participants who had SD-OCT performed, we systematically classified the nAMD lesion. These were type 1 (occult), type 2 (classic), type 3 (retinal angiomatous proliferation), type 4 polypoidal choroidal vasculopathy (PCV). Based on the SD-OCT we sub-classified HRM as subretinal non-fibrotic and fibrotic, subRPE non-fibrotic and fibrotic using both location and reflectivity to assign these characteristics. We measured the area of fibrosis on FA, height, and width of the HRM on OCT.

Results: All patients had CFP, FA, and SD-OCT at baseline and final visit at 24 months (M24). Among 135 eyes, the proportions of type 1, 2, 3, and 4 CNV were 28.1%, 25.9%, 22.2%, and 23.8%, respectively. The height and width of HRM were strongly correlated at baseline as well as at final visit, and were significantly decreased at M24 compared to baseline. Type 1, type 3, and type 4 CNV all showed a significant reduction in height and width of HRM. However, in type 2, there was no reduction of HRM in either height or width.

Conclusions: In eyes with nAMD undergoing 2 years' anti-VEGF treatment and follow-up, the reduction of height and width of HRM was observed in various CNV subtypes, except type 2.

Nov 24, 2019 (Sun) 10:15 - 11:45

Venue: Session Room 6

Four-year Results of a Phase 3 Voretigene Neparvovec Trial in Biallelic RPE65-associated Inherited Retinal Disease

First Author: Daniel ***CHUNG***
Co-Author(s): Jean ***BENETT****, Arlene* ***DRACK****, Katherine* ***HIGH****, Stephen* ***RUSSELL***

Purpose: To report the 4-year outcomes of voretigene neparvovec (VN) administration in subjects with biallelic RPE65 mutation-associated inherited retinal disease.

Methods: Subjects were randomized to either original intervention (OI:bilateral subretinal VN

at baseline; n = 20) or delayed intervention (DI: VN after 1 year; n = 9). Primary endpoint was bilateral performance on multi-luminance mobility test (MLMT) at 7 standard light levels measured by a change score. Additional endpoints were full-field light sensitivity threshold (FST) testing, visual acuity (VA), Goldmann kinetic visual field (GVF), and safety outcomes.

Results: MLMT mean (standard deviation [SD]) bilateral light level change scores were 1.7 (1.1) and 2.4 (1.5) levels at Year 4 (OI; n = 20) and Year 3 (DI; n = 8), respectively. Subsequent to Y1 outcomes, a change of 1 light level occurred in 5 subjects; none were below pre-treatment performance. Mean (SD) change in white light FST averaged over both eyes (log10) was −1.90 (1.33) at Y4 (OI; n = 19) and −2.91 (1.05) at Y3 (DI; n = 8). Mean (SD) change in VA (Holladay Scale) averaged over both eyes (logMAR) was −0.00 (0.75) at Y4 (OI; n = 20) and −0.06 (0.24) at Y3 (DI; n = 8). Mean (SD) change in GVF III4e sum total degrees was 197.7 (282.7) at Y4 (OI; n = 18) and 157.9 (325.3) at Y3 (DI; n = 8). Safety profile was consistent with surgical administration procedures.

Conclusions: Improvements in ambulatory navigation, light sensitivity, and VF were maintained 4 years after VN administration in OI subjects. Improvements in DI subjects were consistent with those observed in OI subjects.

Nov 24, 2019 (Sun) 14:30 - 16:00

Venue: Session Room 5

Increased Mortality After Intravitreal Injections of Anti-vascular Endothelial Growth Factor for Treatment of Neovascular Age-related Macular Degeneration Among Patients with Prior Stroke or Acute Myocardial Infarction

*First Author: Yu-Yen **CHEN***

Purpose: To evaluate whether intravitreal injections (IVI) of anti-vascular endothelial growth factor (anti-VEGF) for neovascular age-related macular degeneration (nAMD) patients with prior stroke or acute myocardial infarction (AMI) would be associated with increased mortality.

Methods: From 2005 to 2013 in the Taiwan National Health Insurance Research Database, nAMD patients receiving IVI of anti-VEGF had a diagnosis of stroke/AMI prior to their first injections and were defined as the IVI group. The mortality of the IVI group during the study period was compared to the control group, which consisted of individuals who had stroke/AMI but were never exposed to anti-VEGF. The IVI group and the control group were 1 to 4 matched on propensity score (PS), which was derived from age, gender, the date of stroke/AMI, and comorbidities. PS-adjusted Cox regression analyses were used to estimate hazard ratio (HR) for mortality associated with IVI of anti-VEGF. Subgroup analyses were also performed according to the interval between stroke/AMI and IVI.

Results: There were 3,384 in the IVI group and 13,536 individuals in the control group. The IVI group had a significantly higher mortality risk (adjusted HR = 2.37; 95% confidence interval [CI], 2.14 – 2.62) compared with the control group. All of the subgroup analyses of different intervals (< 6 months, 6 months - 1 year, 1 - 2 years, > 2 years) between stroke/AMI and IVI revealed significant.

Conclusions: We found an increased mortality associated with IVI of anti-VEGF in nAMD patients after stroke/AMI compared to those post-stroke/AMI patients without exposure to any anti-VEGF.

Nov 24, 2019 (Sun) 14:30 - 16:00

Venue: Session Room 5

Predictors Associated with the Recurrence of Patients with Wet Age-related Macular Degeneration following Anti-vascular Endothelial Growth Factor Treatment

*First Author: Haiyan **WANG***
*Co-Author(s): Yusheng **WANG***

Purpose: To evaluate the recurrence of wet age-related macular degeneration patients after anti-vascular endothelial growth factor (VEGF)

treatment and to investigate the predictive factors.

Methods: In this retrospective study, a total of 40 eyes (38 cases) was included. The morphologic characteristics of the macula were identified by optical coherence tomography (OCT), and the central retinal thickness was measured. As loading dose, Ranibizumab or Conbercept was consecutively injected intravitreally monthly for 3 months. Finally, we analyzed the recurrence rate after treatment and the influenced factors, as well as the functional and morphological response.

Results: A total of 21 (52.5%) eyes recurred during the follow-up. Compared with eyes with worse visual acuity (VA) at the resolution time, the odds ratio (OR) of eyes with better VA which relapse was 16.7 (95% confidence interval: 1.22, 100) ($P < 0.05$). The recurrent eyes received more treatment than eyes with no recurrence. Of the 40 eyes, 35 (87.5%) eyes showed good morphological response at 1 month after the loading phase, while 5 (12.5%) eyes displayed poor morphological response. The best corrected visual acuity (BCVA) at 1 month following the loading phase was better than that at the time when fluid first resolved on OCT ($t = -2.23$, $P < 0.05$). Average CRT after treatment was significantly decreased when compared with the baseline ($t = 5.42$, $P < 0.05$). The BCVA increased 0.10 ± 0.42 at the 12th month compared with baseline ($t = -1.77$, $P < 0.05$).

Conclusions: More attention should be paid to eyes with better VA at the time of fluid absorption, as they may have more chance to experience recurrence.

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Venue: Session Room 5

Real-world Treatment Patterns and Outcomes for Polypoidal Choroidal Vasculopathy in China: Results from a Multicenter, Prospective, Observational Registry Study

*First Author: Yanping **SONG***
*Co-Author(s): Xiaorong **LI**, Kun **LIU**, Gezhi **XU**, Ximei **ZHANG***

Purpose: To observe real-world treatment patterns and assess 1-year outcomes with ranibizumab treatment in Chinese patients with polypoidal choroidal vasculopathy (PCV).

Methods: In this prospective, observational registry study, patients diagnosed with neovacular age-related macular degeneration (nAMD) were included in 23 sites. Treatment was at the physician's discretion based on individual patient's condition and choices. Here we reported the results for the patients diagnosed with PCV.

Results: PCV was diagnosed using indocyanine green angiography in 253 of 1497 (16.9%) enrolled nAMD patients, the mean age was 68.4 ± 9.58. At baseline, only 104 (41.1%) patients chose ranibizumab to begin their treatment, possibly due to the cost reason and limited awareness of the disease management in China. Overall, the mean value of baseline visual acuity (VA) of 253 patients was 40.6 ± 21.50 letters, increased 5.4 ± 19.69 letters at 12 months, while the mean baseline central retinal thickness (CRT) 406.3 ± 238.36 decreased 107.9 ± 137.83 mm at 12 months, and the mean injection was 1.2 in 1 year. The mean VA of the patients who chose ranibizumab as their first treatment was 38.58 ± 21.46, peaked at 6 months of gaining 11.9 ± 15.8, and gained 9.4 ± 19.2 letters at 12 months with 2.6 injections in one year.

Conclusions: This study was the first registry study of ranibizumab for nAMD treatment in China. Overall, Chinese PCV patients had comparatively low baseline VA, and received insufficient anti-VEGF treatment. The patients who selected ranibizumab to begin their

treatment had more VA gains that confirmed ranibizumab efficacy.

Nov 24, 2019 (Sun) 10:15 - 11:45

Venue: Session Room 6

Relationship Between Triglyceride Glucose Index, Retinopathy and Nephropathy in Type-2 Diabetes

First Author: Pallavi ***SINGH***
Co-Author(s): Rajiv ***RAMAN****, Sangeetha* ***SRINIVASAN***

Purpose: The triglyceride glucose (TyG) index is a novel marker for metabolic disorders. It is shown to be associated with insulin resistance and risk of cardiovascular disease. We aimed to study the relationship between TyG index, diabetic retinopathy (DR), and nephropathy.

Methods: Cross-sectional study of 1,414 subjects with type 2 diabetes (both known and newly diagnosed). All subjects underwent a detailed standard evaluation to detect diabetic retinopathy (fundus photography) and nephropathy (defined as urinary albumin excretion ≥ 30 mg/24hrs). The triglyceride index which is calculated as in (fasting triglycerides (mg/dl) × fasting glucose (mg/dl)/2) was stratified into 4 triglyceride index quartiles (TyG-Q) namely ≤ 7.3, > 7.3 and ≤ 7.5, > 7.5 and ≤ 8.0, > 8.0. The baseline characteristics of the study population in the 4 TyG-Q were analyzed. Variables associated with the presence of DR and nephropathy were assessed using a step-wise binary logistic regression analysis.

Results: The presence of DR was associated with higher triglyceride index (OR = 1.453, P = 0.001), longer duration of diabetes (OR = 1.085, P < 0.001). The presence of nephropathy was associated with a higher TyG index (OR = 1.703, P < 0.001), greater age (OR = 1.031, P < 0.001), use of insulin (OR = 1.842, P = 0.033), higher systolic BP (OR = 1.015, P < 0.001), and the presence of DR (OR = 3.052, P < 0.001). The higher TyG-Q was shown to be well correlated with increasing severity of DR (P = 0.024), presence of nephropathy (P = 0.001), age (P < 0.001), and diastolic blood pressure (P = 0.006).

Conclusions: TyG index predicts presence and severity of retinopathy and nephropathy in diabetic patients and could be used for monitoring metabolic status in clinical settings.

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Venue: Session Room 6

Risk of Endophthalmitis After Different Intravitreal Bevacizumab Protocols

First Author: Roshija ***KHANAL RIJAL***
Co-Author(s): Deepesh ***MOURYA***

Purpose: To determine long-term (12 years) incidence of endophthalmitis after intravitreal bevacizumab (IVB) injection using 3 different drug delivery protocols. As per our knowledge, this is a first study comparing endophthalmitis rates after different protocols.

Methods: This was a retrospective study conducted at a high volume tertiary eye hospital in Nepal. Over a period of 12 years (2006 to 2018), 3 protocols for drug delivery were used for IVB: (A) single vial multiple pricks. The same vial is stored for use over 1 to 4 weeks; (B) single vial multiple pricks. Patients are pooled on a single day, after which the vial is discarded. (C) drug aliquoted in small syringe under aseptic condition and refrigerated for later use. All endophthalmitis cases after IVB were collected and evaluated from endophthalmitis registry.

Results: Endophthalmitis rates after a total of 15,388 IVB were 0.058. The endophthalmitis rates in 3 groups were: Group A (n = 5,759) 0.069; Group B (n = 3,117) 0.096; Group C (n = 6,512) 0.030. Group C had the least incidence of endophthalmitis, although the difference was not statistically significant.

Conclusions: Aliquoting bevacizumab in multiple small syringes carries the least risk of endophthalmitis. However, multiple prick method is still widely used by smaller hospitals with limited resources. Although the percentage of endophthalmitis is least in aliquoting method, there is no statistical difference in the rate of infection in 3 drug delivery protocols. The multiple prick method may still be a safe

and economic option for small hospitals albeit with a slightly higher risk of endophthalmitis.

Nov 24, 2019 (Sun) 10:15 - 11:45

Venue: Session Room 6

Role of MicroRNA-23b-3p in the Cellular Metabolic Memory of Diabetic Retinopathy

*First Author: Shuzhi **ZHAO***
*Co-Author(s): Zhi **ZHENG***

Purpose: To explore the roles of miR-23b-3p in the pathogenesis of cellular metabolic memory in diabetic retinopathy (DR).

Methods: Human retinal endothelial cells (HRECs) were incubated in normal glucose (5 mM, N group), high glucose (25mM, H group), normal glucose (5 mM) plus high mannitol (20mM, MN group) for 1 week, high (25mM) glucose for 48 hours, followed by normal glucose for 5 additional days ("metabolic memory", H → N group), "metabolic memory" group transfected by miRNA inhibitors, inhibitors NC, or miRNA inhibitors plus SIRT1 siRNA, respectively; MicroRNA expression profiling microarray was used to screen miRNAs for regulating SIRT1, and miR-23b-3p was identified as a SIRT1-targeting miRNA by luciferase assays, qPCR and Western blot. The expression of miR-23b-3p and SIRT1 were examined by qPCR and Western blot. The apoptotic cells in HRECs were determined by flow cytometry and TUNEL.

Results: High glucose increased miR-23b-3p expression even after returning to normal glucose in HRECs, miR-23b-3p targeted SIRT1 by binding to its 3′ untranslated region (3′ UTR). Reduced miR-23b-3p inhibited Ac-NF-κB expression and activity through rescuing SIRT1 expression, and relieved the effect of metabolic memory induced by high glucose in HRECs.

Conclusions: MiR-23b-3p down-regulated SIRT1, subsequent leading to NF-κB activation, which resulted in the development of the cellular "metabolic memory" in DR.

Nov 24, 2019 (Sun) 14:30 - 16:00

Venue: Session Room 5

To Evaluate the Microvascular Structure Changes After Treatment with Conbercept on Macular Edema Secondary to Retinal Vein Occlusion

*First Author: Bojun **ZHAO***

Purpose: To confirm the therapeutic efficacy of conbercept for the treatment of macular edema (ME) secondary to Retinal Vein Occlusion (RVO) by using optical coherence tomography angiography (OCTA).

Methods: In this prospective, randomized, and comparative study, 30 unilateral eyes suffered from either ischemic RVO (iRVO) or non-ischemic RVO (non-iRVO) combined with macular edema were included and fellow eyes as controls. After an initial intravitreal injection of conbercept, a pro re nata (PRN) strategy was adopted, and the follow-up time was 6 months. The foveal avascular zone (FAZ), vascular density of superficial capillary plexus (SCP) and deep capillary plexus (DCP), non perfused areas (NPAs) were evaluated with OCTA on baseline and after treatment.

Results: The mean intravitreal injection number was 2.9 ± 0.89 times during 6 months in iRVO patients, and 2.1 ± 0.86 times in non-iRVO patients, with a statistically significant difference ($P < 0.05$). On baseline, central macular thickness and FAZ were significantly thickened and enlarged compared to that of healthy fellow eyes; SCP and DCP were significantly decreased, and all the differences had statistical significance ($P < 0.05$). Compared to baseline, after treatment, the best corrected visual acuity (BCVA) were improved in either iRVO or non-iRVO. In non-iRVO group, the improvement was more substantial than that of iRVO group ($P < 0.05$). FAZ in non-iRVO group had significantly decreased compared to that in iRVO group ($P < 0.05$).

Conclusions: The changes of microvascular structure can be quantitatively evaluated by using OCTA in patients with RVO. Conbercept

had a significant effect on the treatment of macular edema secondary to RVO.

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Venue: Session Room 6

Two-year Outcome of Intravitreal Conbercept Versus Ranibizumab for Pathological Myopic Choroidal Neovascularization

*First Author: Cong **CHEN***
*Co-Author(s): Yanping **SONG**, Ming **YAN***

Purpose: To evaluate and compare the 24-month follow-up results of intravitreal conbercept with ranibizumab in the treatment of choroidal neovascularization (CNV) secondary to pathological myopia (PM).

Methods: Sixty-four eyes of 59 patients with pathological myopia CNV were retrospectively reviewed. Thirty-one eyes underwent conbercept treatment (group C) and 33 eyes underwent ranibizumab treatment (group R), respectively. All patients were treated naive. The main outcome measures included best corrected visual acuity (BCVA). The BCVA examination uses an international standard visual acuity chart and is converted to the minimum resolution logarithm (logMAR) visual acuity.

Results: There was no significant difference between the 2 groups in the baseline statistics. At 24 months, the mean logMAR BCVA of the group K increased from 0.95 ± 0.54 to 0.58 ± 0.39 (P = 0.000), and the mean CMT decreased from 280.97 ± 62.69 to 242.35 ± 90.39 (P = 0.033). The mean logMAR BCVA of the group L increased from 0.86 ± 0.40 to 0.54 ± 0.28 (P = 0.000), and the mean CMT was reduced from 303.58 ± 61.95 to 251.82 ± 84.74 (P = 0.005). There was no significant difference of logMAR BCVA and CMT between the 2 groups (P = 0.962, P = 0.667, respectively). The mean number of injections was 3.94 ± 1.88 in group C and 4.06 ± 1.82 in group R (P = 0.788). During the follow-up period, no ocular complications or systemic adverse reactions were observed.

Conclusions: Similar visual acuity and improved planning morphology were achieved in both groups. In addition, the 2 drugs are safe and effective in the treatment of pathological myopic CNV.

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Venue: Session Room 5

Visual and Expanded Anatomical Outcomes for Brolucizumab Versus Aflibercept in Patients with Neovascular AMD: 96-week Data from HAWK and HARRIER

*First Author: Pravin **DUGEL***
*Co-Author(s): Frank G. **HOLZ**, Robin D. **HAMILTON**, Chirag D. **JHAVERI**, Rishi P. **SINGH**, Georges **WEISSGERBER***

Purpose: HAWK and HARRIER were Phase III, prospective studies that assessed the efficacy and safety of brolucizumab versus aflibercept in neovascular AMD patients. Here, we reported the 96-week visual and anatomical outcomes of brolucizumab versus aflibercept.

Methods: Patients were randomized to brolucizumab 3 mg (HAWK only), 6 mg, or aflibercept 2 mg. After 3 loading doses, brolucizumab patients received 12-week dosing (q12w) with an option to adjust to 8-week dosing (q8w) at predefined disease activity assessment visits; aflibercept patients received q8w.

Results: Brolucizumab 6 mg achieved non-inferiority to aflibercept in vision gains with >50% of patients maintained on q12w until Week 48. Vision gains were maintained to Week 96. Brolucizumab achieved superior reductions versus aflibercept in central subfield thickness from baseline to Weeks 16 and 48, which were maintained at Week 96 (HAWK: P = 0.0021 [brolucizumab 3 mg versus aflibercept], P = 0.0115 [brolucizumab 6 mg versus aflibercept]; HARRIER: P < 0.0001). The proportions of patients with intraretinal and/or subretinal fluid at Week 96 were 31% and 24% with brolucizumab 3 mg (P = 0.0688) and 6 mg (P = 0.0002), respectively, versus 37% for aflibercept in HAWK; and 24% for brolucizumab (P < 0.0001) versus 39% for aflibercept in

HARRIER. Sub-RPE fluid was present in 14% and 11% with brolucizumab 3 mg (P = 0.9554) and 6 mg (P = 0.1213), respectively, versus 15% with aflibercept in HAWK, and 17% for brolucizumab (P = 0.0371), versus 22% for aflibercept in HARRIER.

Conclusions: The superior anatomical outcomes at Weeks 16 and 48 along with comparable vision gains seen with brolucizumab 6 mg versus aflibercept at Week 48 were maintained until Week 96, with more brolucizumab patients maintained on q12w interval.

Retina (Surgical)

Nov 22, 2019 (Fri) 10:15 - 11:45

Venue: Session Room 5

A Relatively High IOP Set at the End of Vitrectomy Associated with a More Stable and Rapid Visual Recovery for Patients with Vitreous Hemorrhage: a Prospective, Randomized, Comparative, and Interventional Study

*First Author: Chuandi **ZHOU***
*Co-Author(s): Qinghua **QIU***

Purpose: To compare structural and functional improvements in patients with vitreous hemorrhage (VH) with different intraocular pressures (IOPs) reestablished at the end of PPV.

Methods: A retrospective, comparative, interventional study. Ninety-five patients with VH were randomized to receive PPV with normalized IOPs of 15 mm Hg (Group I: 32 eyes), 25 mm Hg (Group II: 32 eyes) and 35 mm Hg (Group III: 31 eyes) at the conclusion of surgery. The grade of vitreous opacity and best corrected visual acuity (BCVA) on postoperative day 1, week 1, month 1, and month 3 were compared with a mixed model for repeated measures analysis.

Results: All the 3 groups achieved significant improvement postoperatively in BCVA (P < 0.01) and vitreous opacity (P < 0.01) compared with the baseline. The group difference was significant at the end of week 1 and showed a trend of higher IOP set at the end of PPV with better anatomical (P < 0.01) and visual recovery (P < 0.01). However, at postoperative month 1 and month 3, equivalent anatomical (month 1: P = 0.56; month 3: P = 0.36) and visual outcomes (month 1: P = 0.16; month 3: P = 0.88) were obtained in the 3 groups. The average effect of the group difference on BCVA (group II vs group III: effect size(ES):0.41, P < 0.01; group I vs group III:ES:0.66, P < 0.01) and vitreous opacity (group II vs group III:ES:0.70, P < 0.01; group I vs group III:ES:1.09, P < 0.01) over the course of the study period was statistically significant. The only postoperative complication was recurrent VH, which occurred in 2 patients (2%).

Conclusions: A relatively higher IOP set at the end of vitrectomy could result in a more stable and rapid recovery with fewer complications after PPV in patients with non-complex VH.

Nov 22, 2019 (Fri) 10:15 - 11:45

Venue: Session Room 5

Amniotic Membrane Graft for the Treatment of Giant Refractory Macular Hole

*First Author: Hussain **KHAQAN***

Purpose: To investigate the outcomes of amniotic membrane graft for the treatment of giant refractory macular holes.

Methods: Eleven eyes of 10 patients having giant refractory macular holes with smallest of 824 µm and largest of 1568 µm were included in the study, who were previously vitrectomised for macular holes. Group A (amniotic membrane graft and endotamponade of silicon oil) and Group B (amniotic membrane graft and endotamponade of SF6 gas). Amniotic membrane was harvested from human placenta. After staining with brilliant blue G and confirming that enough ILM has already been peeled, all the refractory macular holes were plugged with amniotic membrane graft under air and endotemponade with silicon oil (Group A) and SF6 gas (Group B), respectively.

Results: Average age in Group A is 62.22 ± 8.09 years, and in Group B 56.40 ± 11.84 years. Preoperative mean macular hole diameter in group A is 1177.83 ± 278.81 μm and in Group B it is 1329.20 ± 220.86 μm. Best corrected visual acuity (BCVA) measured by logMAR improved in both groups at 1 month postoperative follow-up compared with preoperative BCVA (Group A, ta = 6.106 PA < 0.034, Group B, tb = 3.162, PB < 0.002), and there was a significant difference in BCVA between the 2 groups (P < 0.024), (PB < 0.002 / PA < 0.034). At 1 month follow-up, the giant refractory macular hole closure rate was 100% in each group.

Conclusions: Amniotic membrane graft is very effective in closing giant refractive macular holes and improving best corrected visual acuity.

Nov 22, 2019 (Fri) 10:15 - 11:45

Venue: Session Room 5

Choroidal Thickness Associated with Delayed Subretinal Fluid Absorption After Rhegmatogenous Retinal Detachment Surgery

*First Author: Yodpong **CHANTARASORN***

Purpose: To investigate the association between choroidal thickness and persistent subretinal fluid (PSF) after surgery for recent-onset macula-off rhegmatogenous retinal detachment (RRD).

Methods: Fourteen eyes that achieved retinal reattachment on funduscopy and had PSF postoperatively (PSF group) were compared with 62 eyes that did not develop PSF postoperatively (non-PSF group). The diagnosis of PSF was made by the detection of submacular fluid pockets beyond 6 weeks post-surgery. Multivariate regression analysis was performed by adding sex, age, and refraction into the model. Subfoveal choroidal thickness was measured by enhanced depth imaging optical coherence tomography (EDI-OCT) images.

Results: The proportion of eyes that underwent vitrectomy, scleral buckle surgery, and pneumatic retinopexy were 71.4%, 14.3%, and 14.3% in the PSF group, and 87.1%, 11.3%, and 1.6% in the non-PSF group. Eyes with PSF had significantly thicker subfoveal choroid than eyes without PSF (305 ± 61 vs 200 ± 70 microns) (adjusted difference, 78.6 ± 19.1 microns; P < 0.001). The PSF group had a greater proportion of RPE changes in fellow eyes (30.8% vs 1.7%, P = 0.03), and significantly worse best corrected visual acuity with a mean difference of 13 ETDRS letters at 12-month follow-up (P = 0.03). Multiple logistic-regression analysis revealed that choroidal thickness ≥ 280 microns was a significant factor associated with the presence of PSF (adjusted odds ratio, 13.4; P = 0.001)

Conclusions: PSF is associated with increased subfoveal choroidal thickness in surgical and fellow eyes, and RPE changes in the fellow eye. This indicates that PSF likely belongs to the pachychoroid spectrum. Preoperative OCT of the fellow non-surgical eyes may be beneficial for surgery planning.

Nov 22, 2019 (Fri) 10:15 - 11:45

Venue: Session Room 5

Clinical Outcomes of Autologous Neurosensory Retinal Free Flap Technique for Recurrent Macular Hole Retinal Detachment in Highly Myopic Eyes

*First Author: Jianhua **WU***

Purpose: To evaluate the postoperative status of the anatomical and functional of macular after pars plana vitrectomy with autologous neurosensory retinal transplantation for recurrent macular hole retinal detachment (MHRD) in patients with high myopia.

Methods: Ten eyes with recurrent MHRD with high myopia were retrospectively reviewed. All eyes had undergone PPV with autologous neurosensory retinal free flap technique. The outcome measures contained the macular hole closure, retinal reattachment rate, the graft thickness and sensitivity threshold, graft blood flow signal and position change, the sensitivity threshold and fixation ability of macula area, and best corrected visual acuity (BCVA).

Results: At the last follow-up, "Closed MH" were in 7 eyes (70%). The retina reattached in 8 eyes (88.9%) after surgery. "No shift" of the graft appeared in 7 eyes (70%). The mean graft thickness at 1 month was 220.86 ± 31.57 μm, and it decreased significantly to 175.71 ± 23.56 μm at 6 months (P = 0.005). The mean macular sensitivity threshold at 6 months (11.04 ± 3.02 dB) was significantly higher than 1 month (6.28 ± 2.23 dB) after surgery(P = 0.000). The sensitivity threshold of the corresponding area of the graft was dark field. There was no blood flow signal either superficially or in the deep retina layer of the graft. The post-BCVA (mean, 1.32 ± 0.31 logMAR) had significant improvement compared with pre-BCVA (mean, 2.06 ± 0.33 logMAR) (P < 0.05).

Conclusions: The study suggested that autologous neurosensory retinal free flap technique appeared safe and effective in facilitating macular hole closure and retinal reattachment, and thus achieved the visual improvements in high myopia with recurrent MHRD, as a result of the graft scar healing rather than function reconstruction.

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Venue: Session Room 5

Comparative Study on Vitreo-retinal Surgery Combined with Intravitreal Ranubizumab or Not in the Treatment of Familial Exudative Vitreoretinopathy of Stage 3 or Greater: A Randomized-control Trial

*First Author: Xiaoyong **HUANG***

Purpose: To compare the function and anatomical outcomes of vitreoretinal surgery combined with pre-operation intravitreal ranubizumab (IVR) for the treatment of familial exudative vitreoretinopathy (FEVR) of stage 3 or greater.

Methods: Our randomized, controlled, clinical study was performed in Southwest Hospital, Southwest Eye Hospital, Army Medical University. We studied 42 consecutive FEVR-RRD patients (44 eyes) hospitalized from 2014 to 2019. All 44 FEVR-RRD eyes accepted vitreoretinal surgery and were divided into 2 groups at random according to the table of random numbers; 22 patients of those accepted pre-operation IVR and vitreoretinal surgery as combining treatment group, another 22 patients only accepted vitreoretinal surgery as control group. Their clinical features and intraocular VEGF concentration were assessed, and the efficiency of IVR in FEVR-RD was evaluated. Correlation was assessed between IVR and the VEGF concentration.

Results: In these 22 patients, 5 days after IVR, retinal neovascular regression was notified (P = 0.000, n = 22), neither systemic nor ocular complications were recorded. The rate of 1 surgery reattachment and increase of best corrected (BCVA) visual acuity of combining treatment group were higher than that of control group (P = 0.03, n = 22). The correlation coefficient between BCVA improvement of combining treatment group and the intraocular VEGF-concentration (110.2 + 32.3 pg/ml) was significant.

Conclusions: Vitreoretinal surgery combined with pre-operation IVR was a safe and effective modality in the treatment of FEVR, and correlates with better BCVA and a higher reattachment rate with one vitreoretinal surgery, especially for cases with higher intraocular VEGF concentration.

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Venue: Session Room 5

Comparison Between 1 DD and 2 DD Radiuses of Conventional Internal Limiting Membrane Peeling for Treatment of Full-thickness Macular Hole: Randomized Clinical Controlled Trial

*First Author: Suthasinee **SINAWAT***
*Co-Author(s): Sasinun **PIPATBANDITSAKUL**, Tanapat **RATANAPAKORN**, Supat **SINAWAT**, Parinya **SRIHATRAI**, Plern **SUTRA***

Purpose: To evaluate the efficacy of pars plana vitrectomy (PPV) with 1 DD versus 2 DD radiuses of conventional internal limiting membrane peeling (C-ILMP) for the treatment of full-thickness macular hole (FTMH) > 400 μm.

Methods: A double-blinded randomized controlled trial (RCT). A total of 100 patients were randomized to 1 DD or 2 DD C-ILMP group. Primary outcome was visual acuity (VA) at 6 months after surgery. Secondary outcomes were closure rate, complications, and identifying predictive factors.

Results: The average age of 27 male and 73 female was 61.7 ± 8.8 years. The mean duration of symptoms was 9.9 ± 7.2 months. Mean preoperative VA was 1.24 ± 0.38 logMAR. The average size of FTMH was 630.2 ± 139.3 μm. There were no significant differences in demographic data between groups. There was no statistically significant difference in VA at 6 months (95% CI -0.21 - 0.03; P = 0.15). The closure rate was significantly higher in 2 DD C-ILMP group (78.0% vs 68.2%, 95% CI 1.02 - 5.08; P = 0.04). The closure type was not significantly different between groups. No significant difference in outcomes was found between < 550 μm and > 550 μm FTMH. In unclosed group, 2 DD C-ILMP provided significantly smaller macular hole size (P = 0.04). Preoperative VA, size of FTMH, and pseudophakia were positive predisposing factors. No serious complications occurred.

Conclusions: PPV with C-ILMP 2 DD had significantly higher closure rate and smaller postoperative macular hole sizes in unclosed patients, but there was no statistically significant difference in visual outcome at 6 months after surgery.

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Venue: Session Room 5

Initial Closure Rate and Aperture Threshold of Large Idiopathic Macular Hole Treated with Vitrectomy

*First Author: Wu **LIU***

Purpose: To investigate the initial closure rate of large idiopathic macular hole and its relationship with the minimum aperture.

Methods: The surgical results of vitrectomy combined with internal limiting membrane peeling and air filling were retrospectively analyzed in 187 eyes with idiopathic macular hole with minimum aperture > 400 microns. The aperture-based progressive grouping analysis and ROC curve analysis were used to explore the aperture threshold that caused the initial closure rate to drop significantly.

Results: The initial closure rate of macular hole gradually decreased from 100% with the increase of aperture, and began to drop significantly (78.6%, P = 0.03) when the aperture reached 650 microns. The ROC curve showed that the initial closure rate of macular hole significantly reduced when the aperture was greater than 664.5 microns (P < 0.001). Compared with 128 large macular holes with diameters less than or equal to 650 microns, the 59 large macular holes with diameters greater than 650 microns had a longer course of symptoms, worse preoperative and postoperative best corrected visual acuity (BCVA) (P < 0.01).

Conclusions: Large macular hole with aperture over 650 microns is worthy of special attention, since it may not only indicate a significant decrease of initial closure rate with simple internal limiting membrane peeling operation, but also indicate that such kind of large macular hole may be more suitable than other holes to explore alternative techniques, such as internal limiting membrane flap, to improve anatomic and visual prognosis.

Nov 22, 2019 (Fri) 10:15 - 11:45

Venue: Session Room 5

Patching Retinal Breaks with Healaflow in 27-gauge Vitrectomy for the Treatment of Rhegmatogenous Retinal Detachment

*First Author: Xiaorong **LI***
*Co-Author(s): Xinjun **REN***

Purpose: To report the surgical outcomes of primary rhegmatogenous retinal detachment (RRD) repaired by 27-gauge pars plana vitrectomy (PPV) combined with Healaflow patch and air tamponade.

Methods: In an initial vitro experiment, we observed and compared the dissolution and

displacement of the dispersion spots of 0.05 ml Healaflow and sodium hyaluronate. We then performed a prospective, interventional cohort study on 38 eyes in 37 consecutive patients with primary RRD. All eyes underwent PPV combined with Healaflow patch and air tamponade; the postoperative period did not involve prone positioning. The primary and final anatomic attachment rate, best corrected visual acuity (BCVA), and intraoperative and postoperative complications were evaluated.

Results: In the in vitro experiment, the viscoelastic Healaflow remained adherent with no change in the size of the area; however, the control dissolved completely in the balance solution. The patient study included 16 women (43.2%) and 21 men (56.8%) (mean age, 59.5 ± 9.5 years; mean follow-up period, 8.9 ± 3.8 months). A single break was present in 21 (55.3%), and 2 to 5 breaks in 17 cases (44.8%). The macula was involved in 25 (65.8%) and attached in 13 cases (34.2%) intraoperatively. Initial reattachment was achieved in 37 (97.4%), and final reattachment in 38 cases (100%). Mean preoperative and postoperative BCVAs were 1.02 ± 0.82 and 0.23 ± 0.17 logarithm of the minimum angle of resolution, respectively.

Conclusions: A 27-gauge PPV combined with Healaflow patch and air tamponade results in a high reattachment rate in the treatment of RRD. Thus, patients can benefit from early visual recovery and fewer complications.

Nov 22, 2019 (Fri) 10:15 - 11:45

Venue: Session Room 5

Relationship Between Shape of Foveal Avascular Zone Determined by OCT Angiography and Metamorphopsia in Epiretinal Membrane Patients

*First Author: Hiroto **TERASAKI***
*Co-Author(s): Taiji **SAKAMOTO**, Hideki **SHIIHARA**, Shozo **SONODA***

Purpose: To investigate the relationship between the shape of foveal avascular zone (FAZ) determined by optical coherence tomography angiography (OCTA) and metamorphopsia in epiretinal membrane (ERM) patients.

Methods: A retrospective, cross-sectional case study was done including 54 eyes of 51 patients with ERM. Macular 3 x 3 mm scan was recorded by PLEX-Elite 9000 (Carl-Zeiss, Dublin, CA). Area, circularity and eigen value determined by principal component analysis of the FAZ (whole retina) were manually calculated using ImageJ software (National Institutes of Health, USA). The relationship between the above parameters of FAZ and visual function such as logMAR visual acuity and the degree of metamorphopsia determined by M-chart (Inami,, Japan) were assessed by Spearman's rank correlation coefficients.

Results: Mean age (±SD), VA, and degree of metamorphopsia of the subjects were 69.6 ± 8.2 years, 0.31 ± 0.30 logMAR units and 0.49 ± 0.42, respectively. Mean area, circularity, and eigen value were 0.137 ± 0.084 mm^2, 0.491 ± 0.106 and 0.651 ± 0.163, respectively. Although VA was not correlated with FAZ parameters, degree of metamorphopsia was significantly correlated with the area (R = -0.491, P = 0.002), circularity (R = -0.385, P = 0.004) and eigen value (R = -0.341, P = 0.012). Multiple regression analysis showed that the area of FAZ was independently correlated with the degree of metamorphopsia.

Conclusions: Area and shape of FAZ might be predictive factors for metamorphopsia in ERM patients.

Nov 22, 2019 (Fri) 10:15 - 11:45

Venue: Session Room 5

Scleral Buckle in Early Stage Rhegmatogenous Retinal Detachment Pre-refractive Surgery

*First Author: Tieying **ZHAO***
*Co-Author(s): Yuanfei **ZHU***

Purpose: To evaluate the efficacy and safety of scleral buckle in early-stage rhegmatogenous retinal detachment (RRD) pre-refractive surgery.

Methods: Nice asymptomatic cases were detected RRD by Scanning Laser

Ophthalmoscope (SLO) in a pre-refractive surgery examination. Mannitol was applied pre-operation (OP) to reduce intraocular pressure. Cryotherapy was used to localize retinal breaks. Silicone was sutured onto the sclera creates an inward indentation to close retinal breaks, and to reduce dynamic vitreoretinal traction. No drainage of sub-retinal fluid (SRF) or gas was carried out. Laser was applied if necessary post-OP. Refractive surgery was carried out 6 months post-OP. Follow up time is from 3 to 12 months. Retina attachment, refractive status, and best corrected visual acuity (BCVA) were evaluated postoperatively.

Results: No significant change between pre- and post-OP BCVA (1.11 ± 0.26 vs 0.99 ± 0.19, P = 0.274). Refractive error slightly increased from -4.56 ± 1.51 to -5.33 ± 1.44 (P = 0.279). Certain characteristics are noted: (1) Localized shallow RD with no more than 2 quadrants area and spare of macular. (2) Retinal breaks are round retinal holes located inferiorly, likely combined with retinal degeneration. (3) SRF resolved spontaneously from 2 weeks to 4 weeks post-OP. (4) Retinal breaks or degeneration were diagnosed in the fellow eye in 7 cases. Temporary ocular hypertension occurred in 3 cases.

Conclusions: Scleral buckle without drainage of SRF or gas is an efficient and safe treatment for early-stage RRD. SLO is a noninvasive and useful tool for early retinal defect diagnosis.

Nov 22, 2019 (Fri) 10:15 - 11:45

Venue: Session Room 5

Silicone Oil Emulsification After Vitrectomy for Rhegmatogenous Retinal Detachment

*First Author: Chunhui **JIANG***
*Co-Author(s): Jian **YU***

Purpose: To investigate the characteristics of silicone oil (SO) emulsification after vitrectomy for rhegmatogenous retinal detachment (RRD) and their possible correlations with clinical factors.

Methods: The first 2 mL of washing out fluid after SO removal was collected and used for the measurement of the size and number of SO droplets using a Multisizer® 3 Coulter counter (Beckman Coulter, USA). The correlations between SO droplets and clinical factors were analyzed.

Results: A total of 38 patients (23 males, 15 females) who underwent primary PPV with SO injection for RRD and whose retina stayed attached for 3 months after SO removal were included in the study. The average number of oil droplets was $1.96 \times 10^6 \pm 3.95 \times 10^6$/mL (range 0.17×10^6 to 21.71×10^6/ml), and 80.8% (range 64.23% – 99.07%) of the droplets were 1 - 2 μm in diameter. The number of emulsified SO droplets was not correlated with any clinical factor (all $P > 0.05$). Using multiple linear regression, we found that age was negatively correlated with the numbers of 5–7-μm-diameter and 7–12-μm-diameter droplets (both $P < 0.05$). Patients using antiglaucoma medications had more 5–7-μm-diameter and 7–12-μm-diameter droplets than other patients (all $P < 0.05$).

Conclusions: Using a Multisizer® Coulter counter, we successfully determined the number and size of SO droplets after emulsification. We found that the number of 5–12-μm-diameter droplets was negatively correlated with patient age and was higher in patients using antiglaucoma eye drops.

Nov 22, 2019 (Fri) 10:15 - 11:45

Venue: Session Room 5

Surgical Outcomes of Myopic Traction Maculopathy According to the International Photographic Classification for Myopic Maculopathy

*First Author: Hyoung Jun **KOH***

Purpose: To compare treatment results of myopic traction maculopathy (MTM) according to the international photographic classification for myopic maculopathy.

Methods: This was a retrospective, single-surgeon based, observational case series of 35 consecutive eyes that underwent vitrectomy for MTM. Eyes were classified into non-pathologic

myopia (PM) (n = 15) and PM (n = 20) groups. Main outcome measures constituted best corrected visual acuity (BCVA) and anatomical change.

Results: The mean follow-up was 32.03 ± 6.85 months. Axial length correlated with myopic maculopathy category (rho = 0.6836, P < 0.001). In total group, BCVA improved from 20/61 to 20/36 (P = 0.001). In subgroup, BCVA improved from 20/41 to 20/22 in the non-PM group (P = 0.002), while from 20/82 to 20/52 in the PM group (P = 0.048). Postoperative BCVA of the PM group was inferior to that of the non-PM group (P = 0.002) and the PM group was more likely to have postoperative BCVA < 20/30 (odds ratio, 17.3; 95% CI, 2.6 - 325.0; P = 0.012). Two cases of macular hole retinal detachment occurred after surgery in the PM group.

Conclusions: As there are limited benefits of vitrectomy in MTM accompanied by PM, careful consideration would be necessary when determining surgery. OCT should not be used alone in determining vitrectomy, as MTM can also have PM defined mainly by fundus photographs.

Nov 22, 2019 (Fri) 10:15 - 11:45

Venue: Session Room 5

Vitrectomy with Internal Limiting Membrane Peeling for Management of Exudative Diabetic Maculopathy

*First Author: Kanwaljeet **MADAN***

Purpose: Exudative diabetic maculopathy is a common cause of severe and irreversible visual loss in patients with diabetic retinopathy. Plaque-like sub-foveal hard exudates usually respond poorly to focal laser treatment. Surgical excision of hard exudates is technically demanding and complicated. We analyze the efficacy of vitrectomy with Internal Limiting Membrane (ILM) peeling alone in the treatment of exudative diabetic maculopathy.

Methods: Retrospective, interventional case series of 59 eyes of 624 patients with exudative diabetic maculopathy that underwent standard 3 port pars plana vitrectomy (27G) combined with ILM peeling using Indo-cyanine Green dye. All patients who had strict metabolic control for at least 6 weeks before the surgery and who had completed 6 months of follow-up after surgery were included in the study. Main outcome measures included visual acuity, size of hard exudates, and surgical complications.

Results: Mean age of patients was 51.6 ± 8.7 years. There were 33 males and 26 females. Mean follow-up was 15.5 months. The mean visual acuity improved from 20/250 to 20/90. Improvement in visual acuity was seen in 45 out of 59 eyes. 38 patients had total resorption of hard exudates, and 21 patients had partial absorption.

Conclusions: Vitrectomy with ILM peeling is a simple and effective option in the management of exudative diabetic maculopathy with plaque-like sub-foveal hard exudates. Prospective, randomized controlled trials are necessary to substantiate the above findings.

POSTERS

Eye Trauma, Emergencies & Infections

Poster No.: EX1-001
Panel No.: 001, Session: EX1
A 3-year Retrospective Study of Incidence and Visual Outcome of Infectious Endophthalmitis in a Tertiary Government Hospital

*First Author: Jan Patrick **CHU***
*Co-Author(s): Egidio **FORTUNA**, Ronaldo **JARIN***

Purpose: To determine the incidence and visual outcomes of patients with endophthalmitis in a 3-year period.

Methods: This was a descriptive, retrospective case series of patients diagnosed with infectious endophthalmitis in a tertiary government hospital.

Results: The overall 3-year incidence rate of infectious endophthalmitis is 1.05%. There were 25 identified cases of infectious endophthalmitis out of 2,382 patients at risk. All patients had unilateral involvement. Seven were female and 18 were male. Age range was 3 - 89 years (median age, 51). Individual incidence rate was highest in penetrating ocular injury (0.42), followed by phacoemulsification (0.17) and infectious keratitis (0.13). Differences in incidence rates per year were only found to be statistically significant in endogenous endophthalmitis cases, but this is because of the small number of subjects and no case of endogenous endophthalmitis was seen in 2017. Only 6 cases were culture-positive endophthalmitis. The isolated organisms include Klebsiella pneumoniae, Enterobacter cloacae, Sphingomonas paucimobilis, and Pantoea agglomerans. Forty-four percent of patients had no light perception upon presentation. Enucleation was performed in 14 patients, evisceration in 2 patients, pars plana vitrectomy in 8 patients, and intravitreal antibiotic injection alone in 1 patient. A final visual acuity of 20/200 or better was only noted in 3 patients.

Conclusions: Infectious endophthalmitis is a debilitating ocular disease. Early diagnosis and treatment are crucial because it plays a large role in the final visual outcome. However, patients may still have poor visual outcomes despite aggressive treatment.

Poster No.: EX1-002
Panel No.: 002, Session: EX1
Clinical and Optical Coherence Tomography Angiographic Features in Patients After Successful Management of Post-cataract Stenotrophomonas Maltophilia Endophthalmitis by Pars Plana Vitrectomy

*First Author: Lu **CHEN***
*Co-Author(s): Dahui **MA**, Jieting **SHE**, Jiantao **WANG**, Guoming **ZHANG***

Purpose: To report clinical presentations and optical coherence tomography (OCT) angiographic features of post-cataract surgery endophthalmitis due to Stenotrophomonas maltophilia, which is an emerging entity for iatrogenic endophthalmitis.

Methods: Retrospective, observational case series of 4 patients who developed S. maltophilia endophthalmitis after cataract surgery between March 28th, 2019 and April 10th, 2019. Pars plana vitrectomy (PPV) and intraocular lens (IOL) removal was performed to control the infection. Follow-up for 3 months. Data were collected for demographic details, logMAR best corrected visual acuity (BCVA), clinical features, antibiotic sensitivity, and outcomes. OCT angiography (OCTA) was carried out to quantitatively evaluate microvascular changes during the follow-up period.

Results: The average duration between cataract surgery and the onset of acute endophthalmitis was 9 days. All 4 patients exhibited severe anterior chamber inflammation and vitritis. The response to PPV therapy were excellent and the final logMAR BCVA in the affected eyes were 0.15, 0.05, 0.92, and 0.52, respectively.

OCTA showed that at their 1-month follow-up, the vascular density (VD) and perfusion density (PD) in the superficial capillary plexus (SCP) were significantly lower than those in healthy collateral eyes. As time went on, the SCP-VD and SCP-PD gradually increased.

Conclusions: Endophthalmitis caused by this pathogen is a rare but devastating cataract surgery complication. With early PPV combined with IOL removal, the infection can be cured and contribute to favorable clinical outcomes. OCTA provides a quantitative, non-invasive assessment of the microvascular network of the retina to evaluate the severity and surgical prognosis of patients with S. maltophilia endophthalmitis.

Poster No.: EX1-003
Panel No.: 003, Session: EX1
Early Vitrectomy in Endophthalmitis

*First Author: Rodger **PAUL***
*Co-Author(s): Gursimrat **BHULLAR**, Andrew **CHANG**, Rosie **DAWKINS**, Matthew **SIMUNOVIC***

Purpose: To compare visual acuity outcomes following early vitrectomy vs late, or no, vitrectomy, in patients who developed endophthalmitis following intravitreal injection or cataract surgery presenting from 2014 - 2019.

Methods: Patients who presented with endophthalmitis following cataract surgery or intravitreal injection and for whom complete data was able to be collected were included in the study. To better understand various treatment outcomes, we focused on 2 patient groups: those who received early vitrectomy (< 24 hours); vs late, or no, vitrectomy.

Results: From 2014 - 2019, there were 316 cases of endophthalmitis following intravitreal injection or cataract surgery that could be included in the study. Thirty-two percent received early vitrectomy, 68% late or no vitrectomy. Patients who received early vitrectomy had significantly worse presenting VA (2.34 vs 1.89 logMAR, P < 0.0001) and better improvement in VA compared to those who received late or no vitrectomy (1.46 vs 1.04 logMAR, P = 0.008). No statistically significant difference in final VA was found between groups (0.869 vs 0.814 logMAR, P = 0.584).

Conclusions: We concluded that patients with worse presenting vision are being selected for early vitrectomy. However, there was no difference in final VA, as compared to those who had no vitrectomy or late vitrectomy. Furthermore, a greater improvement in VA was achieved with early vitrectomy. While further research is required, this data appears to be suggestive of a benefit of early vitrectomy in endophthalmitis.

Poster No.: EX1-004
Panel No.: 004, Session: EX1
Fungal Endophthalmitis – A 20-year Experience at a Tertiary Referral Center

*First Author: Rosie **DAWKINS***
*Co-Author(s): Penelope **ALLEN**, Gursimrat **BHULLAR**, Rodger **PAUL***

Purpose: Endophthalmitis is a disease of great significance; it is serious and potentially blinding. Fungal endophthalmitis is rare, therefore data in the literature is lacking. We provided an overview of a large case series of fungal endophthalmitis at a tertiary referral center over the last 20 years, to improve patient outcomes and assist clinicians in decision-making.

Methods: The Victorian Endophthalmitis Registry is maintained at a tertiary eye hospital – prospectively collecting data of all patients presenting with endophthalmitis to the emergency department. This was a prospective case series of patients with clinically diagnosed and/or microbiologically proven fungal endophthalmitis during the period of 1998 to 2018.

Results: A total of 89 cases of fungal endophthalmitis were identified over the study period with a mean age of 48.7 years, and 62.9% of patients were male. A total of 77.5% of these cases were secondary to endogenous causes, of which 55.1% of cases were due to intravenous drug use (IVDU). Among the exogenous causes, penetrating eye injury (40%)

was the most common etiological factor. Thirty-eight (42.7%) patients grew Candida species on the ocular fluid specimens.

Conclusions: Our case series provided an insight into the trend of fungal endophthalmitis over the last 20 years. Prompt endophthalmitis management with appropriate antibiotic therapy is paramount in improving patient prognosis. A higher index of suspicion of fungal endophthalmitis is warranted in patients with IVDU.

Poster No.: EX1-005
Panel No.: 005, Session: EX1
Human Encephalitis Complicated with Bilateral Acute Retinal Necrosis Caused by Pseudorabies Virus Infection: A Case Report

*First Author: Yuwei **WANG***
*Co-Author(s): Yan **CUI**, Ziwei **LI**, Wenjuan **WANG**, Xin **WANG***

Purpose: This case and literature review remind us that pseudorabies virus is possible for infecting humans across species and self-protection is worth of more attention when contacting with animals.

Methods: We reported a case of a patient who was presented with viral encephalitis and pulmonary infection complicated with bilateral acute retinal necrosis (ARN) after direct contact with diseased swine. Next-generation sequencing (NGS) of cerebrospinal fluid and vitreous humor detected pseudorabies virus (PRV) at the same time.

Results: Intravenous acyclovir and dexamethasone treatment improved his encephalitis symptoms, and vitrectomy surgery with silicone oil tamponade treated retinal detachment.

Conclusions: In conclusion, PRV can cause encephalitis and retinal necrosis in humans. Antiviral and systemic glucocorticoids therapy are essential to control and alleviate inflammation. Vitrectomy is sometimes required to maintain visual function.

Poster No.: EX1-006
Panel No.: 006, Session: EX1
Two Cases of Traumatic Endophthalmitis in Children

*First Author: Tianwei **LIANG***
*Co-Author(s): Yanhui **CUI**, Man **HU**, Shoulong **HU**, Li **LI***

Purpose: To express the damage of the trauma in children's eyes and how to do with it in the first stage.

Methods: Case 1 was a 5-year-old boy that was injured by some tree branches when running. There was a near 10 mm corneal wound and exudation in the anterior chamber. After injury 1 day, suturing the wound and anterior chamber irrigation were done, meanwhile intravenous cefamandole. Case 2 was a 5-year-old boy, too. He was injured by a block of glass due to his fellow was careless. There was a near 5 mm corneal wound and anterior chamber empyema. After injury 1.5 days, suturing the wound and anterior chamber irrigation and intravitreal injection were done simultaneously intravenous ceftriaxone sodium.

Results: Case 1: the inflammation in anterior chamber and vitreous body increased rapidly, accompanying red and painful eye. So, we immediately did vitrectomy, lensectomy, and intravitreal injection with intravenous ceftriaxone sodium. Postoperative local and systemic antibiotics and hormone therapy were used enough for 14 days. And the lesions became quiet after 3 weeks. Case 2, postoperative local and systemic antibiotics and hormone therapy were used enough for 10 days. And the lesions became quiet after 2 weeks, and no relapse.

Conclusions: The traumatic endophthalmitis in children should be sutured, and anterior chamber irrigation and intravitreal injection done as early as possible. And postoperative systemic antibiotics and hormone therapy should be used enough for 10 to 14 days and local treatment is longer.

Intraocular Inflammation, Uveitis & Scleritis

Poster No.: EX1-007
Panel No.: 007, Session: EX1
A Novel Clinical Sign in Tubercular Retinal Vasculitis and Ocular Signs Predictive of Tubercular Retinal Vasculitis

*First Author: Hrishikesh **KAZA***
*Co-Author(s): Soumyava **BASU**, Avinash **PATHENGAY**, Mudit **TYAGI***

Purpose: To determine clinical signs suggestive of tubercular etiology in retinal vasculitis.

Methods: Retrospective, comparative, non-randomized analysis of patients with retinal vasculitis at 3 tertiary care centers in India. All patients underwent a detailed clinical evaluation and tailored laboratory investigations for etiological diagnosis. Tubercular etiology was diagnosed on the basis of the presence of retinal periphlebitis in association with ancillary evidence of systemic tuberculosis (TB) and exclusion on non-TB entities. Patients with tubercular (Group A) and non-tubercular (Group B) etiology were compared for demographic characteristics, supportive diagnostic evidence, and specific ocular signs. Focal vascular tortuosity defined as a single location of kinking in the course of the sheathed vessel. Statistical analysis was done at 5% confidence levels.

Results: Of the 114 patients with retinal vasculitis analyzed, Group A had 69 patients (100 eyes) and Group B 45 patients (75 eyes). Focal vascular tortuosity was seen in 60 eyes (60%) in Group A compared with only 7 eyes (9.3%) in Group B. Active or healed subvascular lesions (P = < 0.0001), focal vascular tortuosity (P = < 0.0001) and occlusive vasculitis (P = 0.002) was significantly more common in Group A than Group B.

Conclusions: The presence of sub-vascular healed or active lesions, focal vascular tortuosity, and occlusive vasculitis are possibly predictive of tubercular etiology in retinal vasculitis.

Poster No.: EX1-008
Panel No.: 008, Session: EX1
A Case of Sweet's Syndrome with Panuveitis

*First Author: Wenjuan **WANG***
*Co-Author(s): Yan **CUI***

Purpose: To report the diagnosis and treatment of a case of Sweet's syndrome with panuveitis.

Methods: A 54-year-old man who complained of blurred vision in his binocular for 4 days, and reported head lesions for 16 days. Binocular vision: HM/10 cm, normal intraocular pressure (IOP), anterior chamber empyema of both eyes about 1 mm, faint flare, and occasional cells were present in binocular anterior chamber, and vitreous opacity (++). Fluorescein angiography (FA) demonstrated no retinal vasculitis. Blood tests revealed inflammation: the white blood cell count was 18.05 × 109/L, neutrophils 82.7%, C-reactive protein (CRP) was 99.1 mg/L, and the related tumor series were negative. Histological examination of a skin biopsy specimen showed diffuse dermal neutrophilic infiltration and subepidermal edema with no features of vasculitis.

Results: After treatment with methylprednisolone (0.5 mg/kg qd ivdrip) therapy for 3 days, the effect was significant. Then the prednisone (30 mg/day) was started and then tapered. The treatment of 1-month disease recurrence was characterized by retinal pull-off of the right fundus, a circular hole above the nose, then the patient underwent surgery. His best corrected visual acuity (BCVA) after silicone oil was removed was 0.5 OD and 0.2 OS.

Conclusions: The incidence of retinal detachment in uveitis is 3%, suggesting that ophthalmology and dermatologists, ss patients involved in the eye should pay close attention to fundus changes, and take intervention as soon as possible.

Poster No.: EX1-009
Panel No.: 009, Session: EX1
Adenovirus-mediated Down-regulation of miR-21-5p Alleviates Experimental Autoimmune Uveoretinitis in Mice

*First Author: Long **SHI***
*Co-Author(s): Yan **CUI**, Ziwei **LI**, Yuwei **WANG**, Hui **GUO***

Purpose: To explore the role of miR-21-5p in EAU.

Methods: C57 mice were immunized with residue1–20 (IRBP1–20) in complete Freund's adjuvant supplemented with Mycobacterium tuberculosis H37Ra to induce EAU, and miR-21-5p was knocked down via subretinal injection of anti-miR-21-5p adenovirus.

Results: The pathological score, TUNEL positive cells, and the expression of pro-inflammatory factors in the retina were reduced, and the expression of IL-10 was increased by down-regulation of miR-21-5p. Up-regulation of miR-21-5p significantly decreased the mRNA and protein levels of IL-10 in ARPE-19 cells. The binding activity of miR-21-5p on the 3′UTR of IL-10 mRNA was confirmed by luciferase reporter assay. Moreover, the miR-21-5p level in splenic lymphocytes of EAU mice was increased at the 7th day after immunization and reached its peak at the 14th day. That was in accordance with the changing trend with the Th17 cell frequency in the spleen. Besides, lentivirus-mediated down-regulation of miR-21-5p reduced the Th17 cell frequency and increased the Treg cell fraction of IRBP1–20-stimulated lymphocytes in vitro.

Conclusions: In situ down-regulation of miR-21-5p attenuates EAU by inhibiting inflammatory responses and reducing retinal cell apoptosis. miR-21-5p may also participate in the progress of EAU by affecting Th17/Treg balance via the regulation of IL-10. Therefore, we demonstrated that miR-21-5p can serve as a therapeutic target in the management of uveitis and other autoimmune diseases.

Poster No.: EX1-010
Panel No.: 010, Session: EX1
Bilateral Ocular Toxocariasis: An Atypical Presentation in a Pediatric Patient

*First Author: Paolo Vicente **PALADIO***
*Co-Author(s): Romulo **AGUILAR**, Jubaida **AQUINO**, Pia Regina **GALVANTE***

Purpose: To report a case of bilateral ocular toxocariasis presenting atypically with panuveitis, ring-like mid-peripheral traction retinal detachment, and vasculitis.

Methods: A 5-year-old male with a 1-month history of whitish opacity on his left eye. Right eye best corrected visual acuity (BCVA) was 20/32, anterior chamber was unremarkable, and posterior-pole findings revealed ring-like, mid-peripheral circular traction retinal detachment with fibrous membrane overlying the posterior pole. Left eye had VA of hand movement, +4 cells, and white cataract in the anterior chamber.

Results: Right eye macular OCT revealed macular edema with traction membranes. FA revealed vasculitis and choroiditis. Left eye ultrasonography revealed traction membranes. Urinalysis, chest X-ray, PPD, and Toxoplasma titers-IgM and IgG were unremarkable. CBC revealed hypereosinophilia and elevated ESR. Left eye underwent lensectomy, intraocular lens (IOL) implantation, PPV, and endolaser after treatment and 6 months quiescence. Intraoperative findings revealed similar posterior pole characteristics to the right. Vitreous samples sent for PCR-HSV1, HSV2, VZV, Mycobacterium Tuberculosis, gram-stain yielded unremarkable results. Serum-ELISA Toxocara antibody testing yielded positive results. Further testing via serum IgG Western- Blot revealed intense, specific toxocara bands indicating positive serology. Referred to pediatrics for further management. Currently, left eye has a BCVA of 5/200.

Conclusions: Bilateral ocular toxocariasis cases are exceedingly rare, especially if they don't conform to the typical presentation of chronic endophthalmitis, localized granuloma and peripheral granuloma. Atypical presentation

may be related to the immunologic reaction of children. Supportive ancillaries may be requested, if presenting uniquely with high clinical suspicion, helping rule out other differentials. Positive serum toxocara-titers are significant in establishing diagnosis, especially with adjunct ocular findings. Eosinophilia may indicate systemic activity status. This is the first case reported that presented with a bilateral, ring-like mid-peripheral tractional retinal detachment with overlying fibrous membrane in a patient with bilateral ocular toxocariasis.

Poster No.: EX1-011
Panel No.: 011, Session: EX1

Clinical Analysis of 17 Acquired Immune Deficiency Syndrome Patients with Ocular Manifestations of Immune Reconstitution Inflammatory Syndrome

*First Author: Wenjun **KONG***

Purpose: The aim of this study was to analyze clinical features of 17 acquired immure deficiency syndrome (AIDS) patients with ocular manifestations of immune reconstitution inflammatory syndrome (IRIS), and to discuss the characteristics of ocular fundus, therapy, and prognosis.

Methods: Retrospective study. Seventeen AIDS patients were diagnosed as ocular manifestations of immune reconstitution inflammatory syndrome (IRIS) from February 2016 to April 2018 by Infection Center and Ophthalmology in Beijing You'an Hospital affiliated to Capital Medical University. The examinations include best corrected visual acuity (BCVA), anterior chamber and fundus photography, aqueous CMV-DNA, and Blood CD4 T lymphocytes count. The average follow-up time was 15 months. Ten eyes were injected intravitreal triamcinolone acetonide (TA), 5 eyes were injected intravitreal ganciclovir, and 2 eyes with macular edema were injected anti-VEGF.

Results: All of the 17 eyes had vitreous opacity more or less, and 5 eyes had iridocyclitis. Blood CD4 T lymphocytes counts in blood were largely increased among 3 months after the start of ART. Nine eyes had cytomegalovirus retinitis (CMVR) and the positive of CMV-DNA. The fundus were controlled in patients with active CMVR after using ganciclovir. The level of best corrected visual acuity (BCVA) increased in patients with vitreous opacity and iridocyclitis after using TA. For patients who had CMVR and vitreous opacity seriously, illnesses were controlled wonderfully using ganciclovir after TA. The level of BCVA increased in patients with macular edema after using anti-VEGF.

Conclusions: The ocular manifestations of IRIS are varied, and the symptomatic treatment is effective.

Poster No.: EX1-012
Panel No.: 012, Session: EX1

Clinical Efficacy of Treating Cytomegalovirus Retinitis in Acquired Immune Deficiency Syndrome Patients with Intravitreal Ganciclovir Injection in an Individual Therapy

*First Author: Chen **CHAO***
*Co-Author(s): Wenjun **KONG***

Purpose: To investigate the effect of individually intravitreal ganciclovir injection combined with intravenous infusion in the treatment of cytomegalovirus retinitis (CMVR) in acquired immune deficiency syndrome (AIDS) patients.

Methods: A total of 32 eyes in 23 AIDS patients diagnosed with CMVR in Beijing YouAn Hospital of Capital Medical University from 2017 to 2018 were included in the retrospective study. All patients underwent induction therapy using intravenous drip of the anti-cytomegalovirus (CMV) agent ganciclovir (5 mg/kg q12h) for combined with intravitreal ganciclovir injection (3 mg/time, 2 times/wk). It can be stopped properly according to the changes of fundus. The visual acuity, fundus photographs, lesion location, and number of intravitreal injections were observed preoperatively and postoperatively.

Results: Among 32 eyes of 23 patients, 14 eyes were cured during induction therapy, and fundus condition. The median (maximum, minimum) of injections in CMVR patients with central fundus lesions 4.89 (2.00,6.00) were

significantly lower than the peripherally 4.13 (2.00,6.00).

Conclusions: Treating CMVR in AIDS patients with intravitreal ganciclovir injections in an individual therapy can effectively reduce the times of intravitreal injections.

Poster No.: EX1-013
Panel No.: 013, Session: EX1
Ocular Syphilis as Retinal Vasculitis with Branch Retinal Artery Occlusion: A Diagnostic Challenge

*First Author: Lalit **AGARWAL***
*Co-Author(s): Nisha **AGRAWAL**, Ichhya **JOSHI***

Purpose: Syphilis is a great masquerader and it can be a cause of ocular inflammation of unknown etiology and origin.

Methods: Case report

Results: A 52-year-old female presented with a history of sudden onset profound diminution of vision in right eye (RE) for 1 week. On examination, her visual acuity in RE was perception of light and in left eye was 6/9. RE had 2+ cells in anterior chamber, and fundus revealed blurred disc margin superiorly with periphlebitis and splinter hemorrhage along superotemporal (ST) vascular arcade. Spectral-domain optical coherence tomography (SD-OCT) of RE revealed increased central macular thickness (472 µm) with peaked foveal configuration. Fluorescein fundus angiography revealed delayed arteriolar filling, delayed AV transit along ST arcade with capillary drop-out and perivascular leakage in that quadrant with early disc hyperfluorescence. TORCH ELISA was done among which only HSV-1 IgG antibody was positive. HIV and Montoux test was negative. Rapid Plasma Reagin and Treponema pallidum hemagglutination test was positive. There was no past history of tuberculosis or syphilis infection. Patient denied unprotected sexual behavior. Cardiac evaluation was normal. On dermatology consultation, no features of syphilis were found. A provisional diagnosis of ocular syphilis with retinal vasculitis with branch retinal artery occlusion was made. Patient was administered intramuscular procaine penicillin along with probenecid. She showed improvement after 2 weeks and attained visual acuity of 6/18 in 2 months.

Conclusions: Syphilitic uveitis should be considered in cases of retinal vasculitis, retinitis, or uveitis of unknown origin. Treatment is that of neurosyphilis and treatment response aids in confirmation of diagnosis.

Poster No.: EX1-014
Panel No.: 014, Session: EX1
Overlapping White Dot Syndrome

*First Author: Sushma **JAYANNA***

Purpose: To present a peculiar case of overlapping whitedot syndrome.

Methods: A 42-year-old female, with history of diminished of vision in the left eye for 2 weeks, with best corrected visual acuity of 20/20 and 20/60 in right and left eye, respectively. Anterior segment of both eyes was unremarkable. Left eye fundus had mild vitritis, with multiple round placoid chorioretinitis lesions at the posterior pole. History and clinical picture were suggestive of inflammatory pathology.

Results: Fundus autofluorescence had hypoautoflurescent center and hyperautofluroscent margins suggesting activity. On fluorescein angiography, initial hypo and late hyperfluorescence of the lesion was noted, suggestive of acute posterior multifocal placoid pigmentary epitheliopathy. A few lesions also showed an initial wreathlike hyperfluorescent pattern, characteristic of multiple evanescent white dot syndrome.

Conclusions: Systematic evaluation including multimodal imaging of white dot syndromes can help in diagnosing rare associations and overlaps. Possibility of other differentials like multifocal choroiditis (MFC) and punctate inner choroidopathy (PIC) should also be kept in mind and to be ruled out.

Poster No.: EX1-015
Panel No.: 015, Session: EX1
Varicella-zoster Virus as a Causative Agent of Acute Retinal Necrosis in Younger Patients: A Retrospective Study

*First Author: Mengda **LI***
*Co-Author(s): Junjie **YE***

Purpose: Herpes virus is considered to be the pathogen of acute retinal necrosis (ARN) infection. Previous studies have found that patients with ARN caused by the varicella-zoster virus (VZV) are often older, and patients with herpes simplex virus (HSV) induced ARN are considerably younger. However, in our clinical work, we find that VZV is also a pathogen in younger ARN patients. We, therefore, aimed to analyze the common etiology of younger ARN patients.

Methods: A retrospective analysis was made of 20 eyes diagnosed as having ARN in the Department of Ophthalmology of Peking Union Medical College Hospital from 2014 to 2016. All patients were reviewed for clinical data. Vitreous or aqueous specimens from 18 eyes of 18 patients were analyzed with multiplex PCR (mPCR)/quantitative PCR (qPCR) and xTAG-liquid chip technology (xTAG-LCT) to determine the causative virus of ARN.

Results: PCR and xTAG-LCT showed 4 of the 5 samples in the younger group (32.2 ± 5.2 years) and 12 of the 13 samples in the senior group (53.6 ± 4.9 years) were positive for VZV, and 2 of the 5 samples in the younger group were positive for HSV-1.

Conclusions: This study demonstrates that VZV is also a common causative virus for ARN in younger patients. Considering this finding, a systemic antiviral treatment protocol should be immediately changed to intravenous ganciclovir when the patient does not respond to acyclovir before determining the causative virus, especially in younger patients.

Poster No.: EX1-016
Panel No.: 016, Session: EX1
Vitritis of Unclear Etiology: Causes, Clinical Features, Microbiology, Management and Outcomes

*First Author: Savla Laxmi **PRABHAVATHI***
*Co-Author(s): Mudit **TYAGI***

Purpose: To describe the possible mimickers of viral retinitis.

Methods: Retrospective chart review of cases that had vitritis of unclear etiology was done for demographic parameters, presenting symptoms, clinical features, intervention, microbiology reports, management, and outcome. Cases with incomplete data were all excluded.

Results: Fifteen eyes of 14 subjects were found to have severe vitritis of unclear etiology. The mean age was 35.9 years and there was a male preponderance. Three cases reported a febrile episode prior to symptoms and 1 case had a history of trauma. The initial diagnoses that were made are: endogenous endophthalmitis (4), traumatic endophthalmitis (1), necrotizing retinitis (2), panuveitis (5), acute anterior uveitis (1), and intermediate uveitis (2). However, the final diagnosis changes to viral retinitis in 9, endogenous endophthalmitis in 4, toxoplasma retinitis in 1, and 1 eye had ocular tuberculosis. Hypopyon and keratic precipitates were more often seen in viral retinitis (3 and 7 eyes) than endogenous endophthamitis and OTB. Polymerase chain reaction (PCR) was positive for HSV in 2 eyes, eubacterial DNA in 1 eye, and Toxo DNA in 1 eye. Seven out of 9 eyes had retinitis patch (viral) (PCR-Negative), and 2 eyes with PCR positivity had no retinitis patch. Retinal detachment was observed in 6 eyes with viral retinitis, with an attached retina after surgery in 3 eyes.

Conclusions: Endogenous endophthalmitis, Toxo retinitis, and ocular TB can mimic viral retinitis. Retinal detachment, retinitis, and keratic precipitates were more frequently seen in viral retinitis. Despite intervention, the visual prognosis was only fairly good in viral retinitis

(only 3 cases had a visual acuity logMAR less than 1).

Neuroscience, Stem Cells & Regenerative Medicine

Poster No.: EX1-017
Panel No.: 017, Session: EX1
A Novel Missense Mutation Locus of Cadherin 23 and the Interaction of Cadherin 23 and Protocadherin 15 in a Patient with Usher Syndrome

*First Author: Chuanzhen **ZHENG***
*Co-Author(s): Xiaorong **LI**, Xinjun **REN**, Dejia **WEN***

Purpose: Usher syndrome (USH) is an autosomal recessive inherited disorder linked to mutations of various genes. A molecular genetic analysis is essential to guide diagnosis and treatment. In this study, we sequenced digenic heterozygous mutations of Usher syndrome type I (USH1) and identified a novel gene mutation locus of cadherin 23 in a Chinese family.

Methods: Targeted next-generation sequencing of the family (MGNC0030032) was performed to confirm the diagnosis of USH in the proband. Co-segregation of the disease phenotype and the detected variants were confirmed in all family members by PCR amplification and Sanger sequencing.

Results: Heterozygous variant of CDH23 c.6155C>T and heterozygous variant of PCDH15 c.2367_2369delTGT were identified in the proband with congenital sensorineural deafness and retinitis pigmentosa. Gene analysis of the proband's mother and sisters revealed only one heterozygous variant (of either CDH23 c.6155C>T or PCDH15 c.2367_2369delTGT), and they had no clinical manifestations of the syndrome.

Conclusions: The missense variant locus of cadherin 23 in the extracellular 19 domain, CDH23 c.6155C>T, is reported for the first time, and may aid in confirmation of USH1 clinical diagnosis. Our findings supplement the possibility that interaction of cadherin 23 and protocadherin 15 not only in sensory hair cells but also in retinal pigment epithelial cells and photoreceptors, which emphasizes the functional integrity of cadherin 23 and protocadherin 15 in the ear and retina. Additionally, we indicate that the digenic heterozygous inheritance may be the uncommon inheritance model of USH.

Poster No.: EX1-018
Panel No.: 018, Session: EX1
Anti-inflammatory Effects of Transgelin-2 in Murine Diabetic Retinopathy

*First Author: Zongming **SONG***

Purpose: Recent studies have revealed that chronic inflammation plays an important role in the development and progression of diabetic retinopathy (DR). This study was to explore the novel anti-inflammatory role and mechanism of transgelin-2 (TAGLN2) in diabetic retinopathy using a murine model and microglial cultures.

Methods: The murine model of DR was induced by streptozotocin (STZ) in C57BL/6 mice. Mouse microglial cell line BV2 was used for in vitro culture model. Lentiviral delivery of shRNA was used to knockdown TAGLN2 gene in BV2 cells. The effect of TAGLN2 on proliferation and migration of BV2 cell were evaluated by CCK8 and transwell cell assays, respectively. Biological function of TAGLN2 on BV2 cell apoptosis was determined by flow cytometry. RT-PCR, Western Blot, and ELISA were used to investigate the detailed mechanism of TAGLN2 on regulating the biological functions of BV2 cells.

Results: TAGLN2 mRNA was found significantly upregulated in mouse diabetic retina induced by STZ and in BV2 cells exposed to high glucose. Knockdown of TAGLN2 gene expression significantly suppressed the capacities of cells migration, proliferation, and colony formation of BV2 cells, accompanied by the increased apoptosis rate. Western Blot showed that activation of phorsphorylated (p) IκB and p-ERK1/2 were increased after knockdown of TAGLN2. Activated microglial leads increase of the release of pro-

inflammatory cytokines, IL-1β, TNFα and IL-6, and chemokines, CCL2, CCL3 and CXCL1.

Conclusions: Our findings demonstrated the novel anti-inflammatory effects of TAGLN2 in glucose-stimulated BV2 cells and STZ induced murine DR.

Poster No.: EX1-019
Panel No.: 019, Session: EX1

Human Induced Pluripotent Stem Cell Derived Enriched RPE Cultures: An Ex-vivo Animal Safety Study

*First Author: Vivek **DAVE***
*Co-Author(s): Praveen **JOSEPH**, Savitri **MADDILETI**, Indumathi **MARIAPPAN**, Vinay **PULIMAMIDI***

Purpose: To evaluate the safety of human-induced pluripotent stem cell (iPSC) derived retinal pigmented epithelial cells (RPE) in immune compromised nude mice model.

Methods: A prospective, ex-vivo animal study. A healthy control iPSC line generated in-house was differentiated into retinal cell types and pure cultures of RPE cells that were established at our cGMP cell culture facility. Two million cells (roughly 10 times the sub-retinal dose), were suspended in 20% Matrigel solution and injected subcutaneously in nude mice (n = 8), with strict adherence to animal handling protocols and ethics as per ARVO guidelines. At 8 weeks post-transplantation, the animals were euthanized and the pigmented cell mass at the site of injection was excised for further evaluations by immunohistochemistry using human antigen and RPE-specific markers.

Results: The transplanted human iPSC-derived RPE cells survived for up to 8 weeks in the subcutaneous space of nude mice and remained confined to the transplant site. No abnormal growth and migration of pigmented cells to ectopic sites were noted. Histopathological examination showed monolayered pigmented epithelial cells, organized into circular clusters, with clear basal and apical polarity. Immunohistochemistry confirmed that the pigmented cells were of human origin and expressed the human mitochondrial antigen. The pigmented cell clusters were also positive for RPE-specific markers, such as PAX6 and RPE65. RPE clusters were negative for the cell proliferation marker, Ki67.

Conclusions: Pure cultures of iPSC-derived human RPE cells did not proliferate abnormally in nude mice. This demonstrates the efficiency and safety of RPE cells for future in-vivo applications in cell therapy for retinal degeneration.

Poster No.: EX1-020
Panel No.: 020, Session: EX1

Leucine-rich Repeats of PXDN Is Essential for Lens Development

*First Author: Longhao **KUANG***

Purpose: Mutations in Peroxidasin (PXDN) cause severe inherited eye disorders in humans, such as congenital cataracts, corneal opacity, and developmental glaucoma. As there are multiple domains in PXDN, including Leucine-rich repeats (LRR), immunoglobulin domain, peroxidase domain, and VW domain. The function of each domain remains unknown. To investigate the role of LRR domain during eye development and disease, we generated a novel PXDN knockout mice with 2 exons of LRR domains that were deleted and performed preliminary characterization.

Methods: CRISPR/Cas9 system was used to make large DNA fragment deletions, including LRR3 and LRR4 domain deletion, about 130-177 aa in size. The eyes of the LRR-deficient mice were analyzed by histology and immunohistochemistry.

Results: We successfully generated a new PXDN knockout mouse line with LRR deficiency, which resulted in the genetic deletion of 2 exons (LRR3 and LRR4) of the LRR domain. This delete in the 2 exons caused severe anterior segment dysgenesis and microphthalmia in postnatal periods, which resembled the manifestations in patients with PXDN mutations. During embryonic periods, the lens capsule was disrupted and broken, and the lens matrix intruded into the anterior chamber.

Conclusions: LRR domain of PXDN is essential for lens development, especially for lens capsule development. Deficiency of LRR domain of the PXDN leads to a broken lens capsule (congenital cataract), and later anterior segment dysgenesis and microphthalmia. Our model also gives a pathological mechanism of anterior segment dysgenesis and microphthalmia due to abnormal lens development.

Poster No.: EX1-021
Panel No.: 021, Session: EX1
Non-invasive Electrical Stimulation Promotes Photoreceptor Survival and Regeneration in Mice with Inherited Photoreceptor Degeneration

First Author: Baoyi ***LIU***
Co-Author(s): Qiaowei ***WU****, Yu* ***XIAO****, Honghua* ***YU****, Xiaomin* ***ZENG***

Purpose: To test if electrostimulation (ES) protects photoreceptors from degeneration and induces photoreceptor regeneration by mobilizing retinal endogenous stem cells in retinal degenerated mice.

Methods: Transpalpebral ES or sham-stimulation was applied to mice carrying inherited retinal degeneration for 7 consecutive days at 5 min per day. The effect of ES on the retinal function of mice with retinal degeneration was tested using electroretinogram (ERG) and immunohistochemistry or histology analysis.

Results: Significant increase of ERG b wave amplitude was observed at the end of the 1st week post-ES, and this was maintained for 4 weeks compared with the sham-stimulated eyes. Significant preservation of photoreceptors and an increase in proliferating cells in the retina were observed after ES. In purified Muller cell cultures, ES increased the expression of neurogenetic signals and photoreceptor progenitor markers, and promoted cell proliferation and neurogenesis.

Conclusions: Transpalpebral ES promotes neuroprotective, regenerative, and repairing potentials of the retinal cells, suggesting the exciting possibility of using non-invasive ES as a versatile tool for preventing photoreceptor degeneration, potentially reversing vision loss in patients with RP.

Poster No.: EX1-022
Panel No.: 022, Session: EX1
Novel Retinal Manifestation of Poretti – Boltshauser Syndrome: Retina as a Window to the Brain

First Author: Komal ***AGARWAL***
Co-Author(s): Deepika C. ***PARAMESWARAPPA***

Purpose: To describe a case of inner retinal holes and role of retinal manifestations in the diagnosis of a neurodysplastic disorder.

Methods: A 4-year-old female child born to a consanguineous marriage presented to us with complaints of a bilateral gradual decrease in vision for a year. On examination, posterior pole of the fundus revealed multiple retinal holes, and the peripheral retina was normal. Optical coherence tomography through these holes revealed them to be affecting only the inner retina. Electroretinogram showed reduced scotopic and photopic responses. Ocular apraxia and inferior oblique overaction was also noted. The child also had speech and motor developmental delay. She was hence evaluated for neuro-degenerative disorders.

Results: Magnetic resonance imaging showed vermis hypoplasia, cerebellar dysgenesis, and cystic spaces in both cerebral hemispheres. Exome sequencing revealed pathogenic variant of LAMA1 gene. On the basis of clinical signs and exome sequencing, the child was diagnosed as Poretti-Boltshauser Syndrome. Glasses, speech therapy, and physiotherapy was advised, and retinal changes were observed.

Conclusions: The retina is known to be an extension of the brain, both embryonically and anatomically. Several neurodegenerative conditions have ocular manifestations, which many times precede the systemic symptoms and signs. Similarly, many ocular disorders have manifestations in the brain. This case highlights the importance of retinal and other ocular

findings in the diagnosis and management of systemic disorders.

Poster No.: EX1-023
Panel No.: 023, Session: EX1

Research on the Effect of Hydrogen Sulfide and Its Generation Pathway in Rats Retinal Ischemia-reperfusion Injury

*First Author: Bing **LI***

Purpose: To investigate the effects of retinal ischemia-reperfusion injury (RIRI) on rat retina, further explore the pathogenesis of glaucoma reperfusion injury, and find new directions for glaucoma prevention and treatment.

Methods: Eighty SD rats were selected, 10 weeks old, 300 - 350 g, male. The model of retinal ischemia-reperfusion was established in SD rats by transient elevation of intraocular pressure (IOP) with perfusion of normal saline into anterior chamber for 60 minutes, then blood supply was resumed. Determination of hydrogen sulfide content in tissue. To detect the messenger RNA (mRNA) expression and protein expression of cystathionine beta synthase (CBS), cystathionine gamma lyase (CSE), cysteine aminotransferase (CAT), and 3-mercaptopyruvate sulfurtransferase (3-MST) in retina.

Results: 1.The pathological damage caused by RIRI was aggravated with the increase of time. In this experiment, the heaviest injury was in the group R72A. The most serious injury happened at 72h after RIRI.2. The mRNA and protein expression of CBS, CSE, CAT, and 3-MST were changeable.

Conclusions: (1) After RIRI, the pathological injury was atrophied first then edema, and the edema was increased with time. The most serious injury after RIRI was 72 hours after perfusion. (2) After RIRI, the content of hydrogen sulfide and the expression of CBS, CAT, and 3-MST in the retina of rats decreased in varying degrees. But it was opposite in CSE, the expression of CSE was significantly higher than that of the normal rats. The decrease of CBS is the most obvious, and it is presumed that CBS may play a leading role in the reduction of hydrogen sulfide production after RIRI.

Poster No.: EX1-024
Panel No.: 024, Session: EX1

The Effect of Apelin on Angiogenesis and Inflammation Through Regulating Macrophages in CNV Model

*First Author: Fan **YANG***

Purpose: Using the CNV model to investigate the macrophage infiltrated in CNV. Investigating the relationship between VEGF and macrophages in CNV model. Detecting the Apelin expression in CNV. Injecting synthetic Apelin-13 peptide in vitreous to investigate the Apelin effects on CNV model.

Methods: Combining immunofluorescence and laser scanning confocal microscope to observe the macrophages, Apelin, and VEGF expression in CNV model. Injecting synthetic Apelin-13 peptide in vitreous to investigate the Apelin effects on CNV model.

Results: Macrophages expressed in the CNV model and became one of the sources of VEGF. Apelin expressed in the center of laser spot in day 4 after laser induced and became weak at day 7. Injecting synthetic Apelin-13 peptide in vitreous increased the angiogenesis in CNV model and increased the infiltrating of macrophage and expression of VEGF.

Conclusions: Macrophages expressed in the CNV model and became one of the sources of VEGF. Apelin expressed in the center of laser spot. Injecting synthetic Apelin-13 peptide in vitreous increased the angiogenesis in CNV model and increased the infiltrating of macrophage and expression of VEGF.

Ocular Imaging

Poster No.: EX1-025
Panel No.: 025, Session: EX1
A Novel and Faster Method of Manual Grading to Measure Mean Choroidal Thickness Using Optical Coherence Tomography

*First Author: Louis **LIM***
*Co-Author(s): Kai Xiong **CHEONG**, Kelvin **LI**, Colin **TAN***

Purpose: Choroidal thickness (CT) measurements are typically obtained from manual segmentation of individual optical coherence tomography (OCT) B-scans. This method is time-consuming and laborious. We aimed to describe a novel and faster technique to obtain CT measurements.

Methods: In a prospective cohort study of 200 healthy eyes, spectral-domain OCT with enhanced depth imaging were performed using standardized imaging protocols and assessed by reading center-certified graders. Standard manual adjustment of segmentation boundaries was performed. The new method consisted of adjusting only the lower segmentation line to the choroid-scleral boundary to form the combined chorioretinal thickness, and subtracting the original retinal thickness (RT) from it. Mean CT measurements were compared with intraclass correlation coefficients (ICC) and Bland-Altman plots.

Results: The mean central subfield CT was 324.4 µm using the original method, compared with 328.8 microns using the new method, with a mean difference of 4.5 microns (range: -14.0 to +4.0), and ICC for agreement of 0.9996 ($P < 0.001$). Similar comparability was achieved for mean CT across all other ETDRS subfields, with mean differences ranging from 2.4 to 3.7 microns, and ICCs ranging from 0.99993 to 0.9996 ($P < 0.001$).

Conclusions: Mean CT can be measured by subtracting the original RT from the combined chorioretinal thickness measurements. The advantage of this method is that only 1 segmentation line needs to be adjusted, instead of 2, hence reducing time required for segmentation. This method has been shown to be faster and reliable.

Poster No.: EX1-026
Panel No.: 026, Session: EX1
Accuracy of SD-OCT Characteristics in Identifying Post-treatment Polypoidal Status in Polypoidal Choroidal Vasculopathy Compared with Indocyanine Green Angiography

*First Author: Voraporn **CHAIKITMONGKOL***
*Co-Author(s): Neil **BRESSLER**, Thanaphat **CHAOVISITSAREE**, Paradee **KUNAVISARUT**, Nopasak **PHASUKKIJWATANA**, Direk **PATIKULSILA***

Purpose: Polypoidal regression or resolution of cyanescence on indocyanine green angiography (ICGA) is an outcome which may guide retreatment decisions in polypoidal choroidal vasculopathy (PCV) trials. However, ICGA is not always available when managing PCV in the clinical practice setting. Therefore, this study explored the accuracy of spectral-domain optical coherence tomography (SD-OCT) for identifying complete, partial, or no polypoidal regression during therapy.

Methods: With IRB approval, treatment-naïve PCV eyes with SD-OCT and ICGA at baseline and 3 months after anti-VEGF or photodynamic therapy between August 2013 and February 2018 were reviewed. Two standardized graders, using de-identified ICGA images, confirmed PCV diagnosis using EVEREST criteria at baseline and graded complete, partial, or no polypoidal regression at month 3. Two other standardized graders reviewed de-identified SD-OCT, determining characteristics of pigment epithelial detachment (PED) corresponding to polypoidal lesions. Disagreements had open adjudications.

Results: Of 65 post-treatment polypoidal lesions (39 PCV eyes, 39 subjects, 54% female, mean age ± SD 64.6 ± 8.2 years), 48% had complete and 52% had partial or no regression; on post-treatment SD-OCT, 85% had PEDs. Compared with ICGA, presence of "no PED" or "PED with homogeneous internal hyperreflectivity and poor-defined RPE" had

86% accuracy (95% CI, 75% to 93%) with 77% sensitivity, 94% specificity, 92% positive predictive value, and 82% negative predictive value for identifying complete polypoidal regression. "Heterogeneous PED with internal hypo-hyperreflectivity" had 85% accuracy (95% CI, 74% to 92%) in identifying partial or no regression.

Conclusions: When ICGA is unavailable, characteristics of PED on SD-OCT may provide acceptable accuracy in identifying the status of polypoidal regression.

Poster No.: EX1-027
Panel No.: 027, Session: EX1

Application of Iris Fluorescein Angiography (IFA) Combined with Ultra-wide Field Fundus Fluorescein Angiography (UWFFA) for Diabetic Retinopathy in Chinese Brown Irises

*First Author: Yifeng **KE***
*Co-Author(s): Xiaorong **LI**, Longli **ZHANG***

Purpose: To assess the relation between diabetic iridopathy (DI) and diabetic retinopathy (DR) and distinguish the neovascular leakage and physiologic leakage.

Methods: A total of 180 subjects were recruited prospectively in this study. Sixty normal subjects were divided equally into 3 groups (less than 40 years old, 40 - 59 years old, 60 - 79 years old). DR patients were divided equally into 3 groups (DR with normal fundus, NPDR, PDR). Normal subjects underwent IFA. DR patients performed both IFA and UWFFA at the same time. The leakage time and leakage area were compared between each group.

Results: Fluorescein leakage occurred at pupil edge in patients of the 40 - 59 year old group and 60 - 79 year old group, but not in ages of less than 40 years old. In PDR group, the leakage time was earlier and leakage area was larger compared with other DR patients (P = 0.039 and P = 0.005). However, the leakage time and leakage area were not significantly different between the 2 NPDR/PDR subgroups with different severity (all P > 0.05).

Conclusions: IFA results can only indicate the fundus of PDR patients. Whereas NPDR and pre-proliferative DR did not relate to DI changes.

Poster No.: EX1-028
Panel No.: 028, Session: EX1

Association Between Morphological Characteristics of Optic Disc and Other Anatomical Features of the Fundus in Highly Myopic Eyes

*First Author: Xiaoxiao **GUO***
*Co-Author(s): Xi **CHEN**, Shanshan **LI**, Yanling **WANG**, Lu **ZHAO***

Purpose: To describe optic disc characteristics of highly myopic eyes and investigate associated factors.

Methods: Patients were divided into groups according to the International Photographic Classification and Grading System, where myopic maculopathy was graded from categories 1 (C1) to C4. Using fundus photographs, the diameters of the optic disc and parapapillary gamma and delta zone were measured among other morphometric variables.

Results: The study included 147 eyes (84 patients). In multivariate analysis, longer horizontal optic disc diameter was associated with larger optic disc tilt ratio (P < 0.001, unstandardized regression coefficient B: -0.59), larger optic disc rotation degree (P < 0.001, B: 001), and longer horizontal delta zone diameter (P < 0.001, B: 0.09). Longer vertical optic disc diameter was associated with longer vertical delta zone diameter (P < 0.001, B: 0.16), smaller optic disc rotation degree (P < 0.001, B: 0.01), and longer disk-fovea distance (DFD; P < 0.024, B: 0.14). Generally, the horizontal optic disc diameter of C3 and C4 groups decreased, while vertical diameter and tilt ratio increased, compared to C1 and C2. After setting axial length (AL) as an independent variable, horizontal diameters and tilt ratio still showed significant differences, while vertical diameters did not show significant differences.

Conclusions: As sagittal enlargement of the eyeball, vertical optic disc diameter increased with delta zone diameters and DFD. However,

the change in horizontal optic disc diameter did not depend on the AL, which may possibly be explained by the synthetic effect of axial elongation, optic disc tilt, and lamina cribrosa shift.

Poster No.: EX1-029
Panel No.: 029, Session: EX1
Association Between the Proportion of Choroidal Vessels and Blood Flow in the Normal Macula

*First Author: Hisaya **ARAKAWA***
*Co-Author(s): Tomohiro **IIDA**, Akiko **KOGURE-KATAKURA**, Ichiro **MARUKO**, Yuriko **MIKAMI***

Purpose: To investigate the association between the proportion of luminal areas and blood flow measured with laser speckle flowgraphy (LSFG) and the optical coherence tomographic (OCT) en-face images obtained by swept-source OCT of normal choroids.

Methods: Forty-six eyes of 42 healthy volunteers (20 women; mean age of 57.8 years) without ocular pathology. The en-face images of choroidal large vessels obtained by swept-source OCT at 3 × 3 mm centered of the fovea were converted to binary images. The proportion of the luminal areas to the total areas were measured. Correlations between mean blur rate (MBR) measured with LSFG and each choroidal proportion of luminal areas were determined. The correlations of each choroidal structure and the age, sex, axial length (AL), and refractive errors were also calculated.

Results: The mean of subfoveal choroidal thickness was 225.1 ± 75.3 μm (98 ~ 363.5 μm). The mean proportion of the luminal areas to the total areas was 64.5 ± 4.0% (58.6 ~ 74.7%). There was a significant negative correlation between MBR and the proportion of the luminal area in the choroid.

Conclusions: Choroidal blood flow velocity was significantly reduced with a greater proportion of choroidal vessels in the normal choroid. It suggested that choroidal blood flow is well-regulated with autoregulation systems.

Poster No.: EX1-030
Panel No.: 030, Session: EX1
Cause of Superior Detectability of Multicolor SLO in Detection of Epiretinal Membrane

*First Author: Ryoh **FUNATSU***
*Co-Author(s): Taiji **SAKAMOTO**, Shozo **SONODA**, Hiroto **TERASAKI***

Purpose: We reported that MultiColor scanning laser ophthalmoscope (MC-SLO, Heidelberg Engineering, Germany) was superior to color fundus image (CF) in detecting epiretinal membrane (ERM) (Funatsu, Terasaki et al. ARVO2018). However, its reason was not well understood. Thus, the purpose of this study was to elucidate the mechanism or cause of making this difference.

Methods: A retrospective, cross-sectional study of patients with ERM enrolled from May to November 2017 in Kagoshima University Hospital. Thirty-five eyes of 32 patients were analyzed. Two different characters of ERM images, such as membrane or retinal folds, were semi-quantified by manual grading into 3 classes as the "visibility score" (1-invisible, 2-Barely visible, 3-Visible). Visibility score of membrane and retinal folds between MC-SLO and CF was compared by the Steel-Dwass test separately.

Results: Visibility scores of the membrane were 1.80 ± 0.71 wth CF, 2.63 ± 0.54 with MC-SLO. In different wavelength of MC-SLO, it was 2.63 ± 0.54 by blue wavelength, 2.71 ± 0.51 by green wavelength, and 1.17 ± 0.38 by red wavelength. Visibility score of retinal fold was 1.23 ± 0.49 with CF, 2.57 ± 0.61 with MC-SLO; 1.63 ± 0.60 by blue wavelength, 1.89 ± 0.68 by green wavelength, and 1.68 ± 0.58 by red wavelength. The visibility score of membrane and retinal fold in MC-SLO was significantly higher than that of CF ($P < 0.01$).

Conclusions: MC-SLO is superior to color fundus photography in detecting ERM. It may be due to better detectability on retinal fold than membrane.

Poster No.: EX1-031
Panel No.: 031, Session: EX1

Comparative Analysis of Multifocal Electroretinogram and OCTA in Non-proliferative Diabetic Retinopathy

*First Author: Ziwei **LI***
*Co-Author(s): Yan **CUI**, Wenjuan **WANG**, Xin **WANG**, Yuwei **WANG***

Purpose: The characteristics and causes of various regions of the non-proliferative diabetic retinopathy were analyzed by using mfERG (multifocal electroretinogram) and optical coherence tomography angiography (OCTA).

Methods: Twenty-four patients (44 eyes) who had not received any treatment for non-proliferative diabetic retinopathy (NPDR group) underwent mfERG examination, and 5 normal subjects (8 eyes) without any eye disease were selected as the control group. Centering on the fovea of the macula, the superior, inferior, nasal, and temporal directions of 30° retina were counted separately, the same in the control group to analyze. In addition, 20 patients (28 eyes) with non-proliferative diabetic retinopathy were selected. The OCTA examination (Colin) of 30° vascular density were used to analyze the causes of different lesions in each region.

Results: The mfERG results showed that the amplitudes of the 4 regions in the normal group were compared with each other ($P > 0.05$). The amplitudes of the 4 regions in the normal group were indistinguishable. The amplitude of NPDR group: nasal > superior > inferior ($P < 0.05$), temporal > inferior ($P < 0.05$). The OCTA study found that the shallow vascular density was: nasal > superior > temporal side ($P < 0.05$) was statistically significant, nasal > inferior > temporal side ($P < 0.05$), statistically significant.

Conclusions: The greater the density of the superficial vasculature, the smaller the damage of the cone-shaped rod function represented by the mfERG amplitude. However, the OCTA results do not correspond to the mfERG results, indicating that there are still other factors affecting changes in retinal function.

Poster No.: EX1-032
Panel No.: 032, Session: EX1

Comparison of Optical Coherence Tomography Angiography in Patients with a History of Intravitreal Injection Versus Laser Therapy for Retinopathy of Prematurity

*First Author: Jinfeng **ZHAO***
*Co-Author(s): Zhenquan **WU**, Guoming **ZHANG***

Purpose: To compare the characteristics of the anterior segment of children with a history of intravitreal injection of ranibizumab (IVR) versus laser therapy for retinopathy of prematurity (ROP) by optical coherence tomography angiography.

Methods: In this cross-sectional study, 54 eyes of 30 children (32 eyes of 17 children after laser therapy and 22 eyes of 13 children after IVR between the ages of 4 and 10 years old) were included. Optical coherence tomography angiography (OCTA) was performed for all eyes. Anterior chamber angle (ACA) and central corneal thickness (CCT) were measured by anterior segment scanning mode.

Results: The ACA was 37.39 ± 3.57° and 37.31 ± 4.21° in eyes with laser and IVR group, respectively ($t = 0.081$, $P = 0.936$). The CCT was 526 ± 22.54 mm in eyes with laser group, and 541 ± 27.71 mm in IVR group ($t = -1.821$, $P = 0.078$). There was no significant difference in 2 groups for the ACA, CCT. The best corrected visual acuity (BCVA) of the patients with laser therapy was (0.102 ± 0.09), which was significantly better than those of the IVR groups (0.210 ± 0.13) ($P = 0.005$). The spherical equivalent refraction (SER) of the patients with laser therapy was (2.97 ± 2.14), which was significantly higher than those of the IVR groups (-0.08 ± 3.11) ($P = 0.005$).

Conclusions: OCTA is a non-invasive novel image modality. Different operations may have a relatively small effect on the development of the anterior segment structure and visual acuity.

Poster No.: EX1-033
Panel No.: 033, Session: EX1

Fluorescein Leakage and Optical Coherence Tomography Angiography Features of Microaneurysms in Diabetic Retinopathy

*First Author: Dan **CAO***
*Co-Author(s): Jun **WANG**, Yunkao **ZENG**, Liang **ZHANG***

Purpose: To correlate optical coherence tomography angiography (OCTA) characteristics of diabetic microaneurysms (MAs) with leakage status on fluorescein angiography (FA).

Methods: A total of 167 MAs from 39 diabetic eyes were analyzed using simultaneous OCTA and FA. The characteristics of MAs on OCTA en face, OCT en face, and OCT B-scan with flow overlay were evaluated and correlated with fluorescein leakage status.

Results: A total of 36, 52, and 79 MAs showed no, mild, and severe leakage on FA, respectively. Most MAs (61.7%) centered in the inner nuclear layer. Cystoid spaces were observed adjacent to 60 MAs (35.9%). MAs with severe leakage had a statistically higher flow proportion compared to MAs with no or mild leakage (both $P < 0.001$). Only 112 MAs (67.1%) were visualized in the OCTA en face images, while 165 MAs (98.8%) could be visualized in the OCT en face images. MA's distributions did not associate significantly with FA leakage status. Presence of nearby cystoid spaces and higher flow proportion by OCT B-scan with flow overlay correlated significantly with FA leakage status.

Conclusions: The flow proportion of MAs observed on OCT B-scans with flow overlay might be a possible biomarker to identify leaking MAs. A combination of OCT B-scan, OCT en face, and OCTA en face images increased the detection rate of diabetic MAs on OCTA.

Poster No.: EX1-034
Panel No.: 034, Session: EX1

New Method to Measure Subfoveal Choroidal Thickness in Optical Coherence Tomography

*First Author: Yu Cheol **KIM***
*Co-Author(s): Ji Hye **JANG**, Kyung Tae **KANG***

Purpose: To introduce a new method to measure the subfoveal choroidal thickness (SFCT) in optical coherence tomography (OCT), and investigate the reliability and consistency by evaluating interpersonal variability.

Methods: Eighty-two senior medical school students were recruited and analyzed the images of the 5 standard subjects with a swept-source OCT. They analyzed the SFCT of each image independently with the following 3 different methods using the caliper: 1) measuring with observers' own methods, 2) measuring perpendicular from the retinal pigment epithelium (RPE), 3) a new method, measuring along the virtual line connecting the lowest point of fovea and the most elevated point of ellipsoid zone. To compare the direction of the measurement line with each method, the angle between the measurement line and the vertical line of the image were also compared. In order to evaluate the interoperator variabilities of each method, the interclass correlation coefficient (ICC) was calculated and compared for the distance and the angle.

Results: The ICC of the distance with method 1 was 0.853, and it with method 2 was 0.880, and it with method 3 was 0.896 ($P < 0.001$). The ICC of the angle with method 1 was 0.647, it with method 2 was 0.842, and it with method 3 was 0.307 ($P < 0.001$).

Conclusions: The new suggested method shows less interpersonal variability than the conventional one. It can be a novel and reliable standard way to measure SFCT.

Poster No.: EX1-035
Panel No.: 035, Session: EX1

Three-dimensional Choroidal Vascularity Index in Acute Central Serous Chorioretinopathy Using Swept-source Optical Coherence Tomography

*First Author: Jingyuan **YANG***
*Co-Author(s): Youxin **CHEN**, Mingzhen **YUAN***

Purpose: To evaluate three-dimensional choroidal vascularity index (CVI) in eyes with treatment- naïve acute central serous chorioretinopathy (CSC) using swept-source optical coherence tomography (SS OCT).

Methods: In this prospective, cross-sectional study, OCT and OCT angiography covered the area of 12 × 12 mm centered on the fovea. Three-dimensional CVI was defined as the proportion of choroidal vascular luminal volume in the total choroidal volume. The location of pigment epithelial detachment (PED) and area with abnormal perfusion at choriocapillary layer was compared with the distribution of three-dimensional CVI.

Results: Thirty-two eyes with treatment-naïve acute CSC, 18 fellow eyes, and 48 control eyes were enrolled. Three-dimensional CVI had good repeatability on control eyes with variable coefficients of 0.166. Mean CVI in the scan area was 0.35 in eyes with CSC, 0.34 in fellow eyes of CSC, and 0.30 in control eyes. The overall CVI in control eyes was less than that in eyes with CSC and that in fellow eyes significantly ($P < 0.001$ and $P = 0.006$, respectively). The eyes with CSC and the fellow eyes had significantly higher CVI at the posterior pole and the drainage routes of choroidal veins. In eyes with CSC, PEDs and choriocapillary with abnormal perfusion colocalized with the dilated choroidal vessels, where has high three-dimensional CVI.

Conclusions: Increased three-dimensional CVI suggested increased vascular component in both eyes with CSC and fellow eyes. Three-dimensional CVI is a useful imaging marker of choroidal diseases to assess choroidal vasculature volumetrically, which might advance our understanding of CSC pathophysiology.

Poster No.: EX1-036
Panel No.: 036, Session: EX1

To Quantitatively Explore the Correlation Between Optical Coherence Tomography (OCT) Parameters and Vision Impairment in Patients with Diabetic Macular Edema (DME)

*First Author: Bing **LI***
*Co-Author(s): Youxin **CHEN***

Purpose: To explore a novel, deep learning (DL) model to detect multiple retinal or optic nerve diseases using color fundus photography (CFP), which will help prevent some vision-threatening diseases at the early stage.

Methods: This study was a cross-sectional, observational case series. One hundred eyes from 66 patients with DME were retrospectively included in this study. OCT parameters, including central macular thickness (CMT), height of intraretinal cysts, subretinal fluid and sponge-like retinal swelling, density of hyperreflective foci (HRF), and the integrity of the ellipsoidal zone (EZ) were assessed. Complete ophthalmic examination and medical history were retrospectively reviewed through patient records. Correlation analyses and multiple linear regression analyses were performed to quantitatively explore the relationship between best corrected visual acuity (BCVA) and OCT parameters.

Results: Among all OCT parameters, CMT, the height of intraretinal cysts, the height of sponge-like retinal swelling, HRF, and the integrity of the EZ were significantly correlated with BCVA ($r = -0.550$, -0.526, -0.411, -0.277 and -0.501, respectively; $P < 0.01$). In DME patients with SRF, only CMT presented a moderate correlation with BCVA ($r = -0.472$, p-value was 0.003). In multiple linear regression analysis, CMT, HRF density, and EZ integrity fit a significant linear equation ($\beta = 0.482$, 0.184, and 0.447, respectively), with the adjusted R square reaching 0.522 ($P < 0.001$).

Conclusions: In DME eyes, OCT parameters, including the density of HRF and integrity of the EZ together with CMT, could explain 52.2% to 60.5% of the variation in BCVA, and were weighted approximately 2:1:2, respectively.

Poster No.: EX1-037
Panel No.: 037, Session: EX1

Ultra-wide Field Swept-source Optical Coherence Tomography Angiography in Patients with Diabetes Without Clinically Detectable Retinopathy

*First Author: Jingyuan **YANG***
*Co-Author(s): Youxin **CHEN**, Song **XIA***

Purpose: To investigate alterations in retinal microvasculature in eyes with preclinical diabetic retinopathy (DR) using ultra-wide field swept-source optical coherence tomography angiography (UWF SS-OCTA).

Methods: Prospective cross-sectional study. Fifty-six eyes of 30 diabetic patients without clinically retinal signs were included. All subjects underwent OCTA examination with 12 × 12 mm^2 field of view of 5 visual fixations (1 central fixation and 4 peripheral fixations). Lesions, including non-perfusion area (NPA), microvascular dilation and tortuosity, and neovascularization (NV), were recorded using the 5 OCTA images. Diabetic history was also recorded.

Results: Peripheral OCTA images presented more microvascular lesions of NPA and microvascular dilation and tortuosity than central OCTA images significantly (P = 0.006 and 0.002, respectively). NV was detected in 1 eye using peripheral OCTA images. The amount of lesions' types was associated with duration of diabetes and HbA1c level (all P values < 0.05).

Conclusions: UWF SS-OCTA is a promising imaging method for diabetic eyes without clinical signs to reveal retinal microvascular alterations which might need interventions. The application of UWF SS-OCTA provides the rationale for more aggressive intervention than fundus photography for diabetic ocular complications at an early stage. Peripheral retina should be assessed carefully for diabetic patients who had a long duration of diabetes and a high HbA1c level.

Poster No.: EX1-038
Panel No.: 038, Session: EX1

Using 3D-MRI Imaging to Quantitatively Analyze the Shape of Eyeballs with High Myopia and to Investigate Relationships Between Myopic Traction Maculopathy and Posterior Staphyloma

*First Author: Xi **CHEN***
*Co-Author(s): Xiaoxiao **GUO**, Shanshan **LI**, Yanling **WANG**, Lu **ZHAO***

Purpose: To quantitatively analyze the shape of eyes with high myopia using high-resolution three-dimensional (3D) magnetic resonance imaging (MRI), and to investigate relationships between myopic traction maculopathy (MTM) and the morphological changes of posterior staphyloma (PS).

Methods: This prospective study enrolled 105 patients with high myopia at Beijing Friendship Hospital. All participants underwent a comprehensive ophthalmic examination. MTM was divided into different types by optical coherence tomography, and ocular shapes were categorized by 3D-MRI.

Results: A total of 105 patients (105 eyes) were studied, with a mean age of 60.4 ± 13.3 years and mean axial length of 28.71 ± 2.78 mm. Spheroidal shape was observed in 35 eyes (33.3%), ellipsoidal shape in 11 eyes (10.5%), conical shape in 17 eyes (16.2%), nasally distorted shape in 18 eyes (17.1%), temporally distorted shape in 16 eyes (15.2%), and barrel shape in 8 eyes (7.7%). PS was identified in 84 eyes (80%), and the proportions for the elliptical, conical, nasal torsion, temporal torsion, and barrel shapes were 27.9%, 23.1%, 12.9%, 9.5%, 17.1%, and 9.5%, respectively. In eyes without PS, MTM accounted for 23.8%, while with PS the proportion increased to 53.8%. The proportion of MTM in spheroidal was lowest, and nasal and temporal torsion shapes were highest. A total of 45.5% of the nasal torsion shapes were with MTM, and for nasal torsion shape was 83.3%.

Conclusions: Not all highly myopic eyes are deformed. Spheroid was the predominant ocular shape. Eyes with PS display more severe

myopic maculopathy. Moreover, nasally and temporally distorted eyes present a significantly high percentage of MTM.

Poster No.: EX1-039
Panel No.: 039, Session: EX1
Utility of a Public-available Artificial Intelligence in Diagnosis of Polypoidal Choroidal Vasculopathy

*First Author: Youxin **CHEN***
*Co-Author(s): Jingyuan **YANG**, Weihong **YU**, Chenxi **ZHANG***

Purpose: To investigate the feasibility of training an artificial intelligence (AI) on a public-available AI platform to diagnose polypoidal choroidal vasculopathy (PCV) using indocyanine green angiography (ICGA).

Methods: Two methods using AI models were trained by a data set including 430 ICGA images of normal, neovascular age-related macular degeneration (nvAMD), and PCV eyes on a public-available AI platform. The 1-step method distinguished normal, nvAMD, and PCV images simultaneously. The 2-step method identifies normal and abnormal ICGA images at the first step and diagnoses PCV from the abnormal ICGA images at the second step. The method with higher performance was used to compare with retinal specialists and ophthalmologic residents on the performance of diagnosing PCV.

Results: The 2-step method had better performance, in which the precision was 0.911 and the recall was 0.911 at the first step, and the precision was 0.783, and the recall was 0.783 at the second step. For the test data set, the 2-step method distinguished normal and abnormal images with an accuracy of 1, and diagnosed PCV with an accuracy of 0.83, which was comparable to retinal specialists and superior to ophthalmologic residents.

Conclusions: In this evaluation of ICGA images from normal, nvAMD, and PCV eyes, the models trained on a publicly-available AI platform had comparable performance to retinal specialists for diagnosing PCV. The utility of a publicly-available AI platform might help everyone, including ophthalmologists who had no AI-related resources and especially those in less developed areas, for future studies.

Poster No.: EX1-040
Panel No.: 040, Session: EX1
Various Facets of Retinal Abnormalities in β-Thalassemia Major and the Role of Fundus Autofluorescence Imaging in Their Diagnosis

*First Author: King Hans **KURNIA***
*Co-Author(s): Elvioza **ELVIOZA**, Rita S. **SITORUS***

Purpose: Retinal abnormalities can occur as a complication of β-thalassemia major. The causative mechanisms include chronic anemia, iron overload, or a side effect of iron-chelating agents. Abnormalities may be asymptomatic or result in decreased vision. This case series demonstrated various manifestations of retinal abnormalities in β-thalassemia major and their fundus autofluorescence (FAF) findings.

Methods: A case report. Three patients with β-thalassemia major were consulted to ophthalmology polyclinic to undergo ophthalmic screening. All patients had a long-term history of regular blood transfusion and iron-chelating agent usage. Complete ophthalmic examination was performed, with additional FAF imaging examination.

Results: First case: 36-year-old female with best corrected visual acuity (BCVA) of 6/6 on both eyes. Peripapillary angioid streaks, retinal pigment epithelium (RPE) pigmentation changes, and sclerotic vessels were found. FAF showed speckled area of macular hypoautofluorescence. Second case: 24-year-old male with BCVA of 6/6 on both eyes. There were bilateral retinal venous tortuosity and RPE pigmentation changes, with intraretinal hemorrhage on the superotemporal quadrant of the left eye. FAF showed hypoautofluorescence on the hemorrhagic area and the macula. Third case: 18-year-old male with BCVA of 6/18 on both eyes. There was RPE atrophy on the macula with pigment clumping. FAF showed extensive area of macular hypoautofluorescence.

Conclusions: Various manifestations of retinal abnormalities in β-thalassemia major should be

recognized by ophthalmologists, especially in patients who have a long-term history of blood transfusion and iron-chelating agent usage. FAF imaging is useful to assist visualization of lesions that are too subtle to be assessed with ophthalmoscopy alone.

Ocular Oncology & Pathology

Poster No.: EX1-041
Panel No.: 041, Session: EX1
Clinical Characteristics of 582 Patients with Uveal Melanoma in China

*First Author: Wenbing **WEI***

Purpose: To assess the clinical characteristics, treatment, and survival of patients with uveal melanoma in China.

Methods: All patients underwent a complete ocular examination including measurement of best corrected visual acuity, anterior biomicroscopy, tonometry, ophthalmoscopy, FA, and echography for measurement of the tumor dimensions. At 6 month intervals during the first 2 years and subsequently once per year.

Results: The mean age of the 582 patients was 44.6 ± 12.6 years. The tumors were located most often in the superior temporal region and least common in the inferior region. In 548 patients, the tumors were located in the choroid, in 33 (5.7%) patients in the ciliary body, and in 1 (0.2%) patient in the iris. Treatment included episcleral brachytherapy (71.3%), local tumor resection (8.2%), and primary enucleation. Median follow-up time was 30 months. The overall survival rate at 5 and 10 years was 92.7% and 85.1%, respectively. Younger age, tumor location in the nasal meridian, smaller tumor size, hemispheric tumor shape, histological tumor cell type, and type of treatment were significantly associated with the overall survival in univariate analysis, while in multivariate analysis only smaller tumor size was significantly associated with better overall survival.

Conclusions: In this first study on clinical characteristics of uveal melanomas of a relatively large group of patients from China, the onset age was considerably younger and survival rate better than in studies from Western countries. Tumor size was the most significant factor for survival.

Poster No.: EX1-042
Panel No.: 042, Session: EX1
Exploration and Analysis of Minimally Invasive Vitrectomy in the Treatment of Intraocular Tumors

*First Author: Xingrong **WANG***
*Co-Author(s): Shuya **WANG***

Purpose: To investigate the efficacy, safety, and indications of minimally invasive vitrectomy in the treatment of intraocular tumors.

Methods: From 2013 to 2015, we have performed vitrectomy for 8 patients with intraocular tumors, including 1 with posterior polar malignant tumor, 5 with equatorial intraocular tumor, and 2 with anterior intraocular tumor. Among those, 1 patient underwent 23 G vitrectomy, and 7 others underwent lamellar scleral choroidectomy. All the tumors were removed completely, and there was no rupture of the tumor. All of the 8 cases were combined with vitreoretinal surgery, including vitrectomy, intraocular photocoagulation, and silicone oil filling.

Results: Postoperative histopathological examination showed that there were 6 cases of choroidal melanoma, 1 case of pigmented epithelial adenoma, and 1 case of schwannoma. After 6 - 24 months follow-up, no tumor recurrence and metastasis were found, and there was no significant change in the shape of the eyeball. The retinal reattachment rate was 87%, and the average postoperative visual acuity was more than 0.1.

Conclusions: The selective use of minimally invasive vitrectomy in the treatment of intraocular tumors can preserve the affected eyes and save visual acuity, and the postoperative recurrence rate is not significantly different from the traditional extirpation. The

treatment and prognosis of intraocular tumors of different locations and sizes were discussed. The pathological examination of resected tissue can help to get a definite diagnosis.

Poster No.: EX1-043
Panel No.: 043, Session: EX1
Idiopathic Orbital Inflammatory Syndrome: Yes or Not?

*First Author: Lindan **XIE***
*Co-Author(s): Shihui **WEI**, Quangang **XU**, Huanfen **ZHOU***

Purpose: We presented 2 cases with similar radiologic features which were initially diagnosed with presumed IOIS. Later biopsy proved to be a different entity.

Methods: Case report

Results: Case 1: A 56-year-old man presented with diplopia and headache. On neuro-ophthalmologic examination, extraocular movement (EOM) revealed esotropia with -4 abduction deficits in his right eye. Orbital MRI with contrast revealed a T2 hyperintense lesion with enhancement in his right eye extending from posterior the lateral rectus muscle to ipsilateral orbital apex, cavernous sinus and meningeal. He received steroids for presumed IOIS and was totally relieved 1 month later. Case 2: A 39-year-old female presented with diplopia, with headache, dizziness, chest stuffiness and nausea, facial pain, and numbness. Orbital MRI revealed a fusiform lesion with heterogeneous enhancement in the outer upper quadrant of the left eye involving lacrimal grand, lateral rectus muscle, and upper extraocular muscle, which extended to ipsilateral orbital apex and meninges. She was diagnosed with presumed IOIS and treated with steroids, but failed to improve. A diagnostic left orbitotomy was performed, and histopathological biopsy showed (left eye) adenoid cystic carcinoma of the lacrimal gland with perineural involvement. Soon, she was transferred to the relevant department for adjuvant orbital radiotherapy. Follow-up over 3 months showed no recurrence of the tumor.

Conclusions: When lacrimal malignancies become more diffuse or ill-defined on imaging studies and indistinguishable clinically, histopathologic biopsy from causative lesions is warranted, especially in advanced cases or refractory cases.

Poster No.: EX1-044
Panel No.: 044, Session: EX1
Multiplatform Omics Analysis for Identification of Molecular Characteristics and Therapeutic Targets of Uveal Melanoma

*First Author: Yongjoon **KIM***
*Co-Author(s): Christopher **LEE**, Sung Chul **LEE***

Purpose: To identify mechanisms involving intrinsic chemoresistance of metastatic uveal melanoma (UVM), and the relevant therapeutic targets for UVM.

Methods: Cohorts of 80 and 67 patients of primary UVM and skin cutaneous melanoma (SKCM), respectively, using The Cancer Genome Atlas dataset, were compared. Mutational burden, mutational signatures, and oncogenic signatures enriched in UVMs and SKCMs were analyzed using whole exome and transcriptome sequencing data. A kinome-wide siRNA library screening was conducted to identify relevant therapeutic targets.

Results: Mutational burdens identified by whole exome sequencing were significantly lower in UVM than in SKCM patients (medians: 19.0 vs. 321.0, respectively; $P < 0.001$). COSMIC mutational signature analysis identified that most of the mutations in UVM patients (> 90%) were associated with spontaneous deamination of 5-methylcytosine or defective mismatch repair. Unlike SKCM patients, the ultraviolet light-related mutational signature was not found in UVM patients. Transcriptome analysis revealed that the MYC signature was more enriched in UVM patients, as compared to SKCM patients. Fifty-nine (73.8%) of 80 UVM patients showed gains in MYC copy number, and a high MYC copy number was associated with aggressive clinicopathological features of tumors, with poor survival. Kinome-wide siRNA library screening identified WEE1 as

a lethal target for UVMs, and UVM cell lines showed high susceptibility to a WEE1 inhibitor (MK-1775; adavosertib) at a clinically tolerable dose.

Conclusions: Whole-exome and transcriptome analyses identified UVM as a MYC-driven cancer. Based on our results, we suggest that WEE1 may be an effective target for UVM patients harboring MYC amplifications.

Poster No.: EX1-045
Panel No.: 045, Session: EX1
The Clinicopathological Features Data and Correlation with Metastasis for 164 Uveal Melanoma Patient

*First Author: Ren **XIANG***

Purpose: To explore clinicopathologic features and its relation with metastasis in uveal melanoma patients.

Methods: Retrospective study. A total of 164 uveal melanoma inpatients from 1980 to 2016 were involved in our study. We collected their clinic and pathologic data, including general demographics, tumor size, location, pathological type, and metastasis stage and make statistical analysis.

Results: There were 91 males and 73 females, 143 of 165 were choroidal melanoma. The average large base diameter (LBD) was 14.52 mm (5 - 50 mm). Average height was 8.4 mm (2 - 20 mm); large, medium, and small tumors were 73, 52, and 3 cases, respectively. Spindle A, spindle B, epithelioid, and mixed cell type were 31, 42, 40, and 30 cases, respectively. Among the metastasis group spindle A, spindle B, epithelioid, and mixed cell type were 12, 13, 17, and 19 mixed cell type had higher metastasis rate. The difference was statistically significant by chi-square test ($c = 17.521$, $P = 0.025 < 0.05$). Metastasis rate were no difference in size and location. Ciliary body tumors were 21 cases, including 5 cases of epithelioid cell type, 6 cases of spindle cell type B, 9 cases of mixed type, and 2 cases of spindle cell type A.

Conclusions: Choroidal melanoma is still the most common type of uveal melanoma. They were more common in 40 - 60's, without gender difference. Similar percentages of 4 pathological types. The metastasis rates in mixed cell type was larger than the other 3 types. Metastasis is not closely related to the size and location of the tumor. Mixed cell type is common for ciliary body melanoma, and still needs to be confirmed with a larger sample.

Poster No.: EX1-046
Panel No.: 046, Session: EX1
The Treatment for Vitreous Implantation of Retinoblastoma with Pars Plana Vitrectomy

*First Author: Tao **LI***
*Co-Author(s): Huasheng **YANG**, Ying **LIN**, Yuqing **WU**, Jizhu **LI***

Purpose: To evaluate the efficacy and safety of pars plana vitrectomy (PPV) in eyes treated for retinoblastoma.

Methods: We evaluated 8 consecutive cases of PPV in eyes that were successfully treated for retinoblastoma between 2018 and 2019. All the patients were received and treated by the same group of ophthalmologists. Before PPV surgery, 3-5 circles of systemic chemotherapy and intravitreal chemotherapy were performed as planned. Mean follow-up was 4.5 months.

Results: One patient had significantly improved visual acuity after surgery, but the tumor reactivated 4 months later which received immediate systemic chemotherapy and intravitreal chemotherapy. No tumor reactivation and postoperative complications were observed in other 7 patients during 1-9 months follow-up.

Conclusions: PPV is associated with significant risks in eyes previously treated for retinoblastoma. However, planed preoperative systemic chemotherapy combined with intravitreal chemotherapy effectively reduced the risk of tumor metastasis caused by vitrectomy. In addition, by excision the opacity and disseminated tumor cells in vitreous and cryotherapy directly during PPV promised the atrophy of tumor tissues and improvement of

postoperative vision acuity. This approach to retinoblastoma depends on multidisciplinary teamwork and careful technique to avoid the tumor spreading.

Ophthalmic Epidemiology

Poster No.: EX1-047
Panel No.: 047, Session: EX1
Burden of Macular Diseases Requiring Anti-vascular Endothelial Growth Factor Injection: Experience from a Public Hospital in Hong Kong

*First Author: Chi Lik **AU***
*Co-Author(s): Simon **KO***

Purpose: With the increasing life expectancy in Hong Kong, there is an increasing demand for public health services, including eye diseases. Being the gold standard of treatment proven by land-marking trials, anti-Vascular Endothelial Growth Factor (anti-VEGF) injection for managing various types of macular diseases is available in public hospitals as a self-financed item in Hong Kong.

Methods: All anti-VEGF injections in a year (1/7/2017 - 30/6/2018) in a local hospital's Ophthalmology department in Hong Kong were retrospectively reviewed. Data on patients' demographics, disease characteristics, injection schedule and regime, hospital visit details, and visual acuity (VA) were collected and analyzed with SPSS version 25.

Results: A total of 1,782 injections were identified, with 58.2% from wet age-related macular degeneration (wAMD). Diabetic-related and retinal vein occlusion accounted for 24.3% and 14.2%, respectively. Patients with wAMD (76.6 years old) was older than ($P < 0.01$) diabetic ones (63.0 years old), but both were male predominant. Monthly new cases were 21.9%, with 2.4% lost to follow-up. Patient on average had 3.8 injections and 13.4 hospital visits annually. At most, 10 injections were done within 1 year. A total of 2.0% of patients died within 1 year from last anti-VEGF injection. There was no statistically significant difference in final VA ($P = 0.98$) and VA change in 1 year ($P = 0.78$) between the Treat and Extend (T&E) and "as needed" (PRN) groups.

Conclusions: Anti-VEGF injection service is an expanding huge burden to the public hospital ophthalmology service with the aging population. There was no difference in visual outcome between the T&E and PRN group.

Poster No.: EX1-048
Panel No.: 048, Session: EX1
Clinical Characteristics of Neovascular Age-related Macular Degeneration in Southwestern Island of Japan

*First Author: Tamaki **TAMASHIRO***
*Co-Author(s): Hideki **KOIZUMI**, Ayano **OSHIRO**, Keiko **SAWAGUCHI**, Sorako **WAKUGAWA***

Purpose: Okinawa, that consists of the southwestern islands of Japan, is known to have a high prevalence of hyperopia compared to mainland Japan. The purpose of this study was to identify the clinical characteristics of neovascular age-related macular degeneration (AMD) in Okinawa.

Methods: A retrospective review of consecutive 133 patients with treatment-naïve neovascular AMD seen at the University of the Ryukyus Hospital from November 2017 to May 2019 was conducted. We classified the patients into 3 subtypes of neovascular AMD, namely, typical neovascular AMD (tAMD), polypoidal choroidal vasculopathy (PCV), and retinal angiomatous proliferation (RAP). Additionally, we evaluated the prevalence of pachychoroid neovasculopathy (PNV) based on the previously reported criteria.

Results: Of the 133 patients, 65 patients (48.9%) were diagnosed as tAMD, 53 patients (39.8%) as PCV, and 12 patients (9.0%) as RAP. The male ratio was 63.1% in tAMD, 67.9% in PCV, and 50% in RAP. Of those patients, bilateral involvement was seen in 8 patients (12.3%) in tAMD, 8 patients (15.1%) in PCV, and 5 eyes (41.7%) in RAP. The remaining 3 patients (2.3%), all of whom were male, had tAMD in 1 eye and PCV in the other eye. PNV was observed in 47 patients (35.3%).

Conclusions: The characteristics of neovascular AMD in Okinawa was comparable to that of mainland Japan and other Asian countries, in terms of the subtype constitution, male to female ratio, and bilaterality. The prevalence of PNV seems to be higher than that of the previous Japanese study.

Poster No.: EX1-049
Panel No.: 049, Session: EX1
Impact of the Morphologic Characteristics of Optic Disc on Choroidal Thickness in Young Myopic Patients

*First Author: Qiuying **CHEN***
*Co-Author(s): Jiangnan **HE**, Xun **XU**, Jianfeng **ZHU**, Ying **FAN***

Purpose: To explore the characteristics of tilted optic disc and peripapillary atrophy (PPA), and their associations with choroidal thickness (ChT) in young myopic patients.

Methods: A total of 821 patients were enrolled in this cross-sectional study. Optic disc tilt ratio, PPA area, macular ChT (mChT), and peripapillary ChT (pChT) were measured. Subjects were divided into 4 groups purely on the basis of the axial length (AL). Relationships between ChT and the morphological characteristics of the optic disc were analyzed using logistic regression.

Results: The prevalence of tilted optic disc and PPA increased as myopia severity increased. Every 0.1 mm^2 increase in PPA area was associated with a 14.93 μm decrease in mChT and a 9.54 μm decrease in pChT; every 0.1 increase in tilt ratio was correlated with a 5.38 μm increase in mChT and a 6.21 decrease in pChT. After stratifying by myopia severity, these trends were still observed in the high myopia group. A larger PPA area (odds ratio [OR], 2.33; $p < 0.01$), a longer AL (OR, 1.34; $p < 0.01$), an increased pChT (OR, 1.11; $p < 0.01$) and a decreased mChT (OR, 0.93; $p < 0.01$) were associated with higher odds of having tilted optic disc.

Conclusions: In young myopic patients, mChT was negatively associated with PPA area and positively associated with tilt ratio, while pChT was negatively associated with PPA area and tilt ratio. In this population, larger PPA area, longer AL, and thinner mChT were associated with higher odds of tilted optic disc.

Poster No.: EX1-050
Panel No.: 050, Session: EX1
Leber Congenital Amaurosis Epidemiology and Management in Russia Assessed by Social Media Listening with Natural Language Processing

*First Author: Yuriy **ASTAKHOV***
*Co-Author(s): Vladimir **BULATOV**, Irina **EFIMENKO**, Marina **LUTOSHKINA**, Tatiana **NEVINITSYNA**, Vera **PETRAKOVSKAIA***

Purpose: To analyze Leber Congenital Amaurosis (LCA) epidemiology and management in Russia using social media listening (SML) with natural language processing (NLP).

Methods: Information from patients' and caregivers' messages in open internet sources was extracted and processed using semantic analysis (NLP). Information related to LCA patient journey and experience was analyzed.

Results: Within 1 month, 24,000 pages and 117,000 unique entries posted over a period of 10 years were included in the analysis. A total of 48 unique LCA cases were identified. A total of 67% of patients were male, and 85% of patients were aged < 1 year old at the time of onset, 29% of patients were aged 1 - 3 years old. Average time to diagnosis was 2.5 years. The most common symptoms were no or poor eye fixation and reaction to the light, photophobia. In 67% of cases, the ophthalmologist was the first specialist contacted, though second specialists mentioned were either neurologist, pediatrician, psychologist, or geneticist. In 18 cases, genetic testing was mentioned, in 6 cases RPE65 was mentioned including 1 case where mutation in RPE65 was explicitly confirmed. The largest number of cases were identified in the southern regions of Russia (8 cases, 35%), Far East (4 cases, 15%), and Moscow (2 cases, 9%). However, analysis of patient movements showed that the majority of

patients would seek medical care in Moscow, Saint Petersburg, and Ufa.

Conclusions: LCA is an ultra-rare disease. Its epidemiology, diagnostics, and management in Russia remains understudied. SML with NLP may provide important real-world data on Russian patients with LCA.

Pediatric Retina

Poster No.: EX1-051
Panel No.: 051, Session: EX1
A Case of Incontinentia Pigmenti

*First Author: Roland Martin **ABAYA***

Purpose: To describe a case of Incontinentia Pigmenti on a 7 month-old patient.

Methods: Case report

Results: This was a case of a 7-month old female who was brought by her mother due to a whitish opacity on the right eye. She has an unremarkable perinatal and birth history. After birth, she was admitted for 5 days due to erythematous vesicular lesions on her trunk and extremities, with concurrent seizure episodes. She was diagnosed with focal epilepsy treated with Phenobarbital. After 4 months, her skin lesions progressed into whirling macular hyperpigmented patches. On eye exam, her left eye blinks to light, while her right eye has no response to light and was also noted to have a poor red-orange reflex. Fundus exam of the right eye showed funnel-shaped retinal detachment with dialysis pulled to superotemporal area, with subretinal proliferative vitreoretinopathy. The left eye was normal. No other family member had the same signs and symptoms.

Conclusions: Incontinentia Pigmenti (a.k.a. Bloch-Sulzberger syndrome) is a rare X-linked dominantly inherited disease manifesting at birth or early childhood. Patients with IP initially present with vesicular skin lesions within the first few months of life associated with eye and neurologic problems occurring 30-40% of the time, as seen in this case. They often yield a positive family history which was absent on this patient. At this time, treatment is only limited to managing symptoms of the disease, hence genetic testing and counseling of family members are warranted.

Poster No.: EX1-052
Panel No.: 052, Session: EX1
Outcome of Intravitreal Bevacizumab Combined with Laser Therapy for Sight Threatening Retinopathy of Prematurity

*First Author: Sanyam **BAJIMAYA***
*Co-Author(s): Eli **PRADHAN**, Shaila **SHARMIN***

Purpose: Both intravitreal anti-VEGF and laser therapy are current modalities of treatment for sight-threatening Stage 3 threshold retinopathy of prematurity (ROP). We evaluated the outcome of preterm children that had undergone both modalities of treatment at Tilganga Institute of Ophthalmology, Nepal.

Methods: We retrospectively reviewed charts and fundus photos of premature babies that had undergone intravitreal Bevacizumab (0.625 mg), and then followed by adjuvant laser photocoagulation during a one and a half year period (January 2018 to June 2019). Babies risk factor parameters, birth weight, gestational age, treatment outcome, and fundus pictures were taken as data sources.

Results: Total 11 preterm babies with mean birth weight of 1,230 grams and mean gestational age of 28.45 weeks had undergone ROP treatment with intravitreal Avastin followed by laser therapy. Low birth weight, comorbidities such as neonatal infection, multiple blood transfusions, and prolonged use of oxygen remained as risk factors for the development of sight-threatening ROP. Ten babies had stable and regressed stage 3 ROP in 3 months follow-up, whereas 1 child progressed to stage 4 b ROP, which required lens-sparing vitrectomy (LSV).

Conclusions: Combination treatment with intravitreal Bevacizumab with laser photocoagulation has better outcomes for sight-threatening ROP.

Poster No.: EX1-053
Panel No.: 053, Session: EX1
Progressive Retinal Vessel Malformation in a Premature Infant with Sturge-Weber Syndrome After Intravitreal Anti-VEGF

*First Author: Yun **LI***

Purpose: To report a case of progressively formed retinal vessel malformation in a premature male infant with Sturge-Weber syndrome (SWS) after he was treated with intravitreal anti-VEGF.

Methods: Retrospective review of the medical records and imaging documentation of the case.

Results: The male baby was born prematurely at gestational age 30 weeks with a port-wine mark involving his left eyelids and maxillary. On postmenstrual age week 33, he had intravitreal anti-VEGF, and 1 week after he presented with posterior retinal vessel tortuosity and comprehensive vein-to-vein anastomoses. Retinal vessel tortuosity is characteristic in SWS, but vein to vein anastomoses are rarely reported. Besides, to the best of our knowledge, this was the first report of documented progression of retinal vessel malformation in Sturge-Weber syndrome.

Conclusions: SWS could coincide with prematurity, and its progressive retinal vessel tortuosity and abnormalities as anastomoses, though rare, could interfere with the judgment of retinopathy of prematurity diagnosis and treatment.

Poster No.: EX1-054
Panel No.: 054, Session: EX1
Retinal Findings Before Retinopathy of Prematurity

*First Author: Ji Hye **JANG***
*Co-Author(s): Yu Cheol **KIM**, Young Do **YEO***

Purpose: To evaluate the retinal findings before retinopathy of prematurity (ROP) as prognostic factors.

Methods: Design: A single-center, retrospective study. The authors reviewed the wide-field retinal imaging at 33~34 weeks of postmenstrual age (PMA) from 78 premature infants (< 31 weeks of gestation age) between March 2019 and April 2019. The authors assessed the location of the leading vascular edge location, the committed vascular abnormality (the retinal edge hemorrhage, circumferential vessels, branching vessels) in immature retina. Analysis was performed to find out the correlation between each variable and the occurrence of any stage ROP.

Results: Any stage ROP had occurred more in infants with the vascular edge in Zone I or posterior Zone II other than infants with normal retinal vessel formation up to Zone II at 34 weeks of PMA. The probability of developing ROP in preterm babies with the retinal edge hemorrhage was 28.96 times higher. The presence of circumferential vessels, branching vessels of immature retina were more common in preterm infants who developed any stage ROP.

Conclusions: The retinal findings such as retinal edge hemorrhage, circumferential vessels, and branching vessels at 33~34 weeks of PMA suggest higher chances to develop ROP than those without these findings.

Poster No.: EX1-055
Panel No.: 055, Session: EX1
Retinopathy of Prematurity in Twins; Bangladesh Perspective

*First Author: Mahmudul **SIDDIQI***

Purpose: To see the incidence, severity, and risk factors of retinopathy of prematurity (ROP) in twins.

Methods: A total of 54 twins conceived spontaneously and delivered by normal vaginal delivery and caesarean section were screened for ROP from March 2016 to December 2018 at a tertiary level eye hospital in Dhaka. The frequency regression, progression, and risk factors for ROP were determined in terms of gender, birth weight, gestational age, oxygen therapy, respiratory distress syndrome, blood transfusion, sepsis, and phototherapy, etc.

Results: A total of 54 (male 40, female 14). All twins delivered by caesarian section except 2 pairs that were by normal vaginal delivery. Incidence rate 30 out of 54 twins (55.55%). Twenty cases developed type 1 ROP, and all them required intravitreal injection and laser photocoagulation. Ten cases regressed spontaneously. One case progressed to total retinal detachment. The mean birth weights with or without ROP were 1290 ±199.3 (1100 - 1700 g) and 1745.4 ± 163.7 (1387 - 2012 g). Mean gestational age with ROP 27.56 ± 1.4 (27 - 31) weeks and without ROP 32.0 ± 1.4 (30 - 34) weeks. Risk factors also involve with ROP. RDS: 20 cases, sepsis: 29 cases, phototherapy needed: 45 cases, oxygen therapy: 27 cases, blood transfusion: 8 cases, and mechanical ventilation in 1 case.

Conclusions: ROP in twins seems to be mainly related to low gestational age and low birth weight. Further studies are necessary to demonstrate risk factors of ROP in twins.

Poster No.: EX1-056
Panel No.: 056, Session: EX1
Symmetric Clinical Ocular Findings in Phenotypically Identic Twins with Familial Exudative Vitreoretinopathy

*First Author: Arif Hayat **PATHAN***
*Co-Author(s): Mohammad **MALEK**, Nazmun **NAHAR**, Jean-Claude **NIYONZIMA***

Purpose: To find out symmetric ocular findings in identical twins with familial exudative vitreoretinopathy.

Methods: Case report

Results: Familial exudative vitreoretinopathy is a rare genetic condition, and several genes have been identified. Clinically, it can cause macular ectopia, and therefore strabismus or exudative retinal detachment leading to loss of vision in severe cases. Other symptoms, including refractive error, cataracts, and glaucoma have been documented. The main differential diagnosis remains retinopathy of prematurity. The reported case underlined the genetic basis of the disease with symmetrical and equally distributed myopia, esotropia, and FEVR features. A multidisciplinary team involving pediatricians, pediatric ophthalmologists, and vitreoretinal surgeons is of utmost importance to manage such cases. A good clinical history is enough to rule out retinopathy of prematurity and focus on other causes of retinal fibrovascular membranes in the pediatric population. The fluorescein angiography can be decisive in the clinical setting, while genotyping is essential for genetic counseling.

Conclusions: Familial exudative vitreoretinopathy in twin babies is a rare clinical entity which needs proper follow-up and prophylactic laser to prevent further complications.

Retina (Medical)

Poster No.: EX1-057
Panel No.: 057, Session: EX1
A Novel Technique to Assess Severity of Diabetic Retinopathy Using Optical Coherence Tomography Angiography

*First Author: Colin **TAN***
*Co-Author(s): Kelvin **LI**, Louis **LIM**, Darren **WONG***

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 mm^2 vs 0.28 mm^2, $P < 0.01$). In those with DR, mean FAZ sizes increases with severity of DR. (mild: 0.36 mm^2 vs moderate: 0.52 mm^2 vs

severe: 0.56 mm^2, $P < 0.05$). 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.

Poster No.: EX1-058
Panel No.: 058, Session: EX1

An Adult Vitelliform Macular Dystrophy with Normal Electro-oculography and No Pathogenic Genes Findings

*First Author: Zheng **LI***
*Co-Author(s): Jie **HU**, Lin **LU**, Kunyi **SU**, Meng **XUAN***

Purpose: To report an adult vitelliform macular dystrophy (AVMD) with normal electro-oculography (EOG) and no detectable disease-associated gene alterations.

Methods: The patient underwent ophthalmic examinations including best corrected visual acuity (BCVA), fundus autofluorescence (FAF), optical coherence tomography (OCT), fundus fluorescein angiography (FFA), indocyanine green angiography (ICGA), visual evoked potential (VEP), full-field electroretinogram (ERG), EOG, and genetic testing.

Results: A 49-year-old female patient was present with a 1-year history of bilateral progressive visual loss. She had no family history. BCVA were 0.2 in the right eye and 0.4 in the left eye. Fundus examination showed a 1.5 PD yellowish macular lesion in both eyes. FAF imaging revealed hypofluorescence at the site of the lesion with hyperfluorescence at the edge. OCT showed the presence of subretinal fluid with a disappeared ellipsoid zone in the lesions of both eyes, FFA and ICGA showed retinal pigment epithelial depigmentation and pigmentation and limited choroidal capillary atrophy in the lesions of both eyes, VEP and ERG were normal, EOG Arden ratios were 1.9 in right eye and 2.0 in left eye. No abnormalities were detected in 386 common ocular genetic pathogenic genes (including PRPH2, BEST1, IMPG1, IMPG2 genes related to AVMD).

Conclusions: AVMD is characterized by subretinal vitelliform macular lesions and is usually diagnosed after the age of 40. The majority of AVMD cases are not associated with monogenic mutations. For this case, a typical vitelliform macular lesion was found in both eyes. No abnormal genes of ocular hereditary diseases were detected. Future studies are needed to identify additional potential genetic factors underlying AVMD.

Poster No.: EX1-059
Panel No.: 059, Session: EX1

Appearance of Polypoidal Lesions in Patients With Polypoidal Choroidal Vasculopathy Using Swept-source Optical Coherence Tomographic Angiography

*First Author: Fenghua **WANG***
*Co-Author(s): Xiaodong **SUN**, Quan **YAN**, Qiyu **BO***

Purpose: To report the morphologic characteristics of polypoidal lesions and their association with branching vascular networks (BVNs) in eyes with PCV using swept-source optical coherence tomographic angiography (SS-OCTA).

Methods: This cross-sectional, observational study included 20 participants recruited from Shanghai General Hospital with a diagnosis of PCV based on the presence of focal hyperfluorescent spots on indocyanine green angiography (ICGA). Polypoidal lesions in eyes with PCV were characterized using multimodal imaging that included fundus photography, fluorescein angiography, ICGA, SS-OCT, and SS-OCTA, and the images were anatomically aligned.

Results: Of the 20 Asian patients, 5 (25%) were women and 15 (75%) were men. Twenty-three eyes underwent imaging and were

diagnosed with PCV. Indocyanine green angiography identified 43 polypoidal lesions, and all corresponded to the structures that appeared as clusters of tangled vessels on SS-OCTA images. In addition, SS-OCTA detected 16 tangled vascular structures not seen on ICGA. Branching vascular networks were detected on SS-OCTA imaging in all eyes, but ICGA identified BVNs in only 17 of 23 eyes (74%). Of the 43 tangled vascular structures, 40 (93%) were located at the edge of a BVN and 3 (7%) were associated with type 2 neovascularization.

Conclusions: In eyes with PCV undergoing SS-OCTA imaging, previously described polypoidal lesions may appear as tangled vascular structures associated with BVN or type 2 neovascularization. The identification of polypoidal lesions in patients with PCV as neovascular tangles rather than actual polypoidal lesions or aneurysmal dilatations may help facilitate understanding of their pathogenesis and response to treatment.

Poster No.: EX1-060
Panel No.: 060, Session: EX1

Bacterial Infection Promotes Spontaneous Choroidal Neovascularization (sCNV) Development in the JR5558 Mouse

*First Author: Yu **SU***
*Co-Author(s): Zhenyu **JI**, Eric **NG***

Purpose: To determine the effect of short-term systemic antibiotic on sCNV development and the mechanism of Toll like receptor 2 TLR2 mediated RPE inflammation.

Methods: Two breeding groups of JR5558 mice were set up from the same litter (F0), with and without Ditrim (0.96 mg/ml) in drinking (F1 mice), and for different durations (F2A and F2B mice). IB4 and antiCD45 staining were used to quantify sCNV and immune cells. NFκB expression was determined by staining. RPE/choroid/sclera explants from C57B6J mice were cultured with and without Pam^2+CEP on the transwell. Expression of VEGFA, TLR2, CD45, and IL6 was determined by qPCR.

Results: In F1, both the number of sCNV and CNV area per eye ($P < 0.0001$) were significantly reduced in the Ditrim group. In F2A group, which Ditrim was stopped at P0, the number of CNV and CNV area per eye ($P < 0.0001$) were significantly reduced, and the numbers of CD45+ leukocytes in both groups were significantly reduced ($P < 0.001$). NFκB staining was lower in all the F2 groups. Expression of TLR2, VEGFA, and IL6 by RPE/choroid was significantly decreased in all the Ditrim treated F1 mice ($P < 0.05$ for all). For the explants, Pam^2+CEP treatment significantly increased the expression of VEGF, TLR2, and MCP1 compared to controls ($P < 0.03$ for all).

Conclusions: Systemic Ditrim inhibits sCNV and suppresses inflammation of the RPE/choroid indirectly, which is likely mediated by the antibacterial activity of Ditrim. Furthermore, activation of TLR2 by bacterial ligand induces robust proinflammatory cytokines and angiogenic marker expression by RPE/choroid/sclera explants and drives sCNV development.

Poster No.: EX1-061
Panel No.: 061, Session: EX1

Changes in Ganglion Cell-inner Plexiform Layer in the Fellow Eyes of Patients with Unilateral Neovascular Age-related Macular Degeneration

*First Author: Minwoo **MINWOO***
*Co-Author(s): Seung-Kook **BAEK**, Jung Yeul **KIM**, Young Hoon **LEE***

Purpose: To determine longitudinal changes in the ganglion cell-inner plexiform layer (GC-IPL) thickness of the fellow eyes of patients with neovascular age-related macular degeneration (AMD).

Methods: Patients with unilateral choroidal neovasculopathy (CNV) due to AMD, unilateral polypoidal choroidal vasculopathy (PCV), and controls were included. After the initial visit, GC-IPL thickness was measured twice more with at least a 1-year interval between examinations using spectral-domain optical coherence tomography (SD-OCT).

Results: A total of 31 eyes with unilateral CNV, 33 eyes with unilateral PCV, and 35 control eyes were enrolled. The GC-IPL thickness was 76.17 ± 16.97, 81.20 ± 5.52, and 81.60 ± 3.83 μm in the CNV, PCV, and control groups, respectively. The GC-IPL thickness of the CNV, PCV, and control groups showed a significant change over time ($P < 0.001$, $P = 0.001$, and $P = 0.003$, respectively). The reduction rate of GCIPL thickness was -0.85, -0.41, and -0.31 μm/yr in the fellow eyes of the CNV, PCV, and control groups, respectively (CNV > PCV, control, $P = 0.002$). In a linear mixed model determination of factors associated with GC-IPL reduction in the fellow eyes of the CNV group, the interaction between baseline GC-IPL thickness and duration showed a significant result ($P < 0.001$).

Conclusions: The fellow eyes of patients with unilateral CNV showed a greater reduction rate of GC-IPL thickness compared to the fellow eyes of patients with unilateral PCV and normal individuals. In patients with unilateral CNV, fellow eyes with a thicker GC-IPL at baseline showed a greater change in GC-IPL thickness over time.

Poster No.: EX1-062
Panel No.: 062, Session: EX1
Characteristics and Treatment Response of Polypoidal Choroidal Vasculopathy in Highly Myopic Eyes

*First Author: Wei-Lun **HUANG***
*Co-Author(s): Tzyy-Chang **HO***

Purpose: To demonstrate the characteristics and treatment responses of polypoidal choroidal vasculopathy (PCV) in highly myopic eyes compared to non-highly myopic eyes.

Methods: A single-center, retrospective, interventional cohort study. Patients diagnosed with high myopia and PCV at a tertiary hospital between January 2014 and July 2018 were reviewed retrospectively and grouped by refractive error and axial length at diagnosis. Characteristics and treatment response were reviewed from Indocyanine green angiography, optical coherent tomography images, and electronic medical records.

Results: In a total of 112 eyes diagnosed with PCV, 9 eyes of 9 patients (8%, 7 women and 2 men) were highly myopic. Five eyes presented with subfoveal polyps, while the other 4 eyes presented with parafoveal polyps, including 1 eye with polyp formation at the border of posterior staphyloma. With a thin subfoveal choroidal thickness (mean, 145.8 ± 80.1 μm), 2 eyes presented a significant increase of choroidal thickness (> 50 μm) at polyp site. Best corrected visual acuity (BCVA) was stationary after treatment (initial vs final, 0.69 vs 0.69 logMAR). No difference in polyp numbers, size, or treatment response was noted between different refractive groups. Subgroup analysis of patients with branching vascular network (BVN) showed a worse treatment response in moderate-to-high myopic eyes compared to low to non-myopic eyes.

Conclusions: PCV is rare but not excluded in highly myopic eyes. Female predominance and thin choroid with preservation of pachychoroid tendency are characteristics of highly myopic PCV patients. Worse treatment response was noted in moderate-to-high myopic eyes with BVN.

Poster No.: EX1-063
Panel No.: 063, Session: EX1
Chronic Photodamage of Chicken Retina by 650nm Semiconductor Laser

*First Author: Yipeng **WANG***

Purpose: To investigate whether there is chronic photodamage in the cone-based retina when long-term exposure to the retina by using a 650 nm semiconductor laser (power 2 mW).

Methods: Group A was a blank control group, and the whole process was irradiated with natural light. Group B was irradiated with laser for 3 minutes every day. Group C 6 minutes and Group D 30 minutes per day. The light experiment time was 6 months, and 5 experimental animals were randomly selected at 1 month, 3 months, and 6 months after laser illumination for light damage index detection,

including optical coherence tomography (OCT) retinal thickness in vivo, HE staining, TUNEL cells, apoptosis staining an dMDA content.

Results: The MDA content of Group D was higher than that of the control group at 1 month (P = 0.019). The MDA content of Group C and Group D was higher than that of the control group at 3 months (P = 0.026, 0.003), and at 6 months Group B, Group C, and Group D were all higher than that in the control group (P = 0.038, 0.032, 0.000). No significant reduction in retinal thickness, abnormal cell arrangement, and positive staining were observed in the detection of OCT retinal thickness, retinal tissue sections, and Tunel apoptosis staining in each group within 6 months.

Conclusions: When the irradiation lasts for 6 months, the free radical content of the retina increased significantly, and the content of rhodopsin decreased, suggesting that there was photodamage. The other groups have not been seen with obvious photodamage.

Poster No.: EX1-064
Panel No.: 064, Session: EX1
Clinical Features and Outcomes of Paracentral Acute Middle Maculopathy Associated with Retinal Artery Occlusion

*First Author: Qingshan **CHEN***
*Co-Author(s): Lu **CHEN***

Purpose: To study the clinical features and outcomes of a large series of eyes with retinal artery obstruction (RAO) combined with paracentral acute middle maculopathy (PAMM).

Methods: Retrospective review of 88 eyes with RAO. Data were collected and analyzed for the demographic details, logMAR best corrected visual acuity (BCVA), fluorescein angiography (FA), optical coherence tomography (OCT), and OCT angiography (OCTA) findings and outcomes. Follow-up for 6 months.

Results: Fifty-eight cases of central RAO (CRAO) and 30 branch RAO (BRAO) were included in the study. With OCT, a hyper-reflective band involving the inner nuclear layer (PAMM) was noted in 52 eyes (33/58 eyes with CRAO and 19/30 eyes with BRAO). FA showed paramacular delayed filling in superior retinal arteries. Typical OCTA findings included attenuation and low flow of the deep capillary plexus. In eyes with CRAO, BCVA increased in 11 patients without PAMM and 24 patients with PAMM, which was statistically significant (P = 0.027). However, in cases with BRAO, 7 eyes without PAMM and 12 eyes with PAMM gained increased vision, and it had no statistical significance (P = 0.979). The ultrastructure of fovea recovered in eyes with PAMM at 1-month follow-up, while disorganized retinal inner layer was present in eyes without PAMM.

Conclusions: Eyes of CRAO associated with PAMM or selective infarction of the inner nuclear layer had better BCVA. RAO producing ischemia involving both the middle and inner retina was associated with worse visual outcomes.

Poster No.: EX1-065
Panel No.: 065, Session: EX1
Comparison of Choroidal Structure and Circulation After One-third and Half Dose Photodynamic Therapy for Chronic Central Serous Chorioretinopathy

*First Author: Shun **KUMASHIRO***

Purpose: To compare the changes of choroidal structures and circulation after one–third and half-dose verteporfin photodynamic therapy (PDT) for chronic central serous chorioretinopathy (CSC).

Methods: This retrospective study included chronic CSC patients who received PDT August 2016 to March 2019. The dosage of verteporfin was defined as to the timing of procedure; the one-third dose group were treated from Aug 2016 to Mar 2018 15 patients (12 male and 3 female, age 46 ± 7.4) and half-dose group were treated from Apr 2018 to Mar 2019 11 patients (10 male and 1 female, age 50.1 ± 5.9). Patients were examined at baseline and 2 weeks, 1 and 3 months after PDT with best corrected visual acuity (BVCA), optical coherence tomography (OCT), and laser speckle flow graphy (LSFG). Primary outcomes were the changes, BVCA, central retinal thickness (CRT), central choroidal

thickness (CCT), and presence of subretinal fluid in OCT images and mean blur rate (MBR) at macula in LSFG.

Results: BVCA was not significantly improved in both the half-dose and the one-third dose group. SRD disappeared in 12 eyes of 15 patients in the one-third dose group and in 11 eyes of 10 patients in the half-dose group at 3 months after. CRT significantly decreased in both groups. CCT did not show any significant change in one-third dose group, but showed significant decrease in half-dose group. Choroidal MBR showed significant decrease in both groups.

Conclusions: Half-dose PDT reduces subfoveal choroidal flow and CCT compared to one-third dose PDT.

Poster No.: EX1-066
Panel No.: 066, Session: EX1
Correlations Between Presenting Vision and Mitochondrial Functions for Degeneration in Polypoidal Choroidal Vasculopathy

*First Author: Thanaphat **CHAOVISITSAREE***
*Co-Author(s): Voraporn **CHAIKITMONGKOL**, Nipon **CHATTIPAKORN**, Siriporn **CHATTIPAKORN**, Direk **PATIKULSILA***

Purpose: Mitochondrial dysfunction in peripheral blood mononuclear cells (PBMCs) has been reported in degenerative diseases, including Alzheimer's disease. However, the role of mitochondrial function is unknown in polypoidal choroidal vasculopathy, a subtype of age-related macular degeneration frequently found among aging Asian or African descendants. Therefore, this study explored the correlations of baseline visual acuity (VA) in PCV patients and mitochondrial functions for degenerations in PBMCs.

Methods: This study was an IRB-approved cross-sectional study. Twenty treatment-naïve PCV patients, diagnosed based on the EVEREST criteria, were enrolled between February 1 2017 and January 31 2019 at a tertiary hospital in Thailand. In addition to visual acuity measurement, blood samples (18-ml) were collected from each participant at baseline before receiving any treatments. PBMCs were isolated to determine mitochondrial function and oxidative stress; plasma was used to determine glutathione levels (antioxidant).

Results: Of 20 PCV patients (60% female, mean age [SD] 62.5 [±9.3], mean logMAR VA [SD] 0.84 [±0.3]), moderate correlations found between VA and mitochondrial basal respiration (r,-0.507, P = 0.045), ATP production (r,-0.595, P = 0.015), maximal respiration (r-0.545, P = 0.024), and spared respiratory capacity (r,-0.484, P = 0.049). No significant correlations between VA and mitochondrial oxidative stress, mitochondrial mass, and glutathione.

Conclusions: These data suggested that baseline visual acuity in PCV might be correlated with mitochondrial functions for degenerations, but no significant correlation found between baseline vision and mitochondrial oxidative stress or serum antioxidant. Future studies with larger sample size are needed to confirm or refute these findings.

Poster No.: EX1-067
Panel No.: 067, Session: EX1
Efficacy of Dexamethasone Intravitreal Implant for Refractory Macular Edema Caused by Retinal Vein Occlusion

*First Author: Wei **GU***

Purpose: Efficacy of dexamethasone intravitreal implant for refractory macular edema caused by retinal vein occlusion.

Methods: This was a retrospective, case series study. Medical records were reviewed, and patients were treated with Ozurdex implant for macular edema secondary to RVO that did not respond to at least 2 consecutive intravitreal anti-VEGF injections were included. Best corrected visual acuity (BCVA), central retinal thickness (CRT), and intraocular pressure (IOP) at baseline and during the follow-up visits were collected.

Results: Eighteen patients (18 eyes) followed for at least 6 months were enrolled in the analysis. Patients had undergone an average of

5.2 ± 3.2 prior anti-VEGF treatments (range: 2 to 12 times) and macular edema present for at least 3 months (mean 9.6 ± 5.6 months, range: 3 to 23 months) before Ozurdex implanted. Mean baseline BCVA was 0.52 ± 0.42 (logMAR), and mean CRT was 441.5 ± 139.0 um. Ozurdex improved the mean BCVA to 0.45 ± 0.45 at 1 month but not the other following visits (2 months: 0.47 ± 0.51; 3 months: 0.48 ± 0.51; 6 months: 0.49 ± 0.53, $P > 0.05$). Mean CRT decreased to 296.4 ± 45.4 um, 281.7 ± 35.6 um, 321.8 ± 65.7 um, 304.9 ± 77.4 um at 1 month, 2 months, 3 months, and 6 months follow-up, respectively (all $P < 0.05$). Two of 18 (11%) patients developed ocular hypertension (IOP > 25) and were well controlled by drugs, and none of the phakic patients developed visually significant cataracts requiring surgery.

Conclusions: Ozurdex resulted in sustained anatomical reduction of refractory macular edema caused by RVO for up to 6 months, but did not ensure long-term BCVA improvement. A possible reason may be related to the chronic structural alterations in the retina despite the reduction of edema.

Poster No.: EX1-068
Panel No.: 068, Session: EX1
Efficacy of Treatment for Residual Active Choroidal Neovascularization Using a Retinal Navigated Laser (Navilas®)

*First Author: Su **ZHANG***
*Co-Author(s): Qin **JIANG***

Purpose: To observe the safety and efficacy of Navilis retinal navigation laser in the treatment of residual active choroidal neovascularization after anti-VEGF injection in vitreous cavity.

Methods: A total of 15 patients (15 eyes) were diagnosed as CNV by optical coherence tomography angiography (OCTA) and fundus fluorescein angiography (FFA/ICG). After being given intravitreal anti-VEGF therapy 1-2 weeks, there was still a little subretinal effusion or FFA showed mild leakage. According to the FFA results, the Navilas retinal navigation laser with the threshold energy was used. Best corrected visual acuity (BCVA), OCT, OCTA, and multifocal ERG were performed before treatment and 1 week, 1 month, and 3 months after treatment. Observe the absorption of subretinal fluid and the height of lesions around the lesion before and after treatment. The BCVA, CNV lesion area, and the average response density value of ring 1-5 b wave amplitude of multifocal ERG before and after treatment was statistically analyzed by SPSS20.0 statistical software.

Results: The neuroepithelial effusion was significantly reduced 1 week after the navigation laser treatment in all cases. At 1 month after treatment, the neuroepithelial effusion was completely absorbed, and most of the cases lasted for 3 months. The height of CNV lesions 1 month after treatment was lower than that before treatment. The BCVA (logMAR) and average retinal amplitude density (in ring 1,2) 1 month after treatment was higher than that before treatment ($P < 0.05$).

Conclusions: The Navilas retinal navigation laser can accurately locate CNV after residual anti-VEGF injection treatment in the vitreous cavity. It can not only reduce subretinal fluid, improve BCVA, but also won't damage the retina.

Poster No.: EX1-069
Panel No.: 069, Session: EX1
Foveal Avascular Zone and Microvascular Changes on OCTA After Macula-off Rhegmatogenous Retinal Detachment Repair

*First Author: Eung Suk **KIM***
*Co-Author(s): Kiyoung **KIM**, Jong Beom **PARK**, Jong In **YOU**, Seung-Young **YU***

Purpose: To investigate the changes of foveal avascular zone (FAZ) area and vessel density in macular-off RRD after repair surgery, and to identify associated factors with FAZ area change after surgery.

Methods: The retrospective study of 27 eyes of 27 patients with macular-off RRD. The best corrected visual acuity (BCVA), FAZ area, and vessel density were reviewed for 1-year follow-up after surgery. The unaffected fellow eye was set as controls. 3 x 3 mm^2, and 6 x 6 mm^2

superficial layer swept-source optical coherence tomography angiography (OCTA) images were analyzed. The associated factors of FAZ area change at 3 months were clinical factors, pre- and postoperative spectral-domain OCT (SD-OCT).

Results: Surgical methods consisted of 20 (74%) eyes of scleral buckling and 7 (26%) eyes of PPV. The FAZ area difference to control was 0.127 ± 0.05 mm^2 at 3 months, 0.111 ± 0.06 mm^2 at 6 months, 0.108 ± 0.07 mm^2 at 9 months, and 0.105 ± 0.06 mm^2 at 12 months, and it was significant at each point ($P < 0.05$). The vessel density difference to control was 4.36 ± 1.37 at 3 months, 3.53 ± 1.90 at 6 months, 2.56 ± 1.50 at 9 months, and 2.25 ± 1.50 at 12 months, and it was significant at each point ($P < 0.05$). The FAZ area and vessel density had a significant difference between surgical methods ($P < 0.05$). The associated factors between control and FAZ area change at 3 months were surgical method (correlation factor -0.678, $P < 0.05$). BCVA (logMAR) change correlated FAZ area change positively (correlation factor 0.324).

Conclusions: After RRD surgery, FAZ area increased and vessel density decreased compared to control, but progressively recovered until 12 months. PPV group showed significantly.

Poster No.: EX1-070
Panel No.: 070, Session: EX1
HtrA1 Serine-protease Expression Levels of Age-related Macular Degeneration (AMD) Patients in Yogyakarta

*First Author: Supanji **SUPANJI***
*Co-Author(s): Angela Nurini **AGNI**, Muhammad **SASONGKO**, Firman **WARDHANA**, Tri Wahyu **WIDAYANTI***

Purpose: To investigate the HtrA1 serine protease circulating level of age-related macular degeneration (AMD) patients in Yogyakarta, Indonesia.

Methods: This case-control study was conducted from January to August 2019 in Yogyakarta, Indonesia which included AMD patients and non-AMD patients/controls. Data were collected and the whole blood sample was obtained. ELISA assay method was used to measure the HtrA1 serine protease circulating level on both groups. This study used the IBM SPSS® version 24 (Chicago, The USA) to investigate any difference in HtrA1 serine protease expression levels between AMD and control groups.

Results: The total subjects of the study were 54, consisting of 38 AMD patients and 16 controls. There was no significant difference between the HtrA1 serine-protease level in the serum of AMD and control groups (p-value 0.31, CI 95%). However, AMD patients had a higher mean HtrA1 serine protease level (35.31 15.73 SD) than controls (30.08 12.78 SD).

Conclusions: Mean HtrA1 serine-protease level was higher in the AMD group compared to the control group. However, the difference was not significant. This might be due to the lack of samples in the study groups. Future studies with a larger number of samples are advised to better see the association between Htra1 serine protease level and AMD incidence.

Poster No.: EX1-071
Panel No.: 071, Session: EX1
Is the Retinal Vasculature Related to β-Peripapillary Atrophy in Non-pathological High Myopia? An Optical Coherence Tomography Angiography Study in Chinese Adults

*First Author: Jiao **SUN***
*Co-Author(s): Jialin **WANG**, Yanling **WANG***

Purpose: The association between β-peripapillary atrophy and the retinal vasculature in non-pathological high myopia is unclear. The aim of this study was to investigate whether β-peripapillary atrophy contributes to the changes of the retinal vasculature using optical coherence tomography angiography (OCTA).

Methods: In a cross-sectional study, 130 eyes with non-pathological high myopia were included. β-peripapillary atrophy was analyzed using Image J software based on fundus photographs. A 3.0 × 3.0 mm^2 grid and a 4.5 ×

4.5 mm^2 grid were used to scan parafoveal and peripapillary regions using OCTA, respectively. Vessel density and fractal dimensions of the retina and foveal avascular zone were analyzed and quantified using en face projection images. Correlations between the vascular density, foveal avascular zone, and β-peripapillary atrophy were determined.

Results: Using multivariate analysis, β-peripapillary atrophy was negatively correlated with the vessel density in radial peripapillary capillaries ($P = 0.002$) even after adjusting for other variables. This relationship was also confirmed in the macula (superficial retinal plexus: $P < 0.05$; deep retinal plexus: $P < 0.05$). The vessel densities in the nasal and inferior sectors were more strongly correlated with β-peripapillary atrophy.

Conclusions: There was a negative correlation between β-peripapillary atrophy and the retinal vasculature in highly myopic eyes, especially in radial peripapillary capillaries and deep retinal plexus. β-peripapillary atrophy can be visualized and is a convenient structural feature that can benefit the early diagnosis and detection of chorioretinal atrophy in high myopia.

Poster No.: EX1-072
Panel No.: 072, Session: EX1
Label-free Absolute Quantitative Proteomic Analysis of Vitreous Humor from Patients with High Myopia

*First Author: Minlu **SONG***
*Co-Author(s): Xiaodong **SUN**, Fenghua **WANG***

Purpose: To offer clues of pathogenic mechanisms related to high myopia, we compared the vitreous humor proteome between patients with high myopia and idiopathic macular hole (MH).

Methods: Vitreous humor (VH) samples were obtained from patients with highly myopic MH (n = 5) and idiopathic MH (n = 5) during pars plana vitrectomy (PPV). Samples were digested and mixed with internal standards, Universal Proteomics Standard 2 (UPS2) peptides. Mixtures were then analyzed by nano-liquid chromatography-tandem mass spectrometry (nano-LC-MS/MS). Label-free quantification and intensity-based absolute quantification (iBAQ) were employed for protein quantification. We evaluated differentially expressed proteins (abundance ratio > 1.5, $P < 0.05$) by bioinformatic analysis.

Results: A total of 1,175 unique proteins were identified and quantified, with an average of 448 proteins per sample. Comparative analysis revealed 22 differentially expressed proteins between the 2 groups. The absolute abundances of these proteins were all significantly higher in high myopia VHs. Gene ontology (GO) annotation suggested that most of the differentially expressed proteins located in extracellular region, functioning as binding proteins. The Kyoto Encyclopedia of Genes and Genomes (KEGG) pathway analysis showed that the complement and coagulation cascades pathway was significantly enriched. The differential expressions of complement factor I (CFI), monocyte differentiation antigen (CD14), and complement C1q were confirmed by Western blot.

Conclusions: This study revealed the differences in the composition of VH proteins between high myopia and non-high myopia. Complement system activation and inflammation may involve in the pathogenesis of high myopia. The identification of potential prognostic markers could be important for prognosis and intervention.

Poster No.: EX1-073
Panel No.: 073, Session: EX1
Laser Photocoagulation vs Intravitreal Injection of Anti-vascular Endothelial Growth Factor for Retinal Arterial Macroaneurysms

*First Author: Ying **HUANG***
*Co-Author(s): Bing **LIN***

Purpose: To analyze the efficacy of laser photocoagulation treatment and intravitreal injection of anti-vascular endothelial growth factor (anti-VEGF) treatment for retinal arterial macroaneurysms (RAM).

Methods: A retrospective study. Patients diagnosed as RAM in our hospital from April

2016 to June 2019 were enrolled. According to the different treatment methods, they were divided into 2 groups: Laser group and anti-VEGF group. LogMAR visual acuity was recorded before and after treatment.

Results: A total of 39 patients (39 eyes) in laser group, 12 males and 27 females, with an average age of 70.77 ± 9.55 years old. There was a significant difference of visual acuity before and after laser treatment (1.44 ± 0.60 vs 0.95 ± 0.68, P = 0.000). Nineteen patients (19 eyes) in anti-VEGF group, 7 males and 12 females, with an average age of 67.47 ± 15.05 years old. There was a significant difference of visual acuity before and after anti-VEGF treatment (1.27 ± 0.73 vs 0.91 ± 0.59, P = 0.008).

Conclusions: Laser and anti-VEGF treatment were both effective for RAM.

Poster No.: EX1-074
Panel No.: 074, Session: EX1
Levels of Aqueous Humor Interleukin 6 and Monocyte Chemotactic Protein 1 are Elevated and Correlated with Macular Edema in Ischemic Retinal Vein Occlusion

*First Author: Honghua **YU***
*Co-Author(s): Baoyi **LIU**, Yu **XIAO**, Xiaomin **ZENG***

Purpose: To investigate the possible roles of interleukin 6 (IL-6) and monocyte chemotactic protein 1 (MCP-1) in the pathogenesis of ischemic retinal vein occlusion (IRVO) and their association with macular edema in IRVO patients.

Methods: Forty patients with treatment-naive IRVO and 40 control individuals were recruited. Aqueous humor samples were collected. Concentrations of IL-6 and MCP-1, and value of central macular thickness (CMT) were examined.

Results: Concentrations of IL-6 (330.2 ± 120.9 pg/ml, P < 0.001) and MCP-1 (1359.7 ± 516.4 pg/ml, P < 0.001) were significantly higher in eyes with IRVO compared with controls (77.2 ± 40.0 pg/ml and 390.4 ± 214.1 pg/ml, respectively). Stratification analyses showed that levels of IL-6 and MCP-1 were similar between ischemic central retinal vein occlusion (ICRVO) group and ischemic branch retinal vein occlusion (IBRVO) group. Interestingly, levels of IL-6 and MCP-1 were positively associated with CMT value in IRVO patients.

Conclusions: IL-6 and MCP-1 are involved in the pathogenesis of IRVO and correlated with macular edema.

Poster No.: EX1-075
Panel No.: 075, Session: EX1
Levels of Inflammatory Cytokines IL-1β, IL-6, IL-8, IL-17A, and TNF-α in Aqueous Humor of Patients with Diabetic Retinopathy

*First Author: Qiaowei **WU***
*Co-Author(s): Yu **XIAO**, Honghua **YU**, Xiaomin **ZENG***

Purpose: To observe the levels of IL-1β, IL-6, IL-8, IL-17A, and TNF-α in aqueous humor of patients with diabetic retinopathy (DR), and to explore the relationship between inflammatory cytokines and DR.

Methods: A total of 80 patients with diabetes mellitus (DM) were included between January 2015 and January 2016. Forty were diagnosed with DR and 40 were not diagnosed with DR. All cases were divided into 5-year DR group, 10-year DR group, 5-year DM group, and 10-year DM group by the lengths of diabetic history. The DR group was further categorized into a 5-year NPDR group, 5-year PDR group, 10-year NPDR group, and 10-year PDR group by the proliferative stages of retinal neovascularization. The levels of inflammatory cytokines in aqueous humor were tested.

Results: The levels of IL-1β, IL-6, IL-8, IL-17A, and TNF-α in aqueous humor of DR group were higher than those in DM group (P < 0.05). The levels of inflammatory cytokines in aqueous humor of PDR patients were higher than those of NPDR patients (P < 0.05). The level of inflammatory cytokines in aqueous humor of 5-year DR group was higher than those in the 10-year DR group (P < 0.001). There was a significant correlation between the levels of inflammatory cytokines of the 5-year DR group and the 10-year DR group (P < 0.05). There was no significant difference in the level of

inflammatory cytokines between the 5-year DM group and the 10-year DM group (P > 0.05).

Conclusions: The levels of inflammatory cytokines IL-1β, IL-6, IL-8, IL-17A, and TNF-α in aqueous humor may be associated with the pathogenesis, severity, and prognosis of DR.

Poster No.: EX1-076
Panel No.: 076, Session: EX1

Longitudinal Changes in Retinal Vasculature After Panretinal Photocoagulation in Diabetic Retinopathy by Swept-source OCT Angiography

*First Author: Jong Beom **PARK***
*Co-Author(s): Eung Suk **KIM**, Kiyoung **KIM**, Jong In **YOU**, Seung-Young **YU***

Purpose: To evaluate quantitative changes of microvascular parameters after panretinal photocoagulation (PRP) in diabetic retinopathy (DR) by swept-source optical coherence tomography angiography (SSOCTA).

Methods: This retrospective, interventional study included 40 treatment-naive eyes of 30 patients who underwent PRP and completed >12 months of follow-up. All subjects underwent SD-OCT and SSOCTA at baseline and 1, 3, 6, and 12 months post-PRP. Foveal avascular zone (FAZ) area, skeleton density (SD), and vessel density (VD) were calculated on 3 x 3 mm angio slab, and nonperfusion area (NPA) was manually obtained on 12 x 12 mm angio slab using Image J.

Results: Mean subfoveal thickness (SFT) and GCIPL thickness significantly increased after PRP from 281.3 μm at baseline to 292.4 μm at 12 months. Mean FAZ area also increased from 0.331 mm^2 to 0.356 at 12 months after PRP. Vessel density in both superficial and deep capillary plexus significantly decreased after 1 month PRP and continuously recovered through 12 months, which results significantly greater than baseline (12.22 and 13.11 vs 10.46 and 11.01). Total NPA significantly increased after 1 month PRP, but there was no significant difference at 12 months.

Conclusions: We found significant longitudinal retinal microvascular changes after PRP in DR. Both superficial and deep parafoveal perfusion status impaired after 1 month, then recovered until 12 months as greater than baseline. Total NPA was not significantly different at 12 months from baseline.

Poster No.: EX1-077
Panel No.: 077, Session: EX1

Neuro-protective Effect and Mechanism of Resveratrol in Low Dose on Diabetic Retinal Neurodegeneration

*First Author: Ke **XIAO***

Purpose: To clarify the neuro-protective effect of resveratrol in low dose on diabetic retinal neurodegeneration and explore its possible mechanism.

Methods: Age-matched male C57BL6 STZ injected mice were randomly divided into diabetic resveratrol treatment group and diabetic group, and the normal control group was set. After 3-month intragastric administration of resvetatrol in 2 mg/kg/d, 10 mg/kg/d, and 50 mg/kg/d, the expression of glial fibrillary acidic protein (GFAP, a marker of neurodegeneration) in retina was detected by immunofluorescence staining. After low dose (10 nM) of resveratrol stimulation on N2a cells under high-glucose or normal condition, the localization of tyrosin-tRNA synthetase (TyrRS) was detected by immunofluorescence staining, and the changes of type I poly (ADP-ribose) polymerase (PARP1) and nicotinamide phosphoribosyl transferase (NAMPT, rate-limiting enzyme of NAD+ salvage synthesis pathway) expression were detected by western blot.

Results: Expression of GFAP was significantly decreased in mice retina of diabetic resveratrol treatment group, compared with diabetic group. After stimulation with low dose of resveratrol, co-staining of TyrRS with nucleus was observed in N2a cells under both conditions, and the activation products of PARP1 and expression of NAMPT were increased.

Conclusions: This study has proved that oral administration of dietary supplement

dose (2 mg/kg) of resveratrol can alleviate neurodegeneration in diabetic mice retina and low dose (10 nM) of resveratrol can activate TyrRS-PARP1 pathway in N2a cells under high-glucose condition, which may be one of the mechanisms of effect of low dose of resveratrol.

Poster No.: EX1-078
Panel No.: 078, Session: EX1
Outcomes of Intravitreal Bevacizumab (IVB) as an Adjuvant Therapy in Coats Disease

*First Author: Sushma **JAYANNA***

Purpose: To evaluate the treatment outcomes of adjuvant IVB in Coats disease and also evaluate any tractional retinal detachment worsening as reported in a few cases in literature.

Methods: A retrospective study was done of medical records of the past 18 years of patients diagnosed with Coats disease who underwent adjuvant IVB in a tertiary eye care center in southern India.

Results: A total of 13 patients, 7 males and 5 adults, underwent IVB adjuvant injections. They received injections either during initial management (10 eyes) or in subsequent sessions (3 eyes). All eyes had additional therapy including Cryopexy (5 eyes), laser (8 eyes), intravitreal triamcinolone (1 eye), and vitreoretinal surgery (5 eyes). Disease severity included Stage 2B (7 eyes), Stage 5 (4 eyes), and Stages 3A and 3B (1 eye each). At a mean follow-up of 4.9 years, the condition resolved in 7, became stable in 2, and progressed despite all therapies in 4 eyes. Final visual acuity ranged from 20/30 to 20/400. Eyes with progressive coats developed phthisis (1), neovascular glaucoma (3). None developed tractional retinal detachment.

Conclusions: Anti-VEGF injections as adjuvants seem to help in overall treatment strategy of this difficult to treat chronic retinal vascular pathology. Individual surgeons chose the drug based on their experience and understanding of pathology of this rare condition. We observed no cases of increased traction in our small series having nearly 5 years of follow-up.

Well-known complications related to disease severity were noted. Further evaluation of exact indications is needed.

Poster No.: EX1-079
Panel No.: 079, Session: EX1
Patterns of Diabetic Retinopathy Grading Among Diabetic Patients in a Community Based Study in Bangladesh Where Diabetic Retinopathy Screening Program Is Unfamiliar

*First Author: Niaz **KHAN***
*Co-Author(s): Mst. **SAYEDATUNNESSA**, Md. **ISLAM**, Muhammad **MONIRUZZAMAN**, Abul **SHEIKH***

Purpose: To apply diabetic retinopathy screening model in community setups where a screening program is unfamiliar, and to observe patterns of diabetic retinopathy.

Methods: A cross-sectional, observational study was conducted among 288 diabetic patients attending community ophthalmic setups. All participants were previously diagnosed diabetic patients. After conducting sufficient campaigning, patients gathered in community eye setups were targeted. Retinal photographs using non-mydriatic fundus cameras were taken, and relevant data were collected. Collected fundus photographs and data from different field areas were analyzed by a group of ophthalmologists headed by 2 retina specialists at a tertiary hospital in Dhaka City.

Results: Study was conducted on 288 diabetic patients. Mean age was 50.85 years ± 11.5 (SD); minimum age was 30 years and maximum 86 years. Out of 288 patients, 246 (85.4%) were male and 42 (14.6%) were female. Distribution of duration of diabetes shows 228 (79.2%) patients had < 5 years, 35 (12.2%) patients had 5-10 years, and 25 (8.7%) patients had > 10 years duration. Patterns of diabetic retinopathy grading show, 229 (79.5%) patients had RO (No DR), 32 (11.1%) had R1 (Background DR), 20 (6.9%) had R2 (Pre-proliferative DR), and 7 (2.4%) patients had R3 (Proliferative DR). DR grading is significantly correlated with duration of diabetes (0.733).

Conclusions: As diabetic retinopathy screening is not a familiar program in Bangladesh, this

small-sized pilot study will help in future implementation of screening programs throughout the country, and it gives an idea about the magnitudes of diabetic retinopathy and its patterns.

Poster No.: EX1-080
Panel No.: 080, Session: EX1

Polyp Evolution over 24 Months Among Patients with Polypoidal Choroidal Vasculopathy

*First Author: Colin **TAN***
*Co-Author(s): Louis **LIM***

Purpose: To evaluate the status of polyps at different time points among patients with symptomatic macular polypoidal choroidal vasculopathy (PCV) from one study site of the EVEREST II study, and to differentiate between polyps originally present at baseline and new polyps arising during the course of the study.

Methods: Review of indocyanine green angiograms (ICGA) by graders from the Central Reading Center. Nine patients were reviewed and ICGA taken at baseline, 3, 6, and 12 months were overlaid and compared. The changes in individual polyps were monitored and classified. Polyps present at follow-up visits were classified into patent polyps which were originally present at baseline, and new polyps which developed subsequently.

Results: Individual polyps exhibited a variable course throughout the study period. At 12 months, 5 of 9 patients (55.6%) had complete resolution of polyps, including 1 eye with new polyps. Of the 4 patients with active polyps, 2 had both patent polyps from baseline and new polyps, 1 had only patent polyps which had been present since baseline, and 1 had only new polyps with complete resolution of baseline polyps. New polyps developed in 4 of 9 eyes (44.4%) at the course of treatment, with the number of new polyps developing ranging from 0 to 17 (mean 1.22, SD ± 2.39).

Conclusions: Individual polyps demonstrate a variable course over a 1-year period. While some polyps originally present at baseline may regress, new polyps may develop over the course of the treatment. It is important to differentiate persistent polyps from new polyps that arise later.

Poster No.: EX1-081
Panel No.: 081, Session: EX1

Potentially Therapeutic Windows for Retinitis Pigmentosa – The Interactions of Heterogenous Genetic Variations, Macular Involvements, and Visual Impairments

*First Author: Ta-Ching **CHEN***
*Co-Author(s): Pei-Lung **CHEN**, Ding-Siang **HUANG**, Chao-Wen **LIN**, Chang-Hao **YANG**, Chung-May **YANG***

Purpose: Retinitis pigmentosa (RP) is the most common phenotype among the inherited retinal degenerations (IRDs). Though affecting rods more than cones, loss of central vision and variable macular degenerations are not uncommon. With the development of genetic medicine and gene therapy, it's getting important to know the interactions of heterogenous genetic variations, macular involvements, and visual impairments to predict the potentially therapeutic windows.

Methods: The reported cohort included the first 400 probands (the first affected family member seeking our medical service) in our IRD cohort, which included cases referred from 12 medical centers to our hospital. All patients received a genetic test that was sequenced by panel-based next-generation sequencing (NGS) with 216 genes associated with IRDs. NGS data were processed and the criteria of classifying pathogenic variants were based on the ACMG standard and guideline. Visual functional tests and multimodal imaging of retina were done for all these patients.

Results: In our presenting cohort, patients of RP, including some cases diagnosed as RPE65 mutation-associated, could be divided into 6 subgroups according to their patterns of retinal degenerations. Specific genetic variants tend to lead to particular patterns and were then related to different visual prognosis. Multimodal imaging of retina helped us to monitor the progression precisely.

Conclusions: Here we reported our interim analysis about our IRD cohort results, which demonstrated that RP contains a group of heterogenous presentation in progression of visual impairments which may be related to genetic factors. The information could be important in the evaluation of therapeutic windows for gene therapy in the near future.

Poster No.: EX1-082
Panel No.: 082, Session: EX1
Quantification of Retinal Microvasculature in Different DR Grades Using Wide Field SS-OCTA

*First Author: Kiyoung **KIM***
*Co-Author(s): Wang Yuhl **OH**, Jang Ryul **PARK**, Jong Beom **PARK**, Jong In **YOU**, Seung-Young **YU***

Purpose: To analyze microvascular parameters of each stage of diabetic retinopathy with different range of views using wide-field swept-source optical coherence tomography angiography (OCTA).

Methods: Ninety-four diabetic patients (94 eyes), either without retinopathy or with different degrees of retinopathy (3 staging and 5 staging), were retrospectively recruited for volumetric swept-source OCTA imaging using 12 x 12 mm fields centered at the fovea. A custom, semiautomatic software algorithm was used to quantify areas of capillary nonperfusion in selected rectangular area perpendicular to the 'fovea to disc' axis above 3 x 3 mm, 6 x 6 mm, and 12 x 12 mm images.

Results: The mean percentage of nonperfused area calculated in the 6 x 6 mm and 12 x 12 mm fields were 0.63 mm^2, 6.93 mm^2 in the eyes without DR; 0.91 mm^2, 6.83 mm^2 in the mild NPDR eyes; 1.61 mm^2, 13.46 mm^2 in the moderate NPDR eyes; 1.57 mm^2, 15.52 mm^2 in the severe NPDR eyes; and 1.59 mm^2, 13.9 mm^2 in the PDR eyes. The nonperfusion area significantly increased with severity DR in 6 x 6 mm, and 12 x 12 mm fields, but not in 3 x 3 mm field. In logistic regression analysis, nonperfusion area in 6 x 6 mm and 12 x 12 mm are significantly different factors across both 3 and 5 DR staging ($P < 0.05$). In specific, nonperfusion area of 12 x 12 mm within 5 DR staging showed the highest coefficient value ($R2 = 0.632$).

Conclusions: Capillary nonperfusion area in the posterior retina increases with increasing DR severity as measured by swept-source OCTA. Quantitative analysis of retinal nonperfusion including peripheral field of OCTA (12 x 12 mm) can be used as a novel method to determine specified DR grade based on retinal microvascular status.

Poster No.: EX1-083
Panel No.: 083, Session: EX1
Real-world Data of Intravitreal Aflibercept for Myopic Choroidal Neovascularization: 12-month Outcomes of Japan Post-marketing Surveillance

*First Author: Tae **YOKOI***
*Co-Author(s): Kyoko **OHNO-MATSUI**, Shoichiro **SATO**, Yasuhiro **TERANO***

Purpose: To assess the safety and effectiveness of intravitreal aflibercept (IVT-AFL) in patients (pts) with myopic choroidal neovascularization (mCNV) in Japan.

Methods: Japan post-marketing surveillance (J-PMS) of mCNV was a prospective, multicenter, observational study that monitored 12-month outcomes following IVT-AFL for mCNV. Safety data from 348 pts and effectiveness data from 209 pts were assessed as the final analysis at 12 months.

Results: Mean age, refractive index, and axial length (mean ± SD) were 66.6 ± 13.2 years, -8.7 ± 5.6 diopters, and 28.5 ± 2.4 mm, respectively. 73.3% were female. Mean number of visits was 8.1 ± 4.3. Mean number of IVT-AFL injections was 2.5 ± 1.6. Adverse events (AEs) occurred in 3.4% of pts. Ocular serious AEs (SAE) were macular hole (0.9% of pts), retinal detachment (0.6% of pts), and endophthalmitis (0.3% of pts). Non-ocular SAE were prostate cancer (0.3% of pts) and quadriplegia (0.3% of pts). Mean best corrected visual acuity (BCVA) at baseline and at Month 12 were 0.61 ± 0.45 logMAR (54.7 letters) and 0.42 ± 0.44 logMAR (63.0 letters), respectively. Mean central retinal thicknesses

(CRT) at baseline and at Month 12 were 332.8 ± 110.9 µm and 268.4 ± 73.4 µm, respectively.

Conclusions: Ocular and non-ocular SAEs were consistent with the known safety profile of IVT-AFL. Mean change in BCVA and CRT improved through 12 months.

Poster No.: EX1-084
Panel No.: 084, Session: EX1

Real-world Use of Intravitreal Aflibercept in Macular Oedema Secondary to Central Retinal Vein Occlusion from Japan: 24-month Outcomes of J-PMS CRVO Study

*First Author: Masahiko **SHIMURA***
*Co-Author(s): Shoichiro **SATO**, Yasuhiro **TERANO***

Purpose: To assess the safety and effectiveness of intravitreal aflibercept (IVT-AFL) in patients with macular edema secondary to central retinal vein occlusion (ME/CRVO) in Japan.

Methods: The Japan Post-Marketing Surveillance (J-PMS) CRVO study is a prospective, multicenter, observational, regulatory study that was monitoring 24-month outcomes following IVT-AFL for ME/CRVO. Safety data from 377 patients and effectiveness data from 215 patients were analyzed.

Results: The mean age of patients was 72.0 ± 11.6 years (mean ± SD), while 51.2% were male. Serious adverse events (SAEs) were reported (RVO: 0.53% [2/377], heart failure: 0.27% [1/377], and myocardial infarction: 0.27% [1/377]). RVO was the only SAE to occur in more than 1 patient (n = 2). The mean number of IVT-AFL injections was 4.0 ± 2.5. Mean changes in best corrected visual acuity (BCVA) and central retinal thickness (CRT) from baseline to month 24 were -0.143 logMAR (+7.2 Early Treatment Diabetic Retinopathy Study [ETDRS] letters) and -223.5 µm (Baseline; BCVA 0.752 logMAR [47.4 ETDRS letters], CRT 558.9 µm).

Conclusions: These real-world safety findings are consistent with the known safety profile of IVT-AFL. The patients in this analysis received fewer injections and had smaller vision gains than those in other clinical studies.

Poster No.: EX1-085
Panel No.: 085, Session: EX1

Regional Growth of Geographic Atrophy and Visual Acuity: A Longitudinal Analysis

*First Author: Jong In **YOU***
*Co-Author(s): Eung Suk **KIM**, Kiyoung **KIM**, Jong Beom **PARK**, Seung-Young **YU***

Purpose: To investigate the correlation between visual acuity and regional growth of geographic atrophic area.

Methods: We retrospectively analyzed 26 eyes of 18 patients who were diagnosed with geographic atrophy and had at least a 1-year follow-up period. The area of atrophy was measured based on fundus autofluorescence images. Areas 1 to 6 mm from foveal center were defined as Area 1 to Area 6, and ring shape areas from between 1 and 2 mm to between 5 to 6 mm were defined as Zone 2 to Zone 6, respectively. Correlation and regression analysis were used to analyze the relationship between visual acuity change in the progression of atrophic area

Results: Mean age was 76.9 years. The mean follow-up period was 2.81 years. The atrophic area showed a more rapid increase in the distance from center. Regression analysis showed that the area of 3 mm diameter (Area 3, B = 0.762), 2 mm area (Area 2, B = 0.742), 4 mm area (Area 4, B = 0.723) (Area 5, B = 0.689), 6 mm area (Area 6, B = 0.668), and 1 mm area (Area 1, B = 0.544) were related to a change of visual acuity. Also, the area increases in Zone 2 (B = 0.737) were significantly associated with decreased visual acuity.

Conclusions: Progression pattern of atrophic area showed the area with the largest correlation with the change of visual acuity was from 1 mm to 2 mm in diameter from the foveal center. It may be used as a factor to determine the visual prognosis of the patient by analyzing the progressive pattern of atrophic area.

Poster No.: EX1-086
Panel No.: 086, Session: EX1

Relationship Between Retinal Perfusion and Retinal Thickness in Healthy Subjects and in Obstructive Sleep Apnea Syndrome Patients

*First Author: Jian **YU***
*Co-Author(s): Chunhui **JIANG***

Purpose: To investigate the relationship between retinal perfusion and retinal thickness of healthy subjects and obstructive sleep apnea syndrome (OSAS) patients.

Methods: Using optical coherence tomography angiography (OCTA), retinal perfusion and retinal thicknesses in the macular and peripapillary areas were measured in healthy volunteers and in OSAS patients, and correlations among these variables were analyzed.

Results: In healthy volunteers, we found that vessel density was significantly correlated with the inner retinal thickness ($P < 0.05$), but not with the thickness of the full retina ($P > 0.05$). In OSAS patients, the full and inner parafoveal retinal thickness and the retinal nerve fiber layer thickness were similar in all 3 groups. The retinal vessel density decreased with greater severity of OSAS. The decrease in vessel density differed between the peripapillary and parafoveal areas. The moderate group had a significantly lower vessel density than the normal-to-mild group in the peripapillary area ($P < 0.05$), but similar vessel density as the normal-to-mild group in the parafoveal area ($P > 0.05$). The vessel densities in the parafoveal and peripapillary areas were significantly and negatively correlated with AHI (both $P < 0.05$); the relative reduction in vessel density was greater in the peripapillary area than in the parafoveal area.

Conclusions: In healthy subjects, retinal perfusion in small vessels was closely correlated with the thickness of the inner retinal layers. In OSAS patients, the vessel densities in the peripapillary and parafoveal areas decreased with greater disease severity, and the decrease of vessels may occur before retinal thickness.

Poster No.: EX1-087
Panel No.: 087, Session: EX1

Short Term Efficacy of Sub-Tenon's Injection of Triamcinolone Acetonide for Cystoid Mmacular Edema After Cataract Surgery

*First Author: Bing **LIN***
*Co-Author(s): Ying **HUANG***

Purpose: To observe the short-term efficacy of sub-tenon's triamcinolone acetonide (TA) in the treatment of cystoid macular edema (CME) after cataract surgery.

Methods: A retrospective study. Sub-Tenon's TA injection treatment for the patients with CME after cataract surgery. The logMAR best corrected visual acuity (BCVA) and central retinal thickness (CRT) were recorded before and after treatment.

Results: A total of 21 subjects (21 eyes) were included, 9 males and 12 females. The mean age was 66.38 ± 10.88 years old. Mean BCVA before and after treatment were 0.46 ± 0.23 and 0.29 ± 0.22 ($t = 5.252$, $P = 0.000$) respectively. Mean CRT before and after treatment was 519.90 ± 131.59 and 307.71 ± 35.82 μm ($t = 8.166$, $P = 0.000$), respectively.

Conclusions: Sub-Tenon's TA injection significantly alleviates macular edema and improves patients' visual acuity. It is effective for CME after cataract surgery.

Poster No.: EX1-088
Panel No.: 088, Session: EX1

The Fellow Eye Effect of Unilateral Intravitreal Conbercept Injections in Eyes with Diabetic Macular Edema

*First Author: Yu **DI***
*Co-Author(s): Bing **LI**, Lue **LI**, Zhiqing **LI**, Junjie **YE***

Purpose: To investigate whether intravitreal conbercept injection affects contralateral untreated eyes in bilateral diabetic macular edema (DME) patients.

Methods: In this retrospective study, 15 patients (30 eyes) with type 2 diabetes were followed after bilateral DME diagnosis in the Department of Ophthalmology, Peking Union Medical College Hospital from 2015 to 2018.

Patients underwent examinations including best corrected visual acuity (BCVA), slit-lamp microscopy, indirect ophthalmoscope, color fundus photography, fundus fluorescein angiography, optical coherence tomography, (OCT) and glycated hemoglobin (HbA1c). Each patient received conbercept (0.5 mg) intravitreally in the severe eye. Non-parametric Wilcoxon signed-rank tests and Pearson's correlation coefficient were used to assess changes in BCVA and CRT, and relations between BCVA changes in treated and untreated eyes, respectively.

Results: In 15 eyes, the mean injection number and mean follow-up time were 9.13 ± 0.68 and 10.60± 2.29 months, respectively. HbA1c remained below 10% during treatment with no significant changes between initial and final visits (7.81 ± 1.17 vs 7.62 ± 1.19%) (P = 0.576). In untreated eyes, CRT significantly decreased from initial to final visits (368.93 ± 125.45 vs 306.27 ± 89.70 μm) (P = 0.028). In untreated eyes, BCVA showed no significant difference between initial and final visits (0.38 ± 0.30 vs 0.40 ± 0.30 logMAR) (P = 0.937), but BCVA changes in treated and untreated eyes were positively correlated (r = 0.527, P = 0.044).

Conclusions: Unilateral intravitreal conbercept injection has a curative effect on untreated eyes in bilateral DME patients as indicated by significantly reduced CRT and increased and unchanged BCVA (approximately 67%), consistent with changes in treated eyes.

Poster No.: EX1-089
Panel No.: 089, Session: EX1

The Role of Intravitreal Bevacizumab for Pseudophakic Cystoid Macular Edema: A Systematic Review

*First Author: Muhammad Rizky Nur **KARIM***
*Co-Author(s): Amani **AUGIANI**, Ari **DJATIKUSUMO**, Anis **FITRIANA**, Marsha **PINTARY**, Carennia **PARAMITA***

Purpose: To determine the role of intravitreal bevacizumab in the outcomes of patients with pseudophakic cystoid macular edema (PCME).

Methods: A systematic literature review was done by searching the following electronic databases from 2000 through 2019: MEDLINE, PubMed, EMBASE, and the Cochrane Library. Studies in English with human participants were included. The outcome of 6 months follow-up was described by the patients' best corrected visual acuity (BCVA) in logMAR equivalent and central macular thickness (CMT) in micrometer (μm) using the optical coherence tomography. Case report studies and review articles were excluded.

Results: We included 90 eyes in several studies consisted of interventional retrospective multicenter studies and case series of PCME patients treated by intravitreal bevacizumab. Despite no benefit was stated in a case series of postoperative PCME patients, the other studies demonstrated that BCVA and CMT were statistically improved after administration of intravitreal bevacizumab ($P < 0.05$). Furthermore, intravitreal bevacizumab was considered safe, proved by no ocular and systemic adverse effects being found in all of these patients.

Conclusions: Current studies suggested that intravitreal bevacizumab has a tendency to be safe and should be considered in patients with PCME since it provides a good prognosis shown by BCVA and CMT improvement. However, further studies, particularly prospectively-observed clinical trials, are still needed.

Poster No.: EX1-090
Panel No.: 090, Session: EX1

The Association Between Age-related Macular Degeneration and Alzheimer's Disease: An Updated Systematic Review

*First Author: Jianan **DUAN***
*Co-Author(s): Meixia **ZHANG***

Purpose: To describe the relationship between age-related macular degeneration (AMD) and Alzheimer's disease (AD) through a review of the current literature.

Methods: An extensive literature search was performed, and key research articles exploring age-related macular degeneration

and Alzheimer's disease reviewed. PubMed and Web of Science databases were used for generating articles to review.

Results: The pathogenesis of AMD has relation with AD. AMD share common risk factors with AD, such as advanced age, hypercholesterolemia, hypertension, obesity, arteriosclerosis, and smoking. The morbidity rate of AD was higher in AMD with statistical significance, especially in nonexudative AMD, and AMD patients had higher morbidity rate of AD. The pathology of AMD and AD share some characteristics, which mainly were vitronectin and β-amyloid peptide deposition, changes of signal pathway, and the complement cascade activated. It was reported that the content, species, and complexity of microRNA (miRNA) in the brain and eye were quite similar in the latest report. Due to the similar symptoms and pathology, the medicine of anti-β-amyloid peptide deposition was used in both AMD and AD patients recently.

Conclusions: AMD is a delayed neurodegenerative disease that affects the macular region of the retina, and it was considered as AD in the eye. Patients with AMD should be paid more attention to the symptoms of AD. The treatment of AMD may be considered using the medicine of AD in the future and the condition of AMD may be the potential prognostic of AD because of the similar symptoms and pathology.

Poster No.: EX1-091
Panel No.: 091, Session: EX1

The Changes of Vitreous Protein Expression Profile Induced by Intravitreal Anti-VEGF Therapy in Eyes with Proliferative Diabetic Retinopathy

*First Author: Dejia **WEN***
*Co-Author(s): Xiaorong **LI**, Xinjun **REN***

Purpose: To observe the efficacy of preoperative anti-vascular endothelial growth factors (anti-VEGF) therapy on proliferative diabetic retinopathy (PDR) patients. To investigate the change of protein profile induced by anti-VEGF agents in vitreous humor and explore the effects and underlying mechanism of anti-VEGF treatment on PDR.

Methods: In this study, 36 vitreous humor samples, pre- and intraoperation data were collected, 16 samples from PDR patients with preoperative anti-VEGF agents intravitreal injection (IVI group), 20 samples from PDR without preoperative treatment (PDR group). The potential changes induced by VEGF inhibitors were analyzed using iTRAQ-based quantitative proteomic strategy. ELISA was employed to confirm concentration of the selected proteins and validate the proteomic results.

Results: Preoperative anti-VEGF therapy regressed neovascularization, shortened the surgical time, and reduced the chance of intraoperative bleeding. By setting a 3-fold SD change as the cutoff standard for up- or down-regulated proteins, we successfully identified 107 altering expressed proteins, including 50 down-regulated expression proteins ($P < 0.05$) and 57 up-regulated expression proteins ($P < 0.05$) in response to IVI. Bioinformatics analysis presented that alerting expression proteins were related to many critical biological processes and signaling pathways, including regulated exocytosis, extracellular matrix organization, regulation IGF transport, PID-HIF2 signaling pathway. GO analysis clustered the differentially expressed proteins involved in categories biological processes.

Conclusions: Preoperative anti-VEGF therapy can effectively assist vitrectomy in PDR patients. Anti-VEGF agents are associated with change of human vitreous protein profile in patients with PDR, in which the altering expressed proteins participated in the key biological process in retina.

Poster No.: EX1-092
Panel No.: 092, Session: EX1
The Effect of Varying Dosage and Fluence Setting of Verteporfin on Choroidal Vasculature in a Rodent Model

First Author: Peng ***QIN***
Co-Author(s): Ian ***WONG***

Purpose: Half-dose photodynamic therapy (PDT) combined with intravitreal ranibizumab was found to have similar effects of polyps regression when compared to standard-dose PDT. This study aimed to investigate the toxicity profile of half-dose PDT and standard-dose PDT to choroidal vasculature.

Methods: SD rats that accepted sham PDT and standard-dose PDT (Verteporfin 6 mg/m^2, laser power 50 J/cm^2) were used as negative and positive controls, respectively. Half-dose PDTs with either half dosage of Verteporfin (3 mg/m^2) or half laser power (25 J/cm^2) were applied to the age-matched rats. Twenty-four hours after PDT, vascular oxidative stress was examined on choroidal whole mounts by co-staining Isolectin (endothelium) with Dihydroethidium (superoxide). Number of subretinal hemorrhage was also observed among the varying-dose PDT groups. As choroidal ischemia might result in retina dysfunction, scotopic ERG was investigated. Statistical analyses were performed using One-way ANOVA followed by Bonferroni-Dunn test.

Results: Standard-dose treated rats (n = 8) showed decreased amplitude of a-wave in scotopic ERG($P < 0.05$) as well as increased intensity of vascular oxidative stress ($P < 0.01$) at the site of laser application. Rats (n = 8) in half dose of Verteporfin (3 mg/m^2) group exhibited amelioration of retinal dysfunction and less superoxide staining in choroidal vasculature ($P < 0.01$). However, rat s(n = 8) in half laser power (25 J/cm^2) group only showed a minor but not significant attenuation of vascular oxidative stress and retinal dysfunction. Two cases of subretinal hemorrhage were observed in standard-dose treated rats, whereas no case was found in either half-dose treated rats.

Conclusions: PDT with half dose of Verteporfin but not half laser power was less toxic to normal choroidal vasculature, suggesting a promising use in PCV treatments, particularly for small polyps lesion.

Poster No.: EX1-093
Panel No.: 093, Session: EX1
The Efficacy of Conbercept or Ranibizumab Intravitreal Injection for ME

First Author: Wang ***YOU***

Purpose: To compare the efficacy of intravitreal conbercept and intravitreal ranibizumab for the treatment of macular edema (ME).

Methods: A total of 360 eyes of 264 patients with ME were contained in this study, with 120 eyes in Group A and 120 eyes in Group B. Group A received an intravitreal injection of 0.5 mg ranibizumab (IVR). Group B received an intravitreal injection of 0.5 mg conbercept (IVC). The patients (120 eyes) who did not receive IVC or IVR were assigned to Group C.

Results: Both Group A ($P = 0.004$) and Group B ($P = 0.001$) had better postoperative best corrected visual acuity (BCVA) than Group C. And Group A ($P = 0.007$) and Group B ($P = 0.002$) had difference in thickness of macular fovea changes with Group C. There was no difference in postoperative BCVA and thickness of macular fovea between Group A and B, but the average frequency of medication was different ($P = 0.004$), and Group A was 2.48 but Group B was 3.75.

Conclusions: Intravitreal injection of ranibizumab or conbercept is an effective therapeutic option in ME. However, the IVC group was more economical than the IVR group.

Poster No.: EX1-094
Panel No.: 094, Session: EX1

The Efficacy of Intravitreal Gas Injection for Chronic Non-resolving Diabetic Cystoid Macular Edema

*First Author: Deepesh **MOURYA***
*Co-Author(s): Roshija **KHANAL RIJAL***

Purpose: To evaluate the efficacy of intravitreal gas injection for chronic non-resolving diabetic cystoid macular edema (CME).

Methods: This was a prospective, randomized, controlled trial. Patients with non-resolving chronic diabetic CME were randomized in 2 groups: (A) intravitreal anti-VEGF with 0.3 cc SF6 gas. (B) intravitreal anti-VEGF only. Non-resolution was defined as poor response to 3 monthly anti-VEGF injections. The main outcome measure was change in central macular thickness after 4 weeks.

Results: There were a total of 106 eyes, 53 in each group. There was no statistical significance in age and gender between the 2 groups. The mean decrease in CMT post-injection was 145.2 microns and 66.7 microns in Groups A and B, respectively ($P < 0.05$). The mean improvement in visual acuity (logMAR) was 0.31 +/- 0.02 in Group A and 0.09 +/- 0.03 in Group B. Improvement was better in CME with large single cyst compared to multiple small cysts. Also, results were better in cases with visible point attachment of vitreous over fovea.

Conclusions: Intravitreal gas injection with anti-VEGF can be a good option for chronic non-resolving diabetic CME. It can decrease the cost of repeated injections. The gas probably works by the release of localized micro attachments of vitreous over the macula.

Poster No.: EX1-095
Panel No.: 095, Session: EX1

Time to Dry Analysis of Brolucizumab Versus Aflibercept in Patients with Neovascular AMD: 96-week Data from the HAWK and HARRIER Trials

*First Author: Andrew **CHANG***
*Co-Author(s): Jahangir **ALAM**, Pravin **DUGEL**, Frank G. **HOLZ**, Carl **REGILLO**, Eric **SOUIED***

Purpose: HAWK and HARRIER were two Phase III, prospective studies that assessed the efficacy and safety of brolucizumab versus aflibercept in neovascular AMD patients. Here, the 48- and 96-week outcomes with respect to time to dryness with brolucizumab versus aflibercept are reported.

Methods: Patients were randomized to brolucizumab 3 mg (HAWK only), 6 mg, or aflibercept 2 mg. After 3 loading doses, brolucizumab patients received 12-week dosing (q12w) with an option to adjust to 8-week (q8w) dosing at predefined disease activity assessment visits; aflibercept was dosed q8w.

Results: The cumulative incidence rate (%) in study eyes with sustained dryness was greater for brolucizumab versus aflibercept at Week 48 (≥2/≥3 visits: HAWK [brolucizumab 3 mg, 82.9/77.6; brolucizumab 6 mg, 86.5/79.1; aflibercept, 76.5/68.3]; HARRIER [brolucizumab 6 mg, 91.5/85.9; aflibercept, 81.4/73.0]). The 50th percentile for sustained dryness was achieved earlier for patients receiving brolucizumab with most achieving dryness at ≥2/≥3 visits by Week 8/8 in HAWK and Week 4/4 in HARRIER compared with aflibercept (HAWK, Week 8/12; HARRIER: Week 4/8). The 75th percentile was also achieved earlier with brolucizumab compared with aflibercept (≥2/≥3 visits: HAWK [brolucizumab 3 mg, Week 24/36; brolucizumab 6 mg, Week 12/32; aflibercept, Week 40/not achieved]; HARRIER [brolucizumab 6 mg, Week 8/20; aflibercept, Week 16/not achieved). Anatomical outcomes were achieved with > 50% of brolucizumab 6 mg patients on q12w by Week 48. The 96-week analyses will also be presented.

Conclusions: The 48- and 96-week "time to dry" analyses showed that brolucizumab patients achieved 'first time to fluid free' faster, and more patients treated with brolucizumab achieved sustained dryness versus aflibercept.

Poster No.: EX1-096
Panel No.: 096, Session: EX1
To Compare the Efficacy of Pneumatic Displacement With and Without Tissue Plasminogen Activator for Traumatic Submacular Hemorrhage

First Author: Deepesh ***MOURYA***
Co-Author(s): Roshija ***KHANAL RIJAL***

Purpose: To compare the efficacy of pneumatic displacement with and without tissue plasminogen activator for traumatic submacular hemorrhage.

Methods: This was a prospective, randomized, controlled trial. Patients with traumatic SMH were randomized in 2 groups: (A) pneumatic displacement only; (B) pneumatic displacement with tPA. Main outcome measure was visible clearance of SMH from fovea.

Results: There were a total of 54 eyes, 27 in each group. There was no statistical difference in age and gender in both groups. The mean duration of presentation was 17.2 days. Visible clearance of SBM was seen in 23 (85.18) in group A and 25 (92.59) in group B. The difference was not statistically significant. The mean improvement in visual acuity (logMAR) was 1.07 +/- 0.39 in Group A and 1.16 +/- 0.5 in Group B.

Conclusions: Pneumatic displacement alone without tPA can be an effective modality of treatment for traumatic SMH. Its benefits clearly outweigh the risks of intravitreal tPA at a lower cost.

Poster No.: EX1-097
Panel No.: 097, Session: EX1
Topical Nepafenac 0.1% After Phacoemulsification Cataract Surgery for Patients with Coexisting Diabetic Retinopathy: A Meta-analysis

First Author: Muhammad Rizky Nur ***KARIM***
Co-Author(s): Ari ***DJATIKUSUMO****, Adinda Mulya* ***PERTIWI****, Arin Aulia* ***RAHMA****, Rahayu* ***WIDHYASTI***

Purpose: To measure the effectiveness of topical nepafenac 0.1% in preventing macular edema (ME) after cataract surgery for patients with cataract and coexisting diabetic retinopathy (DR).

Methods: Systemic searches were conducted through PubMed, EMBASE, and the Cochrane Controlled Trials Register up to June 30, 2019, and pertinent comparative studies were identified. Studies included were those written in English and limited to human participants. The outcome measured was macular edema development. Studies were deemed suitable if they reviewed the strength of evidence of nepafenac in preventing macular edema after cataract surgery for patients with cataract and coexisting diabetic retinopathy. Studies without available raw data, conference abstracts, and review articles were excluded.

Results: Three studies describing a total of 471 eyes were identified. All studies were randomized, controlled trials. The meta-analysis results showed that macular edema at 3 months postoperative was significantly decreased with nepafenac administration ($P < 0.00001$). It also showed that the central subfield macular thickness (CSMT) was lower in the nepafenac group.

Conclusions: Our meta-analysis indicates that cataract surgery in diabetic retinopathy patients followed by topical nepafenac seems to be effective in decreasing macular edema incidence. Further research with randomized, prospective, and large-sample–sized trials are needed to evaluate the long-term effects of nepafenac after cataract surgery in patients with DR.

Poster No.: EX1-098
Panel No.: 098, Session: EX1

Treatment of Chronic Central Serous Chorioretinopathy with Under-threshold Energy of Precision Navigation Laser

*First Author: Jin **YAO***
*Co-Author(s): Qin **JIANG***

Purpose: To observe the safety and efficacy of Navilas precise navigation laser with under-threshold energy in the treatment of chronic CSC with the leakage near fovea.

Methods: A total of 18 patients (18 eyes) with chronic CSC whose course of disease was more than 4 months, including 13 males and 5 females, aged from 33 to 51 years old, were treated with under-threshold energy of Navilas precise navigation laser. The best corrected visual acuity, FFA, autofluorescence, optical coherence tomography (OCT), OCT angiography (OCTA), multifocal ERG, and microvisual field were examined before and 2 weeks, 1 month, and 3 months after treatment, respectively.

Results: Two weeks after laser treatment with under-threshold energy, the subretinal fluid was significantly decreased in all cases. No abnormal autofluorescence was found, and no laser damage was found in all layers of the retina on OCT and OCTA. At 1 month after treatment, all the subretinal fluid was absorbed. Best corrected visual acuity (BCVA) (logMAR) (0.21 ± 0.06) was significantly higher than that before treatment (0.74 ± 0.16).

Conclusions: Navilas precise navigation laser with under-threshold energy can be used to treat the near fovea leakage of chronic CSC without retinal injury, which can effectively increase BCVA and the amplitude density of macular area and decrease CFT.

Poster No.: EX1-099
Panel No.: 099, Session: EX1

Two-year Outcome of Conbercept for Treatment of Choroidal Neovascularization Secondary to Pathologic Myopia and Correlation of Visual Prognosis

*First Author: Cong **CHEN***
*Co-Author(s): Yanping **SONG**, Ming **YAN***

Purpose: To observe and evaluate the efficacy and safety of conbercept in the treatment of pathological myopia (PM) choroidal neovascularization (CNV), and to explore the factors affecting visual prognosis and the number of intravitreal injections.

Methods: A retrospective case study. Forty-seven eyes of 47 patients were included in the study. All patients were treated with 1+PRN for intravitreal injection of conbercept 0.05 ml (containing conbercept 0.5 mg) followed up for 24 months. Observed the best corrected visual acuity (BCVA), CMT, CNV area, CNV leakage area, and the number of vitreous cavity injections at 1, 3, 6, 12, and 24 months after treatment. LogMAR BCVA after treatment of 24 months, the total number of injections, and the baseline data were analyzed by person and spearman.

Results: The total number of injections was 4.08 ± 1.75. Compared with before treatment, BCVA was significantly increased in the eyes at 1, 3, 6, 12, and 24 months after treatment (all $P = 0.000$). Compared with before treatment, the CMT of the eyes decreased significantly at 1, 3, 6, 12, and 24 months after treatment (all $P < 0.01$). There was a positive correlation with logMAR BCVA at 24 months after treatmen and area of CNV leakage at baseline ($P < 0.05$). There was a positive correlation with baseline CMT, CNV area and area of CNV leakage ($P < 0.05$).

Conclusions: Conbercept treatment of pathological myopia with CNV can bring better vision benefits and anatomical benefits, and it is safe and effective. The last follow-up BCVA has a correlation with the area of CNV leakage, and the total number of injections correlation with CMT, CNV area, and area of CNV leakage.

Poster No.: EX1-100
Panel No.: 100, Session: EX1
Visual Evoked Potential Changes in Patients with Type II Diabetes Mellitus

*First Author: Madhurima **CHAUDHURI***

Purpose: Comparison of visual evoked potential (VEP) changes in type II diabetes mellitus (DM) patients with and without non-proliferative diabetic retinopathy (NPDR) with that of healthy non-diabetic controls.

Methods: In this hospital-based, cross-sectional, comparative study, pattern reversal VEP was recorded in 25 diabetic subjects with NPDR (diagnosed on fundus examination and fundus photography) and 25 diabetic subjects without NPDR and compared to 50 age and sex-matched, non-diabetic, healthy controls. Fasting blood sugar (FBS) levels were also recorded in all 3 groups.

Results: P100 latency in VEP was significantly prolonged in diabetic subjects without NPDR as compared to controls (P = 0.004). It was also prolonged in diabetics with NPDR than those without NPDR (P = 0.002). N75-P100 amplitude was significantly decreased in diabetic subjects (P < 0.001). Also, P100 latency values showed an increase in latency in the groups as mean FBS levels increased.

Conclusions: VEP can be used in diagnosing neurological damage in diabetes even before the appearance of ophthalmologically detectable signs of NPDR. VEP measurement of parameters like P100 latency, which are highly reliable, reproducible, and non-invasive tests, could be used for screening various complications of diabetes like retinopathy.

Poster No.: EX1-101
Panel No.: 101, Session: EX1
Wide Foveal Pit: Predilection for Maculopathy

*First Author: Yi-Ting **HSIEH***
*Co-Author(s): I-Hsin **MA***

Purpose: To describe the anatomical characteristics of wide foveal pit and to evaluate its association with vitreoretinal diseases.

Methods: Fifty-two eyes with a wide foveal pit demonstrated by optical coherent tomography (OCT) were retrospectively collected and measured for the foveal width, area of foveal avascular zone (FAZ), and retinal artery trajectory (RAT). The characteristics of the fellow eyes were also described. Age and sex-matched cases with normal foveal contour were enrolled as the control group for comparison.

Results: The mean foveal width (459 ± 92 μm) and FAZ area (0.50 ± 0.11 mm^2) in the study group was significantly larger than that of those in the control group (292 ± 38 μm and 0.29 ± 0.10 mm^2, P < 0.001 for both). The RAT in eyes with wide foveal pit was wider than in normal controls (P < 0.001), and was similar to that in eyes with macular hole. Fellow eyes of those with a wide foveal pit either also had a wide foveal pit (n = 11) or had various macular diseases, such as idiopathic epiretinal membrane (n = 27), macular hole (n = 5), retinal vein occlusion (n = 5), and others maculopathy (n = 15). Formation of idiopathic epiretinal membrane was observed in 1 eye with a wide foveal pit during subsequent follow-up visits.

Conclusions: Eyes with a wide foveal pit had a high proportion of macular diseases including idiopathic epiretinal membrane, macular hole, and retinal vein occlusion in their fellow eyes. The underlying anatomical characteristics of a wide foveal pit may be associated with the development of these macular diseases.

Retina (Surgical)

Poster No.: EX1-102
Panel No.: 102, Session: EX1
Twenty-seven--gauge TSV for High Myopic Foveoschisis

*First Author: Tieying **ZHAO***
*Co-Author(s): Yuanfei **ZHU***

Purpose: To observe the safety and efficacy of 27-gauge transconjunctival sutureless vitrectomy (TSV) for high myopic foveoschisis.

Methods: Seventeen cases with high myopic foveoschisis, including 1 stage I case combined

with retinal detachment from peripheral retinal tear, 9 cases in stage II, 5 cases in stage III, and 2 cases in stage IV, were operated by the same surgeon. Triamcinolone acetonide (TA) assisting TSV was applied, brilliant blue (BB) staining internal limiting membrane (ILM) was peeled, and gas-liquid exchange was performed. All patients were kept in face-down position for 3 to 4 days. Follow-up time was 3 - 12 months, macular structure was observed and evaluated by optical coherence tomography (OCT), and best corrected visual acuity (BCVA) was recorded.

Results: The average axial length was 30.7 ± 1.8 mm. Phacoemulsification combined with intraocular lens (IOL) implantation were carried out in 8 cases with developed cataracts. Average BCVA was increased from 0.07 ± 0.03 to 0.3 ± 0.2 ($P < 0.05$). Detachment between retinal neuroepithelial layer and pigment epithelial layer was observed within 3 months in 5 cases, and complete reattachment was noticed 10 months postoperatively. Macular hole (MH) was fully closed in 4 cases. Noticeably, micro MH maintained in 1 case with BCVA 0.6, no further intervention was applied. There were no complications such as tearing of the macular area, reoccurrence of macular hole, and enlargement of the hole during and after operation.

Conclusions: TA assisting 27 gauge TSV, BB stained ILM peeling, air tamponade for high myopic foveoschisis is safe and effective. Long-term post-anatomical repair state has 2 different stages.

Poster No.: EX1-103
Panel No.: 103, Session: EX1
Application of the Viscoelastic Substance – An Innovative Technique in the Surgical Management of Proliferative Diabetic Retinopathy

First Author: Shuya ***WANG***
Co-Author(s): Xingrong ***WANG***

Purpose: Diabetes is the most common cause of legal blindness among individuals 20 to 74 years old. Due to the low rates of follow-up times and lack of prevention consciousness, proliferative diabetic retinopathy is quite common in China and often needs surgical intervention. In the surgery for proliferative diabetic retinopathy, peeling of the proliferative membrane can be very tricky, especially in the macula. Iatrogenic hole and angiorrhexis in this kind of surgical management can bring an unfavorable prognosis. Then, how to optimize the surgical techniques and tricks has always been our paramount consideration.

Methods: Viscoelastic substance has been recognized for its excellent malleability and histocompatibility, and has been widely used in cataract surgery. In this video, we provided a novel use of viscoelastic substance in PDR surgery. First of all, the operator isolated the proliferative membrane, then made a little tunnel from one edge of the membrane with the 23G vitrectomy probe, and injected viscoelastic substance into the tunnel to separate the membrane from the retina as blunt dissection.

Results: This efficiently reduced the risk of retinal tears, iatrogenic hole, and angiorrhexis while peeling the proliferative membrane and improving the prognosis of PDR.

Conclusions: The application of the viscoelastic substance in the surgical management of proliferative diabetic retinopathy is innovative and proved to be safe and effective.

Poster No.: EX1-104
Panel No.: 104, Session: EX1
Causes and Prognosis of Acute – Onset Vitreous Hemorrhage of Unknown Origin After Vitrectomy in a Tertiary Eye Care Center of Bangladesh

First Author: Sabrina ***RAHMATULLAH***
Co-Author(s): Mominul ***ISLAM****, Maliha* ***SHARMIN***

Purpose: To analyze causes and prognosis of acute-onset preoperatively unknown origin of vitreous hemorrhage (VH).

Methods: This study included patients who had acute-onset of VH of unknown origin for 2 months or more. Patients who had diabetic retinopathy in the fellow eye were excluded.

The underlying causes of VH were identified after vitrectomy. Overall visual prognosis of unknown origin of VH were analyzed.

Results: Forty eyes were included from January 2017 to December 2017. Among these, retinal vein occlusion (RVO) 14 (35%), vasculitis retinae 10 (25%), age-related macular degeneration (AMD) 12 (30%), retinal break leading to retinal detachment (RD) 3 (7.5%), and ruptured choroid 1 (2.5%) were identified after vitrectomy. Visual prognosis was found better in retinal vein occlusion and vasculitis retinae patients. However, poor visual prognosis was associated with old age, trauma, AMD, and retinal detachment with break.

Conclusions: Retinal vein occlusion, age-related macular degeneration, and vasculitis retinae are the most common causes of acute-onset preoperatively unknown origin of VH in this subcontinent. The visual prognosis of unknown origin of VH is relatively good after vitrectomy, except among AMD and retinal detachment patients. Older patients with drusen in fellow eye and traumatic patients with retinal detachment are at a higher risk of poor visual prognosis after vitrectomy.

Poster No.: EX1-105
Panel No.: 105, Session: EX1
Clinical Outcomes of Refractory Neovascular Glaucoma with Endoscopic Cyclophotocoagulation and Vitreous Surgery After Anti-VEGF Treatment

*First Author: Baoke **HOU***

Purpose: To evaluate the efficiency by a comprehensive approach for the management of neovascular glaucoma (NVG) patients with anti-VEGF in eyes undergoing endoscopic cyclophotocoagulation (ECP), pars plana vitrectomy (PPV), and complement pan-retinal photocoagulation (PRP).

Methods: This was a prospective study. This study included 12 eyes of patients with angle-closing neovascular glaucoma (NVG) who had paid a visit to our hospital from 2017.01 - 2018.01. According to past medical history, we divided patients into 2 groups.

There were 5 eyes in Group A that underwent the surgery of ECP, PPV, and PRP. As for Group B, there were 7 eyes of 7 patients with Ahmed glaucoma valve implant. We recorded the intraocular pressure (IOP), best corrected visual acuity (BCVA), the fundus status of primary disease, and complications before and after surgery.

Results: Patients were followed up for 6 - 12 months. Compared to preoperative IOP (Group A: 35.12 ± 5.54, Group B: 39.17 ± 10.17), both groups had lower postoperative IOP (Group A: 14.8 ± 6.01, Group B: 8.86 ± 2.36). To some extent, BCVA had also been improved in Group A. There was no significant difference between Group A and Group B in IOP (P = 0.49) and BCVA (P = 0.20).

Conclusions: Endoscopic cyclophotocoagulation (ECP) and vitreous surgery after anti-VEGF treatment can control IOP effectively and be friendly to patients' BCVA in the long-term for neovascular glaucoma (NVG) patients without obvious serious complications.

Poster No.: EX1-106
Panel No.: 106, Session: EX1
Clinical Features of Subretinal Proliferation in Proliferative Diabetic Retinopathy

*First Author: Chan **WU***
*Co-Author(s): Youxin **CHEN**, Rongping **DAI***

Purpose: To investigate the clinical characteristics, treatments, and prognosis of subretinal proliferation (SRP) in proliferative diabetic retinopathy (PDR) patients.

Methods: Clinical features of patients who received vitrectomy for PDR between January 2017 and December 2018 were retrospectively reviewed. The patients presented with subretinal proliferation were enrolled as the study group, and those who exhibited no subretinal proliferation served as the control group. Data were collected from the medical records as follows: demographics, systemic and ophthalmologic findings, and treatment given specifically for subretinal proliferations.

Findings at baseline and during follow-up were evaluated.

Results: There were 9 eyes (9 patients) in the study group and 145 eyes (145 patients) in the control group. The average fasting blood glucose was 11.48 ± 3.52 mmol/L and 8.72 ± 3.05 mmol/L, respectively (P = 0.048). The analysis of surgical indication revealed those in the study group had a significantly higher proportion of tractional retinal detachment (TRD) (P < 0.0001) and significantly lower proportion of vitreous hemorrhage (VH) (P = 0.0006). The rate of silicone oil usage was higher in the study group (P < 0.0001). No retinal break was found preoperatively or intraoperatively. No eye had undergone subretinal band removal or transection procedure intraoperatively except one eye (11.1%), and the final anatomical success rate was 100%.

Conclusions: Subretinal proliferation in PDR was associated with worse blood sugar levels and tractional retinal detachment. The retina can reattach successfully after pars plana vitrectomy without removal or transection of the subretinal bands in most eyes.

Poster No.: EX1-107
Panel No.: 107, Session: EX1
Evaluating the Use and Outcomes of Digitally Assisted Vitreo-retinal Surgery: A Systematic Literature Review

*First Author: Leighton **MORRIS***

Purpose: To evaluate the available evidence for heads-up setup and digitally assisted vitreoretinal surgery (DAVS) compared to conventional microscopy.

Methods: A systematic literature review was conducted in PubMed for English studies published between 2009-2019 using comprehensive search terms pertaining to retinal surgery, 3D heads-up visualization, and health economics / outcomes research. Additional targeted searches were performed in EMBASE. Two independent reviewers scored 302 abstracts in total and found 16 full-text papers that met final inclusion criteria. Of the publications that were screened out, 150 studies involved unrelated surgeries (e.g. Blepharoplasty), and 66 studies involved unrelated technologies (e.g. OCT).

Results: Studies by Eckardt et al. (2016), Zhang et al. (2018), Palácios et al. (2019), and Rizzo et al. (2018) suggest that heads-up displays provide improved surgical ergonomics and comfort for the primary surgeon. Additionally, studies by Talcott et al. (2018), Zhang et al. (2018), Adam et al. (2017), and Kita et al. (2018) suggest a reduced need for endo-illumination with DAVS compared to conventional microscopes. A few studies by Talcott et al. (2018), De la Huerta et al. (2017), and Babu et al. (2018) noted that DAVS lengthened surgical and set-up time compared to conventional microscopes.

Conclusions: Most studies on DAVS support the clinical benefit and physician preference of the technology compared to conventional microscopes. However, some studies show a steeper learning curve evidenced by lengthened surgical and set-up time compared to conventional microscopes.

Poster No.: EX1-108
Panel No.: 108, Session: EX1
Efficacy of Intraoperative Optical Coherence Tomography (iOCT) in Various Vitreo-retinal Indications

*First Author: Sabia **HANDA***
*Co-Author(s): Ashish **MARKAN**, Bruttendu **MOHARANA**, Ramandeep **SINGH***

Purpose: To evaluate the efficacy of intraoperative OCT (iOCT) in diagnostic and surgical decision-making for various vitreoretinal indications.

Methods: In a retrospective study, surgical data of patients undergoing microscope-integrated iOCT assisted procedures for any vitreoretinal indications was collected. Depending on the usefulness of iOCT, 4 groups were prepared i.e A) An alternative to a surgical adjuvant such as dyes, B) Surgical step endpoint guide, C) Informative tool necessitating additional

surgical maneuver, D) Diagnostic tool in pediatric patients.

Results: A total of 67 eyes were enrolled in the study. Successful image acquisition could be possible in 65 eyes (92.68%, 95% confidence interval 91.8% - 93.24%). Efficacy of iOCT in various groups was A) 27 of 31 eyes (85.95%), B) 6 of 6 eyes (100%), C) 6 of 21 eyes (28.57%), D) 8 of 9 eyes (88%).

Conclusions: In our experience, iOCT has come up as an effective tool in diagnostic and surgical decision-making.

Poster No.: EX1-109
Panel No.: 109, Session: EX1
Evaluation of the Treatment Results in Patients with Rhegmatogenous Retinal Detachment Treated by 25-gauge Pars Plana Vitrectomy with Air Tamponade

*First Author: Li **YAN***
*Co-Author(s): Xiaoting **XI**, Qianbo **CHEN**, Xuewei **WANG***

Purpose: The aim of this study was to evaluate the effectiveness of treatment and the restoration of the anatomic condition rhegmatogenous retinal detachment treated by 25G pars plana vitrectomy (PPV) using air tamponade.

Methods: Forty-five patients (45 eyes) with rhegmatogenous retinal detachment were included in the study. These were eyes with retinal detachment both with and without macular involvement. During the PPV surgery, the peripheral and central part of the vitreous was excised, laser therapy was performed peripherally and in retinal openings, and the eyeball was filled with filtered air. Local conditions were evaluated at 1, 7, 14, 30, and 60 days after the procedure.

Results: The single-operation success rates were 93.3%, and the final surgery success rates increased to 97.78%. In the long-term assessment, the final visual acuity was better in 44 patients compared to the initial results. On average, air in the eyeball was completely absorbed about 10 to 14 days after surgery.

Conclusions: In this study, very good results of the treatment of open-rooted retinal detachment were achieved. The air was quickly absorbed and visual acuity improved. Owing to the relatively fast absorption time, this method could be used successfully in patients with primary retinal detachment.

Poster No.: EX1-110
Panel No.: 110, Session: EX1
Internal Limiting Membrane Insertion Technique Combined with Nerve Growth Factor Injection for Large Macular Hole

*First Author: Miaoqin **WU***
*Co-Author(s): Luyi **ZHANG***

Purpose: To determine whether nerve growth factor (NGF) combined with an internal limiting membrane (ILM) insertion was effective in the large idiopathic full-thickness macular hole (iFTMH) therapy.

Methods: A subset of 18 eyes (July 2015 - October 2017) diagnosed as the large iFTMH were enrolled in this study. The subjects were treated using ILM insertion technique alone (ILM group) or ILM combined with NGF injection (NGF group), and the follow-up period was 6 months. Macular hole closure rates, best corrected visual acuity (BCVA, improvements using ETDRS), and optical coherence tomography (OCT) findings were analyzed at 1st, 3rd, and 6th months postoperatively.

Results: Macular holes in both groups fully closed. In comparison to ILM insertion group, the NGF group had better BCVA at the 3rd month (48.00 ± 2.392 vs 58.22 ± 2.957). The mean external limiting membrane (ELM, 422.2 ± 96 vs 674.9 ± 103.6) and ellipsoid zone (EZ, 496.7 ± 101.6 vs 766.7 ± 111.8) defects were significantly smaller in the NGF group at the 6th month in the follow-up examination. Complete recovery of ELM and EZ was observed in the NGF group in 1 eye of a patient and 2 eyes of 2 patients, respectively. In comparison, 1 eye's ELM and another eye's EZ were completely recovered in the ILM insertion group.

Conclusions: Our results indicated that ILM insertion with NGF injection might be

an effective technique for the initial surgical treatment of eyes with large MHs. The proposed approach yielded better recovery of the photoreceptor layers and consequently might have superior postoperative visual acuity.

Poster No.: EX1-111
Panel No.: 111, Session: EX1
Management of Proliferative Retinopathy Secondary to Acute Myeloid Leukaemia

*First Author: Sarah **CHAN***
*Co-Author(s): Joseph **PARK***

Purpose: Case report

Methods: A 52-year-old Caucasian, non-diabetic male awaiting bone marrow transplant (BMT) for acute myeloid leukemia (AML) with severe pancytopenia presented with a 2-day history of reduced vision in his right eye to 20/50 and left to hand movements. He was found to have a dense vitreous hemorrhage in the left eye precluding adequate view of the posterior pole. In the right fundus, subhyaloid hemorrhage was present along the inferotemporal arcade and scattered retinal hemorrhages in 4 quadrants. Leukemic infiltration was absent. Fundus fluorescein angiogram revealed bilateral extensive capillary non-perfusion in mid-peripheral and peripheral retina and retinal neovascularisation in mid-peripheral retina. White cell count (WCC) on presentation was 3.7x109/L. Fifteen days following BMT, vision in the left eye deteriorated to perception to light secondary to further vitreous hemorrhage. In the right, he developed cystoid macula edema, reducing vision to 20/70.

Results: The patient was treated with granulocyte-colony-stimulating-factor (G-CSF) which resulted in WCC improving to 4.2x109/L 7 days following treatment. Three weeks following G-CSF, patient underwent left vitrectomy, endo-laser with intravitreal aflibercept injection. Intravitreal ranibizumab injection was performed 12 days prior to left vitrectomy. Seven weeks following treatment, vision in the right improved to 20/30, and the left to 20/25. It is postulated that combination of anemia with thrombocytopenia is implicated in the pathogenesis of proliferative retinopathy secondary to AML.

Conclusions: This case report highlights important and less common complication of proliferative retinopathy secondary to AML. Collaborative management with hematologist is important in managing these patients to achieve a good visual outcome.

Poster No.: EX1-112
Panel No.: 112, Session: EX1
Microglia Protect Photoreceptors from Apoptosis After Experimental Retinal Detachment

*First Author: Quan **YAN***

Purpose: This study aimed to investigate the protection mechanism of microglia in photoreceptors in a rat model of retinal detachment.

Methods: Animal model of RD was created in Wistar rats by subretinal injection of 1% sodium hyaluronate. M-CSF, an activator of microglia, was intravitreally injected to activate microglia in retina in vivo. The rats were randomly divided into 4 groups: normal control group (non-detachment), RD control group, M-CSF group, and M-CSF+RD group. At 3 days after RD, electroretinogram (ERG) was also detected in each group to reveal rats' retinal function. Then, TdT-mediated fluorescein-16-dUTP nick-end labeling (TUNEL) assay was used to stain the apoptosis cells in histological sections. The retinal outer nuclear layer (ONL) thickness was measured to assess retina damage in each group. Meanwhile, Müller cells were detected by immunofluorescence stain, and expression of BDNF was detected using western blotting in each group.

Results: Microglia was activated in retina tissues by intravitreal injection of M-CSF. In M-CSF+RD group, the ratio of TUNEL-positive photoreceptors was significantly decreased than that in RD group ($P < 0.01$). The amplitude of a-wave in M-CSF+RD group was increased than that in RD group ($P < 0.05$). Meanwhile, the ONL thickness in M-CSF+RD group was

thicker than that in RD group. Müller cells were activated in M-CSF+RD group and M-CSF group. The expression of BDNF was increased significantly in M-CSF+RD group than that in RD group (P < 0.001).

Conclusions: Microglia may protect photoreceptors from apoptosis by promoting activation of Müller cells and expression level of BDNF after RD.

Poster No.: EX1-113
Panel No.: 113, Session: EX1
Prognostic Factors and Outcome of Vitrectomy in Advanced Diabetic Eye Disease with Combined Tractional and Rhegmatogenous Retinal Detachment

First Author: Premala Devi ***SIVAGURUNATHAN***
Co-Author(s): Nurul Syahida ***ABDUL WAHAB****, Maizan* ***BINTI YAAKUB****, Nirna Hazeera* ***ZAHAR***

Purpose: To investigate the prognostic factors and outcomes associated with vitrectomy in diabetics having combined tractional and rhegmatogenous retinal detachment (TRD & RRD).

Methods: Ninety-seven eyes of 91 patients who underwent vitrectomy from 2010 until 2018 with at least 6 months follow-up were retrospectively reviewed. Factors associated with good visual and anatomical outcomes were analyzed.

Results: There were 67 females (69.1%) and 30 males (30.9%) with mean age of 50.8 ± 9.3 years. The median duration of postoperative follow up was 18 (range: 6 - 108) months. Preoperatively, 52.6% of patients had vision < 3/60 and at final follow-up, only 41.2% had vision < 3/60. Visual improvement ≥ 2 lines was achieved in 38.1% of patients, while 35.1% had stable vision (± 1 line). The vision worsened in 11.3% of patients, and about 15.5% of them had poor final vision (perception to light [PL] and no perception to light [NPL]). Anatomical success was achieved in 69 patients (71.1%). In multivariate analysis, younger age (P = 0.04), longer postoperative follow up (P = 0.014), preoperative visual acuity ≥ 3/60 (P = 0.008), lower Hba1c levels (P = 0.014), anatomical success (P = 0.007), and 23G vitrectomy (P = 0.016) were associated with final visual outcome of ≥ 3/60. Preoperative anti-vascular endothelial growth factor (VEGF) (P = 0.003) and normal silicone oil (P = 0.012) as opposed to heavy oil were associated with anatomical success.

Conclusions: Vitrectomy in combined TRD & RRD diabetics may be beneficial in younger patients with adequate glucose control and good preoperative vision. Preoperative anti-VEGF and normal silicone oil tamponade improved surgical outcomes.

Poster No.: EX1-114
Panel No.: 114, Session: EX1
Prognostic Factor Analysis in Vitreo-retinal Surgery for Retinal Detachment Attributable to Macular Hole in High Myopia

First Author: Song ***CHEN***

Purpose: To detect the prognostic factors associated with initial reattachment after vitreoretinal surgery for retinal detachment attributable to macular hole (MHRD) in high myopia.

Methods: This study included 85 eyes of 84 patients with MHRD in high myopia (diopter more than -8.0 or axial length more than 26.0 mm). We retrospectively reviewed the medical records and performed univariate analysis to detect the presence of any difference between eyes with a successful initial reattachment and those that failed. We performed multivariate logistic regression analysis to assess the influence of each preoperative factor on initial success.

Results: Success rate of initial reattachment was 83.53%. Postoperative best-corrected visual acuity (BCVA) of 71 eyes with initial success was significantly better than those of 14 eyes with initial failure (P < 0.05); preoperative BCVA was not significantly different (P = 0.43). There were no significant differences noted for other factors such as axial length (P=0.632), use of ILM peeling (P = 0.082), triamcinolone acetonide (P = 0.871), and combined phacoemulsification (P = 0.358). Multiple logistic regression analysis using preoperative factors indicated that

only peripheral retinal break was significantly associated with initial success (odds ratio, 0.694; 95% confidence interval, 1.21 to 18.43; P < 0.05).

Conclusions: Initial reattachment is important for visual prognosis, and peripheral retinal break is a prognostic factor for initial reattachment after vitreoretinal surgery for MHRD in high myopia.

Poster No.: EX1-115
Panel No.: 115, Session: EX1
Results of Scleral Plug Versus Internal Limiting Membrane Stuffing Versus ILM Peeling Alone in the Management of Optic Disc Pit Maculopathy

*First Author: Naresh **KANNAN***
*Co-Author(s): Piyush **KOHLI**, Kim **RAMASAMY***

Purpose: To evaluate long-term outcomes of inverted internal limiting membrane (ILM) or scleral plug (SP) stuffed into optic disc pit for optic disc pit maculopathy (ODP-M) compared with vitrectomy with ILM peeling alone.

Methods: We retrospectively analyzed anatomical and functional outcomes of inverted ILM flap stuffing into ODP (Group 1, n = 7), scleral plug stuffing into ODP (Group 2, n = 8), and ILM peeling alone (Group 3, n = 8) after 12 months. The criterion included post-surgery change in best corrected visual acuity (BCVA), neurosensory detachment (NSD), and central foveal thickness (CFT).

Results: Median BCVA in Group 1 improved from logMAR 0.60 to 0.48 (P = 0.050), while Groups 2 and 3 BCVA did not change, logMAR 0.48 (P = 0.159) and logMAR 0.39 (P = 0.682), respectively. Preoperative CFT in Groups 1, 2, and 3 was 603.7 ± 135.1, 774.6 ± 255.2, and 753.9 ± 204.1, respectively (P = 0.251). The 12-month postoperative CFT in Groups 1, 2, and 3 was 170.9 ± 52.5, 217.2 ± 55.4, and 323.5 ± 171.5, respectively (P = 0.039). Preoperative NSD in Groups 1, 2, and 3 was 302.4 ± 241.8, 526.4 ± 314.8, and 504.8 ± 153.0 respectively (P = 0.190). The 12-month postoperative CFT in Groups 1, 2, and 3 was 0, 20.2 ± 57.3, and 244.5 ± 193.4, respectively (P = 0.003).

Conclusions: Stuffing with either inverted ILM or SP shows faster resolution of maculoschisis than ILM peeling alone. Functional outcome is best in cases of inverted ILM stuffing.

Poster No.: EX1-116
Panel No.: 116, Session: EX1
Retention of Anti-VEGF Drugs in Vitreous Cavity to Reduce Rebleeding After PDR Vitrectomy

*First Author: Jin **YAO***
*Co-Author(s): Su **ZHANG***

Purpose: To observe and evaluate the efficacy and feasibility of anti-VEGF drugs retained in vitreous cavity in reducing rebleeding after vitrectomy performed for PDR patients.

Methods: A retrospective, case-control study was carried out in 35 PDR patients with vitrectomy performed. In the study group, 17 patients (17 eyes) underwent vitrectomy, and lucentis or conbercept 0.05 ml was retained in the vitreous cavity after operation, while 18 patients (18 eyes) in the control group underwent vitrectomy only. The intraocular pressure (IOP), vitreous rebleeding, and retinal position in the 2 groups were observed at 1 week and 1 month after operation.

Results: Seven eyes (38.9%) of patients with vitre-hemorrhage at 1 week, and 5 eyes (27.8%) at 1 month post-operation in the control group. In the study group, there was no vitreous rebleeding after operation. There was a significant difference between the 2 groups (P < 0.05).

Conclusions: The retention of anti-VEGF drugs in vitreous cavity at the end of vitrectomy procedure can significantly reduce the incidence of rebleeding in patients with PDR after vitrectomy. It is one of the feasible methods to prevent rebleeding in PDR patients.

Poster No.: EX1-117
Panel No.: 117, Session: EX1

Retinal Function Assessment by Microperimetry After Internal Limiting Membrane Peeling for Macular Hole Surgery

*First Author: Lijun **SHEN***

Purpose: To evaluate preoperative and postoperative retinal function in patients who underwent surgery for idiopathic macular hole, and the correlations between anatomical and functional changes studied with microperimetry and spectral-domain OCT (SD-OCT) were analyzed.

Methods: This was a retrospective, case series study. Forty eyes of 40 patients with idiopathic macular hole were included in the study. Patients underwent pars plana vitrectomy and peeling of the internal limiting membrane (ILM). Spectral-domain optical coherence tomography (SD-OCT) examination was performed to document macular hole closure. Retinal function was assessed preoperatively and postoperatively over a period of 6 months by best corrected visual acuity (BCVA) measurement (logMAR), MP-3 microperimetry.

Results: Macular hole closure was achieved in all patients. At 6 months, visual acuity were improved postoperatively. Fixation location shifted an average 0.75 deg at 6 months after surgery. Fixation stability improved from an average of 0.45 deg2 before surgery to 0.27 deg2 at 6 months after surgery (P = 0.0093). Mean retinal sensitivity (in dB) in 2 degrees increased from an average of 13.59 ± 5.28 db before surgery to 17.95 ± 5.83 db after surgery (P = 0.028). There were no statistically significant differences in 20 degrees of mean retinal sensitivity (P = 0.566). Postoperative microscotomas were significantly more frequent after ILM peeling in parafovea region (P < 0.001). Postoperative microscotoma was associated with intraoperative nerve fiber layer injury caused by ILM peeling.

Conclusions: Vitrectomy and ILM peeling improves visual acuity and mean macular sensitivity in 2 d at 6 months in patients affected by idiopathic macular hole. However, ILM peeling may reduce retinal sensitivity and significantly increase the incidence of microscotomas in parafovea region.

Poster No.: EX1-118
Panel No.: 118, Session: EX1

Safety and Efficacy of Intravitreal Conbercept Injection After Vitrectomy for the Treatment of Proliferative Diabetic Retinopathy

*First Author: Xinjun **REN***
*Co-Author(s): Xiaorong **LI***

Purpose: The aim of this study was to evaluate the safety and efficacy of intravitreal conbercept (a recombinant fusion protein that primarily targets vascular endothelial growth factors) after vitrectomy for the management of proliferative diabetic retinopathy without tractional retinal detachment (TRD).

Methods: Fifty patients with non-clearing vitreous hemorrhage due to proliferative diabetic retinopathy without TRD were enrolled. They were randomly divided into control and treatment groups (25 eyes to each group) after they provided informed consent. The treatment group received intravitreal conbercept (10 mg/mL, 0.5 mg) immediately after surgery, while the control group did not. The best corrected visual acuity (BCVA) and the central retinal thickness were measured.

Results: There were no significant between-group differences in baseline characteristics (P > 0.05), except in age (P = 0.003). Improvement in BCVA was significantly greater at 1 week, 4 weeks, 12 weeks, and 24 weeks post-surgery in the treatment group than it was in the control group (P < 0.001). There were more cases in the control group that developed recurrent vitreous hemorrhage (VH), but the recurrence rate of VH was not significantly different between the 2 groups at 12 weeks and 24 weeks post-surgery (P = 0.192, P = 0.103). Central retinal thickness was lower in the treatment group than in the control group at 1 week (P = 0.012), 4 weeks (P = 0.01), 12 weeks (P = 0.001), and 24 weeks (P = 0.004) post-surgery, which were statistically significant.

Conclusions: An intravitreal injection of conbercept after vitrectomy improved visual acuity and seemed to reduce the recurrence of vitreous hemorrhage, resulting in a prompt visual recovery in the PDR patients.

Poster No.: EX1-119
Panel No.: 119, Session: EX1
Spectral-domain Optical Coherence Tomography Outcomes of Different Skills in Vitrectomy for Lamellar Macular Holes

*First Author: Zongming **SONG***

Purpose: We aimed to observe the outcomes of new techniques of repair for different types of lamellar macular holes.

Methods: A total of 44 eyes with LMHs underwent pars plana vitrectomy (PPV) to treat LMH. PPV combined ILM peeling was used in 28 eyes with Tractional type, and LHEP flap insertion and autologous blood clot without ILM peeling were used in 16 eyes with degenerative type LMHs.

Results: The closure rate was 100% for Group 1 and Group 2. Patients' mean age was 63.86 ± 14.42, no statistical difference in age, gender, ocular axis, and lens opacity between the 2 groups. The postoperative best corrected visual acuities (BCVA) of all patients were significantly better than the preoperative BCVAs ($t = -4.814$, $P < 0.001$, paired t-test). Initial and final BCVA were not significantly different between the 2 groups. The mean central foveal thickness (CFT) ± SD recovered from 193.67 ± 60.29 mm preoperatively to 226.61 ± 70.49 mm at the final visit postoperatively ($P = 0.146$, paired t-test) for Group 1. The mean CFT± SD recovered from 124.00 ± 36.86 mm preoperatively to 200.1 ± 58.78 mm at the final visit postoperatively ($P = 0.005$, paired t-test) in Group 2. No case developed a full-thickness macular hole in the follow-up.

Conclusions: PV with LHEP flap insertion and ABC technical could improve anatomic and visual outcomes in the treatment of degenerative LMHs, and PPV with ILM peeling could recover tractional type LMHs.

Poster No.: EX1-120
Panel No.: 120, Session: EX1
Surgical and Visual Outcomes of Pars Plana Vitrectomy in Patients of Advanced Diabetic Eye Diseases in Tertiary Eye Hospital in Developing Country

*First Author: Mahmudul **SIDDIQI***

Purpose: We aimed to assess the surgical and visual outcomes of pars plana vitrectomy in patients of advanced diabetic eye diseases in a tertiary eye hospital of Bangladesh.

Methods: A total of 450 patients underwent pars plana vitrectomy in patients of advanced diabetic eye diseases between January 2015 to December 2018 were analyzed.

Results: Out of 450 eyes of 450 patients, the proportion of males 247 (58.88%) were higher than females. Pars plana vitrectomy was performed for tractional retinal detachment (42.22%), persistent vitreous hemorrhage (36.66%), and combined tractional and rhegmatogenous retinal detachment (21.11%), respectively. Preoperative intravitreal injection of Bevacizumab lowered the preoperative and postoperative bleeding, as well as retinal breaks. Postoperative visual results significantly related to initial visual acuity, preoperative retinal breaks, and silicone oil implantation, but not with Bevacizumab.

Conclusions: Pars plana vitrectomy for advanced diabetic eye diseases is a very good option for a stable retina. Poor visual outcome is strictly related to preoperative low vision, preoperative bleeding, retinal tear, silicone oil implantation, and poor glycemic control.

Poster No.: EX1-121
Panel No.: 121, Session: EX1
The Study of Factors Predicting Anatomical Success and Visual Outcome Following Macular Hole Surgery in Thammasat University Hospital

*First Author: Chartchai **WIBHUSANAWIT***

Purpose: To evaluate predictors and outcomes for anatomical success in macular hole surgery.

Methods: This was a retrospective, case-control study of patients diagnosed as macular hole (MH). The preoperative measurement of macular hole diameter using optical coherence tomography (OCT) was performed. All patients underwent standardized macular hole surgery, which was pars plana vitrectomy with internal membrane (ILM) peeling, internal gas tamponade, and postoperative face-down positioning, with at least 3 months postoperative follow-up. The primary outcome measurement was anatomical closure of MH, while secondary outcome measurement was postoperative visual acuity improvement.

Results: Of the 91 eyes operated, anatomical closure of MH was achieved in 59 eyes (64.8%). The median duration of follow-up was 6 months. There was a statistically significant association between stage of MH and anatomical closure of MH ( ), also the size of MH (P = < 0.001). Mean BCVA statistically improved in success anatomical closure group (-0.39 ± 0.41 logMAR ; CI -0.5 - -0.28, P < 0.001)

Conclusions: Stage and size of MH are predictors of anatomical success postoperatively in MH surgery with the chance of patients having better visual outcomes.

Poster No.: EX1-122
Panel No.: 122, Session: EX1
The Analysis of Cytomegalovirus Retinitis-related Retinal Detachment Surgery in Patients of Acquired Immune Deficiency Syndrome

*First Author: Wenjun **KONG***

Purpose: The purpose of this study was to evaluate the vitrectomy results of acquired immune deficiency syndrome (AIDS) patients with retinal detachment (RD) secondary to cytomegalovirus retinitis (CMVR), and describe these functional and anatomical outcomes in China.

Methods: A retrospective analysis of the medical cases of 39 eyes of 37 AIDS patients who underwent retinal reattachment surgery for CMVR associated RD between December 2017 and July 2019 was done in hospital. All patients had an adequate follow-up of at least 12 months.

Results: Anatomical success was achieved in 35 eyes (89.7%). After the silicone oils had taken out, and combined with cataract surgery in necessity, 29 eyes (74.4%) had improvement of 2 or more lines in visual acuity (VA). Favorable functional outcome (vision > 3/60) was achieved in 92.3%. CMVR was inactive in 87.2% of the eyes at time of surgery. CD4+T cell counts in blood were 267 (63, 871) /ul in these patients. All patients occurred rhegmatogenous retinal detachment, 9 eyes (23.1%) incorporated traction retinal detachment. Four eyes (10.3%) that the lesion areas were greater than 50% had re-detachments during 2.7 and 5 months.

Conclusions: Results of these series indicate that patients have excellent anatomic reattachment rates, preservation, or improvement of visual acuity in most cases. If the CMVR involved lesion areas are more than 70%, the re-detachment rate will reduce.

Poster No.: EX1-123
Panel No.: 123, Session: EX1
Therapeutic Effect of Macular Hole Surgery Using Scraping Knife

*First Author: Zhongping **CHEN***

Purpose: To compare the therapeutic effect of scraping knife peeling inner membrane and traditional inner membrane peeling in macular hole surgery.

Methods: This retrospective, non-randomized study included consecutive patients with a macular hole who had undergone surgery by the same physician from January 2019 to May 2019 in our hospital.

Results: We included 38 eyes of 36 patients, 20 in the traditional group (A) and 18 in the scraping knife group (B). The postoperative BCVA (logMAR) of A and B was 0.82 ± 0.24 and 0.66 ± 0.14, respectively, which both lower than those before surgery, and the difference was statistically significant (both P < 0.05). The BCVA in A was lower than that in B, and the difference was statistically significant (P < 0.05).

Postoperative optical coherence tomography (OCT) showed the number of U-shaped closures, V-shaped closures, and W-shaped closures was 12 eyes, 3 eyes, and 3 eyes in A, and it was 15 eyes, 1 eye, and 1 eye in B. There was no significant difference in total closure rate between the two groups (P > 0.05), but the U-shaped closure rate was higher in B than in A, and the difference was statistically significant (P < 0.05).

Conclusions: This study shows that the scraping knife is more effective than the traditional apparatus in macular hole surgery. It can improve visual function recovery and retina repair, which is worth popularizing in the clinic.

Poster No.: EX1-124
Panel No.: 124, Session: EX1

To Evaluate the Surgical Outcome of Epi-retinal Membrane Surgery

*First Author: Pawan **MAHAT***
*Co-Author(s): Sanyam **BAJIMAYA**, Govinda **PAUDYAL**, Eli **PRADHAN**, Sanjita **SHARMA**, Raba **THAPA***

Purpose: We aimed to evaluate the outcome of vitreoretinal surgery in epiretinal membrane.

Methods: We retrospectively reviewed the medical records of patients who underwent vitreoretinal surgery in Tilganga Institute of Ophthalmology for epiretinal membrane and completed at least 3 months follow-up from April 2018 to June 2019. The patients' pre- and postoperative best corrected visual acuity, slit-lamp examination findings, and optical coherence tomography (OCT) images were evaluated

Results: Thirteen eyes of 12 patients (3 male, 9 female) with mean age group of 58.38 ± 13.370 (29 - 76) years were included in the study. Three cases were pseudophakic, 10 cases were phakic, out of which 7 had combined surgery (pars plana vitrectomy with phacoemulsification and foldable lens implantation) and 3 had consecutive surgery (pars plana vitrectomy followed by cataract surgery). The mean baseline best corrected visual acuity in logMAR was 0.78 ± 0.188, which improved to 0.50 ± 0.507 at 3 months follow-up (P - 0.113). OCT parameters showed improvement in 12 eyes, while 1 eye developed inferior retinal detachment. Six eyes had postoperative rise in IOP (>20 mm Hg) which were managed with topical anti-glaucoma medication.

Conclusions: Pars plana vitrectomy with membrane peeling is a safe and effective measure in restoring VA in patients with ERM. Though the study population was small with a short duration of follow-up, results are encouraging. A further prospective, large, multi-centered study is needed to determine the effectiveness of ERM surgery.

Poster No.: EX1-125
Panel No.: 125, Session: EX1

Total Cost, Functional and Anatomical Outcome Following Pars Plana Vitrectomy (PPV) in Advanced Diabetic Eye Disease (ADED) Patients

*First Author: Wan Dien **TAI***
*Co-Author(s): Anhar **ANHAR**, Nor Fadzillah **ABD JALIL**, Kyaw Soe **HTOO**, Ang **JEAT***

Purpose: To estimate the cost of each PPV. To compare the relationship between time, duration of diagnosis till operation date (TDTO), and the functional/anatomical outcome.

Methods: Retrospective study.

Results: Sample size included 96 patients with 106 eyes, those with tractional retinal detachment (TRD), or combined TRD with rhegmatogenous retinal detachment (RRD), with or without vitreous hemorrhage (VH). The total cost of each ADED patients underwent vitrectomy surgery ranged from USD603.68 to USD1192.27, with a mean of USD851.62. When comparing TDTO and visual outcome, TDTO were categorized into 3 groups: <3 months, 3-6 months, and >6 months. The visual outcomes were categorized into 5 groups, that are worsened, same, improved by 1 line, improved by 2 lines, and improved by 3 lines or more based on the Snellen chart 6 months post-operation. The results were calculated with Fisher's Exact test using the SPSS version 12.0. The p-value is 0.423, which is insignificant. When comparing the TDTO with anatomical outcomes, the anatomical outcomes were

divided into 2 groups, that are flat retina and re-detached retina 6 months post-operation. The data collected showed 100 percent flat retina, hence the comparison is unnecessary.

Conclusions: The average cost for each PPV is USD851.62 which is one third higher than the mean monthly salary (USD700.76) of paid employees in Malaysia. From this study, there is no association between TDTO and the functional outcome. Preoperative factors that can be taken into consideration are the preoperative visual acuity, detachment involvement of macula, and presence of VH for future studies.

E-POSTERS

Eye Trauma, Emergencies & Infections

A Case of Subretinal Parasite

*First Author: Simanta **KHADKA***
*Co-Author(s): Raghunandan **BYANJU**, Sangita **PRADHAN***

Purpose: Parasitic infections of the eyes are a major cause of ocular disease across the globe. Filarial and filarial-like nematodes top the list of the nematodes that affect the eye. We reported an unusual encounter of a live subretinal worm.

Methods: A rare case of a live subretinal worm was reported in a 25-year-old, apparently healthy young male. The case presented with unilateral loss of vision and floaters in front of the affected eye. Upon examination, a live subfoveal worm was identified with continuous wriggling movements and diffuse retinal edema. The worm was removed surgically and sent for parasitological examination.

Results: The worm was identified microscopically as Loa Loa. However, detailed histopathological examination could not be incorporated. The patient's vision improved to 6/12 from the initial presentation of 3/60 after 3 months follow-up.

Conclusions: The rare subretinal live worm presents a challenge in management. The management depends upon the location and viability of the parasite. Surgical management is aimed at worm removal and vision preservation.

A Case Report of Traumatic Bacillus Cereus Endophthalmitis with Drug Resistance

*First Author: Xinyu **ZHANG***

Purpose: To report a case of traumatic Bacillus cereus endophthalmitis with drug resistance.

Methods: We reported a case of a 57-year-old male with the Bacillus cereus infection in his right eye. His right eye was injured by a flying object while digging, with the symptoms of vision loss and eye pain for 2 days after injury. The visual acuity and intraocular pressure of his right eye was light perception and Tn+2 respectively before surgery. The methods of operation are pars plana vitrectomy, intracapsular cataract extraction, foreign body removal, silicone oil tamponade, peripheral iriotomy, and cornea suture. The vitreous body was collected for bacterial cultivation and drug-sensitive test with the result of Bacillus cereus infection, which is resistant to vancomycin, penicillin G, cefotaxime, ceftriaxone, cefepime, bacterium and sensitive to meropenem, gentamicin, ciprofloxacin, erythrocin, and linezolid.

Results: After surgery, the patient was placed on Ciprofloxacin by intravenous injection, intraocular pressure-lowering medication, and antibiotic eyedrops.

Conclusions: The Bacillus cereus is a kind of Gram-positive bacteria commonly distributed in soil and food, which is not often resistant to vancomycin and cefotaxime. We reported a case of traumatic Bacillus cereus endophthalmitis with vancomycin and cefotaxime resistance. The antibiotics selection in the clinical treatment of infectious endophthalmitis should be based on microorganism cultivation and drug-sensitive test.

Antimicrobial Blue Light Therapy for Infectious Keratitis: Ex Vivo and In Vivo Studies

*First Author: Hong **ZHU***
*Co-Author(s): Tianhong **DAI**, Xiaodong **SUN**, Quan **YAN***

Purpose: To investigate the effectiveness of antimicrobial blue light (aBL) as an alternative or adjunctive therapeutic for infectious keratitis.

Methods: We developed an ex vivo rabbit model and an in vivo mouse model of infectious keratitis. A bioluminescent strain of Pseudomonas aeruginosa was used as the

causative pathogen, allowing noninvasive monitoring of the extent of infection in real-time via bioluminescence imaging. Quantitation of bacterial luminescence was correlated to colony forming units (CFU). Using the ex vivo and in vivo models, the effectiveness of aBL (415-nm) for the treatment of keratitis was evaluated as a function of radiant exposure when aBL was delivered at 6 or 24 h after bacterial inoculation. The aBL exposures calculated to reach the retina were compared to the ANSI standards to estimate aBL retinal safety.

Results: Pseudomonas aeruginosa keratitis fully developed in both the ex vivo and in vivo models at 24 h post-inoculation. Bacterial luminescence in the infected corneas correlated linearly to CFU (R2 = 0.921). Bacterial burden in the infected corneas was rapidly and significantly reduced (> 2-log10) both ex vivo and in vivo after a single exposure of aBL. Recurrence of infection was observed in the aBL-treated mice at 24 h after aBL exposure. The aBL toxicity to the retina is largely dependent on the aBL transmission of the cornea.

Conclusions: aBL is a potential alternative or adjunctive therapeutic for infectious keratitis. Further studies of corneal and retinal safety using large animal models, of which the ocular anatomies are similar to that of humans, are warranted.

Clinical Features and Surgical Outcomes of Pediatric Vitrectomy Patients in Southwest of China

*First Author: Nan **WU***
*Co-Author(s): Yong **LIU***

Purpose: Ocular trauma is one of the major threats of monocular blindness in children. The purpose of the study was to investigate the epidemiology, clinical characteristics, and surgical outcomes of pediatric vitrectomy patients in southwest of China.

Methods: The medical records of all patients with ocular trauma under 12 years old receiving three-port pars plana vitrectomy (PPV) in Southwest Eye Hospital from January 2007 to December 2017 were retrospectively analyzed in this study. Data records included age, gender, cause, type and time of injury, initial and final visual acuity (VA), type and times of operation.

Results: This study included 122 eyes of 122 pediatric patients over a 11-year period. The mean age was 6.6 ± 3.2 years with a male-to-female ratio of 4.3:1. There were 100 (82%) open globe injuries (OGI) and 22 (18%) closed globe injuries. Of the open globe injuries, penetrating injury caused by sharp metal objects accounted for the highest percentage (70%). PPV could significantly improve VA in children with ocular trauma ($P < 0.01$). In addition, the successful rate of PPV was not related with the age ($P = 0.23$) but significantly associated with intraocular tamponade ($P < 0.05$).

Conclusions: The most common predisposing factor of pediatric ocular trauma in southwest of China was sharp metal objects resulting in penetrating injury. In our study, gas tamponade for vitrectomy had the highest successful rate, followed by balanced salt solution (BSS) and silicone oil. Unlike the age and injury classification, the preoperative VA was a solid prognostic indicator of postoperative vision.

Comparative Outcomes of Primary Vitrectomy Versus Tap and Inject for Endophthalmitis Following Phacoemulsification Cataract Surgery

*First Author: Niall **CROSBY***
*Co-Author(s): William **CUNNINGHAM**, Eugene **MICHAEL**, Philip **POLKINGHORNE**, Sarah **WELCH**, Mark **WESTCOTT***

Purpose: To compare functional and anatomical outcomes, rates of culture positivity, and number of procedures in eyes with endophthalmitis following phacoemulsification surgery, treated with either primary vitrectomy and intravitreal antibiotics (PV) or vitreous tap and antibiotic injection (T&I).

Methods: Patients developing endophthalmitis after phacoemulsification surgery between

2007 and 2016 were identified. Visual acuity (VA), anatomic outcomes, culture results, and the number of procedures relating to the endophthalmitis were compared.

Results: Forty-one patients were identified. A total of 19 patients had a PV, and 22 underwent T&I. Presenting VAs were strongly predictive of post-treatment VAs (P = 0.001), but culture positivity was not (P = 0.22). There was a significant improvement in VA after T&I (P = 0.003) and PV (P = 0.00005). The median improvement in VA was significantly greater for the PV group than for the T&I group (P = 0.024). 68% of eyes were culture positive with T&I, and 63% with PV (P = 0.74). Two eyes that were negative with T&I were subsequently positive with a vitrectomy 24 hours later. Five cases that were culture positive with a T&I and underwent a vitrectomy 24 hours later were still positive at the second biopsy. The T&I group underwent a mean of 2.3 procedures each, and the PV group underwent 1.5 (P = 0.03).

Conclusions: Eyes with endophthalmitis treated with PV demonstrated a greater improvement in VA and needed fewer procedures than those treated with an initial T&I. Viable bacteria were only seen at a subsequent procedure in the T&I group, indicating that PV was superior at sterilizing the eye.

Intraocular Foreign Body (IOFB) Masquerading as Uveitis (Case Report Presentation)

First Author: Ruchi ***SHRESTHA***

Purpose: IOFB may masquerade as uveitis for years.

Methods: A 24–year-old male came with complaints of blurring of vision in left eye for 1 and a half years, associated with flashes and floaters for 1 week. He was treated as a case of intermediate uveitis for 1 and a half years with oral and topical steroids. He was diagnosed as a case of IOFB when he was referred to a retina clinic on the basis of clinical findings of a corneal scar and defect in iris. On indirect ophthalmoscopy, brightness scan, and computed tomography scan, the IOFB was confirmed. His best corrected visual acuity (BCVA) at presentation was 6/6 in right eye and 6/24 in left eye.

Results: He underwent pars plana vitrectomy, IOFB removal, endolaser, and silicone oil insertion in left eye. His BCVA in LE after silicone oil removal was 6/12.

Conclusions: IOFB may masquerade as intermediate uveitis. The most sensitive tool to diagnose an IOFB is computed tomography scan. IOFBs should be removed as early as possible to prevent complications of endophthalmitis, retinal detachment, proliferative vitreoretinopathies, and siderosis bulbi.

Propionibacterium Acnes Endophthalmitis Following Repeated Non-standard Intravitreal Injections

First Author: Haixiang ***HUANG***

Purpose: We reported a case of a 24-year-old woman with macular edema to central retinal vein occlusion (CRVO) who developed Propionibacterium acnes endophthalmitis following repeated nonstandard intravitreal injections (IVIs).

Methods: A 24-year-old woman developed CRVO with macular edema due to oral contraceptives, and endophthalmitis occurred after repeated nonstandard IVIs of anti–vascular endothelial growth factor agents in right eye. Symptoms were characterized by decreased visual acuity in the right eye, and signs were conjunctival hyperemia, inflammatory reaction in anterior chamber, vitreous agglomerated gray-white substance adhesion on the posterior capsule of the lens, and distorted expansion of retinal vein with macular edema.

Results: The pathogen detection by aqueous humor showed that the gene of Propionibacterium acnes was positive, but local and systemic antibiotics were not sensitive. After treatment with pars plana vitrectomy, combined with anti-VEGF and oral hormone therapy, the visual acuity improved and the

condition was stable. Similar cases were not reported before.

Conclusions: IVIs is a routine surgery of ophthalmologists, which should strictly follow the surgical disinfection and standard to avoid iatrogenic intraocular infection. The etiological diagnosis of endophthalmitis is very important for prognosis, which means it's necessary to do auxiliary examinations as soon as possible, such as PCR test of aqueous humor, culture of vitreous fluid, and sensitivity test for drug use to make a clear diagnosis and timely treatment.

Short Synthetic Self-assemble Peptide Amphiphiles for Endophthalmitis Treatment

*First Author: Hong **WU***
*Co-Author(s): Songtian **CHE**, Ning **HAN**, Zaoxia **LIU**, Guanfang **SU**, Xiaomeng **ZHANG***

Purpose: Endophthalmitis is a severe sight-threatening inflammation of the inner chambers of the eye, typically caused by bacterial or fungal infections in the intraocular fluids (vitreous and aqueous). With the growing threat of antimicrobial resistance, there is an urgent need to develop new classes of antimicrobial agents that can combat these activities, and excellent biocompatibilities are desirable candidates for the treatment of this infection. In recent years, antimicrobial peptides (AMPs) have received considerable attention as potent and broad-spectrum antimicrobial agents with the potential to overcome antibiotics resistance, AMPs eradicate both bacteria and fungi. We developed a series of short synthetic self-assemble peptide amphiphilic with excellent antimicrobial activities and selectivities against various clinically relevant microorganisms, including Gram-positive, Gram-negative bacteria and fungi.

Methods: In order to investigate the potential application of the peptides in endophthalmitis treatment, endophthalmitis model was established in a rabbit. The applications of synthetic peptides were evaluated for in vivo endophthalmitis treatment in comparison with the commercially available amphotericin B.

Results: It was found that the designed peptides were safe, and as effective as the clinically used drug. Compared to the costly and unstable amphotericin B, our peptides were water-soluble, less expensive, stable, effectively clear Fungi biofilm, and treated endophthalmitis in rabbit. Compared to the blank control group, 90% less fungal cells were found in the treated rabbit endophthalmitis group. These results clearly demonstrated that peptides effectively eradicated fungal biofilm and prevented endophthalmitis in rabbit eyes.

Conclusions: The peptides are presented as promising candidates for the treatment of fungal endophthalmitis.

Unilateral Metastatic Endophthalmitis Due to Staphylococcus Epidermidis with Dental Caries: A Case Report

*First Author: Jianan **DUAN***
*Co-Author(s): Meixia **ZHANG***

Purpose: Endophthalmitis means bacterial or fungal infection inside the eye involving the vitreous and/or aqueous humors. It could be divided into exogenous or endogenous, and the latter one is less common. We described a case of a 68-year-old man who had the symptoms of lacrimation of the right eye for 3 days and visual loss for 15 hours. Twenty years ago, his left eye was hit by scrap iron and underwent anti-glaucoma surgery in the right eye. Traffic accident caused injury to his left eye 14 years ago. One month ago, he was diagnosed with dental caries in a local hospital. Ocular examination showed hyperemia of conjunctiva, keratic precipitates, aqueous flare, aniridia, lens opacity, and subluxation of lens in the right eye and corneal macula in the left eye. His best corrected visual acuity (BCVA) was hand motion (HM) in both eyes. We diagnosed him metastatic endophthalmitis and conducted a surgery of vitrectomy and anterior chamber irrigation in the right eye. Due to the drinking history before visiting our hospital, he was treated with clindamycin and dexamethasone before the surgery. The cultivation of bacteria indicated Staphylococcus epidermidis, and he received intravenous dripping with vancomycin

after the operation. A week after the surgery, his BCVA of right eye was 0.2 and HM in the left eye.

Methods: Case report

Results: Clinical features, fundus photographs, bacterial culture are reported.

Conclusions: Timely diagnosis of endogenous endophthalmitis is very important when a patient's eyesight suddenly declines, and even dental caries can cause it. Prompt symptomatic treatment and surgery are important for the prognosis.

Intraocular Inflammation, Uveitis & Scleritis

A Case-reported Study: Are Mumps Deadly? Macular Retinitis in Mumps

*First Author: Withawat **SAPTHANAKORN***
*Co-Author(s): Atchara **AMPHONPHRUET**, Kornkan **JITSOPIT***

Purpose: To report ocular complications of mumps.

Methods: Case report

Results: We reported a 14-year-old Laos boy's history of mumps infection, presenting with blurry vision in both eyes. Visual acuity was 20/50 and 20/70. Fundus showed no vitreous cell, and macular retinitis in both eyes with secondary very large macular hole from severe necrosis of outer and inner retinal layer around macular. Anterior segment examination was normal in both eyes. His laboratory finding confirmed Mump IgM was high titer positive and IgG was also positive. PCR of vitreous were undetected for all other organisms including bacteria and virus. He was empirically treated with intravenous acyclovir during the pending investigation and then oral prednosolone. After treatment, visual acuity was 20/100, 20/50. Fundus revealed atrophic macular with a spontaneously closed macular hole from fibrovascular healing.

Conclusions: In the era of proper education of vaccinations, Mumps or Parotid gland infection has been lost in the world, but still sometimes occurs in a middle-income country or developing country.

Acute EBV Retinitis After Allogenetic Hematopoieic Stem Cell Transplantation: A Case Report

*First Author: Ziwei **LI***
*Co-Author(s): Yan **CUI**, Long **SHI***

Purpose: To report a special viral retinitis case and introduce the identification method of infected intraocular virus.

Methods: Xin x, male, 21 years old, who was admitted to hematology department due to paroxysmal nocturnal hemoglobinuria. After allogeneic hematopoietic stem cell transplantation, MTX, G-CSF, and TPO was prescribed. One month after transplantation, he got EBV, CMV hyperlipidemia, and meningitis encephalitis. Two months later, he felt blurred vision in the left eye. The ophthalmic examination showed vitreous opacities, retinal edema, and bleeding and exudation in superficial temporal retina, Retinal artery became narrow with a white coating. Suspected diagnosed with CMV retinitis, and ganciclovir was given. Three days later, the retinitis involved area expanded, including the macular area. The acuity decreased rapidly to HM / 10 cm. Vitrectomy was performed with silicone oil tamponade. Intraoperative vitreous humor was examined by real-time PCR. EBV-DNA 6.80E+06 copy / ml in vitreous, whereas EBV-DNA < 5000 in blood.

Results: The diagnosis was EBV retinitis. The postoperative visual acuity maintained at HM / 10 cm, and retinitis lesions were not expanded. Ten days later, aqueous humor was tested for CMV and EBV with negative results.

Conclusions: The clinical features of viral retinitis vary according to the different infections. The virus can only exist in the eye, and low in the blood. It's difficult for antiviral drugs to remove an intraocular virus. Vitreoretinal surgery is an effective method. TORCH, Real-time PCR for virus of aqueous humor and vitreous humor can identify the

infected virus and monitor the therapeutic effect.

Bilateral Acute Retinal Necrosis

*First Author: Min **ZHOU***
*Co-Author(s): Rui **JIANG**, Boya **LEI**, Gezhi **XU***

Purpose: To investigate the clinical characteristics and visual outcomes of bilateral acute retinal necrosis (BARN).

Methods: The study included 31 patients (62 eyes) who were diagnosed with BARN. The medical records were reviewed.

Results: Twenty-six patients developed the disease in the contralateral eye within 5 months and 5 patients at > 2 years after the initial onset. At presentation, 15 of 22 eyes suffered from retinal necrosis of more than 180° in the initially affected eye, whereas 3 of 23 eyes suffered it in the later-affected eye. Retinal detachment occurred in 24 of the 28 initially affected eyes and in 5 of the 28 later-affected eyes. The mean logMAR best corrected visual acuity decreased from 2.1 ± 1.0 (Snellen equivalent counting fingers) to 2.2 ± 1.0 (Snellen equivalent counting fingers) in the initially affected eyes after a follow-up of 33.4 ± 48.4 months (P = 0.615), and improved from 0.5 ± 0.4 (Snellen equivalent 20/66) to 0.3 ± 0.4 (Snellen equivalent 20/40) in the later-affected eyes after a follow-up of 20.9 ± 23.0 months (P = 0.003).

Conclusions: BARN usually occurs in the contralateral eye within a few months, but sometimes after several years. Inflammation and retinal necrosis are less severe in the later-affected eye, with less retinal detachment and a better visual outcome.

Clinical Manifestations and Diagnosis of Eales Disease Complicated by Tuberculosis Infection

*First Author: Jizhu **LI***

Purpose: To describe clinical manifestations and diagnostic approaches in Eales disease complicated by tuberculosis infection.

Methods: Retrospective review of patients with Eales disease complicated by tuberculosis infection between 2017 and 2019. All patients were received and treated by the same ophthalmic expert. The mean follow-up time was 15 months.

Results: Three patients received pars plana vitrectomy due to vitreous hemorrhage. All patients achieved remission by their final visit.

Conclusions: Recurrent vasculitis and vitreous hemorrhage in children should raise the suspicion of Eales disease, and concurrent infection of TB should get more attention.

Diagnosis and Differential Diagnosis of Vitritis

*First Author: Junjie **YE***

Purpose: To investigate the diagnosis and differential diagnosis of vitritis with different etiologies.

Methods: A total of 65 eyes with vitritis were included in this study, including 20 eyes with acute retinal necrosis, 20 eyes with bacterial endophthalmitis, 15 eyes with fungal endophthalmitis and 6 eyes with intraocular lymphoma. Another 4 eyes were undiagnosed. Clinical data of all the eyes was recorded for best corrected visual acuity, slit lamp and dilated fundus examination, color fundus image, and B-scan ultrasound. The undiagnosed 4 eyes with severe vitritis and invisible fundus underwent diagnostic vitrectomy, and the vitreous specimens were analyzed for etiology with PCR, GWC (Goldmann-Witmer coefficient), Gram staining, acid-fast staining, fungal smear, bacterial culture and drug sensitivity test, pathological and cytological examination, cytokine and gene rearrangement.

Results: Vitreous opacities of different etiologies differed from each other with characteristic manifestations. B-scan ultrasound revealed inflammatory vitreous opacities in ARN, homogenous pyogenic opacities in bacterial endophthalmitis, membranous opacities in fungal endophthalmitis, and clustered or flaky opacities in intraocular

lymphoma. Etiological analysis showed 3 of the 4 eyes that underwent diagnostic vitrectomy were infected with varicella zoster virus (VZV), burkholderia and Candida albicans, respectively. The other patient was diagnosed with intraocular lymphoma based on pathological study, flow cytometry, and gene rearrangement.

Conclusions: Vitritis with different etiologies show their characteristic manifestations of vitreous opacities, especially in B-scan ultrasound examination, which can assist the clinical diagnosis. Diagnostic vitrectomy is an effective method for accurate diagnosis, and is important for etiological therapy which can improve the treatment efficacy.

Exorbitism, Eye Redness, Peripheral Retinal and Ciliary Body Mass in a Middle-aged Man: A Case Report of Ciliary Body Tubercle

*First Author: Bing **LI***
*Co-Author(s): Junjie **YE***

Purpose: To report a case of tuberculosis infection in the ciliary body till now and its diagnosis and management.

Methods: A 45-year-old male presented with exorbitism, red eye, and blurred vision. Fundus examination and ultrasound biomicroscopy showed local temporal periretinal and ciliary body lesion. He was treated as panuveitis with steroid pulse therapy in another medical center, but no improvement was acquired.

Results: He reported a past medical history of tuberculosis (TB) infection without standard treatment. The results of tuberculin skin test (TST) and interferon gamma release assay (IGRA) were strong positive. We gave the diagnosis with a ciliary body tubercle. After standard trigeminal anti-TB therapy, the lesion on the ciliary body was apparently resolved.

Conclusions: Ciliary body tubercle could occur without other systemic tuberculosis. It could mimic idiopathic panuveitis or sclerosis because of its insidious and chronic pathogenic process. If patients with a previous infection of TB present local sclerosis and a ciliary body mass extended to the periretina, this diagnosis is strongly prompted. A standard regimen of diagnostic anti-TB treatment is preferable, as a non-invasive intervention in such cases with supportive history, positive immunological TB tests, and clinical findings.

Multimodal Imaging in Patients with Acute Posterior Multifocal Placoid Pigment Epitheliopathy (APMPPE)

*First Author: Kanwaljeet **MADAN***

Purpose: APMPPE is characterized by whitish yellow plaques at the level of retinal pigment epithelium (RPE) with indistinct margins. Primary site of involvement in this disease is RPE or choriocapillaris, remains controversial. The aim of this study was to describe the features of multimodal imaging, which provide novel insights in pathogenesis of APMPPE.

Methods: A total of 32 eyes of 22 patients with APMPPE were recruited in the study. Mean age was 37.13 years. Mean follow-up period was 4.04 months. Spectral domain optical coherence tomography (SD-OCT), angio-OCT (OCTA), fundus fluorescein angiography (FFA), indocyanine green angiography (ICGA), and fundus autofluorescence (FAF) were done in all patients on initial presentation. Non-invasive procedures (SD-OCT, OCTA, FAF) were repeated at each visit.

Results: On FFA, in acute phase, active lesions demonstrated hypofluorescence in early phase with staining in late phases. On resolution of the disease, the inactive lesions showed hyperfluorescence. On ICG, active lesions showed hypocyanescence in early and late phases. On SD-OCT, in active disease, the placoid lesions appear as prominent, dome-shaped elevations of the ellipsoid zone with hyper-reflective material and subretinal fluid accumulation. During resolution phase, the dome-shaped lesions flatten and subretinal fluid decreases. FAF presented with hypoautofluorescence in the acute phase. After resolution, lesions may demonstrate hyperautofluorescence but often the hypoautofluorescence persists. OCTA showed focal areas of hypoperfusion at the level of

choriocapillaris in active disease which resolved later.

Conclusions: Multimodal imaging proves that APMPPE has primary inciting pathology in choriocapillaris. OCTA may provide a non-invasive biomarker in choroidal inflammatory pathologies and response to treatment.

Optic Neuritis Complicating Herpes Zoster Ophthalmicus in an Immunocompetent Adult

*First Author: Wan Dien **TAI***
*Co-Author(s): Anhar **ANHAR**, Raja Norliza **RAJA OMAR***

Purpose: To report a case of isolated optic neuritis following herpes zoster ophthalmicus.

Methods: Case report

Results: A 48-year-old lady who was treated with shingles over the right ophthalmic division of the trigeminal nerve presented with sudden, painless, central blurring of vision in her right eye. Despite being on oral acyclovir for 10 days, her visual symptoms did not subside. Further ophthalmic examination revealed a visual acuity of 6/36 and 6/12 in right and left eye, respectively. A grade 3 relative afferent pupillary defect was present in the right eye. Anterior segment examination was unremarkable. Fundus examination showed hyperemic swollen disc with normal retinal vasculature on the right eye and normal left eye fundus. Prompt treatment with oral acyclovir and tapering dose of oral prednisolone over 3 months led to improvement of her visual acuity and resolving optic disc edema.

Conclusions: Herpes zoster ophthalmicus (HZO) is an inflammation related to reactivation of the latent varicella zoster virus, involving the ophthalmic branch of the trigeminal nerve. Optic neuritis is a rare ocular complication following HZO. This HZO case uniquely demonstrated as an isolated optic neuritis with mild anterior segment involvement. Prompt treatment with both acyclovir and corticosteroids should be started for a better visual prognosis.

Progress in Systemic Treatments of Inflammatory Eye Diseases

*First Author: Yuqing **ZHANG***
*Co-Author(s): Zhou **QIONG***

Purpose: We want to develop a safe and effective system in therapy for patients with inflammatory eye disease.

Methods: We described the etiology of inflammatory eye diseases, considering the current evidence for the treatment of inflammatory eye diseases, especially uveitis. Reviewing the history of systemic therapies of inflammatory eye diseases, reviewing treatments of inflammatory eye diseases, highlighting the prospects of eye inflammation.

Results: The use of some new immunosuppressive agents and biological agents improved the therapeutic effect of inflammatory eye diseases.

Conclusions: Although there are challenges, these are encouraging, as we seek to develop a safe and effective system in therapy for patients with inflammatory eye disease.

Treatment Outcomes in Eales Disease with Vitreous Hemorrhage at Tertiary Center in Southern Thailand

*First Author: Thada **TANTISARASART***
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Purpose: To compare the anatomical and functional outcomes of Eales disease patient with vitreous hemorrhage after pars plana vitrectomy and conservative treatment.

Methods: A retrospective chart review of 32 eyes in 28 patients diagnosed with Eales disease with vitreous hemorrhage that underwent pars plana vitrectomy (PPV) and conservative treatment at a tertiary center in southern Thailand between January 1, 2003 and December 31, 2017 were conducted.

Results: Anatomical success rate of 15 eyes that underwent PPV was 86.7%, and of 17 eyes that had conservative treatment had lower anatomical success rate which was 64%. The mean final logarithm of the minimum angle of

resolution (logMAR) best corrected visual acuity (BCVA) in the PPV group was 0.25 ± 0.28 which had no significant difference compared to the conservative group (0.13 ± 0.17). Recurrence of vitreous hemorrhage occurred approximately 24% in the conservative group and 20% in the PPV. The earliest recurrent time was within a month, and the latest was 96 months.

Conclusions: Majority of Eales disease with vitreous hemorrhage which underwent either vitrectomy or conservative treatment had relatively good anatomical and functional outcomes, with the exception of those who had complications such as retinal detachment or neovascular glaucoma. Although pars plana vitrectomy offered better speed of disappearance of vitreous hemorrhage and visual improvement than conservative treatment, it unfortunately aggravated 52.9% of cataract progression. Nevertheless, after cataract extraction was performed, there were eventually no significant differences in final BCVA between these two groups. Finally, the recurrent time of vitreous hemorrhage in this disease was quite diverse. Therefore, regular long-term follow-up is necessary.

Ultra-wide Field Fundus Imaging of Acute Retinal Necrosis: Clinical Characteristics and Visual Significance

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Purpose: To investigate the clinical characteristics of acute retinal necrosis (ARN) with ultra-wide-field imaging (UWFI) and analyze their visual significance.

Methods: Clinical and UWFI records of patients diagnosed with ARN at a single center over 2 years were reviewed.

Results: In 38 eyes of 35 patients, the clinical manifestations of ARN on UWFI included patchy (12 eyes) or fan-shaped necrotic lesions (26 eyes), retinal arterial obliteration (38 eyes), vitritis (38 eyes), retinal venous hemorrhage (19 eyes), and vitreous hemorrhage (6 eyes). Retinal detachment was associated with the number of retinal quadrants involved (β = 2.145, P = 0.005). LogMAR BCVA at last follow-up was associated with logMAR BCVA at presentation (β = 0.473, P = 0.004) and retinal detachment (β = 0.367, P = 0.020).

Conclusions: UWFI is useful for detecting retinal lesions in ARN, especially peripheral lesions or through opaque media, and provides valuable information concerning visual prognosis.

Uveitis Mimickers: Masquerades of the Masquerade

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Purpose: To evaluate the profile of patients who were erroneously referred to the uveitis clinic of a tertiary care eye hospital in North India with the diagnosis of some form of uveitis by non-uveitis experts.

Methods: This was a retrospective observational study in which hospital records of patients referred to the uveitis clinic of a tertiary care eye center in North India, between June 2011 and September 2014, were reviewed.

Results: Records of 2,460 patients were analyzed. A total of 122 patients (4.96%) were wrongly labeled as uveitis. Diagnosis was revised on the basis of clinical examination, fundus photography, fundus autofluorescence, fluorescein angiography, visual fields, etc. Of these, 12.3% were children aged less than 18 years. Amongst children, the most common misdiagnosis was trauma (26.7%), rhegmatogenous retinal detachment (RRD) (20%), and pigment dispersion syndrome (PDS) (13.3%). Amongst adults, the most common misdiagnosis was RRD (14%), trauma (12.2%), PDS (5.6%), retinal vein occlusion, and pingeculitis (4.7% each).

Conclusions: It is important to be aware of these disorders which can mimic uveitis, thus leading to accurate diagnosis, minimizing unnecessary investigations and over-treatment of such patients.

Neuroscience, Stem Cells & Regenerative Medicine

A Novel GPR143 Mutation in a Chinese Family with X-linked Ocular Albinism Type 1

*First Author: Xuhui **GAO***

Purpose: To analyze the clinical features of the genotypes in ocular albinism type 1 (OA1) family and to determine the disease-causing mutation.

Methods: A total of 18 members of a family (9 patients and 9 normal subjects) in Hainan Province, China, were recruited to the present study in December 2017. A detailed clinical ophthalmic examination was performed for all participants. Patients also underwent a visual acuity test, anterior segment slit lamp examination, eye fundus examination, and optical coherence tomography. Their clinical phenotype data were then analyzed. Mutations in G protein-coupled receptor 143 (GPR143) were determined by DNA sequencing assays and multiplex polymerase chain reaction assays for deletions, including all exon coding sequences, exon 5'- and 3'-end and the non-coding region sequences of intron splicing in the GPR143 gene.

Results: A total of 9 patients in the family were males with disease occurrence at the age of 0-6 months. All patients presented different degrees of iris depigmentation, horizontal jerk nystagmus, foveal hypoplasia, and reduced visual acuity. Only fundus of one patient exhibited choroid coloboma. In the remaining patients, their fundi exhibited different degrees of irregular retinal depigmentation. The mutation c.360+5G>T in the GPR143 gene was identified in this family.

Conclusions: The present study revealed the splicing mutation c.360+5G>T in the GPR143 gene in a Chinese OA1 family and successfully identified the site. To the best of our knowledge, there have been no reports of this mutation in any major genome databases. This outcome has enriched the mutation spectrum of the GPR143 gene.

Bioinformatics Analysis of Aberrantly Methylated-differentially Expressed Genes and Pathways in AMD

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Purpose: Age-related macular degeneration (AMD) represents the leading cause of visual impairment in the aging population. The goal of the study was to identify aberrantly methylated-differentially expressed genes (MDEGs) in AMD and to explore the potential pathways by integrated bioinformatic analysis.

Methods: The data of expression profiling and methylation profiling were obtained from GEO database. We analyzed the differentially methylated genes and differentially expressed genes using the in R software. Functional enrichment analysis in GO, KEGG, and protein–protein interaction (PPI) network analysis of screened genes were performed, respectively. The hub genes were identified by Cytoscape software. The Molecular Complex Detection (MCODE) algorithm was used to screen modules.

Results: We categorized 153 genes as hypermethylated, low-expression genes (Hyper-LGs), and 24 genes as hypomethylated, high-expression genes (Hypo-HGs). We screened four Hyper-LGs (CKB, PPP3CA, TGFB2, and SOCS2) overlapped with potential AMD risk genes in PHGKB. KEGG pathway enrichment analysis implied the Hypo-HGs were enriched in calcium signaling pathway, and the Hyper-LGs were enriched in sphingolipid metabolism. In Go, the Hypo-HGs were enriched in the biological process (BP) of fibroblast migration; cell component (CC) of membrane raft, membrane microdomain; molecular function (MF) of coenzyme binding. The Hyper-LGs were enriched in BP of mRNA transport; CC of nuclear speck; MF of DNA binding. A total of 23 nodes and 2 edges were established from the Hypo-HGs, and 151 nodes and 73 edges were established from the Hyper-LGs.

Conclusions: This study indicated possible aberrantly MDEGs and pathways in AMD,

which could improve the understanding of the underlying molecular mechanisms.

Cav-1 Regulates Retinal Microglia Phenotype in Acute Ocular Hypertension Injury Model

*First Author: Zhang **WEI***

Purpose: To investigate the effect of Cav-1 on AOH induced retinal microglia phenotype changes.

Methods: C57BL/6 mice, normal group treated with nothing, experimental group and control group were intravitreal injected exogenous Cav-1 (Cavtratin) and AP 2μl respectively. After 4 hours, the AOH model was established. After 3 days, the retina wholemount and cryosection immunofluorescence staining was performed. The number of retinal microglia were observed and the microglia M1 and M2 polarized markers were observed by immunofluorescence staining and Q-RCR.

Results: The number of microglia in AP group was significantly increased, while in Cavtratin group it was significantly decreased. In the retinal section, more retinal microglia cells were observed in the AP group in inner plexiform layer than in the Cavtratin group. In the outer plexiform layer, the number of retinal microglia in the Cavtratin group increased than that in the AP group. The expression of CD16/32 and Iba1 in the AP group was significantly increased over that in the Cavtratin group, while the expression of CD206 and Iba1 in the Cavtratin group was significantly increased than that in the AP group. The expression of IL-1β, iNOS, and IL-6 mRNA in Cavtratin group was significantly decreased after AOH injury was established. At the same time, the expression of Arg-1, CCL2, and IL-10 mRNA in Cavtratin group was significantly increased over that in AP group.

Conclusions: Cav-1 facilitated the transformation of microglia from the M1 polarized phenotype to the M2 polarized phenotype, which may be the cellular mechanism of Cav-1 neuroprotection in the AOH model.

Effects of IKK-β Inhibitor IMD-0354 on Diabetic Retinopathy in Streptozocin-treated Mice

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Purpose: To investigate the effect of selective IKK-β inhibition by IMD-0354 toward onset and progression of diabetic retinopathy (DR).

Methods: A 6-week administration of streptozotocin (STZ) to mice, in which DR became evident, was systemically administered with IMD-0354 (30 mg/kg) daily for 6 weeks. Alternatively, 10-week STZ injected mice with DR already progressive was administered IMD-0354 for 2 weeks. As controls, nondiabetic mice of the same age were treated with IMD-0354 for 6 weeks, and diabetic mice were treated with 10 μL of dimethyl sulfoxide (DMSO) for 6 weeks. Using these groups, (1) inhibition of nuclear factor-κB (NF-κB) 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 were analyzed.

Results: Systemic administration of IMD-0354 for 6 weeks to before onset of STZ-induced DR (week-6) caused 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-κB 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.

Conclusions: Our present data revealed that NF-κB activation is the pivotal step in the onset and progression of DR. Thus, its suppression by IMD-0354 may be a promising therapeutic strategy for the early stages of DR.

Expression Levels of Aqueous Humor Cytokines and Associations with Disease Severity in Coats Disease

*First Author: Tingyi **LIANG***
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Purpose: To investigate the expression levels of aqueous humour cytokines and analyze their associations with disease severity in Coats disease.

Methods: Aqueous humour samples were collected in 38 patients (38 eyes) with Coats disease and 10 age-matched control patients (16 eyes) with congenital cataracts. Concentrations of 22 cytokines including angiogenic, proinflammatory, and vasopermeability cytokines in aqueous humour were assessed through Cytometric Bead Array (CBA) technology. Clinical features in patients with Coats disease were also recorded for analysis.

Results: The aqueous humour expression levels of VEGF, IL-4, IL-6, IL-8, IL-12, MIP-1α, IP-10, MCP-1, RANTES, VCAM-1, ICAM-1 and G-CSF in Coats disease group were significantly higher than control group ($P < 0.001$, < 0.001, < 0.001, < 0.001, 0.006, < 0.001, < 0.001, < 0.001, 0.021, <0.001, <0.001, and <0.001), in which IL-8, MIP-1α concentrations showed a significant positive correlation with VEGF concentration ($r = 0.391$, $P = 0.015$; $r = 0.497$, $P = 0.001$). The aqueous humour expression levels of VEGF, IL-8, MIP-1α and G-CSF were significantly positively correlated with the extent of retinal exudation ($r = 0.483$, $P = 0.002$; $r = 0.559$, $P < 0.001$; $r = 0.675$, $P < 0.001$; $r = 0.389$, $P = 0.016$), and the aqueous humour expression levels of VEGF, IL-8, MIP-1α and G-CSF were significantly positively correlated with the extent of exudative retinal detachment ($r = 0.508$, $P = 0.001$; $r = 0.713$, $P < 0.001$; $r = 0.455$, $P = 0.004$; $r = 0.367$, $P = 0.023$; $r = 0.559$, $P < 0.001$).

Conclusions: The high expression levels of angiogenic and proinflammatory cytokines in aqueous humour may correlate with the severity of Coats disease.

The Changes of Sympathetic and Parasympathetic Neuronal Factors or Related Enzymes in Diabetic Choroid

*First Author: Yuanjun **QIN***
*Co-Author(s): Xufang **SUN***

Purpose: We sought to find out whether there is a change of neuronal function or structure in diabetic choroidapathy.

Methods: Eight diabetic (4 persons, all male) and 24 healthy (12 persons, 8 male and 4 female) donated eyeballs were involved in this research. C57 wild type mice received streptozotocin (STZ) a intraperitoneal injection (50 mg/kg/d, 5d) to build diabetes disease models. Tyrosine hydroxylase (TH)/ dopamine β-hydroxylase (DBH) / neuronal nitric oxide synthase (nNOS)/ vasoactive intestinal peptide (VIP)/ choline acetyl transferase (ChAT)/ neuropeptide Y (NPY)/ vesicular monoamine transporter II (VMAT-2)/ vesicular acetylcholine transporter (VAChT)/ calcitonin gene-related peptide (CGRP)/Synaptophysin expression levels were measured with immunofluorescence and Western blot at 6 months after STZ injection.

Results: Some nerve factors enzymes (DBH, TH, NPY) were decreased both in diabetic patients and mouse models' choroid. By contrast, VMAT-2, VAChT, ChAT, and VIP were increased in diabetic human choroid, as well as the mouse models. CGRP, considered as a sensory nerve factor, was increased in the diabetic human, while it was decreased in the diabetic mouse TG. We also observed that the ultrastructure of nerve fibers were destroyed in the diabetic mice choroid, such as myelinated fibers with axonal atrophy and loose myelin sheaths.

Conclusions: In diabetic choroid, the neuronal factors and related enzymes were changed. It may influence the blood flow of choroid, which supply the nutrient and oxygen of rod cells and cone cells, and promote the progress of diabetic retinopathy. This may be a potential target to prevent the progress of diabetic retinopathy.

Ocular Imaging

A Supramaximal Vortex Vein in the Margin of the Optic Disc

*First Author: Yu **ZHANG***
*Co-Author(s): Xinyi **LI***

Purpose: To show a supramaximal vortex vein in the margin of the optic disc.

Methods: Indocyanine green angiography

Results: A 30-year-old myopic woman presented with the complaint of a vision loss after being injured in the left eye at our outpatient clinic one day. She was a high myope with no other significant ocular history. The refractive error was -9 D sphere in both eyes. Fundus examination was normal in the right eye. Examination of the left eye revealed an ill-defined yellow lesion and hemorrhage located in macular. There were no changes in the surrounding retina. Fluorescein angiography demonstrated early patchy hyperfluorescence with gradual pooling of dye and enhancement of the hyperfluorescence in the macular lesion. The retinal filling time was generally normal, and there was no obviously abnormal fluorescence in the optic disc. The indocyanine green angiography exhibited a large number of tortuous choroidal veins were collected to the temporal edge of the optic disc from the temporal and nasal fundus. These veins with spider-like appearance assembled into one large trunk and constricted slightly to form the ampulla. The vortex vein drained into the margin of the optic disc and penetrated the sclera. The ICGA displayed an area of hypofluorescent, corresponding to the lesion on clinical examination.

Conclusions: Vortex veins are the venous drainage system of the choroid. In normal eyes, 4 to 8 vortex veins are found in the region of the equator. Vortex veins can be easily visualized in patients who have a thin retina in myopic subjects. Fewer vortex veins drained into the margin of the optic nerve head.

Application Effects of Daytona Pre-examination in Optimizing Ophthalmology Outpatient Process

*First Author: Zhaotao **ZHOU***

Purpose: To research the effect of Daytona pre-examination in optimizing the ophthalmology outpatient process.

Methods: Included study subjects for March 2019 to April 2019 were 200 outpatient first-visit patients with fixed ophthalmologists. Using a prospective randomized control study to divide subjects into the experimental group and control groups, each including 100 patients. The control group conducts the conventional treatment process, which is registration, examination of visual acuity, optometry, slit lamp examination, special examination (Daytona), and return to the clinic for diagnosis and treatment. The experimental group optimizes the eye treatment process, which is registration, examination of visual acuity, optometry, special examination, and return to the clinic for diagnosis and treatment. Study the total time of the first visit patients, the patients' visit time at different outpatient levels, patients' satisfaction, and special examination waiting time (Daytona). The measurement data and numeration data were statistically analyzed with t-test and $\chi 2$ test, respectively. The difference was statistically significant, with $P < 0.05$.

Results: Compared to the control group, the total visit time of the first visit patients was shorter. If the outpatient number was over 50 people, the shortening of time is more obvious, and the waiting time for special examination (Daytona) was shortened. The satisfaction of patients in the experimental group was significantly higher ($P < 0.05$).

Conclusions: Daytona pre-examination can optimize the ophthalmic consultation process, effectively improve patients' satisfaction, shorten the total visit time of the first visit patients, and shorten the waiting time of Daytona in the special examination department.

Application of Optical Coherence Tomography Angiography in Diabetic Retinopathy

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Purpose: Diabetic retinopathy (DR) is one of the most common and most important microvascular complications in diabetes and an important blind eye disease in adults. In the early stage of diabetes, the retina can successfully adapt to the changes of systemic metabolism. When the lesion continues to develop, inconsistency between supply and demand of oxygen and nutrition in the retina leads to homeostasis imbalance, which leads to the damage of retinal vascular microstructure. Optical coherence tomography angiography (OCTA) can display the fundus vascular network noninvasively, clearly, and quickly, and reflect the corresponding fundus anatomical structure at the same time, and OCTA can quantitatively analyze the vascular density and blood flow index.

Methods: Review

Results: OCTA can display the morphology and structure of the foveal avascular zone (FAZ) intuitively and clearly. OCTA can also display retinal and choroid capillary networks in layers and quantify the blood flow density in macular area. With the progress of retinopathy, the area of FAZ increased in the early stage of diabetes mellitus. And the degree of capillary occlusion and non-perfusion in macular area was more serious. The blood flow density of superficial and deep retinal macular decreased in DR patients, and the blood flow density decreased more significantly with the aggravation of DR.

Conclusions: Before the early DR such as fundus microaneurysm was clearly found by ophthalmoscope, the microvascular changes in macular area could be observed by OCTA, which could be used as an important means for early screening and intervention of DR, and was helpful to evaluate the condition and development of DR.

Comparison of Choriocapillary Flow Density Between Contralateral Eyes of Polypoidal Choroidal Vasculopathy and Neovascular Age-related Macular Degeneration Using Spectral Domain Optical Coherence Tomography Angiography

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Purpose: To compare the choriocapillary flow density (CFD) among the contralateral eyes of polypoidal choroidal vasculopathy (PCV), neovascular age-related macular degeneration (nAMD), and healthy controls with spectral-domain optical coherence angiography tomography (SD-OCTA).

Methods: This was a cross-sectional study. A total of 36 eyes of 36 PCV patients, 35 eyes of nAMD patients, and 34 control eyes were included. All patients underwent the HD Angio Retina 6.0 mm scan pattern of OCTA (RTVue XR Avanti AngioVue; Optovue, Inc., Fremont, CA, USA). Circles with radius of 1.00, 1.50, and 3.00 mm were manually selected in choriocapillaries (CC) slab, and CFD was calculated as the percentage of flow area to the whole selected area as CFD-1.00, 1.50, 3.00 respectively. Multivariate linear regression analysis was performed to evaluate the differences of CFD among the 3 groups after adjusting for age, gender, and the existence of drusen.

Results: Mean CFD-1.00, 1.50, 3.00 of nAMD group were 61.09, 62.65, and 65.67, significantly lower than PCV group (65.80, 66.75, 67.86, P = 0.000, 0.000, 0.022) and control (66.17, 66.45, 68.08, P = 0.000, 0.001, 0.025), while no difference were detected between PCV group and control (P = 0.507, 0.798, 0.575).

Conclusions: CFD of contralateral eyes of nAMD patients were significantly lower than that of PCV patients and healthy eyes, while no difference was detected between PCV contralateral eyes and control, indicating different pathogenesis of nAMD and PCV.

Comparison of Optical Coherence Tomography Angiography Microvascular Findings Between Macular Telangiectasia Type 2 and Tamoxifen Retinopathy

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Purpose: To evaluate the retinal microvascular changes using optical coherence tomography angiography (OCTA) in patients with macular telangiectasia type 2 (MacTel2) and to compare these changes with findings of tamoxifen retinopathy (TR).

Methods: OCTA images of 33 eyes of 20 patients diagnosed as MacTel2 and 26 eyes of 15 patients with TR were obtained and follow-up periods were recorded. Angiovue imaging system was used to quantify morphology and foveal vascular density (FVD) and parafoveal vascular density (PFVD) of retinal capillaries in the 3 x 3 mm central macular region.

Results: The mean age of Mactel2 patients and TR patients was 64.4 ± 11.5 and 59.0 ± 8.7, respectively (P = 0.056). In Mactel2 group, 17 eyes (51.5%) showed only intraretinal cavitation, and 16 eyes (48.5%) showed disruption of ellipsoid zone as well on OCT, whereas in TR group, 16 eyes (61.5%) and 10 eyes (38.5%), respectively (P = 0.441). The temporal quadrant of deep PFVD was significantly lower in patients with MacTel2 than that of the TR patients (50.23% vs 54.03%, P = 0.031). After a mean follow-up of 10 months (range 5 - 19), there was a significant reduction of FVD of superficial capillary plexus, and also significant increase of PFVD of deep capillary plexus in Mactel2 (Mactel2 vs TR; -4.46% vs -0.03%, 3.37% vs -2.15%, respectively, all P < 0.05), related to dilated and disorganized capillary network in deep capillary plexus as the disease progression.

Conclusions: OCTA findings could be important for understanding the differences in pathology and disease progression between Mactel2 and tamoxifen retinopathy and providing better follow-up.

Effect of Optical Media Opacities on Quantitative Measurement of OCTA

*First Author: Haoyu **CHEN***

Purpose: Optical coherence tomography angiography (OCTA) provides not only visualization but also quantitative measurement of retinal and choroidal vasculature. Opacity of optical media is common in elderly subjects with cataracts. The purpose of this study was to analyze the impact of optical media opacities on quantitative measurement of OCTA.

Methods: In 31 eyes of 31 healthy subjects, spectral-domain OCTA (ZEISS Cirrus 5000) images were acquired from the macula by using 3*3 mm^2 mode. Optical opacities were simulated with neutral-density (ND) filters. The same examiner scanned the subjects without filter and with the filters (80%, 60%, 53%, 42%, 33% light transmittance) placed in front of the eye. The superficial capillary map images were analyzed using inbuild software. Signal score, vessel density, and foveal avascular zone (FAZ) area were then collected. The correlation between the parameters and transmittances was analyzed.

Results: With the decrease of light transmittance, signal score and vessel density decreased (r = 0.577 and r = 0.548 respectively, both P < 0.01), while FAZ area increased (r = 0.304, P < 0.01). When the light transmittance was 42%, vessel density decreased 13.3 ± 3.3%, signal score decreased 1.93 ± 0.28, and FAZ increased 13.7 ± 5.4% (all P < 0.05).

Conclusions: OCTA quantitative measurement of vessel density and FAZ area are influenced by image degradation by optical media opacities. Caution must be taken when interpreting the OCTA quantitative measurement results in patients with optical media opacities.

Enhanced Depth Imaging OCT of Combined Hamartoma of Retina and Retinal Pigment Epithelium

*First Author: Yongyue **SU***

Purpose: To describe the image features of combined hamartoma of retina and retinal pigment epithelium (CHRRPE).

Methods: Case report

Results: A 35-year-old man suffered from deterioration of visual acuity in his left eye associated with black shadows for 3 years. His visual acuity of the affected eye was 2/10. Histories of trauma and systemic diseases were all denied. On examination, contracted yellowish-white retinal mass with retinal vascular traction was seen in the peripapillary and macular areas. Enhanced depth imaging OCT showed both mini- (sawtooth pattern) and maxi-peaks (retina folded pattern) of full-thickness thickened, disorganized retina with vitreoretinal traction. Fundus fluorescein angiography demonstrated blockage of choroidal fluorescence by the outer pigmented portion of the lesion. Tortuosity of vessels within the lesion was prominent in the arterial phase. There was subtle late staining within the lesion.

Conclusions: Enhanced depth imaging optical coherence tomography of CHRRPE revealed epiretinal membrane with vitreoretinal traction in a sawtooth (mini-peak) or folded (maxi-peak) pattern. By using EDI-OCT in this patient, we could obtain detailed tumor characteristics, which may be helpful in the diagnosis and management of CHRRPE.

Evaluation of Aurora Fundus Camera Performance in Diabetic Retinopathy Screening by Ophthalmologist Grader and Visual Artificial Intelligence

*First Author: Shang **RUAN***

Purpose: To evaluate the image quality as well as specificity and sensitivity of diabetic retinopathy screening by Aurora camera in comparison to traditional tabletop cameras, and to explore the possibility of using Aurora combined with Phoebus DR algorithm system in DR screening.

Methods: Patients were enrolled from 3 centers. Fundus images were transferred to the grading center for remote digital grading by 3 masked retina specialists. DR screening results of patients were graded by the ophthalmologist or AI with Aurora and tabletop cameras.

Results: A total of 630 eyes from 315 subjects were included. In non-mydriatic condition, images taken by Aurora had better quality ($P < 0.001$), while no significant differences were observed in mydriatic condition ($P > 0.05$). For Aurora+AI screening, the sensitivity and specificity for referral was 0.882 and 0.407.

Conclusions: Aurora could acquire fundus images with comparable quality with traditional tabletop cameras with higher applicability and convenience in non-mydriatic situations. DR algorithm-based automatic image grading to Aurora camera offers the potential for further improvements of screening programs.

Neovascularization Detected with Optical Coherence Tomography Angiography in Fellow Eye with Unilateral Retinal Angiomatous Proliferation

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Purpose: To detect the early phase of neovascularization in fellow eye with unilateral retinal angiomatous proliferation (RAP) using optical coherence tomography angiography (OCTA).

Methods: Seven eyes of 7 patients (1 man, 6 women; average age, 80.4 years) with unilateral RAP during the follow-up were examined at the early phase of neovascularization using OCTA (RTVue XR Avanti, Optovue Inc., Fremont, CA). In all patients, an OCTA acquisition scanning area of 3 x 3 mm was used that included the area of the lesion. In 4 eyes, OCTA was also examined before the onset of neovascularization. The occurrence of neovascularization was defined to detect the intraretinal fluid in swept-source

OCT (DRI-OCT, Topcon, Japan). The slabs of deep capillary plexus (DCP) and outer retina (OR) were analyzed, respectively.

Results: Neovascularization at the occurrence was observed only at the DCP in 1 eye, and at the DCP and OR in 6 eyes. OCTA was obtained in 4 eyes before a mean of 3.7 months of onset. In 3 out of 4 eyes, blood flow information suggesting NV had already observed at DCP and OR.

Conclusions: OCTA was able to detect NV at the onset in all eyes. And it was also possible to visualize NV at the very early stage before onset. OCTA is useful to detect the early lesions of RAP.

Optical Coherence Tomography Angiography of Optic Disc Vessel Density in Eyes with Silicone Oil Tamponade

*First Author: Fang **WANG***

Purpose: To investigate optic disc vessel density by optical coherence tomography angiography (OCTA) in patients with successful retinal detachment surgery with silicone oil tamponade.

Methods: A prospective, cross-sectional study was performed that included 15 eyes receiving silicone oil endotamponade with RRD, and 12 eyes after silicone oil removal. OCTA images of optic disc were obtained at 1 week, 1 month, and 3 months after silicone oil tamponade or silicone oil removal. Parameters analyzed included vessel density (VD) provided for the whole scan image (WI VD); inside the optic boundary (ID VD); and the peripapillary region (PR VD). Healthy fellow eyes served as the control.

Results: One week after surgery, OCTA WI VD value in silicone oil-filled eyes began to decrease, which was significantly lower than that of the fellow eyes (45.46 ± 3.37 vs 47.86 ± 2.31, P = 0.021). Three months after silicone oil filling, WI VD (45.15 ± 3.24 vs 48.57 ± 2.85), PR VD (46.85 ± 4.75 vs 50.77 ± 4.01) were significantly lower in silicone oil-filled eyes as compared with the fellow eyes (both P < 0.05). After the silicone oil was removed from the eyes, both the WI VD and PR VD values did not improve substantially, and these values were significantly lower compared with the fellow eyes during follow-up (all P < 0.05).

Conclusions: Decreased vessel density parameters of optic disc were identified using OCTA in eyes receiving silicone oil endotamponade. OCTA may potentially become a useful tool for the management of eyes with silicone oil tamponade.

Prediction of Visual Function Using Deep Learning from Ultra-wide Field Color and Autofluorescence Fundus Images in Retinitis Pigmentosa

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Purpose: We evaluated the accuracy of predicting visual function using deep learning (DL) from ultrawide-field fundus color (UWF-FC) and ultrawide-field autofluorescence fundus (UWF-FAF) images in retinitis pigmentosa (RP).

Methods: We used the 248 UWF-FC and UWF-FAF images, obtained from RP patients. Three types of fundus image combinations (UWF-FC image only, UWF-FAF image only, and both UWF-FC and UWF-FAF images) were used to predict visual function. The trained model was diverted from the Neural Network structure and verified by the K-Fold cross-validation (K = 5). The trained model predicted values of logMAR best corrected visual acuity (logMAR BCVA), mean deviation (MD), pattern standard deviation (PSD), and mean retinal sensitivity of central 4 (CENT 4) and 12 points (CENT 12) in Humphrey Field Analyzer 10-2 program. Additionally, we compared actual values with predicted values.

Results: The actual mean values are -0.299 (logMAR BCVA), -15.6 (MD), 6.30 (PSD), 24.2 (CENT 4), 22.7 (CENT 12). The predicted mean values (UWF-FC image only, UWF-FAF image only, and both UWF-FC and UWF-FAF images) are -0.282, -0.273, -0.262 (logMAR BCVA), -15.4, -15.1, -15.6 (MD), 5.87, 6.20, 6.26 (PSD),

23.9, 24.1, 23.8 (CENT 4), 22.2, 23.0, and 22.4 (CENT 12), respectively. The correlation coefficient between the actual and predicted values from the UWF-FC, UWF-FAF, and both UWF-FC and UWF-FAF images was 0.262, 0.407, 0.506 (logMAR BCVA), 0.623, 0.787, 0.778 (MD), 0.225, 0.555, 0.500 (PSD), 0.468, 0.752, 0.705 (CENT4), 0.575, 0.761, and 0.775 (CENT12), respectively (all $P < 0.001$).

Conclusions: DL model could predict visual function from UWF-FC and UWF-FAF images in eyes with RP.

Retinal Layer Characteristics on SD-OCT as Predictors of Postoperative Visual Outcome in Idiopathic Epiretinal Membrane Surgery

*First Author: Rachel **YIU***
*Co-Author(s): Nicholas **FUNG**, Wai Ching **LAM***

Purpose: The purpose of this study was to evaluate whether the morphological and thickness-related characteristics of retinal layers at the fovea detected by spectral-domain optical coherence tomography (SD-OCT) are correlated with visual outcome after epiretinal membrane (ERM) removal by pars plana vitrectomy (PPV) with internal limiting membrane peeling.

Methods: Fifty-four eyes of 54 consecutive patients with idiopathic ERM who had a preoperative visual acuity of ≤ 20/40 who underwent PPV for ERM removal were included in this retrospective study. Patients with full-thickness macular hole, diabetic retinopathy, and retinal detachment were excluded. Ophthalmic evaluations included best corrected visual acuity (BCVA), whole central foveal thickness (CFT), inner CFT and outer CFT, defined in Fig.1a, before and after (6 months) surgery. Multiple logistic regression analysis was performed to identify independent predictors of postoperative visual outcome.

Results: Postoperative BCVA was positively correlated with preoperative BCVA ($P < 0.0001$), whereas a smaller postoperative (6 month) outer CFT was positively correlated with BCVA improvement by at least 2 lines ($P = .037$). Preoperative outer CFT ($P = .004$) and disorganization of retinal layers (Fig.1b) ($P = .019$) were identified preoperative predictors of postoperative outer CFT.

Conclusions: Preoperative larger outer CFT and presence of disorganized retinal layers were identified as predictors of postoperative visual acuity improvement in eyes with idiopathic ERM.

The Application of Optical Coherence Tomography Angiography (OCTA) in the Diagnosis of Diabetic Retinopathy (DR)

*First Author: Muye **LI***
*Co-Author(s): Xuedong **ZHANG***

Purpose: To review the basic principle of OCTA and its clinical applications in diabetic retinopathy.

Methods: This article summarized the literature from the last 5 years, and introduced the clinical application of OCTA in diabetic retinopathy from 5 aspects, such as foveal avascular zone (FAZ), microaneurysms (Mas), retinal vascular density (RVD), retinal neovascularization (RNV), and so on.

Results: OCTA can observe the morphology of blood vessels in all stages of diabetic retinopathy, including foveal avascular zone, microaneurysms, retinal vascular density, retinal neovascularization, and so on. It can be used as a supplement to FFA to observe and track the fundus of diabetic patients without diabetic retinopathy (DWR). Because there is no fluorescein leakage in OCTA, FAZ images in OCTA can quantify FAZ area and can be followed up to monitor abnormal changes of FAZ. Besides, It was found that the detection rate of the microaneurysm was less in OCTA than that in FFA, but the imaging was clearer. RVD is inversely proportional to the severity of diabetic retinopathy.

Conclusions: Understanding OCT angiography features of DR lesions with a different course of the disease may provide a reference value for the diagnosis and treatment of DR.

Ocular Oncology & Pathology

A Case of Giant Melanocytoma of the Optic Disc

*First Author: Xu **QIU***

Purpose: A case of giant melanocytoma of the optic disc was reported

Methods: A 19-year-old Asian male presented for an eye exam complaining of blurry vision O.D. for approximately 19 years. At his last eye exam 1.5 months before, he was told there was "something" in the back of his right eye. He denied a history of ocular surgery or vision therapy. Best corrected visual acuity (BCVA) was 1.0 in both eyes. On routine fundus examination, an elevated pigmented lesion was found, involving the optic nerve head of the right eye. B-scan ultrasound demonstrated a mass arising from ONH. FFA revealed blocked fluorescence corresponding to pigmented mass. The diameter of the tumor was about 5 optic disc diameter, accompanied by a corresponding visual field defect.

Results: This was an extremely rare giant optic disc melanoma. When the patient was testing his vision, it was discovered by accident that he had suffered a corresponding defect in his field of vision for many years.

Conclusions: Melanocytoma of the optic disc is a benign tumor that rarely causes visual impairment. However, visual acuity may be impaired by several mechanisms, such as tumor necrosis, progressive enlargement, and associated rare tumor-related complications. It is important to follow up every case with melanocytoma of the optic disc for as long as possible. This case was very rare because of the giant tumor, which had a diameter of about 5 optic disc diameter. We will focus on the size and development of the tumor and the visual field defect.

A Case Report of Clinically Suspected Primary Vitreo-retinal Lymphoma

*First Author: Liu **LING***
*Co-Author(s): Jianping **ZHANG**, Zhang **MEIXIA***

Purpose: To report a case of a female patient with clinically suspected primary vitreoretinal lymphoma (PVRL).

Methods: A 44-year-old woman presented with a 2-year history of decreased vision in her left eye and 1 month history in the right eye. She had previously been diagnosed with uveitis, retinal pigment epitheliopathy, and vitreous opacity, subsequently treated with corticosteroids and vitrectomy in her left eye. However, the vision decreased again, and even in the right eye. Slit lamp examination showed mild inflammation in anterior segment, and white to orange lesion in retinal. Fundus fluorescein angiography (FAA) showed hyperfluorescence in the early stage and fluorescein leakage later. Optical coherence tomography (OCT) shows retinal structural disorder. Pre-transfusion test, serum immunological examination, and head computed tomography (CT) were negative. No enlarged superficial lymph node could be found. The ratio of interleukin-10 (IL-10): interleukin-6 (IL-6) is 3.72, and the quantity of IL-10 is 707.4 pg/ml in aqueous humor of left eye, which can't exclude diffuse large B-cell lymphoma (DLBL). Both eyes then received diagnostic intravitreal methotrexate injections.

Results: The visual acuity improved respectively from 0.5 to 0.7 in right eye and hand move to count fingers within 10 cm in left.

Conclusions: PVRL is a fatal ocular tumor with a challenging diagnosis, which requires invasive procedures for tissue diagnosis as it often masquerades as chronic uveitis. In this case, we couldn't get tissue for pathology since the patient had already gotten a vitrectomy. Ocular ratio of IL/10:IL-6, IL-10 levels, and diagnostic medicine may play an important role in diagnosing PVRL when tissue can't be obtained.

Adenoid Cystic Carcinoma of the Orbital Apex Under the Ocular Trauma

*First Author: Wang **LING***
*Co-Author(s): Hui **YANG***

Purpose: To report a case of metastatic adenoid cystic carcinoma of orbital apex with right blunt ocular trauma.

Methods: Case report

Results: A 25-year-old woman had visual impairment for half a year after the right eye was injured by a rock shot blown off by firecrackers, and had recurrent mild pain in the right frontotemporal region for 5 months. Once she was diagnosed as traumatic glaucoma, and intraocular tension was controlled within normal range after drug treatment. When she first visited our clinical, the vision of the right eye was 0.12 and the vision of the left eye was 1.0. Visual field and VEP in the right eye was abnormal. MRI in the other hospital suggested a high probability of right orbital apical optic schwannoma. However, pathology of external biopsy showed adenoid cystic carcinoma of orbital apex. After chemoradiotherapy in other hospitals: the visual field and vision was significantly improved.

Conclusions: This case reports right blunt ocular trauma with metastatic adenoid cystic carcinoma of the orbital apex of the right hard palate. When trauma does not explain the progressive decline in monocular function after trauma, the condition should be re-examined in other ways.

A Case Report: Extraction of a Posterior Choroidal Melanoma Involving Fovea via Vitrectomy

*First Author: Xingrong **WANG***
*Co-Author(s): Shuya **WANG***

Purpose: Vitrectomy and endoresection is an alternative to enucleation for the treatment of posterior malignant choroidal melanoma. And this kind of surgical management may offer the best hope of conserving vision in some patients. However, the concerns regarding iatrogenic tumor cell dissemination should not be neglected. So, we've been searching for a new way to avoid the intraocular dissemination while reducing the devastating level to minima.

Methods: In this case, the posterior choroidal melanoma is 9 disc diameters in width and localized right beneath the macula. In the surgery, a 23-gauge pars plana vitrectomy was performed, and the retina of the macular region was cut open with electrocoagulator and dissociated and flipped over with vitrectomy probe. After wiping off the superficial RPE of the melanoma, and exposing the Bruch's membrane, the operator separated the melanoma from the choroidal membrane integrally with the bimanual technique. Then enlarged the sclera incision and increased intraocular pressure to 100 mm Hg and extracted the tumor from the sclera incision. Laser was applied 2 mm around the tumor margins, as well as on the tumor bed to destroy possible malignant residual cells. And retina reattachment and silicone oil tamponade was performed.

Results: At a 6-month follow-up visit, no evidence of local recurrence or metastatic spread was present and the best corrected visual acuity was 0.1.

Conclusions: In this case, we provided a new idea of removing the posterior malignant choroidal melanoma instead of enucleation an endoresection.

Optic Nerve Glioma: A Rare Case Study

*First Author: Udbuddha **DUTTA***

Purpose: To evaluate a 5-year-old boy with painless progressive enlargement of the left eye for the past year. He also complained of a loss of vision in the left eye.

Methods: Study Design: Case Study Duration of Study: 1 year The patient was evaluated over 1 year, and investigations were carried out as deemed necessary. Investigations: Slit lamp biomicroscopy with 90D Volk lens was done for anterior and posterior segment examination. Gonioscopy, applanation tonometry, automated

perimetry, and indirect ophthalmoscopy were done. CT and MRI of the orbit was also carried out.

Results: Presenting visual acuity was absence of light perception in the left eye and the proptosis was measured of 25 mm, which was in the downward and outward direction. A relative afferent pupillary defect was noticed in the left eye and extraocular movements were restricted superiorly and medially. Funduscopy of the left eye revealed a pale disc, blurring of the disc margins and presence of optociliary shunt vessels. CT scan of the left eye showed a fusiform optic nerve swelling. MRI showed a fairly large fusiform swelling in the left optic nerve, pressure effect on ocular bulb with proptosis, and no extension of the lesion in the optic canal. This was consistent with the diagnosis of optic nerve glioma.

Conclusions: Optic nerve glioma is an important cause of unilateral proptosis in children. Early diagnosis is mandatory and management should involve a multidisciplinary approach.

Retinal Hamartoma Masquerading as Disc Edema

*First Author: Sherine **DSOUZA***
*Co-Author(s): Jivitesh **SINGH***

Purpose: To highlight a unique ocular manifestation of tuberous sclerosis complex (TSC), where retinal hamartoma can mimic as optic disc edema.

Methods: A 22-year-old female presented with diffuse headaches, with a frequency of 2 to 3 per week for a period of 2 years. It was not associated with aura, variation with change in posture and vomiting episodes. Vision was recorded to be 20/20 on Snellen's Visual acuity chart in both eyes. Fundus examination revealed blurred nasal borders of the optic disc in right eye. On general physical examination, she had papules of firm consistency on her nose and nasolabial folds, which were present since early childhood. Her right lower limb had a depigmented patch since childhood.

Results: In ocular examination the anterior segment examination showed a clear cornea with quite anterior chamber and a clear lens. Optical coherence tomography (OCT) of the optic disc in right eye was performed which revealed hamartoma arising from the NFL layer. Whitish yellow lesions of non-specific shape and sharp margins were seen in the left eye in periphery. MRI brain was done which revealed cortical and sub-cortical tubers with radial migration bands in cerebral hemispheres.

Conclusions: Retinal hamartomas of optic disc in TSC can present as disc edema, which can be observed. Subcortical tubers seen on the MRI can be the cause of repeated headaches, which were present in our patient. TSC can also manifest as seizures and epilepsy which is usually resistant to anti-epileptic drugs

The Circulating Level of IFNϒ in Patients with Age-related Macular Degeneration (AMD) in Yogyakarta: Characteristics to Disease Activity

*First Author: Ayudha Bahana Ilham **PERDAMAIAN***
*Co-Author(s): Anindita **DIANRATRI**, Nurida **KHASANAH**, Supanji **SUPANJI***

Purpose: To investigate the IFN-ϒ profiles in plasma of exudative AMD.

Methods: In this cross-sectional study, blood plasma samples from 16 AMD patients and 23 age-matched were collected. Samples were examined for inflammatory cytokines (IFN-ϒ) using a commercially available ELISA. Acquired data were log-transformed to normalize the outlier prior student T-test (SPSS software).

Results: Based on recent research, there is a statistical difference of IFN-ϒ among AMD patients and control.

Conclusions: Detection of a high level of inflammatory cytokines supports a role for inflammation in AMD pathogenesis.

The Photodynamic Therapy of Papillary Capillary Hemangiomas

*First Author: Sheng **GAO***

Purpose: To evaluate the benefit and risk of photodynamic therapy in the treatment of papillary capillary hemangioma.

Methods: Five eyes were treated by PDT with 7 ml verteporfin but different exposed time at 692 nm. Two eyes were performed 89 s, 2 eyes were performed 178 s, and 1 eye was performed 356 nm. Visual acuity (VA), SLO, optical coherence tomography, and ultrasonography were collected. An anti-VEGF drug was injected if necessary.

Results: VA levels depended on the exudation under the fovea from 50/100 to NLP. Tumor size was reduced according to the exposed time.

Conclusions: PDT is successful in reducing the tumor size, but may cause exudative activity shortly after the treatment.

Transpupillary Thermotherapy (TTT) and Anti-VEGF in Management of Circumscribed Choroidal Hemangioma (CCH)

*First Author: Durgesh **KUMAR***

Purpose: To evaluate the combination of anti-VEGF and Transpupillary Thermotherapy (TTT) in the management of Circumscribed Choroidal Hemangioma (CCH).

Methods: Seven cases of clinically diagnosed extrafoveal (5 cases) and subfoveal (2 cases) CCH were examined for VA on Snellen's chart, tonometry, slit lamp, biomicroscopy, FFA, ultra-sonography, and optical coherence tomography (OCT). All cases received TTT 2 - 4 weeks following initial anti-VEGF injection. For extrafoveal CCH, TTT was done with overlapping spots of 1 to 3 mm completely covering the lesion for a duration of 120 - 240 seconds, achieving light grey blanching with power 180 - 560 mw. For subfoveal CCH, spot size used was 0.6 mm or 1.0 mm, duration 90 - 150 seconds, and subthreshold (20% less) power to achieve just a visible blanching titrated at extra macular site. Cases were followed post-TTT at 2 weeks, 4 weeks, then monthly for 1 year.

Results: Pretreatment VA was HM – FC 4 mm. Submacular fluid and cystoid edema resolution seen in 1 subfoveal CCH and 40% extrafoveal cases. Complete resolution achieved in all cases by 4 - 6 weeks post-TTT. CCH thickness regressed by 15 - 34% at 12 weeks post-TTT. Subfoveal gliosis was minimal ellipsoid zone was retained, but in cases with extrafoveal CCH subretinal glosis was marked but retinal architecture was preserved. VA in subfoveal cases improved up to 6/36 or 6/24, and in extrafoveal CCH 6/36 to 6/18. One additional TTT setting were required in 3 extrafoveal cases. Also, one/two additional anti-VEGF injections required in both. Subfoveal and 2 extrafoveal cases during 1-year follow-up.

Conclusions: Anti-VEGF along with TTT is a cost-effective and safe treatment for CCH.

Ophthalmic Epidemiology

A 2-year Review on the Etiology and Surgical Outcomes of Young-aged Retinal Detachments in Hong Kong

*First Author: Mei Kwan **YIU***
*Co-Author(s): Mary **HO**, Alvin **YOUNG***

Purpose: Pediatric and young-aged retinal detachment (RD) surgery is always challenging. Despite the advancement of vitreoretinal surgery, the anatomical success rate for young RD is still lower than their adult counterparts. This study aimed to review the etiology and surgical outcomes of young-onset RD surgery in a tertiary university ophthalmic center.

Methods: A retrospective review of medical records was performed from 1/1/2017 - 12/31/2018 in the retinal clinic of a tertiary eye center. Patients younger than 35 years old, with retinal detachment due to various reasons, were selected. Data on patient demographics, clinical characteristics, surgical details, and anatomical and functional outcomes were retrospectively reviewed.

Results: A total of 49 eyes were identified from 42 patients aged from 7 months to 35 years old, with a male-to-female ratio of 1.33:1. Congenital developmental abnormalities and atopy history were found in 22.4% and 28.6% respectively, with congenital cataracts and eczema being the most common reason. Tractional RD was present in 24.5%, of which 83.3% were diabetic-related, with a mean Hemoglobin A1c level of 7.2%. Overall, 59.2% were rhegmatogenous RD, of which 31.0% were pseudophakic. The youngest one was 18 years old, and the primary anatomical success rate was 60%, higher with the external approach (66.6%) compared to vitrectomy (50.0%), despite not being statistically significant (P = 0.35). Eczema was not found to be a risk factor for failure (OR 1.75, P = 0.50). A total of 8.2% eyes were exudative RD, which got the worst prognosis among all.

Conclusions: Pediatric and young-aged retinal detachment surgery remains a challenge to vitreoretinal surgeons. Congenital cataracts, eczema, and diabetes mellitus are the major causes of retinal detachment occurring at a young age.

Association Between Diabetic Retinopathy and Diabetic Kidney Disease

*First Author: Ailian **HU***

Purpose: The purpose of this study was to investigate the associated factors between DR, CKD and DKD in a rural adult population in Northern China.

Methods: A total of 5064 subjects aged≥30 years were included. The associations between age, gender, BMI, hypertension, blood glucose, total cholesterol, low density lipoprotein, urinary albumin and kidney damage were examined. We also analyse the association between DR, CKD and DKD.

Results: A. The prevalence of diabetes was 6.58%, the prevalence of chronic kidney disease was 16.69%, and the prevalence of diabetic kidney disease was 1.15% among the 5064 patients;,B. Hypertension had a 2.649 times higher risk of DKD than those without a history of hypertension. The higher the total cholesterol is, the higher the risk of DKD. The risk of DKD is 2.716 times higher for every 1mmol/L of total cholesterol. When urinary albumin and blood glucose increased, the risk of DKD increased; Low density lipoprotein increased, the risk of DKD decreased;,C. Of those with diabetes, 28.83% had CKD, compared with 15.83% of those without diabetes.,D. Among patients with CKD, 6.59% had DM&DR, while among those without CKD, only 2.15% had DM&DR.

Conclusions: Patients with diabetes are more likely to develop CKD, and patients with DR have a higher risk of CKD than patients without DR. High blood pressure, blood glucose, total cholesterol, low density lipoprotein, and urinary albumin are associated with the development of DKD.

Morphological Characteristics and Risk Factors of Myopic Maculopathy in an Older High Myopia Population – Based on the New Classification System (ATN)

*First Author: Qiuying **CHEN***
*Co-Author(s): Jiangnan **HE**, Xun **XU**, Jianfeng **ZHU**, Ying **FAN***

Purpose: To investigate the characteristics, mergers, and risk factors of different types of myopic maculopathy (MM) in a highly myopic population. DESIGN: Population-based, cross-sectional study.

Methods: Population-based, cross-sectional study. A total of 1,086 eyes (762 patients) were enrolled. Each participant underwent detailed ocular examinations. Combining the fundus photographs and optical coherence tomography images, types of MM were assessed as myopic atrophy maculopathy (MAM), myopic tractional maculopathy (MTM), or myopic neovascular maculopathy (MNM) according to the ATN classification system. Peripapillary atrophy (PPA) area, tilt ratio, and macular choroidal thickness (mChT) were measured individually.

Results: Eyes with larger PPA area were more likely to have MAM (odds ratio [OR], 1.220; P = 0.037 per 1-mm^2 increase) and MNM (OR,

1.723; P < 0.001 per 1-mm^2 increase), and eyes with thicker mChT were less likely to have MAM (OR, 0.740; P < 0.001 per 10-μm increase) and MNM (OR, 0.784; P < 0.001 per 10-μm increase). Whereas eyes with higher tilt ratio were less likely to have MTM (OR, 0.020; P < 0.001 per 1 increase). The severity of MTM and MNM was not precisely consistent with that of MAM.

Conclusions: Different types of MM have different risk factors; larger PPA area and thinner mChT are risk factors for MAM and MNM, whereas lower tilt ratio is a risk factor for MTM. Our results indicate that the pathogenesis of MTM is different from that of MAM and MNM, and a tractional component must therefore be integrated into the classification system of MM.

Other (General Ophthalmology)

Alagille Syndrome Complicated by Retina Neovascular

*First Author: Jun **XIAO***

Purpose: To report a family with 1 mother and her 2 daughters who were diagnosed with Alagille syndrome by a gene test. The little daughter suffered from a vitreous hemorrhage caused by retina neovascular.

Methods: Multi-modality image including color fundus photography, optical coherence tomography (OCT), fundus fluorescence angiography (FFA), fundus autofluorescence, and wide-field photography were taken from all the patients. The images were analyzed.

Results: JAG1 gene mutation was detected in all of the patients. Peripapillary and peripheral chorioretinal atrophy were found in all of the 3 patients. Vitreous-retina traction was detected by OCT, and was found in the 2 daughters. The little daughter suffered with vitreous hemorrhage in the first visit, retina neovascular was detected by wide-field fundus image, and FFA showed retina neovascular with diffuse leakage. Six months later, the hemorrhage resolved without any treatment, but the retina neovascular was unchanged.

Conclusions: The retina neovascular may be a rare symptom of the Alagille syndrome. Unlike the chorioretinal atrophy, this symptom has not been reported in the previous literature.

Clinical Observation of Triple Therapy on Neovascular Glaucoma

*First Author: Simin **WEN***

Purpose: To investigate the clinical efficacy of intravitreal injection of Ranibizumab combined with trabeculectomy and panretinal photocoagulation (PRP) in the treatment of neovascular glaucoma (NVG).

Methods: A total of 24 patients (24 eyes) diagnosed as angle-closure NVG were treated with intravitreal injection of Ranibizumab combined with trabeculectomy and PRP (triple therapy) in the experimental group. Twenty patients (20 eyes) were treated with trabeculectomy combined with PRP (control group). The changes of intraocular pressure (IOP) in 1 month, 3 months, and 6 months after treatment, the best corrected visual acuity, the success rate of treatment, the disappearance of iris neovascularization, and complications were observed.

Results: 1. The IOP of NVG patients in 2 groups decreased 1 month, 3 months, and 6 months after treatment (P < 0.05). 2. After 6 months, compared with the control group, the experimental group retained visual function and decreased IOP were better than the control group (P < 0.05). Six months later, there was no significant difference in the treatment success rate between the 2 groups, but the experimental group was slightly higher than the control group. All the iris neovascularization in the experimental group disappeared within 3-5 days after the injection of Ranibizumab, and no complications such as atrophy of the eyeball and low IOP occurred in the experimental group.

Conclusions: Both treatments can effectively reduce IOP and preserve visual function. However, the triple therapy can significantly reduce IOP, eliminate neovascularization, retain visual function, improve the success rate of

treatment, and reduce adverse reactions and complications.

Comparison of Surgically Induced Astigmatism Following Small Incision Cataract Surgery: Superior Versus Temporal Approach

*First Author: Udbuddha **DUTTA***

Purpose: To compare surgically induced astigmatism resulting from superior incision and temporal incision in manual small incision cataract surgery (SICS)

Methods: Study Design: prospective longitudinal observational. Patients were divided into 2 main groups. Group 1: undergoing superior SICS with 6.5 mm frown incision. Group 2: undergoing temporal SICS with 6.5 mm frown incision. Sample Size: 100 Duration of Study: 18 months Investigations: Visual acuity was recorded. Slit lamp examination with 90D Volk lens was done for anterior segment examination. Macular function tests, applanation tonometry, and syringing were done. Biometry was done. Preoperative astigmatism and postoperative (after 4 and 8 weeks) were measured. Surgically induced astigmatism was measured using SIA Calculator Version 2.1. Statistical Analysis: SPSS version 20 was used with a p value of less than 0.05 taken as significant.

Results: The mean SIA was calculated and the value was compared between superior and temporal SICS at 4th & 8th postoperative week. It was found that at the 4th week, the mean SIA in temporal SICS (0.75 ± 0.36) D is lower than superior SICS (1.06 ± 0.41) D, and at 8^{th} week in temporal approach, the mean SIA (0.64 ± 0.32) D is lower than superior SICS (0.99 ± 0.31) D. Also, the difference between these two approaches is statistically highly significant ($P < 0.01$).

Conclusions: Temporal approach is preferable than superior approach SICS and is producing less surgically induced astigmatism (SIA) postoperatively.

Exploring the Molecular Pathogenesis Associated with Diabetic Retinopathy (DR) Based on a Comprehensive Bioinformatics Analysis

*First Author: Hui **CHEN***
*Co-Author(s): Feng **WEN***

Purpose: To investigate the pathogenesis of DR based on a comprehensive bioinformatics analysis.

Methods: Microarray data on gene expression and gene methylation were downloaded from the Gene Expression Omnibus (GEO) database. Abnormal methylated/expressed genes were analyzed by GEO2R and statistical software R. Gene Ontology term enrichment and Kyoto Encyclopedia of Genes and Genomes (KEGG) pathway analysis were performed using the DAVID database and KOBAS 3.0. STRING. Cytoscape software was used to construct protein–protein interaction (PPI) networks and analyze modules of the PPI network.

Results: A total of 71 hypomethylated/upregulated genes were significantly enriched in immune response and inflammation. KEGG pathway analysis highlighted NF-signaling pathways. Additionally, 89 hypermethyl-ated/downregulated genes were found. These genes were enriched mostly in cell adhesion and signal transduction. The top 5 core genes in the PPI net-work were TGFB1, CCL2, and TNFSF2, which may have important associations with the progression of DR. Alterations to cell functions, including immune response and inflammation may contribute to the process of DR.

Conclusions: Abnormal methylated/expressed genes and key signaling pathways involved in DR were identified through integrated bioinformatics analysis. Extensive immune response and related pathways were found significant up-regulation in the retina of diabetic retinopathy patients. The methylation modification of NLRP3 gene, the core gene associated with inflammatory corpuscles, was highly consistent with the expression level, and the expression level of related inflammatory response genes also showed the same trend.

In the future, these genes may serve as therapeutic targets in DR.

Observational Study of Ocular Manifestations of Rheumatoid Arthritis in a Tertiary Care Hospital in East India

First Author: Udbuddha ***DUTTA***
Co-Author(s): Uddeepta ***DUTTA***

Purpose: 1. To evaluate the magnitude of ocular manifestations in patients suffering from rheumatoid arthritis 2. To establish a statistical significance of duration of disease to age of patients 3. To establish a statistical significance of duration of disease to frequency of ocular manifestations

Methods: Study Design: Cross-sectional observational study Sample Size: 144 Duration of Study: 18 months Case control was not required in this study. Investigations: Slit lamp biomicroscopy with 90D Volk lens was done for anterior and posterior segment examination. Gonioscopy, applanation tonometry, automated perimetry, and indirect ophthalmoscopy were done. Dry eye evaluation was done. Statistical Analysis: SPSS version 20 was used with a P value of less than 0.05 taken as significant.

Results: Out of 144 patients, females (118) dominated. Ocular manifestations were seen in 53 (36.8%) patients, bilateral in 35 (66%) patients, and multiple in 32 (60.4%) patients. Dry eye was the most common ocular manifestation (30.5%). The duration of disease was statistically significant (P = 0.001) with respect to ocular manifestations and also age groups (P = 0.000).

Conclusions: Dry eye was the most common ocular manifestation. The duration of disease was statistically significant with respect to ocular manifestations. The duration of disease was statistically significant when co-related with age groups.

The Size of the Gauge and the Cross-sectional Area of the Shaft are Factors That Determine the Aspiration Volume of the Backflush Needle

First Author: Akira ***TETSUMOTO***
Co-Author(s): Hisanori ***IMAI****, Makoto* ***NAKAMURA***

Purpose: To compare the aspiration volume (AV) (cc/min) of backflush needles among 4 companies and investigate the factors contributing to AV.

Methods: The following 27-gauge (27G), 25-gauge (25G), and 23-gauge (23G) backflush needles were used for this experiment; Advanced DSP Backflush Soft Tip® (Alcon Grieshaber AG), Backflush FlexTip™ (MedOne Surgical, Inc.), Brush Backflush Instrument (VitreQ B.V.), and Backflush instrument (DORC. International). AV at vacuum level of 650 mm Hg was compared among the backflush needles of each company. The following parameters were used for the multiple regression analysis; the outer/inner diameter, the length, and the cross-sectional area of the shaft and the tube, the capacity of the reservoir, and the size of gauge.

Results: AV in each gauge of each company are as follows; in 27G, 19.56 ± 0.04, 8.46 ± 0.17, 14.08 ± 0.04, 15.85 ± 0.27, in 25G, 25.98 ± 0.12, 8.71 ± 0.13, 17.33 ± 0.15, 17.73 ± 0.24, in 23G, 47.57 ± 0.47, 12.01 ± 1.32, 16.31 ± 0.60, 26.35 ± 0.17, respectively. AV in Advanced DSP Backflush Soft Tip® was significantly larger than other backflush needles at each gauge (P < 0.01). Multiple regression analysis revealed that AV has a significant positive correlation with the cross-sectional area of the shaft and the size of gauge (P = 0.01, 0.03, respectively).

Conclusions: Advanced DSP Backflush Soft Tip® had larger AV than other backflush needles on each gauge. Factors contributing to AV were the cross-sectional area of the shaft and the size of gauge.

The Stability of Transscleral Suture-fixated Posterior Chamber Intraocular Lens Implantation: Comparison of Double Sutured Fixation and Single Sutured Fixation

*First Author: Lin **YANG***

Purpose: To observe the stability of transscleral suture-fixated posterior chamber intraocular lens (IOL) implantation and compare double sutured fixation with single sutured fixation.

Methods: A retrospective case-control study. We collected 25 patients with aphakic and scleral suture fixation. Main outcome measures: IOL level and vertical tilt distance and offset, tilt distance of IOL surgical site, preoperative and postoperative 3 months. The IOL eccentric distance and the position of the ankle, where the IOL position is observed and measured by a slit lamp and an ultrasound biomicroscope.

Results: The offset distance and offset of the DSF-IOL group in the vertical direction were smaller than those in the SSF-IOL group ($P < 0.05$). There was no significant difference in the horizontal tilt distance and offset between the two groups ($P > 0.05$). There was no significant difference in the eccentric distance between the two groups and the tilt distance of the surgical site ($P > 0.05$). There were 28 sputum in the DSF-IOL group: 15 cases (53.6%) in the ciliary sulcus, 12 cases (42.8%) in the ciliary crown, and 1 case (3.6%) in the ciliary crown; 24 in the SSF group: There were 12 cases (50.0%) of ciliary sulcus, 10 cases (41.7%) of ciliary sulcus, and 2 cases (8.3%) of ciliary crown. There were 3 cases (21.4%) and 3 cases (25%) in the two groups.

Conclusions: The single sutured scleral fixation group has a smaller degree of deviation in the vertical direction than double sutured scleral fixated group IOL, which can be used as the first choice.

Pediatric Retina

A Case Report of Epstein–Barr Virus-associated Retinal Vasculitis in a Child

*First Author: Tianwei **LIANG***
*Co-Author(s): Wenhong **CAO**, Yanhui **CUI**, Li **LI**, Chengyao **ZHANG***

Purpose: To know the Epstein–Barr virus-associated retinal vasculitis.

Methods: In the case of osteopetrosis of a 16 month-old boy, it was found that there was retinal vasculitis. We conducted the aqueous humor detection and blood detection, which demonstrated it was the Epstein–Barr virus-associated retinal vasculitis. Consequently, we did the intravitreal ganciclovir (2 mg) twice and intravenous acyclovir for 7 days followed by oral acyclovir.

Results: All lesions had become quiet after 3 months.

Conclusions: Epstein–Barr virus may be a rare cause of retinal disease, and intravitreal ganciclovir uniting intravenous acyclovir is a successful treatment choice.

Characteristics of Babies Referred for Retinopathy of Prematurity Management in a Tertiary Eye Hospital of Bangladesh

*First Author: Nazmun **NAHAR***

Purpose: To analyze the characteristics of referred babies for retinopathy of prematurity (ROP) screening at Ispahani Islamia Eye Institute and Hospital (IIEI&H).

Methods: Electronic records of babies referred to IIEI&H for a period of 3 years (2016 - 2018) were analyzed retrospectively. All the babies registered in the electronic file were diagnosed by any of the 3 consultants with interest in ROP. Variables of interest were ROP stage, gestational age, birth weight, time to screening, referring institution, and treatment modalities (laser, anti-VEGF, retina surgery, or a combination). Data were exported to SPSS version 23 for Mac for descriptive and correlation analysis. P-value less than 0.05 was considered statistically significant.

Results: A total of 887 babies with ROP stage 1 or above were registered. A large majority were referred by private institutions (75%), 60% of babies were moderate pre-terms according to WHO classification, and the mean birth weight was 1563±397.1 grams. ROP was largely stage 2 (37%), and 61% of babies had at least 1 treatment modality. The younger the gestational age and the lower the birth weight, the higher the risk of presenting with ROP with advanced stage.

Conclusions: The majority of babies with ROP came from private institutions, and more than half of them needed at least 1 treatment modality. We recommend a large study to analyze the incidence and availability of ROP services in public hospitals.

Incidence and Risk Factors for Retinopathy of Prematurity in Hong Kong

*First Author: Lawrence **IU***
*Co-Author(s): Leanne **CHEUNG**, Tania **WU**, Wilson **YIP***

Purpose: To investigate the incidence and risk factors for retinopathy of prematurity (ROP) in Hong Kong.

Methods: Medical records of all premature infants who received ROP screening between 2006 and 2018 in a tertiary hospital of Hong Kong were reviewed. The primary outcome measure was incidence of ROP. Secondary outcome measures include incidence of type 1 prethreshold ROP and odd ratios between risk factors and ROP development.

Results: A total of 955 infants were included. The mean gestational age at birth was 29 weeks and 6 days ± 17 days. The mean birth weight was 1268 ± 336 grams. ROP of any stage developed in 292 infants (30.6%) and severe ROP requiring treatment developed in 39 infants (4.1%). Multivariate logistic regression analysis showed that risk factors significantly associated with any ROP development were extremely preterm [odd ratio (OR) = 5.97, 95% confidence interval (C.I.) = 3.65 – 9.86], extremely low birth weight (OR = 5.13, 95% C.I. = 3.35 – 7.86), intraventricular hemorrhage (OR = 2.52, 95% C.I. = 1.50 – 4.23), and respiratory distress syndrome (OR = 3.17, 95% C.I. = 1.50 – 7.57). Risk factor significantly associated with type 1 prethreshold ROP development was extremely preterm (OR = 17.44, 95% C.I. = 5.93 – 56.94).

Conclusions: In conclusion, ROP is common among premature infants in Hong Kong. Extremely preterm was significantly associated with risk of severe ROP development requiring treatment.

Late Fibrovascular Contraction and Reactivated of ROP Post Intravitreous Bevacizumab Injection

*First Author: Kornkan **JITSOPIT***
*Co-Author(s): Atchara **AMPHONPHRUET**, Withawat **SAPTHANAKORN***

Purpose: To report retinopathy of prematurity (ROP) cases treated with injection of Bevacizumab and LIO, which had late (after 60 weeks) reactivated of ROP with active neovascularization also with fibrovascular contraction (Crunch phenomenon) at posterior pole.

Methods: Retrospective chart reviewed of ROP which had been treated with injection of bevacizamab and LIO from 2015 - 2019. Regressed ROP which had been reactivated and revealed fibrovascular contraction at posterior pole after 60 weeks of follow-up had been recorded.

Results: We found 3 cases of ROP reactivated and revealed fibrovascular contraction at posterior pole after ROP had been regressed. ROP had been reactivated with some areas of active neovascularization and revealed fibrovascular contraction at posterior pole in 1 eye, 1 case at 75 weeks, and only 1 eye, 2 cases at 80 weeks. The first case had been added LIO in that eye. Fortunately, the contraction was more localized in the nasal part. ROP was quieted and regressed after LIO. The second case had been added LIO in the area of active neovascularization, but unsuccessful to repair severe tractional retinal detachment from very tight severe fibrovascular contraction at

the posterior pole. The third case had been added LIO in the active neovascularization. Unfortunately, the fibrovascular contraction complicated with a small retinal tear and progressed to severe total retinal detachment.

Conclusions: Late reactivation of ROP included fibrovascular contraction can occur at later than 60 weeks which timely most reported of ROP treated with bevacizumab injection. Early detection, careful examination of activated diseases with a fluorescein angiogram, and urgently adding LIO can prevent this severe complication.

Retina (Medical)

A Case Report on Purtscher-like Retinopathy

*First Author: Nusrat **NIZAM***
*Co-Author(s): Mominul **ISLAM**, Arif Hayat **PATHAN**, Mostafizur **RAHMAN**, Mustafa **YUSUFALI***

Purpose: To present a rare case of bilateral Purtscher's like retinopathy secondary to pancreatic disease.

Methods: Case report

Results: A 25-year-old female came with sudden, painless loss of vision which was preceded by diarrhea, fever, vomiting, and abdominal pain. She was treated with systemic steroid, which improved her vision slightly within a month without any definite diagnosis. Then she was thoroughly examined by the physician and diagnosed as a case of acute pancreatitis with diabetes. For recurrent abdominal pain, she underwent pancreatic surgery after 6 years of her initial symptoms. Now she again developed visual disturbance and visited our hospital. After evaluating her previous all investigation report and history we diagnosed her bilateral Purtscher's.

Conclusions: Purtscher's like retinopathy is called when patient has no trauma where other causes can be associated like acute pancreatitis, long bone fracture, renal failure. Therefore, it is important to thoroughly examine patients before starting management and look for possible causes of the pathology.

A Case Presenting with Central Retinal Artery Occlusion, Central Retinal Vein Occlusion in Combination with Ocular Ischemic Syndrome

*First Author: Tongtao **ZHAO***
*Co-Author(s): Yong **LIU***

Purpose: To summarize the clinical features and diagnosis approaches of central retinal artery occlusion (CRAO), central retinal vein occlusion (CAVO) in combination with ocular ischemic syndrome (OIS).

Methods: Reported a rare case in which patient concurrently had CRAO and CRVO in combination with OIS, and summarized the clinical features and diagnosis approaches of OIS.

Results: A 55-year-old Asian male, complaining of sudden visual loss of the right eye for 3 days. He had diabetes mellitus for 10 years. On presentation, vision of right eye was light perception, and 0.5 for left eye. Remarkable signs of right eye included iris neovascularization, optic disc edema, extensive retinal hemorrhage, and edema especially in posterior pole which took a pale appearance with a "cherry red" in central. In the left eye, there were spread microangiomas and limited hemorrhage in fundus. For assistant examinations, fundus fluorescence angiography (FFA) showed CRAO and CRVO. Optical coherence tomography (OCT) showed macular edema. The blood homocysteine increased by two-fold. Carotid duplex ultrasound showed carotid atherosclerostic plaque on both sides. The duplex ultrasound of both eyes showed no retrobulbar blood flow signal in the right eye. Computed tomograplic angiography (CTA) showed no development in C1-C4 segments of both internal carotids. The patient was diagnosed with CRAO and CAVO in right eye, and OIS in left eye.

Conclusions: OIS can be diagnosed by duplex ultrasound of eyeballs and carotid. When the evidence is not convincing enough, CTA can be used. OIS combined with CRAO & CRVO is a rare condition of OIS. The upregulation of blood homocysteine can be a risk index.

A Prospective and Controlled Case Study on the Correlation Between Retinal Vein Occlusion and Cardiovascular Disease

*First Author: Qiyun **WANG***
*Co-Author(s): Xinyuan **ZHANG***

Purpose: To investigate the correlation between retinal vein occlusion (RVO) and the incidence of cardiovascular disease.

Methods: This is a prospective controlled case study. 59 patients (128 eyes) with RVO were enrolled in this study. Age- and sex-matched 44 subjects (44 eyes) were as the normal control. The best corrected visual acuity (BSVA), non-contact intraocular pressure, slit-lamp microscopic examination and fundus photography were applied for all the enrolled subjects. The diameter of the retinal artery and vein, the retinal arteriovenous ratio was calculated by DaHeng software (Da Heng eye fundus measurement software2.1.1.1).

Results: The diameter of the retinal artery of the affected eyes with BRVO and CRVO was significant thinner than that of the normal control group (0.056±0.009 vs 0.073±0.008, P1<0.001 and 0.059±0.008 vs 0.073±0.008, P2<0.001). The retinal arteriovenous ratio of the affected eyes in the BRVO and CRVO group were smaller than the normal control group (0.760±0.064 vs 0.830±0.070,P4<0.001 and 0.711±0.123 vs 0.830±0.070, P5=0.003).

Conclusions: Atherosclerosis is one of the important risk factors for the pathogenesis of RVO. Both BRVO and CRVO could predict the incidence of cardiovascular diseases. In comparison of CRVO, BRVO has stronger predict role in the occurrence of cardiovascular disease.

A Case of Bietti Crystalline Dystrophy

*First Author: Yong **WANG***

Purpose: An elderly woman came to our hospital due to progressive visual acuity loss in both eyes for 8 months.

Methods: She had diabetes for more than 10 years, and denied other systemic history and drug allergy history. Fundus examination, OCT, visual field, FFA combined with ICGA examination, and ERG were performed.

Results: She had diabetes for more than 10 years, and denied other systemic history and drug allergy history. Fundus examination revealed that both eyes were similar, which had a mass of spotted yellow-white crystals and some irregular pigment clumps around the posterior pole. What's more, the macular structure was uncleared, and RPE layer atrophy leading to the choroidal vessels exposure in 2 eyes. OCT showed macular thinning with high-density sediments in RPE layer and choroidal layer, outer retinal tubules (ORT) in the other nuclear layer and RPE, choriocapillaris atrophy in both eyes. A 30-degree visual field inspection revealed serious visual sensitivity decreased in both eyes, and central dark spots in the right eye. FFA combined with ICGA examination showed the RPE and choriocapillaris atrophy for some lobular black no perfusion areas around macular and optic disc during FFA early period in both eyes, while there may be CNV in left eye as fluorescence leakage appeared in macular area. MfERG showed abnormal foveal peak in both eyes, which indicated foveal lesion especially cone.

Conclusions: Diagnosis: Bietti crystalline dystrophy

A Case of Prednisolone Effective Severe Acute Posterior Multifocal Placoid Pigment Epitheliopathy

*First Author: Kaori **YAMASHITA***
*Co-Author(s): Hideo **KOHNO**, Teruaki **TOKHISA**, Tomoyuki **WATANABE**, Akira **WATANABE***

Purpose: The onset of APMPPE is unilateral or bilateral. Here, we presented a case of APMPPE with unilateral at first visiting. Subsequently, it became bilateral 5 months later. Hence, the first affected eye did not show recovery, the second eye was treated by corticosteroids.

Methods: A 41-year-old female presented with left blurred vision. Best corrected visual acuity (BCVA) was 1.2 and 0.1 in the right and left eye. Fundus examination showed

multiple scars only in the left eye. Fluorescein angiography (FA) revealed no active findings in both eyes. Five months after the involvement of the left eye, she felt visual loss in the right eye. The BCVA of the right eye decreased from 1.2 to 0.2. Fundus examination showed multiple white placoid lesions. FA showed early hypofluorescence and late hyperfluorescence at placoid areas. Intravenous steroid pulse therapy was administered for 3 days, followed by oral prednisolone for 6 weeks. After steroid therapy, BCVA improved to 1.2 in the right eye.

Results: We diagnosed current case as APMPPE because of FA findings. However, the clinical course, such as lateral onset and insufficient visual recovery in her left eye, is distinct from typical APMPPE progress. The corticosteroid therapy for APMPPE is controversial. In current case, though no improvement was observed in the first affected eye, there was marked recovery of visual acuity and symptoms in the second affected eye after corticosteroid therapy. Presumably, it is indicating that corticosteroid therapy is beneficial in APMPPE patients.

Conclusions: In severe cases of APMPPE, corticosteroids might be beneficial.

A Rare Case of Terbinafine-induced Macular Toxicity

First Author: Savla Laxmi ***PRABHAVATHI***

Purpose: To report a case of terbinafine-induced macular toxicity.

Methods: A 60-year-old lady, with Type 2 Diabetes mellitus, in her 6th decade of life with no ocular symptoms came for a routine ophthalmological evaluation. On examination, her best corrected vision was 20/20, N06 in both eyes. The anterior segment examination was essentially normal other than posterior subscapsular cataract. Fundus examination revealed bilateral pigmentary changes at the macula. The rest of the fundus was normal. Autofluorescence showed stippled fluorescence, and optical coherence tomography revealed loss of photoreceptors and disrupted ellipsoid zone corresponding to the lesion. Electroretinogram (ERG) showed a normal scotopic and reduced photopic response with intact waveform. Multifocal ERG showed central depressed waves, and a few central scotomas were noted on visual fields. Angiography revealed only staining, and no leakage was noted. On probing the history, there was no night blindness, dyschormatopsia, or photophobia. However, the patient gave a past history of nail infection (ichthyosis, smear taken had grown candida) for which the patient was on antifungal agents terbinafine (for 2.5 years) and itraconazole (1.5 years duration).

Results: Based on the history, clinical features, and the investigations, drug-induced macular toxicity secondary to terbinafine was made and the patient was advised routine follow-up.

Conclusions: Drug-induced maculopathy is a diagnosis of exclusion. A detailed history with a comprehensive clinical examination and workup is needed to confirm the diagnosis.

Acute Visual Loss After Photodynamic Therapy for Polypoidal Choroidal Vasculopathy

First Author: Chih-Chun ***CHUANG***

Purpose: To report a rare complication of sudden onset visual loss after photodynamic therapy (PDT) for polypoidal choroidal vasculopathy (PCV).

Methods: Case report

Results: A 72-year-old man with a history of cardiovascular disease complained of a sudden onset of blurred vision in the left eye 5 days after photodynamic therapy for recurrent PCV. He received intravitreal injection of Ranibizumab immediately and oral aspirin (100 mg) once per day. Two months later, the vision in the left eye was improved from 20/400 to 20/25. The reperfusion of macular choroidal vessels was noted in indocyanine green angiography (ICGA).

Conclusions: Choroidal ischemic change, exudative maculopathy, and patient's underlying cardiovascular disease would result in subsequent visual loss after photodynamic

therapy. Modifications to the settings of PDT or reduced dose of PDT, aspirin for patients underlying with cardiovascular disease, and combination therapy of anti-vascular endothelial growth factor and PDT are important to prevent complications.

Amyloid β 40 and Amyloid β 42 Levels in Aqueous Humor of Patients with Neovascular Age-related Macular Degeneration

*First Author: Fang **WANG***

Purpose: To determine Amyloid β 40 (Aβ40) and Amyloid β 42 (Aβ42) levels in aqueous humor of patients with neovascular age-related macular degeneration (nAMD) and their correlation with the parameters of retina.

Methods: A total of 50 patients that was composed of 30 nAMD and 20 cataract. Cytometric bead array method (CBA) was used to detect Aβ40 and Aβ42 expression in aqueous humor and optical coherence tomography angiography (OCTA) observed the parameters of the retina. The mini-mental state examination (MMSE), Montreal cognitive assessment scale (MoCA), and MRI of the hippocampus were used to diagnose Alzheimer's disease (AD).

Results: Of the 30 patients with nAMD, 9 had combined AD (AD group). The expressions of Aβ40 and Aβ42 in aqueous humor in AD group and nAMD group were significantly higher than those in the cataract group (P = 0.04, P = 0.02; P = 0.03, P = 0.03). In AD group, Aβ40 and Aβ42 were positively correlated with the blood flow density in the 4 quadrants in the deep macular area and the thickness of the tempo inferior retina of the optic disc. And the Aβ42/40 ratio had a significant negative correlation with macular superficial superior retinal vessel density (r = -0.84, P = 0.004).

Conclusions: As biomarkers of AD, Aβ40 and Aβ42 are highly expressed in aqueous humor of patients with nAMD, indicating that Aβ plays a positive role in nAMD. Aβ40 and Aβ42 are correlated with the retinal parameters of OCTA in AD group, which is expected to predict AD in the early stage by OCTA detection.

Beneficial Effect of IκB Kinase β Inhibitor on Progression of Choroidal Neovascularization in AMD Mouse Model

*First Author: Chiaki **OTA***
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Purpose: To evaluate the effect of IMD-0354, a non-ATP binding competitive selective IKK-β inhibitor, in laser-induced choroidal neovascularization (CNV) of mice.

Methods: Several 9-week-old C57BL/6 male mice were randomly assigned to IMD-0354 30 mg/kg treated or untreated groups (5 mice each). CNV was induced with a 532-nm laser (power 250 mW, spot size 100 μm, time of exposure 50 ms) in each eye. To evaluate the efficacy of IMD-0354, another group of mice treated intraperitoneally with 1.5 mg/kg of ranibizumab, and naive mice as control were used. Effects of IMD-0354 toward ameliorative effect on CNV development and size by retinal flat mounts and in vivo fundus imaging, inhibition of NFκB activation, CD45 positive cell infiltration, apoptotic signaling by cleaved caspase-3, and retinal production of vascular endothelial growth factor (VEGF) were analyzed.

Results: Systemic administration of IMD-0354 for 7 days in CNV mice caused significant reduction in the size of CNV area, reduced apoptotic signaling, decreased CD45 positive cells infiltration, and suppression of VEGF. The efficacy of IMD-0354 treatment was comparable with the effect of single intraperitoneal injection of ranibizumab.

Conclusions: The present data indicates that NFκB activation is crucially involved in the progression of laser CNV in mice, and its suppression by IMD-0354 might be a promising therapeutic strategy for wet AMD in humans.

Bioinformatics Analysis of Gub genes in Proliferative Diabetic Retinopathy

First Author: Aiai ***DAI***
Co-Author(s): Tiecheng ***LIU***

Purpose: To explore the potential therapeutic targets of proliferative diabetic retinopathy (PDR) by bioinformatics analysis.

Methods: Three microarray datasets (GSE53257, GSE60436, and GSE94019) in GEO database were analyzed. The differentially expressed genes between diabetic fibroblast proliferation membrane and normal retina were screened by GEO2R. GO, KEGG, and genome pathway enrichment analysis were carried out by using the database to identify pathways and functional annotations involving differentially expressed genes, and then protein interaction network was constructed and hub genes in the network were screened.

Results: A total of 91 genes were significantly up-regulated, including angiogenesis-related functional subgroups, stress response, metabolism, cell differentiation, and extracellular matrix. The most abundant genes were angiogenesis-related genes, including ANGPT2, ANXA2P1, APLN, CD34, DLL4, MMP9, NES, ROBO4, SEMA3F, THY. 1, CDH5, ESM1.

Conclusions: Compared with normal retinal tissues, some hub genes are over-expressed in diabetic fibrous proliferation membranes, and their value in the treatment of diabetic retinopathy needs to be further studied.

CRVO Multiple Anti-VEGF Treatment of Secondary Neovascular Glaucoma: A Case Report

First Author: Zhongping ***CHEN***

Purpose: Neovascular glaucoma (NVG) is a common eye disease that leads to further damage of visual function in patients with central retinal vein occlusion (CRVO). We observed a patient with secondary NVG after multiple treatments, which was reported as follows.

Methods: The patient Zhang, female, 63 years old, saw a doctor for more than 10 days because of the loss of visual acuity in the left eye. The patients were diagnosed as CRVO in the left eye. Ranibizumab+ triamcinolone acetonide was injected into the vitreous cavity. The patients were reexamined in our hospital at the 2nd, 3rd, 4th, 5th, 6th, and 7th month after the first treatment, and the vitreous injection was performed again at the 2nd, 3rd, and 5th month, and the left eye panretinal photocoagulation was performed. The reexamination is shown in figure 1. At the 13th month after the first treatment, he was admitted to the hospital again because of "left eye redness, eye pain, eye distension with vision loss for 1 week". Admission diagnosis: left eye NVG. Anti-glaucoma surgery was performed.

Results: Reviewing the whole treatment process, after a total of 4 intraocular injections and 1 PRP, NVG, occurred 5 months after the reexamination, which showed that the patient did not carry out the treatment and revisit according to the standard, which delayed the best time for treatment.

Conclusions: This also affects the therapeutic effect to a large extent.

Changes in Retinal Hemodynamics After Intravitreal Anti-vascular Endothelial Growth Factor Injection in Diabetic Mouse Model

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Purpose: To investigate alteration in retinal hemodynamics in Akita mouse model for diabetes after intravitreal anti-vascular endothelial growth factor (anti-VEGF) injection using laser speckle flowgraphy (LSFG).

Methods: After anesthesia of the mice, intravitreal anti-VEGF (aflibercept, 1 μg/eye) was injected into each study eye. Using LSFG, mean blur rate (MBR), which reflected relative retinal blood flow, was measured in the superior, inferior, nasal, and temporal quadrants of the optic nerve head (ONH). Intraocular

pressure (IOP) was measured by handheld tonometer. MBR of tissue (MT) and IOP were recorded at baseline, week 1, 2, 3, and 4 post-injection, and their longitudinal changes were compared at each time point.

Results: Fourteen eyes from 8 Akita mice were included in the study. Two eyes were excluded due to poor image quality. Age of the mice was between 12 and 19 weeks old. There was no statistically significant longitudinal change in IOP after anti-VEGF injection. There was increased retina blood flow as measured by MT values in the ONH region longitudinally in the 4 weeks following intravitreal aflibercept injection, which appeared to peak at 3 weeks post-injection. This increasing trend was statistically significant in the superior and temporal quadrants in the right eye and in all quadrants in the left eye.

Conclusions: Significant changes in retinal blood flow as measured by MT values from LSFG were shown after intravitreal anti-VEGF injection in diabetic mouse model.

Characteristics and Response of Subretinal Hyperreflective Material to Anti-vascular Endothelial Growth Factor in Myopic Choroidal Neovascularization

*First Author: Chien-Jung **HUANG***
*Co-Author(s): Tzyy-Chang **HO***

Purpose: To evaluate the characteristics and response of subretinal hyper-reflective material (SHRM) to anti-vascular endothelial growth factor (VEGF) in myopic choroidal neovascularization (CNV)

Methods: We retrospectively reviewed 119 eyes of 116 patients with SHRM in myopic CNV in our hospital. Multi-modal imaging including color fundus photography, fluorescein angiography, and optical coherence tomography angiography (OCTA) were done. We classified the SHRM in to type 2 neovascularization (NV), subretinal hyper-reflective exudation (SHE), NV with hemorrhage and fibrosis. All patients received anti-VEGF treatment and visual acuity was recorded at 3, 6, and 12 months.

Results: Among 119 patients, there are 64 cases of Type 2 NV, 37 cases of SHE, 15 cases of NV with hemorrhage, and 3 cases of fibrosis. During follow-up, the neovascularization group and NV with hemorrhage group showed significant visual acuity improvement after 12 months treatment, but SHE group failed to improve (0.60 ± 0.57 in NV group, $P < 0.05$, SHE 0.82 ± 0.55 in SHE group, $P = 0.366$, 0.46 ± 0.46 in hemorrhage group, $P < 0.05$). All groups showed significant central foveal thickness reduction during 12 months treatment (252.52 ± 50.87 μm in NV group, 227.11 ± 32.76 μm in SHE group, 268.47 ± 50.08 μm in hemorrhage group, all $P < 0.05$). However, significant higher percentage of interrupted ellipsoid zone was noted in the SHE group (NV: 45.0%, SHE: 71.4%, hemorrhage: 46.7%, $P < 0.05$).

Conclusions: Myopic CNV presented as subretinal hyper-reflective material on OCT. Different types of SHRM may have different visual prognoses. The OCT and fluorescein angiography may help to predict the outcome of different subtypes of myopic CNV.

Clinical Factors Associated with Aniseikonia After Reduced-fluence Photodynamic Therapy in Central Serous Chorioretinopathy Patients with Good Visual Acuity

*First Author: Mayuka **HAYASHIDA***
*Co-Author(s): Akiko **MIKI**, Shunichiro **NAKAI**, Makoto **NAKAMURA***

Purpose: To investigate the clinical factors associated with aniseikonia after reduced-fluence photodynamic therapy (RFPDT) in central serous chorioretinopathy (CSC) patients with good visual acuity.

Methods: We retrospectively reviewed 19 eyes of 19 consecutive patients with resolved CSC after RFPDT and logarithmic minimum angle of resolution best corrected visual acuity (logMAR BCVA) better than 0.10 at 12 months after RFPDT. Patients with more than 2.0 diopters of anisometropia were excluded. We measured aniseikonia using New Aniseikonia Tests at 12 months after RFPDT. We also manually measured findings of optical coherence

tomography at baseline and analyzed the factors related to the absolute value of aniseikonia at 12 months after RFPDT. Patients were divided into 2 groups depending on the presence or absence of subjective symptoms of aniseikonia; aniseikonia (+) group (n = 7), or aniseikonia (-) group (n = 12). We investigated the differences in factors related to the absolute value of aniseikonia between groups.

Results: The mean duration of symptoms was 10.2 ± 16.4 months, and the mean absolute value of aniseikonia at 12 months after RFPDT was 1.34 ± 1.78%. In the bivariate analysis, the only duration of symptoms (P = 0.027) was related to the absolute value of aniseikonia in CSC patients with good BCVA at 12 months. The duration of symptoms in aniseikonia (+) group (20.6 ± 14.4 months) was significantly longer compared with that in aniseikonia (-) group (4.2 ± 2.8 months) (P = 0.036).

Conclusions: The duration of symptoms may be related to aniseikonia in CSC patients with good BCVA at 12 months after RFPDT.

Clinical Manifestations and Diagnosis of Intraocular Lymphoma

*First Author: Tao **LI***
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Purpose: To describe clinical manifestations and diagnostic approaches in intraocular lymphoma.

Methods: Review of 3 cases with biopsy-proven intraocular lymphoma and 3 cases of highly suspected intraocular lymphoma between 2017 and 2019. All patients were received and treated by the same ophthalmic expert. The mean follow-up was 15 months.

Results: Yellowish retinal lesions were seen in all 6 patients, and hyperreflective subretinal lesions above the retinal pigment epithelium (RPE) were shown on OCT images. Three patients received pars plana vitrectomy and biopsy due to vitreous opacity, and pathological results were consistent with the diagnosis of B-cell lymphoma. In the 3 patients with highly suspected intraocular lymphoma, the IL10/IL6 ratio in aqueous humor was < 1, and IL10 concentration was less than 50 pg/ml. Two patients with macular edema were treated with Ranibizumab. All patients achieved remission by their final visit.

Conclusions: Intraocular lymphoma often masquerades as intraocular inflammation, resulting in delayed or misdiagnosis with subsequent inappropriate management. Increased IL10 concentration or IL10/IL6 ratio > 1 in aqueous humor and vitreous has certain significance for the diagnosis. But it also should be observed closely when there is no specificity by cytokine detection. And anti-VEGF therapy has a certain therapeutic effect on concurrent macular edema.

Clinical Significance of the ABI and PWV in Patients with Diabetic Retinopathy and/or Retinal Vascular Occlusion

*First Author: Arisa **TAKAHASHI***
*Co-Author(s): Fumihito **HIKAGE**, Yosuke **IDA**, Kaku **ITOH**, Hiroshi **OHGURO**, Chiaki **OTA***

Purpose: The purpose of this study was to report the clinical characteristics of ankle-brachial index (ABI) and pulse wave velocity (PWV) in diabetic retinopathy (DR) with retinal vascular occlusion (RVO).

Methods: We measured the ABI and PWV, which are used as clinical indicators of arteriosclerosis in 106 patients with RVO, DR, and hypertensive retinopathy (HR). As a control group, a total of 100 age-matched healthy control subjects.

Results: ABI decreased with advancing age in patients with RVO, whereas no age-related changes were observed in non-RVO patients and control subjects. Furthermore, ABI was significantly lower in patients having combined presence of HR, DR, and RVO than it was in patients with either HR, DR, RVO, HR+DR, HR+RVO, or DR+RVO. Five out of 6 patients with abnormally low ABI values (less than 0.9) had associated central retinal artery occlusion (CRAO). In contrast, no such associations were observed in PWV among the groups.

Conclusions: Our present data provide the first evidence that measurement of ABI may

be a clinical marker for management of retinal vascular occlusion, especially for CRAO in patients with DR.

Clinical Study of Dexamethasone Intravitreal Implant for Treatment of Macular Edema Secondary to Retinal Vein Occlusion

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Purpose: To observe the efficacy of dexamethasone intravitreal implant (ozudex 0.7 mg) in the treatment of branch or central retinal vein occlusion complicated with macular edema (RVO-ME).

Methods: Eight patients (8 eyes) diagnosed as RVO-ME in our hospital were randomly divided into group D (use ozudex only, 4 eyes) and group C+D (use conbercept 0.5 mg 3 times regularly and switch to ozudex, 4 eyes). Best corrected visual acuity (BCVA), Early Treatment Diabetic Retinopathy Study (ETDRS), central retinal thickness (CRT), intraocular pressure (IOP), and surgical complications were measured monthly for a total of 6 months.

Results: The ETDRS improvement was most obvious in the 2 groups after 2 months of ozudex intravitreal implant ($P = 0.09$). And the drug's effect lasts for 3 months ($P = 0.038$). However, there was no statistical difference between the 2 groups ($P > 0.05$). The average BCVA improvement in the 2 groups was 23 letters, and the proportion of patients with > 15-letter ETDRS improvement from baseline was 62.5%. The mean CRT changes in the 2 groups from baseline was 373.5 um ($P < 0.01$). But there was no significant difference between the 2 groups ($P > 0.05$). Patients with subconjunctival hemorrhage were found in the intravitreal injection of ozudex, and the IOP increased slightly in the first 2 months.

Conclusions: Intravitreal injection of ozudex in the treatment of RVO-ME has a long-term utility, with safe and effective improvement of visual prognosis and reduction of CRT at early stages. There was no significant difference in combined with anti-VEGF cure at short-term treatment.

Comparisons of Biomarkers Between Epiretinal Membrane (ERM) and Myopic Traction Maculopathy (MTM): The Effects of Internal Limiting Membrane Incompliance and Posterior Staphyloma

*First Author: Shih-Wen **WANG***
*Co-Author(s): Tzyy-Chang **HO***

Purpose: We aim to compare structural and vascular intraretinal changes between ERM and MTM eyes.

Methods: We conducted an observational retrospective study on treatment-naïve ERM and MTM eyes. Biomarkers using optical coherence tomography angiography (OCTA) were performed on a 3 x 3 mm macular region centered on the fovea.

Results: There were 27 MTM eyes and 32 ERM eyes. In MTM group, the spherical equivalent was more myopic and the axial length was longer (-12.09 diopters (D) ± 6.45 vs. -0.77 D ± 2.48, $P < 0.001$, and 29.41 mm ± 1.54 vs 25.32 mm ± 2.79, $P < 0.001$). The MTM eyes had larger outer retinal volumes (5.88 mm^3 ± 1.76 vs 4.77 mm^3 ± 0.6, $P = 0.003$) and smaller inner retinal volumes (2.58 mm^3 ± 0.35 vs 3.23 mm^3 ± 0.53, $P < 0.001$). The MTM eyes had larger area and perimeter of foveal avascular zones (0.29 mm^2 ± 0.1 vs 0.16 mm^2 ± 0.12, $P < 0.001$, and 2.15 mm ± 0.4 vs 1.62 mm ± 0.58, $P < 0.001$), greater circularity of foveal avascular zones ($P < 0.001$), and smaller foveal vessel density in superficial layer (24.65% ± 5.74 vs 32.73% ± 10.29, $P < 0.001$).

Conclusions: Our data suggests that the larger avascular zones in MTM eyes may be caused by internal limiting membrane (ILM) incompliance. The anteroposterior traction forces from staphyloma in MTM eyes may lead to larger outer retinal volumes. In ERM eyes, the traction forces confined in the superficial retina causing larger inner retinal volumes and foveal acircularity. Our results highlighted the intraretinal changes caused by ILM traction and

staphyloma in MTM eyes compared to ERM eyes.

Development and Application of a Follow-up Management System for Diabetic Retinopathy

*First Author: Wanyue **LI***

Purpose: To explore the clinical application of the follow-up management system for diabetic retinopathy based on mobile terminals in ophthalmology.

Methods: Ophthalmologists designed the database structure according to the characteristics of disease diagnosis and treatment, and cooperated with software engineers to develop an electronic system for follow-up management of diabetic retinopathy. Ophthalmologists developed individualized clinical treatment and follow-up plans, conducted disease education for diabetic retinopathy patients, and trained them to use follow-up software.

Results: The follow-up management system for diabetic retinopathy was divided into 2 parts: mobile application(APP)/WeChat public account server and background server. Medical staff and patients could download follow-up APP or follow the WeChat public account on mobile devices. The system included 6 types of data items: personal information, medical history, physical examination, ophthalmology examination, ophthalmology treatment, and system treatment. It had functions such as mobile office, doctor-patient communication, medical record management, follow-up reminders, scientific research management, and security protection.

Conclusions: Using a mobile, terminal-based follow-up platform to track and manage diabetic patients can improve the communication efficiency between doctors and patients and systematically collect a patient's clinical data. The function of real-time monitoring and statistical analysis provide a reference for clinical diagnosis and treatment and facilitate clinical research. This system also strengthens patients' awareness of health management. Its development has broad application prospects and social benefits.

Dexamethasone Intravitreal Implant of Macular Edema Related to Retinal Vein Occlusion in Chinese Patients

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Purpose: To evaluate the efficacy and safety of dexamethasone (DEX) intravitreal implant for macular edema (ME) following retinal vein occlusion (RVO).

Methods: This single-center, retrospective observational study included 20 RVO (50% CRVO, 50% BRVO) patients with ME receiving DEX treatment from June 2018 to March 2019 in the department of ophthalmology of Guangdong Provincial People's Hospital. All participants underwent best corrected visual acuity (BCVA) by ETDRS, center retinal thickness (CRT) by optical coherence tomography (OCT), cataract progression, and intraocular pressure (IOP) examinations on baseline, 1 week, 1 month, and 3 months after DEX treatment. The variations among these parameters were assessed by paired-samples T-tests.

Results: The BCVA of all RVO patients improved significantly 1 week (39.6 ± 10.3), 1 month (40.2 ± 10.5), and 3 months (37.3 ± 7.5) after a single DEX treatment, compared with the baseline (31.8 ± 8.5) ($P < 0.001$). The CRT decreased significantly 1 week (411.1 ± 124.5 μm), 1 month (332.0 ± 110.4 μm) and 3 months (556.3 ± 145.6 μm) after the treatment, compared with the baseline (804.2 ± 247.9 μm) ($P < 0.001$). However, there was no change in IOP or progression of cataracts ($P > 0.05$).

Conclusions: Dexamethasone intravitreal implant is efficient in reducing the vision loss in eyes with ME secondary to BRVO or CRVO accompanied by safety in Chinese patients.

Diabetic Retinopathy (DR) and Macular Edema After Cataract Surgery: A Systematic Review and Meta-analysis

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Purpose: To determine the association between cataract surgery and progression of DR, and incidence of clinically significant macular edema (CSME) among persons with diabetes in paired-eye studies, which are less prone to the confounding effects of systemic factors.

Methods: A comprehensive literature search was conducted using PubMed, Embase, ISI Web of Science, and Google Scholar. We included prospective or retrospective paired-eye studies on the association of cataract surgery with progression of DR or incidence of CSME among adults with diabetes. A paired-eye study was defined as using the fellow non-operated eye as a control to compare with the eye that had cataract surgery.

Results: Six eligible studies involving 496 diabetic individuals (987 eyes) were identified and included in the meta-analysis. Among these 6 studies, 2 paired-eye studies were included for analysis of the association between cataract surgery and CSME incidence. The overall pooled RR for association between cataract surgery and DR progression was 1.04 (95% CI, 0.83 - 1.30). Consistent results were shown in sensitivity analysis. Cataract surgery was not significantly associated with DR progression in subgroup analyses stratified by study design, methodological quality of studies, duration of diabetes, follow-up period, type of diabetes, or DR grading criteria. There was also no significant association between cataract surgery and incidence of CSME after cataract surgery (RR: 1.79, 95%; CI: 0.90-3.58).

Conclusions: Our data, based on paired-eye studies, do not support any association of cataract surgery with risk of DR progression or CSME incidence.

Dome-shaped Maculopathy: A Retrospective Analysis

First Author: Obuli N.
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Purpose: Dome-shaped maculopathy (DSM) is a rare manifestation of pathological myopia. Subretinal fluid (SRF) in DSM has been seen to be resistant to a variety of treatments, and visual acuity may stay stable despite persistence of SRF.

Methods: We evaluated retrospectively 25 eyes of 14 patients with DSM, with 3 patients having unilateral DSM.

Results: Mean spherical equivalent (SE) in these eyes was -3.25 +- 1.06 diopters with 11/25 eyes having myopia < -3 diopters. On performing SD OCT, we found that 11/25 eyes had dome-shaped elevation in both horizontal and vertical axis, 5/25 had only in the vertical, and 9/25 had only in the horizontal. Mean logMAR visual acuity of the eyes was 0.327 +- 0.305. Central macular thickness (CMT) and central choroidal thickness (CCT) were respectively 267.47 +- 117.87 µm and 274.65 +- 94.86 µm, and did not seem to differ significantly from the healthy population. The mean logMAR visual acuity of the eyes with IS-OS disruption was 0.432 +- 0.245, which was poorer than eyes without the same, but not significantly so. The mean dome height (DH) measured between RPE and choroidoscleral complex below fovea was 520.24 +- 33.016 µm.

Conclusions: DSM is a peculiar manifestation of pathological myopia and is believed to occur because of compressional forces during growth of the eyeball, along with differential thickening of the sclera. SRF associated with DSM is quite intractable to treatment, and although visual acuity may improve or stay stable over time, the macula may not become dry.

Effect of Mineralocorticoid Antagonists on Multimodal Imaging in Eyes with Chronic Central Serous Chorioretinopathy

*First Author: Yun **ZHANG***

Purpose: Central serous chorioretinopathy (CSC) has been proven to be related to inappropriate mineralocorticoid receptor activation. We intended to assess the effects and safety of mineralocorticoid antagonists in chronic CSC using multimodal imaging.

Methods: In this prospective interventional study, 21 patients with chronic CSC treated with spironolactone for 4 months. The outcome measures included the mean change of best corrected visual acuity (BCVA), area of persistent subretinal fluid (SRF), the central retinal thickness (CRT), subfoveal choroidal thickness (SFCT), choroidal density (CD) and choriocapillaris density (CCD), and level of serum potassium, blood pressure.

Results: Eighteen patients (19 eyes) completed the study. After 4 months of spironolactone therapy, 11 eyes (58%) presented total regression of SRF. The mean BCVA (in logMAR) improved from 0.27 ± 0.32 at baseline to 0.14 ± 0.31 at final. With respect to anatomic changes, a significant decrease in area of SRF was presented from 0.34 ± 0.19 mm^2 to 0.02 ± 0.03 mm^2 (P = 0.008), mean SFCT decreased from 408.9 ± 136.7 μm to 322.8 ± 101.4 μm (P = 0.001), and mean CRT decreased from 377.8 ± 108.9 μm to 218.4 ± 63.9 μm (P = 0.002). However, there was no statistically significant mean change in the CCD and CD during the period of therapy (P = 0.085, P = 0.265). No patients experienced serious adverse events of the treatment.

Conclusions: Our study confirms the oral spironolactone therapy is safe and potentially effective in the treatment of chronic CSC through improving BCVA and recovering anatomic structure, but does not affect the density of choriocapillary and choroidal vessels.

Efficacy of Ozurdex Implant in the Treatment of Macular Edema After Vitrectomy

*First Author: Qiuming **LI***

Purpose: Macular edema is a major cause of reduced vision after vitrectomy. The purpose of this study was to evaluate the effect of OZURDEX® (dexamethasone intravitreal implant) on persistent macular edema after vitrectomy.

Methods: Ten patients with persistent macular edema and a history of previous pars plana vitrectomy received an intravitreal injection of 0.7-mg dexamethasone intravitreal implant. Record preoperative and postoperative best corrected visual acuity (BCVA), intraocular pressure (IOP), central retinal thickness measured by optical coherence tomography (OCT), etc.

Results: The mean age of patients was 61 years. Preoperative BCVA was 0.02~0.25, with an average of 0.15 ± 0.08. Postoperative BCVA ranged from 0.1 to 0.6, with an average of 0.27 ± 0.15. OCT showed macular edema was significantly reduced after injection. Migration of the implant into the anterior chamber occurred in 2 patients. Migration was managed noninvasively by pupillary dilatation and positioning of the patient. No IOP increase was observed.

Conclusions: Intravitreal injection of dexamethasone intravitreal implant for the treatment of macular edema after vitrectomy is safe and effective. However, further study with a larger sample size is needed to confer statistical significance.

Genetic and Clinical Characteristics of Patients with Retinitis Pigmentosa Associated with PDE6B Mutations

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Purpose: To report ocular and genetic findings of autosomal recessive retinitis pigmentosa (arRP) caused by PDE6B mutations in Korean patients.

Methods: Targeted next-generation sequencing (NGS) using a gene panel consisted of 88 genes associated with inherited retinal degeneration was performed for patients clinically diagnosed with RP. The patients with PDE6B mutations were screened and underwent comprehensive clinical history taking including pedigree analysis as well as ophthalmic examinations.

Results: Nine patients from 8 families were revealed to have PDE6B mutations with 6 pathogenic variants, including 5 reported variants (c.1488del, c.1669C>T, c.2395C>T, c.1547T>C, and c.1811C>T) and 1 novel variant (c.712del). Their median age of the latest examinations was 26 years old (range 13 - 65). Eight of nine patients experienced night blindness as their first ocular symptom at the median age of 10 (range 4 - 47), and the median age of diagnosis was 17 (range 11 - 55). The median VA (logMAR) was 0.3 (range 0.0 - 3.0) and deterioration of VA varies by patients. But ERG showed profoundly extinguished rod response in all patients. In SD-OCT, peripheral RPE disruption was noted in most patients, but diffuse atrophy involving fovea was observed in 2 patients over 55 years old. In addition, 6 of 9 patients (66.7%) revealed cystoid macular edema (CME). In kinetic perimetry, central islands with paracentral ring scotoma were common features, although the phenotypes vary by the degree of individual disease progression.

Conclusions: Although there are significant variations in clinical findings in PDE6B associated arRP, including onsets of disease and VA, some phenotypes such as CME were shared in most cases.

Increased Incidence of Age-related Macular Degeneration in Sensorineural Hearing Loss

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Purpose: To evaluate the incidence of age-related macular degeneration (AMD) in patients diagnosed with sensorineural hearing loss (SNHL) via the application of the National Health Insurance Research Database in Taiwan.

Methods: A retrospective cohort study was conducted. Patients with a diagnosis of SNHL was enrolled in the study group after exclusion and a propensity score matched group without SNHL was served as the control group with a 1:2 ratio. The main outcome was regarded as the emergence of AMD diagnostic codes. Cox proportional hazard regression was applied to analyze the incidence and adjusted hazard ratio (aHR) of AMD in the multivariate model.

Results: A total of 15,686 patients with SNHL were included in the study group while another 31,372 non-SNHL patients served as the control group. After a follow-up interval up to 16 years, there were 484 AMD events that occurred in the study group and 660 AMD cases in those non-SNHL patients with a significantly higher aHR compared to the control group after adjusting for multiple potential risk factors (aHR: 1.399, 95% CI: 1.244 - 1.574). Other prominent risk factors for AMD included older age, ischemic heart disease, hyperlipidemia, Alzheimer's disease, liver disease, and kidney disease (Table 3).

Conclusions: The patients with SNHL demonstrated a higher incidence of developing AMD.

Intraocular VEGF Deprivation Induces Degeneration and Fibrogenic Response in Retina

*First Author: Meichun **XIAO***
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Purpose: Current therapeutic strategies depend on multiple intraocular injections of VEGF antagonizing reagents, which results in sustained deprivation of VEGF and suppression of pathogenic vascularization locally. Despite significant advancement that has been achieved in preserving vision with therapeutic VEGF antagonism in the last decade, substantially adverse effects have been reported in recent years with retrospective clinical studies. To understand mechanisms for intraocular VEGF deprivation associated adverse effects, we

delivered recombinant adeno-associated virus encoding soluble Fms-related tyrosine kinase-1 (rAAV.sFLT-1), the extracellular domain of VEGF receptor, intravitreally in mice, followed by analysis of retinal tissues and function.

Methods: Some 6-8 weeks C57BL/6J mice were intravitreally injected with rAAV.sFLT-1, rAAV.mCherry or PBS. Electroretinogram was used to evaluate retinal response. And the eye tissues were collected for HE/immunofluorescence staining, apoptotis detection, and gene expression analysis by RNA sequencing (RNA-seq). Pathway analyses were employed for further bioinformatic analyses.

Results: Immunofluorescence staining revealed neuronal degeneration and activation of gliosis. Functional deficit was recorded by electroretinogram in rAAV.sFLT-1 treated eyes as compared to control. Moreover, RNA-seq analysis confirmed activation of pro-inflammatory and degenerative pathways in VEGF-deprived retina and implicated potential mechanisms for VEGF deprivation associated neurodegeneration, inflammation, and other adverse effects.

Conclusions: Our findings demonstrate that sustained intraocular VEGF deprivation induces retinal degeneration and fibrogenic response, which paves the way to the elucidation of the pathogenic mechanisms for adverse effects associated with VEGF deprivation in clinical practice and identification of potential therapeutic targets.

Intraretinal Cystoid Spaces in Regression of Punctate Inner Choroidopathy Lesions

*First Author: Yuhong **GAN***
*Co-Author(s): Feng **WEN***

Purpose: Purpose: To describe and evaluate the intraretinal cystoid spaces (ICSs) in the eyes of punctate inner choroidopathy (PIC) patients.

Methods: Methods: In this observational study, patients diagnosed with PIC were included and reviewed between December 2016 and November 2018. All patients underwent multimodal retinal imaging examinations.

Results: Forty-one eyes of 26 patients diagnosed with PIC were included. ICSs were found in 13 eyes (31.7%) of 11 subjects. Statistical analysis revealed that except for the spherical equivalent (P = 0.020), there was no significant difference between patients with ICSs and those with no ICSs at baseline. There were 2 types of ICSs according to the multimodal imaging findings. These 2 types of ICSs appeared with regressive PIC lesion and were stable during the follow-up period.

Conclusions: ICSs are commonly observed in PIC and they may be a sign of the restoration stage of the disease rather than a need for further clinical intervention.

Macula Function Assessment with SLO-microperimetry Before and After Anti-VEGF Therapy

*First Author: Rajasudha Sawri **RAJAN***
*Co-Author(s): Nor Fariza **NGAH***

Purpose: PURPOSE: To evaluate the difference in macula sensitivities using the NIDEK SLO-microperimetry (SLO-MP3) in patients who received antivascular endothelial growth factor therapy (anti-VEGF) with ranibizumab.

Methods: Patients with an indication for anti-VEGF therapy that were treatment-naïve prior were recruited for this study. Best corrected visual acuity (BCVA), SLO-MP3, and spectral-domain optical coherence tomography (OCT) were performed before commencing anti-VEGF injections, at 1 month and 2 months post-injection. The differences were tabulated.

Results: Ten patients were analyzed at the end of the study. The diagnoses of these patients were diabetic macula edema (5), age-related macular degeneration (4), or retinal vein occlusion (1). Six patients showed improvement in their macula sensitivities and this corresponds with improvement in OCT. However, the BCVA improved only in 4 out of the 6 patients. The BCVA was the same in the other 2 patients. There was worsening of the macula sensitivities in the remaining 4 patients in the study. Three of those patients showed concomitant worsening or no changes in OCT and BCVA.

One patient, however, had improvement in both OCT and BCVA but a decrease in macula sensitivity.

Conclusions: Besides visual acuity, which can sometimes be subjective, SLO-MP is able to analyze retinal function of various retinal diseases. It can be a useful tool to assess improvement in retina function, especially when the visual acuity is equivocal to treatment.

Meta-analysis of the Efficacy of Compoxip and Razumab in the Treatment of Diabetic Macular Edema

*First Author: Mengying **PENG***

Purpose: To evaluate the difference of clinical efficacy of intravitreal injections of Compoxip and Razumab in the treatment of DME.

Methods: A comprehensive search of PubMed, CBM, CNKI, VIP, and WanFang databases was conducted to obtain randomized controlled trials (RCTs) of Compassix and Razumab for DME in these databases. The risk bias assessment tool of Cochrane was used to assess the risk bias. Risk bias was assessed in the literature. The best corrected visual acuity (BCVA) and central macular thickness (CMT) were selected as the outcome indicators. The weighted mean difference (WMD) is used to measure the continuous variables as the merging effect. This study used Revman 5.2 software of Cochrane Collaboration Network to analyze the merging effect.

Results: Through systematic literature search, this meta-analysis included 5 randomized controlled trial (RCT) studies with 377 eyes, including 187 eyes in Conbercept group and 190 eyes in Ranibizumab group. Statistical analysis showed that there was no significant difference in the improvement of visual acuity between the 2 groups at 3 months of treatment (WMD = 0.02, 95% CI: -0.02 - 0.07, P = 0.33); there was no significant difference in CMT between the 2 groups at 1 and 3 months of treatment 1 month. At 6 months of treatment, the degree of macular edema subsidence in Compaxir group was significantly better than that in Razumab group (WMD = 75.94, 95% CI: -99.79 - 52.09, P < 0.00001).

Conclusions: Compassip and Razumab have similar effects on improving visual acuity of diabetic macular edema. Compassip has better long-term effects than Razumab in alleviating macular edema.

Multicolor Imaging (MCI) in Macular Telangiectasia Type 2 (MacTel Type 2) and Comparative Analysis with Blue Light Fundus Autofluorescence (BAF)

*First Author: Vishal **GOVINDHARI***
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Purpose: The purpose of the study was to describe various clinical findings of mactel type 2 on MCI, compare the same with BAF, and characterize the disease status in a comprehensive manner using non-invasive multimodal imaging.

Methods: Clinically diagnosed patients of mactel type 2 underwent a routine clinical examination, followed by MCI, BAF, and optical coherence tomography (OCT). Analysis included area of retinal involvement, margins of retinal involvement, detection of crystals, BAF grading, and the corresponding findings on MCI and OCT, identifying loci of venule blunting and correlating foci of hypoautofluorescence on BAF with findings on MCI.

Results: A total of 83 eyes of 51 patients were included in the study for image analysis. MCI showed larger areas of retinal involvement with better-defined lesions when compared to BAF. MCI detected crystals as green distinct superficial lesions and hyperautofluorescence on BAF showed corresponding areas of retinal atrophy on MCI (detected as orange-red well-demarcated areas). Both yielded similar mean number of venule blunting foci. Hypoautofluorescence of BAF corresponded to pigment hyperplasia (orange-brown well-defined superficial lesions with overlying venule blunting) and RPE atrophy (areas of enhanced

visualization of underlying bright orange choroidal vessels) on MCI.

Conclusions: MCI, by means of its 3 excitation wavelengths, helps us understand various degenerative changes in mactel type 2 along with BAF and OCT. Detection of crystals, differentiating hyperautofluorescence into areas of retinal atrophy, increased endogenous RPE fluorescence, and differentiating hypoautofluorescence into pigment hyperplasia and RPE atrophy are the advantages of MCI in comparison to BAF.

Multispectral Reflectance Patterns in Lacquer Cracks (LC)

*First Author: Vishal **GOVINDHARI***
*Co-Author(s): Tushar **AGARWAL**, Jay **CHHABLANI***

Purpose: The purpose of this study was to compare the detection rates, clarity of detection, location, the number and pattern of LC on blue reflectance (BR), green reflectance or red-free (RF), infra-red reflectance (IRR), and fundus autofluorescence (FAF).

Methods: Clinically diagnosed cases of LC underwent routine assessment, including refractive error assessment and clinical examination followed by BR, RF, IRR, and FAF imaging on the same day. Images were analyzed for detection and distinctness of LC. The number of LC in each eye were counted, and each LC was classified into 1 of the 2 patterns - linear and stellate. The location of each LC was defined with respect to the nearest point of the LC from the fovea and classified into quadrants, with the fovea at the center.

Results: A total of 18 eyes of 10 patients were included in the study. Detection rates of BR, RF, and IRR were similar and superior when compared to FAF. LC were best identified on RF, followed by BR and IRR. Maximum number of LC was detected on red-free imaging, and a linear pattern was noted in the majority of eyes. Inferior temporal followed by superior temporal quadrant was the most common LC location.

Conclusions: Considering the natural course of LC towards the development of choroidal neovascular membranes and indocyanine green angiography (an invasive technique) as the gold standard for detection of LC, multispectral reflectance imaging is a useful, non-invasive adjunct in the identification of LC. It can be used to detect the progression of LC during routine follow-ups in patients with high myopia.

One-year Outcome of Aflibercept Treatment for Diabetic Macular Edema in Taiwan

*First Author: Yi-Sheng **CHANG***

Purpose: To investigate 1-year outcomes and prognostic factors of "real-world" aflibercept treatment for diabetic macular edema (DME).

Methods: Medical records of DME patients at a medical center in Taiwan treated with aflibercept were retrospectively reviewed during 2017 – 2019. The responder group was defined as those with central retinal thickness (CRT) reduction at least 100 μm at 12 months, while the incomplete responder group was all others.

Results: Among 136 eyes (102 patients; 59.6% men; mean ± SD age 60.3 ± 11.2 years), best corrected visual acuity (BCVA) statistically improved from 0.76 ± 0.37 in logMAR (0.24 ± 0.17 on Landolt C chart; range 0.05 – 0.5) at baseline to 0.66 ± 0.39 (0.30 ± 0.22; range 0.01 – 1.0) at 12 months. CRT statistically improved from 412.5 ± 88.0 μm (range 300 - 630 μm) at baseline to 292.8 ± 73.1 μm (range 166 – 497 μm) at 12 months. At 12 months, 25.0% of eyes gained vision ≥2 lines, 16.2% gained vision ≥ 1 but < 2 lines, and 36.0% were stabilized. On multivariate linear regression, better final visual acuity was significantly associated with younger age, better baseline visual acuity, pseudophakia (compared to phakia), or a patient undergoing cataract surgery during the study period (compared to phakia). More reduction of CRT after injections was associated with higher baseline CRT. The average number of aflibercept injections was 5.2 ± 2.5 within 12 months, which was positively correlated with baseline CRT. Baseline HbA1c level, previous laser photocoagulation, or previous intravitreal

injections did not affect the outcome of visual acuity or CRT.

Conclusions: Aflibercept was an effective treatment toward DME.

Poor Prognostic Factors in Patients with Central Retinal Vein Occlusion

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Purpose: To investigate the poor visual prognosis of patients with central retinal vein occlusion (CRVO).

Methods: We included 150 treatment-naïve patients with unilateral CRVO who had been observed for over 2 years in Japanese multi-institutes (Tsukazaki hospitals, and Kyoto, Kagawa, and Tokushima University hospitals). To treat macular edema, we administered anti-vascular endothelial growth factor (VEGF) drugs pro re nata. According to the final visual acuity (VA) measured using the Snellen chart, we divided the patients into 2 groups: non-severe, with VA ≥ 0.1, and severe, with VA < 0.1, and examined the systemic and ocular manifestations associated with VA.

Results: The number of anti-VEGF injections administered was 5.4 ± 3.4 in the non-severe group and 5.2 ± 4.2 in the severe group. Among the 49 of 150 patients (33%) in the severe group, vitreous hemorrhage and neovascular glaucoma were observed in 10 and 16 patients, respectively, and the VA decreased after 6 months compared to the 3-month value. At baseline, patients in the severe group were older, with more advanced visual impairments and foveal photoreceptor damage compared to the patients in the non-severe group (P = 0.002, < 0.001, and 0.035, respectively). Additionally, hypertension, diabetic retinopathy, and glaucoma were associated with worse visual impairment (odds ratio [95% confidence interval]: 2.3 [1.1 – 4.9], 3.6 [1.2 – 10.7], and 4.9 [1.6 – 15.3], respectively).

Conclusions: After treatment of macular edema with anti-VEGF drugs, one-third of the CRVO patients had a final VA of < 0.1. Old age, hypertension, diabetic retinopathy, and glaucoma were considered the prognostic risk factors.

Rapid Progression of High-risk Proliferative Diabetic Retinopathy Induced by Insulin Intensive Therapy

*First Author: Shuya **WANG***

Purpose: Near-normalization of blood glucose has always been an ultimate goal for diabetes monitoring, especially for the patients with severe diabetic complications. But since the 1980s, several studies have confirmed that insulin intensive therapy (IT) can induce transient progression of diabetic retinopathy (DR) after the rapid drop of blood glucose. But the people included in those studies were all with mild-moderate DR or even without DR. The consequences of insulin IT for patients with proliferative diabetic retinopathy (PDR) are unknown. This case report described a more rapid and serious progression of DR after the insulin IT in a patient with pre-existing PDR.

Methods: A 58-year-old type 2 diabetes female patient suffered a rapid and dramatic decline of vision acuity in the left eye from 20/40 to 20/160 in 2 months after the insulin IT. She has 21-year diabetes with poor glycemic control, and pre-existing PDR before the insulin IT. Her HbA1c dropped from 11% to 7.3% during the 2-months insulin IT.

Results: The affected eye has been performed vitrectomy, and postoperative BCVA improved to 20/160.

Conclusions: Insulin IT for untreated PDR patients can cause severe and irreversible consequences. So for these patients, the conservative treatment for glycemic control may be much safer. But if insulin IT is inevitable, the patient should undergo panretinal photocoagulation promptly before the IT, and close eye monitoring during the IT is essential.

Real-world Outcomes of Intravitreal Therapy on Myopic Choroidal Neovascularization: Data from the Largest Public Anti-VEGF Ophthalmic Service Unit in Hong Kong

*First Author: Chi Lik **AU***
*Co-Author(s): Simon **KO***

Purpose: Myopia is very common in Hong Kong, and myopic choroidal neovascularization (mCNV) is a relatively benign macular disease with treatment by anti-vascular endothelial growth factor (anti-VEGF).

Methods: Patients with mCNV and anti-VEGF injection from 1/6/2017 - 31/5/2018 were recruited. Clinical records were retrospectively reviewed after 1 year of follow-up. Data including basic demographics, ophthalmic investigations and imaging details, visual outcomes, and choice of medications with details of injection were extracted and analyzed with SPSS version 25.

Results: A total of 49 patients with a mean age of 66.5 years (range 50 - 85 years) were included. The male-to-female, right-to-left eye, phakic-to-pseudophakic ratio were all 1:1.1. Background myopia and mean axial length were -11.6 diopters (D) (-4.5 to -19.25 D) sphere and 28.76 mm (26.41 - 31.18 mm), respectively. 14.3% of patients had a history of mCNV in the contralateral eye. None presented simultaneously as bilateral disease. Macula pigment epithelial detachment (PED) with leakage were present in all cases, with 22.6% of eyes having retinal cysts. Baseline visual acuity (VA) and central macula thickness (CMT) were 0.74 logMAR and 443 µm respectively. Both ranibizumab and aflibercept were used in a ratio of 2.4:1. Mean total number of injections was 2.5, without difference between the ranibizumab and aflibercept groups ($P = 0.129$), but more in the only-eye group ($P = 0.034$). 29.0% and 81.7% of eyes were treated with 1 and less than 3 injections, respectively. Anatomical success was 87.1%, with significant improvement in final VA ($P = 0.002$) and CMT ($P = 0.000$) of 0.50 logMAR and 320 µm, respectively. No complications and mortality were detected.

Conclusions: Anti-VEGF is an effective and safe treatment for mCNV. There was no observed difference in outcomes between the ranibizumab and aflibercept groups.

Regulation of High Glucose-induced Retinal Vascular Permeability with Metformin

*First Author: Jing **HAN***

Purpose: Metformin is a drug used for the treatment of Type 2 diabetes mellitus, and has been reported for the beneficial effects other than glucose-lowering. The purpose of this study was to determine the effect of metformin on high glucose (HG)-induced retinal vascular hyperpermeability in vitro.

Methods: Primary human retinal microvascular endothelial cells (hRVECs) were challenged with HG. Effect of metformin on the permeability of cell monolayer was analyzed with transwell monolayer permeability assay. Changes of claudin-5 and occludin were detected with immunofluorescent staining and western blot.

Results: HG at 25 mM induced a dose-dependent increase in the permeability of hRVECs monolayer to FITC-labeled dextran when compared to control. Pretreatment of metformin for 16 h was able to counter the effect of HG significantly ($P < 0.05$). Immunofluorescent staining assay and western blotting revealed HG disrupted the ubiquitous membrane expression of claudin-5 and occludin in hRVEC monolayer. Pretreatment with metformin significantly abolished the effect of HG dose-dependently.

Conclusions: The preliminary study reveals that metformin may possess a protective capacity on high glucose-induced retinal vascular permeability in vitro. The results offer a novel approach for using metformin to control retinal hyperpermeability in diabetic retinopathy.

Retinal Vasculature and Microstructure in Early Dry-type Myopic Maculopathy

*First Author: Jiao **SUN***
*Co-Author(s): Jialin **WANG**, Yanling **WANG***

Purpose: The aim of this cross-sectional study was to characterize and compare the retinal vasculature and microstructure in patients with early dry-type myopic maculopathy.

Methods: Patients with a refractive error of less than -6 diopters were enrolled and classified into 2 groups. Group 1 comprised 82 eyes with a tessellated fundus, and Group 2 comprised 56 eyes with diffuse chorioretinal atrophy (DCA). The clinical characteristics, refractive error, axial length, retinal vessel density of the superficial capillary plexus (SCP) and deep capillary plexus (DCP), macular choroidal thickness, and best corrected visual acuity (BCVA) were compared between the groups. Logistic regression was used to determine the protective and risk factors for DCA.

Results: Group 1 patients were significantly younger and had better BCVA, less myopia, and shorter axial length than Group 2 patients. The vessel densities of the SCP and DCP, choroidal thickness, retinal nerve fiber layer thickness, ganglion cell complex thickness, and retinal thickness were reduced in Group 2. Multiple logistic regression analysis revealed that the vessel densities of the SCP and DCP were protective factors for DCA.

Conclusions: The vessel density of the SCP had the highest diagnostic value (sensitivity = 78.0%, specificity = 96.6%). When the SCP vessel density was reduced to ≤ 49.98%, DCA was indicated. The retinal vessel densities of the SCP and DCP and parameters of microstructure were reduced significantly in patients with DCA. Vessel density may be a better diagnostic indicator of the development of DCA.

Risk Factors of Neovascularization Secondary to Central Retinal Vein Occlusion Receiving Anti-VEGF Therapy

*First Author: Peipei **WU***
*Co-Author(s): Haifeng **XU***

Purpose: To analyze the risk factors associated with neovascularization secondary to central retinal vein occlusion (CRVO).

Methods: Retrospective series of CRVO treated with anti-VEGF in Qingdao Eye Hospital during Oct 2014 to Jun 2018 were followed up for at least 12 months and analyzed.

Results: Among 196 CRVO treated with anti-VEGF, there was more neovascularization that occurred in the group of those aged 40-65 than those under 40 years old and over 65 years old ($P < 0.05$ separately). A higher proportion of patients with secondary neovascularization accompanied by a history of hypertension, visual acuity less than 0.1, RAPD (+), retinal cotton spots, and retina nonperfusion area (NPA) greater than 10 disc areas (DA) in fluorescein fundus angiography (FFA) ($P < 0.01$ separately). 96.5% neovascularization secondary to CRVO received intravitreal injection within 30 days after the first injection for the recurrence of macular edema (ME), which was higher than that of non-neovascularization secondary to CRVO ($P < 0.001$).

Conclusions: Risk factors of neovascularization secondary to CRVO receiving anti-VEGF include age, history of hypertension, visual acuity less than 0.1, RAPD(+), cotton lint spots, NPA greater than 10DA, and the first ME recurrence less than 1 month after anti-VEGF therapy.

Risk Analysis of Diabetic Retinopathy in Type 2 Diabetic Patients

*First Author: Ying **ZHANG***

Purpose: Diabetic retinopathy (DR) is influenced by multiple factors. The aim of this study was to study and analyze the risk factors of DR in patients with type 2 diabetes mellitus (T2DM) and assist medical decision-making.

Methods: Data extraction and cleaning were carried out on the electronic medical records of patients with T2DM from 2013 to 2017. A variety of machine learning models were constructed based on the digital mining to analyze the related risk factors and generate the DR prediction model.

Results: A total of 51,023 diabetic patients were recruited, including 2,991 patients complicated with DR and 48,032 patients who weren't diagnosed with DR. A total of 83 characteristic variables were extracted from electronic medical records, mainly including 6 categories of indicators: demography, complications, biochemical test indicators, signs, medication information, and surgical records. According to the Adaboost model, the importance of characteristic variables was ranked. Top 30 risk factors mainly included serum creatinine, serum urea, nephropathy; HBA1C, fasting blood glucose; aspartate aminotransferases (AST), glutamine transferase (GGT), direct bilirubin, indirect bilirubin, total bilirubin, etc. According to multivariate regression analysis, significant risk factors ($P < 0.01$) included HBA1C, indirect bilirubin, nephropathy, renal failure, artery disease, insulin treatment, and other endocrine diseases.

Conclusions: DR is a common complication of diabetes, which is a blinding disease. The incidence of diabetic retinopathy is increasing. The progress of the diseases seriously affect the patient's quality of life. Analyzing and evaluating the risk factors for the development of DR in patients with T2DM helps patients with early intervention, which is important for preventing disease progression.

Spironolactone Versus Observation in the Treatment of Acute Central Serous Chorioretinopathy

*First Author: Qinghuai **LIU***
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Purpose: To evaluate the efficacy of oral spironolactone, a mineralocorticoid receptor antagonist (MRa), compared with observation in patients with acute central serous chorioretinopathy (CSC).

Methods: This prospective, randomized, controlled clinical study included 30 patients with acute CSC. Eighteen patients were treated with spironolactone (40 mg p.o.b.i.d.) for 2 months in the experimental group and 12 patients received observation in the control group. Main outcome measures included the proportion of eyes achieving complete resolution of subretinal fluid (SRF), change in best corrected visual acuity (BCVA), central macular thickness (CMT), the height of SRF (SRFH), and subfovealchoroidal thickness (SFCT). The follow-up period was 2 months.

Results: Complete resolution of SRF was achieved in 55.6% (10/18) and 8.3% (1/12) of eyes in the MRa group and the control group respectively at 2 months ($P = 0.018$). The mean CMT and SRFH decreased significantly at each visit compared to baseline in both groups ($P < 0.05$), and there was a significant difference between the 2 groups at 2 months ($P = 0.048$, $P = 0.017$, respectively). In the treatment group, the mean baseline SFCT significantly decreased from 502.50 ± 87.38 μm to 427.44 ± 74.37 μm at 2 months ($P < 0.01$) while the change from baseline (from 480.33 ± 102.38 μm to 463.75 ± 100.63 μm) was not significant in the control group ($P = 0.195$). But the differences between 2 groups in BCVA and SFCT were not significant.

Conclusions: Oral spironolactone may be effective with a faster absorption of SRF compared with observation in treating patients with acute CSC.

Spontaneous Choroidal Detachments: A Case Series

*First Author: Jayson **SO***
*Co-Author(s): Jubaida **AQUINO**, Pia Regina **GALVANTE***

Purpose: To present a case series of spontaneous choroidal detachments with associated systemic inflammation.

Methods: Case series

Results: Four eyes from 3 patients (mean age of 58 years old; age range of 55 - 60, all female), with spontaneous choroidal detachment were included. All patients had no history of trauma, episodes of valsalva maneuver, or any ocular surgical interventions. All 3 patients had controlled hypertension and were not on any anti-coagulant or anti-platelet medications. All had elevated erythrocyte sedimentation rate. Case 1 was assessed with ocular tuberculosis with choroidal detachment, Case 2 was assessed with suprachoroidal hemorrhage (SCH) probably secondary to a hemorrhagic polypoidal choroidal vasculopathy complicated with secondary angle closure glaucoma. Case 3 was a combined case of ocular tuberculosis with SCH. The patients with ocular tuberculosis were initially treated medically and eventually had improvement of choroidal lesions and visual acuity (VA) better than no light perception. Case 3 underwent pars plana vitrectomy and injection of silicone oil with a final VA of 5/400. Case 2 had final VA of no light perception and was treated for increased intraocular pressure with transcleral cyclophotocoagulation.

Conclusions: Choroidal detachments have various presentations and etiologies from vascular disorders to inflammatory conditions. A good clinical eye is important for the management of these cases. B-scan ultrasonography is a simple, readily accessible yet effective and invaluable imaging tool to better evaluate posterior segment characteristics. In general, spontaneous choroidal detachments complicate medical and surgical management and often have poor prognosis.

Suspected Macular Light Damage Caused by the Excessive Use of Smartphone

*First Author: Lei **GAO***
*Co-Author(s): Xiang **GAO**, Xudong **HUANG**, Gang **MA**, Jie **ZHANG***

Purpose: Damage to the retina caused by light, especially blue light, is a well-established phenomenon either in the laboratory or in real life. On the other hand, it is true that the spectral peaks for smartphones are very similar to short-wavelength blue visible light. But there is no knowledge of when or if a damage threshold is reached. We describe one patient with suspected macular light damage caused by the excessive use of a smartphone.

Methods: Observational case report

Results: A young man presented with blurred binocular vision for 3 days. The subnormal vision could not be explained by all known macular diseases. Ocular examination including the slit lamp biomicroscopy, autofluorescence, fluoresceinangiography, ICG angiography, multifocal ERG, visual evoked potentials, central visual field, and optical coherence tomography (OCT) angioplex was unremarkable at initial presentation and at 6 months follow-up. OCT revealed subtle defects in the outer segment of fovea, which is in line with the pathological changes of chronic light injury. Detailed history taking revealed that only the extensive long-time viewing of smartphones (6-8 hours almost every night in the dark for 3 years) was considered to be the most likely factor. After a 6-month behavioral intervention, his visual acuity was restored from 20/50 to 20/20 and confirmed with revised OCT images.

Conclusions: If similar reports are confirmed, it will surely have a profound impact on both the manufacturers and the consumers of the smartphone, especially when we are one step into the era of VR.

The 1-year Outcome of Polypoidal Choroidal Vasculopathy After Intravitreal Conbercept Injections Based on "Point to Point" OCTA Follow-up

*First Author: Rui **HUA***

Purpose: To investigate the characteristics of polypoidal choroidal vasculopathy (PCV) on optical coherence tomography angiography (OCTA), and to assess the 1-year prognosis of PCV after intravitreal conbercept injections (IVC) based on point to point OCTA follow-up in a "point to point" manner.

Methods: A PCV case was diagnosed by OCTA and ICGA. Initial three section injections

of conbercept (0.05ml) in loading phase were performed intravitreally. The follow-up lasted 1 year.

Results: At baseline, both polyps and branch vascular network (BVN) were demonstrated by OCTA and ICGA. Additionally, subretinal fluid and macular leakage were also detected by SD-OCT and FFA respectively. The subretinal fluid was absorbed on SD-OCT 1 month after the third section of IVC and lasted to 1 year later. At the final visit, polyps disappeared and BVN changed to "dead tree aspect" on OCTA with a point to point follow-up manner, compared with baseline.

Conclusions: Point to point OCTA follow-up ensured the observation of PCV prognosis after treatment. Moreover, IVC is effective in PCV therapy even though the patient only received loading phase injections.

The Anti-inflammatory and Anti-oxidative Effects of Conbercept in Treatment of Macular Edema Secondary to Retinal Vein Occlusion

*First Author: Jianping **XIA***

Purpose: To investigate the effects of conbercept on inflammatory and oxidative response in macular edema secondary to retinal vein occlusion (RVO-ME).

Methods: Retinal microvasculature were detected by optical coherence tomographic angiography (OCTA). The inflammation-related factors including prostaglandin E1 (PGE1), prostaglandin E2 (PGE2), prostaglandin F2a (PGF2a), intercellular cell adhesion molecule-1 (ICAM-1), and macrophage inflammatory protein-1 (MIP-1) were determined in human and mice with RVO-ME. OCTA images showed that capillary non-perfusion, enlargement of the foveal avascular zone, telangiectatic vessels and some forms of intraretinal edema in RVO-ME and all these were alleviated by conbercept treatment. PGE1, PGE2, PGF2a, ICAM-1, and MIP-1 in aqueous fluid extracted from RVO-ME patients was significantly increased compared with non-RVO subjects.

Results: Intravitreal injection of conbercept partly reduced ICAM-1 and MIP-1 levels but not PGE1, PGE2, and PGF2a. The glutathione level was reduced in aqueous fluid extracted from RVO-ME patients, but was restored after conbercept treatment.

Conclusions: The inflammation, angiogenesis, and ROS generation was increased in RVO-ME mice, and conbercept partly inhibited these effects. Mechanistically, conbercept inhibited vascular endothelial growth factor (VEGF), ICAM-1, MIP-1, NOX-1, and NOX-4 protein expressions, but not PGE1, PGE2, and PGF2a expressions. Conbercept alleviates RVO-ME through inhibiting inflammation, angiogenesis, and oxidative responses. These findings further reveal the molecular mechanism of conbercept for treatment of RVO.

The Outer Layers Characteristics of Retina in Commotion Retinae

*First Author: Liguo **FENG***

Purpose: We reported the multimodality imaging characteristics of retina in Commotion retinae.

Methods: This was a retrospective, observational case report.

Results: A 27-year-old man with sharply decreased visual acuity in left eye visited our clinic after blunt ocular trauma by a steel tube. On examination, his best corrected visual acuity was 20/20 in right eye and counting fingers in left. Intraocular pressure was 18.0 mm Hg and 17.5 mm Hg. External examination showed periorbital swelling and ecchymosis. Slit lamp examination revealed subconjunctiva hemorrhage in left eye and 2.0+ cells in anterior chamber. Dilated fundus examination showed yellow-white opacification of the retina over posterior pole consistent with commotion retinae. Spectral-domain optical coherence tomography (OCT) presented thickened outer plexus layers in nasal fovea and a cavity in foveola. Fundus autofluorescence showed the hypointensity at fovea. After one week, his best corrected visual acuity of left eye was restored to 20/200. Intraocular pressure was 17.0 mm

Hg and 15.0 mm Hg. Cells in anterior chamber were decreased to 1.0+. Opacification of the retina was reduced. Thickened outer plexus layers were decreased and the foveola became atrophy.

Conclusions: The characteristic outer layer changes in Commotion retinae could be presented by multimodality imaging.

Unilateral Exudative Retinal Detachment in Polycythemia Vera Patient

First Author: Md. ***ISLAM***
Co-Author(s): Mst. ***SAYEDATUNNESSA****, Niaz* ***KHAN****, Muhammad* ***MONIRUZZAMAN***

Purpose: To report a case with new signs that could be caused by polycythemia vera itself or just a coincidence and managing it with systemic steroids.

Methods: This was an interventional case report of a 21-year-old patient with polycythemia vera, who presented with acute unilateral vision loss. Ophthalmological investigation revealed exudative retinal detachment in right eye. No vitreous or anterior chamber cellular activity. Patient had associated congenital cardiac disease. Polycythemia vera is a hematological disease that causes an increased number of red blood cells. The patient red blood cells were increased, and he was in compliance with polycythemia vera treatment. All infectious tests were negative, as well as autoimmune disease markers.

Results: Polycythemia vera is a hematological disease that has a few ocular symptoms. These signs include exudative retinal detachments that respond well to corticosteroids.

Conclusions: Systematic corticosteroids show a remarkable improvement in the exudative retinal detachment of polycythemia vera.

Viral Encephalitis Complicated by Acute Retinal Necrosis Syndrome After 10 years: A Case Report

First Author: Zhongping ***CHEN***

Purpose: Acute retinal necrosis (ARN) is a viral infectious disease that progresses rapidly and leads to poor visual prognosis. Viral encephalitis is a common central nervous system infectious disease, and if treated early, the prognosis is usually favorable.

Methods: The study described a case report of a patient who developed bilateral ARN more than 10 years after manifestation of encephalitis. A 45-year-old man was admitted to the hospital with complaints of vision loss in both eyes. According to the results of the examination, the patient was diagnosed with viral encephalitis complicated by bilateral ARN. He underwent intraocular surgery following antiviral drugs and glucocorticoids applications. However, although his binocular retinitis was extinguished, the final vision was limited to finger counts due to retinal necrosis and optic nerve atrophy.

Results: This case shows that ARN can be complicated for more than 10 years after viral encephalitis, resulting in a sharp decrease in vision in a short period of time.

Conclusions: Therefore, timely and accurate diagnosis and early treatment are of great significance.

Retina (Surgical)

Twenty-three-gauge BSS Flow of Dual-pneumatic 10,000 cpm Vitrectomy Probes

First Author: Ying ***ZHU***
Co-Author(s): Dina Joy ***ABULON***

Purpose: Characterize Buffered Saline Solution (BSS) aspiration flow of 23-gauge (Ga) dual-pneumatic 10,000 cuts per minute (cpm) vitrectomy probes at various vitrectomy system settings and compare with previous probes.

Methods: Aspiration flow rates through 23 Ga Advanced UltraVit® and UltraVit® vitrectomy probes were measured using a precision balance (Mettler Toledo, XS with reliability of 0.1 g/ 1 g, Greifensee, Switzerland) that reported the mass of BSS in an open beaker. A LabVIEW VI program calculated the volumetric flow rate from the weight change,

while a vitrectomy probe aspirated BSS from an open beaker. Cut rates of 500, 2,500, 5,000, 7,500, and 10,000 cpm were tested. At each specified duty cycle and cut rate, flow was measured for the same parameter set at least 3 times and averaged. A Welch's statistical T-Test was used to compare the flow rate of two probes.

Results: For cut rates ranging from 500 - 10,000 cpm, the Core duty cycle generated the highest BSS flow (9.65 ± 0.15 - 17.77 ± 0.34 cc/min), while Shave duty cycle generated the lowest BSS flow (5.54 ± 0.36 - 9.24 ± 0.22 cc/min). In the 50% duty cycle, BSS flow associated with 500 - 10,000 cpm cut rates ranged from 9.69 ± 0.25 cc/min to 11.77 ± 0.23 cc/min. At maximum cut rate, 10,000 cpm probes generated 77 - 80% higher BSS flow than previous generation 7,500 cpm probes in the Core, 50%, and Shave duty cycle modes (+4.23 cc/min, P << 0.05; +4.32 cc/min, P << 0.05; +4.02 cc/min, P << 0.05).

Conclusions: The 23 Ga dual-pneumatic probes operating at a maximum cut rate of 10,000 cpm generated significantly greater BSS aspiration than previous generation probes operating at 7,500 cpm.

A Retrospective Analysis of the Efficacy of Dexamethasone Implants in Silicone Oil Filled Eyes with Diabetic Macular Edema

*First Author: Sherine **DSOUZA***
*Co-Author(s): Jivitesh **SINGH***

Purpose: Purpose: The objective of the study was to investigate the efficacy and safety of intravitreal dexamethasone (DEX; Ozurdex; Allergan Inc, Irvine, CA) implants for the treatment of diabetic macular edema (DME) in patients with advanced proliferative diabetic retinopathy who have previously undergone vitrectomy with silicone oil tamponade.

Methods: Material and methods: This was a retrospective, non-randomized, interventional study of 10 patients with a minimum follow-up of 6 months. Each patient had received a 0.7 mg DEX implant after 1 month post-vitrectomy. The change in central macular thickness (CMT) and corrected distance visual acuity (CDVA) in logMAR was ascertained at baseline, at the 3rd month, and at the 6th month. The intraocular pressure (IOP) during the follow-up was also analyzed.

Results: Results: There were 7 males and 3 females in the age group of 40 to 70 years. The mean CMT at baseline was 455.30 microns, at three months was 317.7 microns, and at six months was 344.50. The mean logMAR CDVA at baseline was 0.8, at 3 months was 0.73, and at 6 months was 0.75. The IOP remained stable throughout the follow-up period. The implant did not cause early emulsification of silicone oil in any of the patients. The vision improvement was not statistically significant.

Conclusions: Conclusion: The Dexamethasone implant was effective in reducing the DME in vitrectomized diabetic retinopathy patients with silicone oil tamponade. The implant was well tolerated and hence a viable treatment option for DME in silicone oil-filled eyes.

A Systematic Literature Review of the Efficacy and Safety of Micro-incision Vitrectomy Surgery Tools in Asian Populations

*First Author: Leighton **MORRIS***

Purpose: High-speed microincision vitrectomy surgery (MIVS) has greatly improved vitrectomy procedures. However, the safety of MIVS in Asian populations is not fully understood. The objective of this systematic literature review was to identify publications reporting the efficacy and safety of MIVS tools in Asian patients, in clinical and real-world settings.

Methods: Searches using key terms were conducted in Embase®, PubMed®, and Cochrane databases, supplemented with grey-literature searches. Citations were reviewed by 2 independent researchers. Comparative clinical trials and observational studies conducted in Asian countries were included. Outcomes of interest included visual acuity, surgical time, and complications.

Results: Overall, 1,323 publications were retrieved and screened for eligibility. Ten

comparative studies in Asian patients were eligible for analysis (Japan [n = 6], China [n = 2], Korea [n = 2]). Included patients had various vitreoretinal pathologies including retinal detachment, diabetic retinopathy, and epiretinal membrane. Smaller instrumentation led to faster postoperative improvements in visual acuity. Smaller probes reduced the frequency of postoperative hypotony, but no differences were noted for other complications. In 4 studies, operation times were longer in 27-gauge compared to 25-gauge. The Constellation® vision system led to shorter operation times, smaller intraocular pressure (IOP) fluctuations and fewer cases of abnormal IOP than Accurus®.

Conclusions: In Asian patients, 27-gauge vitrectomy is safe and efficacious, leading to rapid improvements in visual acuity, but longer operation times. Similarly, the Constellation® system reduces surgical times and improves IOP control without increasing rates of complications. Unfortunately, no studies comparing Asian patients to other ethnic groups were uncovered in this review.

A New 2-step Anesthesia for Microincision Vitrectomy Surgery: A Prospective, Randomized Clinical Trial

*First Author: Wensheng **LI***
*Co-Author(s): Hua **FAN***

Purpose: To investigate the safety and efficacy of topical anesthesia combined with sub-conjunctival anesthesia (termed 2-step anesthesia) for small-gauge pars plana vitrectomy or other posterior segment operations.

Methods: Patients (n = 90) were randomized into 3 groups. Group 1 received peribulbar anesthesia, Group 2 received retrobulbar anesthesia, and Group 3 received 2-step anesthesia. Outcomes were assessed during surgery, 1 hour postoperatively, and 24 hours postoperatively. A 5-point visual analog pain scale (VAPS) was used to measure self-report of patient pain and a 5-point visual analog surgeon's discomfort scale (VASS) measured intraoperative surgical ease. Complications were recorded for subsequent analysis.

Results: The VAPS for overall intraoperative pain ranged from 0 - 3 (mean = 1.07; SD = 1.07) in Group 1, from 0 - 2 (mean = 0.69; SD = 0.93) in Group 2, and from 0 - 3 (mean = 1.06; SD = 0.98) in Group 3. The VASS assessment of surgeon discomfort ranged from 0 - 2 (mean = 0.31; SD = 0.66) in the peribulbar group, from 0 - 3 (mean = 0.38; SD = 0.82) in the retrobulbar group, and from 0 - 2 (mean = 0.47; SD = 0.62) in the 2-step group. The VAPS and VASS scores reveal no significant difference among the 3 groups. While there were no complications noted in Group 1, there was an ocular perforation in Group 2.

Conclusions: Two-step anesthesia may be a good alternative to peribulbar anesthesia and retrobulbar anesthesia for most ocular fundus surgeries.

A Study on Pattern of Retinal Detachment in Patients with Choroidal Coloboma and Its Outcome After Surgery at a Tertiary Eye Hospital in Nepal

*First Author: Barsha **SUWAL***
*Co-Author(s): Sanyam **BAJIMAYA**, Govinda **PAUDYAL**, Eli **PRADHAN**, Sanjita **SHARMA**, Raba **THAPA***

Purpose: To study the pattern of retinal detachment (RD) in patients with choroidal coloboma, type of reattachment surgery performed, and to study its outcome in terms of retinal reattachment, visual acuity, and post-surgical complications.

Methods: Observational case series of a single tertiary eye institution of 13 eyes having choroidal coloboma with RD done from January 2015 to June 2017.

Results: Mean age of presentation was 29.3 years (range 14 - 60 years). Males were twice more affected than females (2.25:1). The overall rate of anatomic success achieved after RD repair and silicon oil removal at 6 months was 92.3% (12/13 eyes). Following surgery, visual acuity improved in 6 out of 11 eyes (54.54%), remained unchanged in 4 eyes (36.36%), and worsened in 1 eye (9.1%). The most common

complication following surgery was secondary glaucoma in 30.7% (4/11 eyes).

Conclusions: The overall anatomic success rate of retinal reattachment surgery in colobomatous eye is good and the visual outcome following surgery can improve in a majority of the cases or may remain the same in a few cases. Hence, timely surgery is advocated. But careful follow-up is required, as the risk of postoperative complications is also high.

Analysis of Pars Plana Vitrectomy with Foveola Non-peeling Internal Limiting Membrane Surgery to Treat Foveoschisis in High Myopia

*First Author: Lina **ZHANG***
*Co-Author(s): Zhigang **LV***

Purpose: To analyze the results of pars plana vitrectomy with foveola nonpeeling internal limiting membrane surgery to treat foveoschisis in high myopia (MF).

Methods: This was a retrospective case study. A total of 22 MF patients (23 eyes) were enrolled in this study. There were 7 males (7 eyes) and 15 females (16 eyes), with an average age of (56.23 ± 6.86) years. The preoperative refractive errors ranged from -6.25 D to -13.25 D with the mean of -8.88 ± 2.11 D. The best corrected visual acuity (BCVA) was converted to logMAR acuity, and the average BCVA was (0.87 ± 0.20). Pars plana vitrectomy with foveola nonpeeling internal limiting membrane surgery by ICG dying were performed. Gas tamponade was performed to end the operation. The follow-up was more than 6 months. The BCVA and the foveoschisis cavity were observed at the final follow-up.

Results: At the final follow-up, the foveoschisis cavity of 21 eyes were healed, with BCVA increased and visual distortion alleviated distinctly (91%) (t = 6.652, P < 0. 05).

Conclusions: Pars plana vitrectomy with foveola nonpeeling internal limiting membrane surgery is useful in treating foveoschisis in high myopia with visual function preserved.

Challenging Surgical Management of Vitreomacular Traction Syndrome

*First Author: Farhana **YASMIN***
*Co-Author(s): Arif Hayat **PATHAN***

Purpose: To describe a case of challenging surgical management of vitreomacular traction syndrome.

Methods: Case report

Results: A 56-year-old male patient presented to the retina department of Ispahani Islamia Eye Institute and Hospital with the complaints of gradual dimness of vision in the right eye for more than 6 months. He also complained of objects seen as distorted in shape for the same duration. He had a history of cataract surgery 2 years back and was treated with PRP for proliferative diabetic retinopathy in the right eye. His left eye was a prosthetic eye. On examination, best corrected visual acuity was HM in the R/E and NPL in the L/E. Clinical examination revealed the presence of VMT with macular edema in his right fundus. Optical coherence tomography (OCT) demonstrated the presence of a focal area of abnormal adhesion due to VMT and accumulation of fluid and exudates in the macular region. Considering duration of visual loss, one eye, and consequence of untreated cases, a decision was made for surgical intervention. Pars plana vitrectomy with ILM peeling and gas tamponade at the end of the surgery. Subsequent postoperative follow-up revealed the progressive improvement of visual acuity to 6/36 after 1 month and 6/18 after 3 months. OCT picture after 3 months showed normal foveal contour.

Conclusions: Pars plana vitrectomy with peeling of the internal limiting membrane and gas tamponade provides good outcomes in cases of vitreomacular traction syndrome. Considering one eye, duration, postoperative complications, and consequence of untreated cases PPV is a challenging option for this well-managed patient.

Clinical Observation of Treatments for Retinal Arterial Macroaneurysm

*First Author: Li **XU***

Purpose: To analyze the treatment of retinal arterial macroaneurysm (RAM) and its efficacy.

Methods: A total of 26 diagnoses of retinal arterial microaneurysm made by the Fourth People's Hospital of Shenyang between June 2016 and June 2018 were reviewed following discharge. Various treatment strategies for different types, and complications, of RAM were utilized, with the clinical, anatomical, and functional outcomes being analyzed retrospectively.

Results: Visual prognosis and its efficacy were due to the scope and location of exudation or hemorrhage, disease duration, and treatments employed. Hemorrhagic RAM, edema, or hemorrhage affects the macular region and long disease duration can cause poor prognosis. Vitrectomy with subretinal air tamponade has strong functional and anatomical effects on submacular hemorrhages within 3 weeks.

Conclusions: A suitable, individually adapted treatment of retinal aortic aneurysm should be chosen to achieve a better prognosis.

Clinical Features and Efficacy of Surgery on Rhegmatogenous Retinal Detachment with Unilateral Blindness

*First Author: Rui **LIU***

Purpose: To investigate the clinical characteristics and surgical effect on rhegmatogenous retinal detachment with unilateral blindness

Methods: A total of 78 patients (78 eyes) of rhegmatogenous retinal detachment with unilateral blindness were analyzed retrospectively. Patients underwent minimally invasive vitrectomy in 64 eyes and scleral buckling in 14 eyes according to the size, location of retinal hole, and extent of retinal detachment. All cases were followed up ranging from 6 to 12 months to observe vision and complications.

Results: Successful operation was achieved in 69 eyes (88.5%), including 58 eyes with de-blind (74.4%) (best corrected visual acuities, BCVA ≥ 0.05), and 9 eyes with failed operation (11.5%). The difference of BCVA before and after surgery has statistical significance ($P < 0.05$).

Conclusions: Considering the patient's specificity, preoperative condition assessment, and physician-patient communication are helpful to relieve patients' concerns and reduce medical disputes. Most patients of rhegmatogenous retinal detachment with unilateral blindness undergoing early surgical treatment can be anatomically cured.

Comparative Analysis of Scleral Buckling Using a Chandelier-assisted Technique Versus Conventional Procedure for Primary Rhegmatogenous Retinal Detachment

*First Author: Jingyang **FENG***
*Co-Author(s): Fenge **CHEN**, Ying **FAN***

Purpose: To investigate whether scleral buckling (SB) using a chandelier combined with noncontact wide-field viewing technique is as effective and safe as the conventional SB surgery for primary rhegmatogenous retinal detachment (RRD).

Methods: This retrospective comparative study recruited 60 eyes of 60 patients with primary RRD who underwent a modified SB using a 25-gauge chandelier illumination and noncontact wide-field viewing system (Group A, 30 eyes) or a conventional SB surgery (Group B, 30 eyes). The surgical duration in both groups was recorded. The retinal reattachment rate, pre and postoperative best corrected visual acuity (BCVA), and intraocular pressure were analyzed at 6 months after surgery.

Results: Retinal reattachment was achieved in 29/30 eyes in Group A and 28/30 eyes in Group B, respectively. Mean BCVA was significantly improved in both groups at 6 months postoperatively. The mean operating duration in Group A was markedly shorter than Group B. There were no severe complications found due to the chandelier insertion.

Conclusions: Chandelier-assisted SB combined with noncontact wide-field viewing system is an effective, feasible, and safe method for primary RRD. It has the advantage of identifying the position of retinal holes and facilitating the study of operation compared to conventional SB surgery.

Comparison of Vitreous Removal: 3D Digitally Assisted Visualization System vs Current Standard Visualization

*First Author: Dina Joy **ABULON***
*Co-Author(s): Marco **MURA**, Keven **WILLIAMS***

Purpose: To determine if 3D Digitally Assisted Visualization System (DAVS) allows the surgeon to remove more vitreous during vitrectomy than the standard surgical microscope.

Methods: A three-port valved 23 gauge PPV was performed in 15 live pigs using the CONSTELLATION® Vision System comparing the NGENUITY® 3D DAVS with a standard surgical microscope (all products from Alcon, Fort Worth, TX). PVD followed by a core and peripheral vitrectomy without scleral depression was performed. For residual vitreous assessment, each eye was enucleated, bisected posterior to lens, irrigation solution was drained, extraneous irrigating solution was removed by blotting, and the eye was weighed by a masked observer. Then residual vitreous was stripped from the remaining ocular tissues with a surgical sponge and the eye was weighed a second time. The second weight was subtracted from the first to determine residual vitreous weight. The paired difference in residual vitreous between arms were analyzed using a paired t-test at 0.05 type I level.

Results: Average residual vitreous was 0.580 ± 0.269 g with standard visualization and 0.143 ± 0.146 g with 3D DAVS. Vitreous removal with 3D DAVS was significantly greater than vitrectomy with standard visualization ($P < 0.0001$) with a mean paired difference of 0.436 g.

Conclusions: Surgery with 3D DAVS resulted in significantly less residual vitreous than with standard visualization, indicating that 3D DAVS allowed the surgeon to see more vitreous in the periphery and perform a more complete vitrectomy.

Discussion on the Etiology of Vitreous Hemorrhage and the Best Time of Surgical Treatment

*First Author: Lanlan **ZHANG***

Purpose: To analyze the etiology of vitreous hemorrhage, observe the clinical effect of surgical treatment, and discuss the best time of surgical treatment.

Methods: Retrospective analysis of 103 eyes of patients with vitreous hemorrhage admitted to our hospital from August 2018 to December 2018, all of whom received 25G vitrectomy, analyzed the etiologies, observed the changes in postoperative vision, and discussed the best time for surgical treatment.

Results: Diabetic retinopathy 44 eyes (42.72%), retinal vein occlusion 33 eyes (32.04%), rhegmatogenous retinal detachment 11 eyes (10.68%), ocular trauma 6 eyes (5.82%), Eales disease 4 eyes (3.88%), retinal vasculitis 3 eyes (2.91%). Postoperative vision were increased for 83 eyes (80.58%), were not increased for 14 eyes (13.59%), and decreased for 6 eyes (5.83%).

Conclusions: Middle-aged and older patients with vitreous hemorrhage in diabetic retinopathy and retinal vein occlusion with up to see, young patients with Eales diseases for the most common. 25G vitrectomy in the treatment of vitreous hemorrhage curative effect significantly, can effectively improve vision, improve visual function, in the era of vitreous retinal minimally invasive surgery, don't wait blindly hemorrhage absorption, thus miss the best timing of the surgical treatment, should be surgical treatment as soon as possible in order to make clear the cause, to guide the next treatment.

Duty Cycle of 23-gauge of Dual-pneumatic 10,000 cpm Vitrectomy Probes

*First Author: Ishaq **MOHAMEDY***
*Co-Author(s): Ying **ZHU***

Purpose: To examine the duty cycle of 23-gauge (Ga) dual-pneumatic 10,000 cuts per minute (cpm) vitrectomy probes as a function of cut rate and various duty cycle modes, then compare duty cycles of 2 dual-pneumatic probe designs at maximum cut rate.

Methods: Advanced UltraVit® and UltraVit® 23 Ga vitrectomy probes were evaluated at cut rates of 500, 2,500, 5,000, 7,500, and 10,000 cpm and at all 3 duty cycle modes (ie, Core, 50/50, and Shave) on the CONSTELLATION® Vision System. A Keyence digital high-speed camera was focused on the port of the vitrectomy probe using a high magnification camera lens. Duty cycle was measured as the percent of open cycle time (OCT) to whole cycle time (WCT). The OCT was the duration with which the cutter was more than halfway open. The WCT was the duration of 1 cut cycle. Average duty cycle and standard deviations were reported. A Welch's statistical T-Test was used to compare the duty cycle of both groups.

Results: Core duty cycle ranged from 56.95 - 82.22% as cut rate increased from 500 to 10,000 cpm, while Shave duty cycle ranged from 20.27 - 56.47% with increasing cut rate. In the 50% mode, duty cycle ranged 51.51 - 56.76%. When comparing 10,000 cpm probes to previous generation 7,500 cpm probes at maximum cut rate, there was a 9 - 12% increase in the Core, 50%, and Shave duty cycle modes (+4.87%, $P < 0.05$; +5.72%, $P < 0.05$; +5.95%, $P < 0.05$).

Conclusions: The performance of 23 Ga vitrectomy probes appears to be optimized at 10,000 cpm.

Effects of Vitrectomy on the Optic Nerve Head Blood Flow in Patients with Proliferative Diabetic Retinopathy

*First Author: Yurie **MATSUOKA***
*Co-Author(s): Fumihito **HIKAGE**, Yosuke **IDA**, Kaku **ITOH**, Hiroshi **OHGURO**, Chiaki **OTA***

Purpose: To study the effects of vitrectomy on the optic nerve head blood flow in patients with proliferative diabetic retinopathy. Laser speckle flowgraphy (LSGF) was measured before and after the surgery.

Methods: Twenty-three eyes of 23 patients who underwent vitrectomy at our university hospital were recruited in the current study. The optic nerve head blood flow by LSFG before and 2 weeks after operation. In addition, the average blood pressure and ocular perfusion pressure were measured before and after surgery.

Results: In all eyes measured, blood flow levels in the central retinal artery and on both the nasal and temporal sides of the optic nerve head greatly increased after surgery. In eyes with more than a 59% increase in the blood flow at the optic disk temporal side after vitrectomy, visual acuity was ameliorated.

Conclusions: Evaluating the optic nerve head blood flow by LSFG is useful for prediction of postoperative visual acuity prognosis after vitrectomy in patients with proliferative diabetic retinopathy.

Efficiency and Safety of Pars Plana Vitrectomy Using a Bevel-tip, Ultra-high Speed, 25-gauge Cutter

*First Author: Harvey **UY***
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Purpose: To determine the efficiency and safety of pars plana vitrectomy (PPV) using bevel-tip, 10000 cut per minute (cpm) 25-gauge cutter probes.

Methods: Prospective, single-center, interventional case series. We included eyes that underwent primary PPV using a novel, bevel-tip, 10000 cpm, 25-gauge cutter, for various indications including non-resolving vitreous opacification, epiretinal membrane,

macular hole, and sight-threatening retinal detachment (RD). Main outcome measures: operative duration, perioperative intraocular pressure (IOP), rate of surgical success, number of surgical steps, usage of accessory instrument, visual outcomes, and operative complications.

Results: Fifty patients were enrolled. The mean age was 57.4 ± 14.7 (range, 16 - 84). The mean core vitrectomy duration was 231 ± 90.6 (range, 61 - 603) seconds; the mean shave vitrectomy duration was 380.4 ± 340.8 (range, 120 - 1740) seconds; the mean total operative duration was 1970.5 ± 949.6 (range, 480 - 3780) seconds. The mean pre-, end-of-surgery, and first postoperative day IOP were: 12.8 ± 3.7, 8.2 ± 3.3, and 10.9 ± 5.5 mm Hg, respectively. The surgical objective was successfully achieved in all eyes. The mean number of surgical steps was 4.1 ± 1.4; the mean number times an accessory instrument was placed inside the eye was 4.5 ± 2.1 times. The mean distance-corrected visual acuity improved from 20/150 to 20/60. Intraoperative complications included iatrogenic retinal hemorrhage from nicking a retinal blood vessel and subretinal placement of the infusion cannula requiring repositioning. The most common postoperative complications were hypotony (IOP < 4 mm Hg) in 2 eyes (4%) and elevated IOP (> 22 mm Hg) in 2 eyes (4%). Forty-two (84%) patients reported no discomfort after surgery while 6 (12%) reported mild discomfort.

Conclusions: This new PPV instrumentation appears effective, efficient, and safe for vitreoretinal procedures.

Evaluation of the Therapeutic Effect of Vitreous Hemorrhage Caused by PCV

*First Author: Lina **GE***

Purpose: To investigate the effect of vitrectomy on vitreous hemorrhage caused by PCV.

Methods: Ten patients with vitreous hemorrhage caused by PCV were treated with vitrectomy from July 2018 to May 2019. Normal ophthalmic examinations and fundus fluorescein angiography were operated after vitrectomy.

Results: A total of 10 patients with vitreous hemorrhage caused by PCV were collected for routine ophthalmologic examination. All patients underwent vitrectomy, followed by normal ophthalmologic examination and fundus fluorescein angiography. Visual acuity improved in 5 patients, remained unchanged in 5 patients, and silicone oil was injected in 2 patients. Fundus fluorescein angiography showed no obvious polypoid lesions.

Conclusions: Vitrectomy is effective for vitreous hemorrhage caused by PCV. No polypoid lesion was found in fundus fluorescein angiography.

Fluid Flow Performance 27-gauge Dual Cutters

*First Author: Ishaq **MOHAMEDY***
*Co-Author(s): Dina Joy **ABULON***

Purpose: To measure the fluid flow performance of 27-gauge (Ga) 20,000 cuts per minute (cpm) vitrectomy probes and compare flow at maximum cut rate (20,000 cpm) to 10,000 cpm probes.

Methods: During 27+® Ga Advanced UltraVit® and HyperVit® (Alcon, Fort Worth, TX) probe aspiration of fluid, a LabVIEW VI program (National Instruments, Austin, TX) calculated volumetric flow at various cut rates (2,500 - 20,000 cpm) and duty cycle modes. For each test, flow was measured 3 times. Average flow rates and standard deviations were reported. A Welch's t-test compared HyperVit® flow at maximum cut rate (20,000 cpm) to previous generation Advanced UltraVit flow at maximum cut rate (10,000 cpm) with statistical significance level of $P < 0.05$.

Results: Fluid flow of 27 Ga cutters was similar for all cut rates. In the shave mode, fluid flow ranged from 8.38 ± 0.24 to 8.6 5 ± 0.29 cc/min. In core duty cycle, flow ranged 8.27 ± 0.34 to 8.49 ± 0.45 cc/min. In 50% duty cycle mode, fluid flow was 8.37 ± 0.26 to 8.57 ± 0.28 cc/min. The 20,000 cpm probes generated 63 - 64% higher fluid flow than previous generation 10,000 cpm probes at maximum cut rate in the Core, 50%, and Shave duty cycle modes (+3.19

cc/min, P < 0.05; +3.25 cc/min, P < 0.05; +3.27 cc/min, P < 0.05).

Conclusions: At a maximum cut rate of 20,000 cpm, 27 Ga probes generated significantly greater fluid aspiration than previous generation probes at maximum cut rate (10,000 cpm). When operating at 20,000 cpm, dual pneumatic probes optimize aspiration.

Long-lasting Viscoelastics Suprachoroidal Buckling for Rhegmatogenous Retinal Detachments in Chinese Population: A Preliminary Report

*First Author: Yun **LI***

Purpose: To report preliminary outcomes of suprachoroidal buckling for the management of peripheral retinal breaks in rhegmatogenous retinal detachment.

Methods: A prospective study of patients underwent suprachoroidal buckling for the management of rhegmatogenous retinal detachment (RRD) in a single center. Patients were consecutively recruited, with exclusion criteria as 1. Affected eye is the only eye 2. Uncooperative (age < 12 or mental disability) 3. Refusal to participate. A suprachoroidal cannula (MedOne, USA) was inserted into the suprachoroidal space to the position of the retinal break. Randomizely allocated Healaflow and Healon5 were injected to form a dome-shaped suprachoroidal indentation to achieve chorio-retinal attachment, compared with the routine scleral explant buckle. Best corrected visual acuity (BCVA) was the primary outcome measure. Final retinal reattachment rate, single-surgery reattachment rate, and complications were secondary outcome measures.

Results: Eight eyes of 8 consecutive patients were recruited. Seven patients were followed for at least 6 months. Single surgery reattachment rate was 71.4% (5/7 eyes). BCVA was improved or maintained in all cases. Final retinal reattachment was achieved in all 8 eyes (100%). No major complications were observed. No significant difference in visual acuity or anatomical reattachment was found in terms of filler material, retinal break quadrant, or extent. The 2 failed cases were both with moderate vitreous hemorrhage, and RRD relapse in 2-3 months time after the initial attachment of the retina.

Conclusions: Suprachoroidal buckling is an effective procedure for the management of RRD in selected cases, while there is a moderate learning curve.

Macular Hole Retinal Detachment in a Patient with Cytomegalovirus Retinitis

*First Author: Kiet-Phang **LING***
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Purpose: To report a rare case of macular hole retinal detachment (MHRD) in a young patient with cytomegalovirus (CMV) retinitis.

Methods: Case report

Results: A 34-year-old male with systemic retroviral disease who had both eyes treated for CMV retinitis in 2018. After completing the antiviral therapy, his right eye vision was counting fingers, and fundoscopy revealed extensive macular thinning with macular hole. Subsequently, he presented with deteriorated right eye vision to hand movement, and fundoscopy revealed retinal detachment confined to the posterior pole. The patient received pars plana vitrectomy (PPV) and intraoperatively, the right eye revealed macular hole induced retinal detachment (stage 2). No other periphery break was seen. Thus, the inverted internal limiting membrane peeling was done. After flattening the retina, the vitreous cavity was completely filled with silicone oil. As of the last clinical visit, the visual acuity of this patient had recovered to counting fingers. The macular hole had closed and the retina had reattached.

Conclusions: The pathogenesis of MH formation and development of MHDR after CMV retinitis remains unclear. Macular traction with the retinochoroidal atrophy might be the underlying mechanism of this complication.

Outcome of Primary Rhegmatogenous Retinal Detachment Surgery in an Eye Center in Singapore

*First Author: Wenting **ZHOU***
*Co-Author(s): Kelvin **LI**, Rajesh **RAJAGOPALAN**, Wai Kitt **CHEE**, Chun Hau **CHUA**, Wenjun **SONG***

Purpose: To report the primary success outcome of patients with primary rhegmatogenous retinal detachment (RRD) who underwent retinal detachment repair surgery in an eye center in Singapore.

Methods: This was a retrospective case series of all patients who underwent primary RRD repair between January 1, 2015 and December 31, 2015. All clinical records were reviewed. Patients' demographics, duration from consult to surgery, overall primary anatomical and functional success outcome, and complication rates were identified. Subgroup analysis according to predisposing factors, preoperative macular status, and preoperative proliferative vitreoretinopathy (PVR) was also performed.

Results: A total of 100 eyes of primary RRD were included. Mean age of the patients at time of surgery was 53.25 years. The main predisposing factors were identified including previous cataract surgery (37.8%), peripheral retinal degeneration (19.4%), and high myope (12.6%). A total of 67 eyes had macula-off RRD, 25 eyes had macula-on RRD, and 8 eyes had macula-splitting RRD. Thirty-nine eyes (39.4%) had preoperative PVR. 64% of the eyes underwent surgery within 24 hours from consultation. Overall, primary anatomical and functional success rates were 90% and 88% respectively at 1-year follow-up. There was no significant difference in the primary anatomical success rate in relation to the baseline macular status. The presence of predisposing factors and PVR negatively affected the primary anatomical success rate. The most common intraoperative and postoperative complication was iatrogenic retinal breaks (91.3%) and cataract (34.8%), respectively.

Conclusions: This study demonstrates a success rate comparable with other international audit results with a low rate of failure.

Outcome of Rhegmatogenous Retinal Detachment Repair by Scleral Buckling: 10-year Experience of a Local Eye Hospital in Hong Kong

*First Author: Chi Lik **AU***
*Co-Author(s): Kenneth Kai Wang **LI***

Purpose: In the era of vitrectomy, scleral buckling for rhegmatogenous retinal detachment (RRD) repair becomes a lost art. This external approach for RRD repair helps preserve the vitreous and the clear lens. Outcomes of scleral buckling cases for RRD repair in a local eye hospital in Hong Kong from 2009 - 2018 were reviewed.

Methods: Operation records for scleral buckling of eye for RRD repair from 1/1/2009 - 12/31/2018 were retrospectively reviewed. Vitrectomy cases were excluded. Data on patients' demographics, risk factors for RRD, characteristics of RRD, operation details, visual outcomes, and complications were extracted. Analyses were done by SPSS (IBM) version 25.

Results: A total of 135 patients, with a male-to-female ratio of 1:1.02 were identified. Their ages ranged from 8 to 78 years old, with a mean of 44.3 years old. 10.5% were pediatric patients, with eczema as the identifiable risk factor. Multiple breaks were identified in 48.5% of eyes, and superotemporal quadrant was the most common (55.8%) quadrant to localize the break. 71.6% of eyes underwent DACE (Drainage-Air-Cryotherapy-Explant), whereas 28.4% were non-drainage surgery. Primary success rate for DACE and non-drainage surgery were 89.7% and 81.5%, respectively. Myopic shift after encircling buckle was 0-3.5 diopters, with a mean of 1.7 diopters. Epithelial defects were the most common (21.0%) transient postoperative complications, followed by subretinal hemorrhage over the drainage site (14.5%). Epiretinal membrane developed in 14.7% of eyes over 10 years of follow-up, and gas injection in DACE was the identifiable risk factor.

Conclusions: Scleral buckling for RRD achieves a high anatomical and visual success. This surgical option is useful for preservation of

vitreous and clear lens, especially meaningful in young patients.

Outcome of Vitrectomy, Scleral Drain, Endolaser, and Silicone Oil Tamponade in the Management of Serous Choroidal Detachment (CD) with Retinal Detachment

First Author: Abul ***SHEIKH***
Co-Author(s): Mst. ***SAYEDATUNNESSA****, Md.* ***ISLAM****, Niaz* ***KHAN****, Muhammad* ***MONIRUZZAMAN***

Purpose: To evaluate anatomical and functional outcomes in CD with retinal detachment undergoing pars plana vitrectomy (PPV), CD drain, followed by fluid-air exchange, endolaser, and finally air-silicone oil exchange.

Methods: This was a prospective study of 5 eyes of 4 patients with serous annular choroidal detachment from postoperative hypotony after phaco surgery, who were recruited from September 10, 2018 to March 15, 2019. All cases were with total non-rhegmatogenous retinal detachment plus PVR change. One female patient was bilaterally affected, and 3 males in a single eye. First CD developed in severe form, followed by NRD and PVR change. All cases were treated conservatively, with systemic steroid and mydriatics. Visual acuity was perception of light and projection of rays in all cases. Intraocular pressure (IOP) was 2 - 4 mm Hg. Pars plana vitrectomy was done first, then drainage of CD was done by maintaining infusion pressure 40 - 50 mm Hg.

Results: First POD anterior chamber was deep and quiet in all eyes. Corneal striation was found in 1 eye. No CD in any eye, and retina was flat in all eyes. After 7 days, visual acuity was counting fingers (CF) in all eyes. IOP was 10 ±1.58 mm Hg. After 6 months, best corrected visual acuity was CF to 20/200. IOP was 11.2 ± 1.92 mm Hg. Retina was flat in all eyes. Silicone oil was not removed.

Conclusions: Pars plana vitrectomy and drainage of choroidal detachment followed by fluid-air exchange, endolaser, and introduction of silicone oil provides better anatomical results in CD with RD.

Pars Plana Vitrectomy for Retinal Detachment with Large Macular Intraretinal Cyst

First Author: Arif Hayat ***PATHAN***
Co-Author(s): Mohammad ***MALEK****, Nazmun* ***NAHAR****, Nusrat* ***NIZAM****, Mostafizur* ***RAHMAN***

Purpose: To describe the diagnosis and management of a macular intraretinal cyst along with retinal detachment.

Methods: Case report

Results: A 54-year-old man with a history of sudden diminution of vision in the right eye for 4 years. On examination, patient has right eye visual acuity of projection of light + projection of rays present in all quadrants and left eye 6/24. Pupil was sluggishly reacting to light in right eye. Rest anterior segment finding was normal in both eyes. Right eye media was hazy. CFP done for documentation and B-scan done to confirm the diagnosis. Intraretinal cyst was noted at macula. Pars plana vitrectomy performed. A intraretinal macrocyst at the macula seen. Retinotomy and retinectomy were performed over temporal retinal side. Retina was folded over the disc so that cyst over macula can be approached sub-retinal way. Initially, retinal cyst was punctured with vitrectomy cutter and fluid was drained. Rest of walls of the cyst were trimmed, and attached wall was removed with forceps. Endolaser was done and silicone oil was used.

Conclusions: Intraretinal cysts are associated with long-standing retinal detachment. It is very rare to get retina cysts at the macula. Periodic fundus examination is essential for their detection. Surgical management gives complete removal of the cyst and maintains the integrity of the retina.

Peeling Internal Limiting Membrane of Maculopathy in High Myopia

First Author: Hongbing ***ZHANG***

Purpose: To explore the characteristics of internal limiting membrane (ILM) in high myopia during peeling.

Methods: ILM of macular holes with choroidal atrophy (white hole) or not and macular

epiretinal membrane in high myopia in 31 cases was peeled by 1 vitrectomy surgeon.

Results: All operations were successfully done by the same vitrectomy surgeon. ILM of macular hole in high myopia with no choroidal atrophy in 7 cases can be easily detected and peeled just as idiopathic macular hole, while not easily done in high myopia with choroidal atrophy (white hole) in 5 cases because of hypochromic and fragile ILM and white background. In 6 cases of macular epiretinal membrane, epiretinal membrane and ILM was not separated from each other and peeled together. In 7 cases of retinal detachment induced by macular hole, ILM were not easily peeled because of tight adhesion between ILM and the tissue under it in the cases with no choroidal atrophy. While in 6 cases with choroidal atrophy, it is difficult to peel ILM without severely harming the tissue under it.

Conclusions: Peeling ILM of maculopathy in high myopia is not the same as in no high myopia. More attention should be paid to it during peeling.

Performance Evaluation of Small Gauge 25+ High Speed Vitrectomy Probes

*First Author: Ying **ZHU***
*Co-Author(s): Dina Joy **ABULON***

Purpose: This study assessed the performance of smaller instruments by measuring vitreous flow rates of 25-gauge dual-pneumatic probes under various duty cycle modes and high-speed cut rates up to 10,000 cpm.

Methods: Six 25+® gauge Advanced UltraVit® vitrectomy probes were tested using the CONSTELLATION® Vision System (Alcon Laboratories, Inc.). Each probe was evaluated at 3 duty cycle modes (ie, port biased open, 50% port open time, port biased closed), at various cut rates (ie, 2500, 5000, 7500, and 10,000 cpm), using 650 mm Hg vacuum. During simulated vitrectomy, an electronic balance (Mettler Toledo MS 2014S) measured the volume of aspirated vitreous during a 1 minute time frame. Average vitreous flow rates were calculated using the density of vitreous, change in weight, and duration of aspiration.

Results: The 25-gauge vitreous flow rates associated with the biased-open mode increased from 2.72 ± 0.34 to 2.83 ± 0.27 as cut rate increased from 2,500 cpm to 10,000 cpm. Vitreous flow rates associated with the 50% port open duty cycle increased from 2.19 ± 0.23 cc/min to 2.84 ± 0.27 cc/min as cut rates increased from 2,500 cpm to 10,000 cpm. In the biased-closed duty cycle mode, vitreous flow rates also increased from 1.89 ± 0.31 cc/min at 2500 cpm to 2.78 ± 0.15 cc/min at 10,000 cpm. With all 3 duty cycles, maximum vitreous flow rates were associated with the maximum cut rate of 10,000 cpm.

Conclusions: The 10,000 cpm cut rates of the dual-pneumatic high-speed vitrectomy probes may optimize vitreous aspiration.

Relationship of Gender with Laser Retinopexy for Retinal Breaks

*First Author: Siddiqui M. A. **REHMAN***
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Purpose: To explore the relationship of gender with laser retinopexy for retinal breaks in Pakistani population.

Methods: This was a 10-year retrospective study. All consecutive patients undergoing laser retinopexy, between January 2009 and December 2018, for retinal tear or high-risk retinal degeneration (such as lattice degeneration) were included in the study. Data was collected from patients' files. Eyes with a history or treatment of retinal detachment in the index eye were excluded. Structured proforma was used to collect information. Descriptive statistics were used to explore relationship between gender and patients undergoing laser retinopexy.

Results: We identified 12,457 patients through the coding system of our hospital who underwent various laser procedures from January 2009 to December 2018. YAG laser, laser PI, and 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. Among 958 patients, males were in higher numbers 515 (53.87%). 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; 27.13% and 24.79% of patients underwent laser retinopexy for left and right eye, respectively.

Conclusions: In our study, laser retinopexy was more commonly performed in men as compared to women. The ratio was not significantly different from the prevalence of retinal tears and retinal detachment in the general population, which has slightly higher male preponderance.

Result of Pars Plana Vitrectomy (PPV), Endolaser, and Silicone Oil Introduction in a Child with Acute Promyelocytic Leukemia

*First Author: Abul **SHEIKH***
*Co-Author(s): Tariq **ALI**, Fahad **HOSSEN**, Md. **ISLAM**, Niaz **KHAN**, Muhammad **MONIRUZZAMAN***

Purpose: To report the outcome of pars plana vitrectomy, endolaser, and silicone oil introduction done in a child with massive vitreous hemorrhage from acute myelocytic leukemia.

Methods: We performed 23G pars plana vitrectomy, endolaser around the holes, and silicone oil injection in left eye under local anesthesia on September 20, 2018. Vitrectomy was not done in right eye due to poor general condition.

Results: After 6 months, his visual acuity in right eye was NPL and in left eye was CF (counting fingers). Lens in both eyes was clear. Fundus in left was done, which showed normal disc color and black retina with mottled yellow white deposition in the periphery. Right eye has become worse, as intervention was not possible due to his poor health. Silicone oil in left eye was removed under local anesthesia on May 25, 2019. Last follow-up on July 3, 2019, we found him with visual acuity in right eye as NPL and in left eye as CF.

Conclusions: By doing PPV, endolaser, silicone oil injection, and finally removal of silicone oil, we successfully managed one eye of a child having acute promyelocytic leukemia with massive vitreous hemorrhage. So, we want to report the outcome of this procedure and convey a message not to deny surgical intervention in these patients.

Risk Factors Analysis of Silicone Oil Emulsification: A Retrospective Study

*First Author: Yi **LU***
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Purpose: To investigate the risk factors contributed to the silicone oil emulsification after intravitreal silicone oil tamponade usage in vitreoretinal surgery.

Methods: The retrospective study included 29 eyes of 26 patients who took follow-up visits from October 2016 to December 2016 after vitrectomy with silicone oil tamponade. Silicone oil emulsification in anterior chamber was quantified by calculating the ratio of emulsified silicone oil area over corneal area using anterior ocular images. Medical records and information on postoperative lifestyle were investigated and assessed as potential risk factors associated with silicone oil emulsification using regression analysis.

Results: The duration of silicone oil tamponade (SOTT) was 600 ± 758 days. The average emulsified silicone oil area/corneal area ratio (ECR) was 0.16 ± 0.18. The regression analysis indicated that longer eye/head movement time after the first month post-operation might be an independent risk factor for silicone oil emulsification (P = 0.024).

Conclusions: A novel method to evaluate silicone oil emulsification was introduced. To prevent or postpone the occurrence of silicone oil emulsification, the patients should be advised for less eye/head movement even after first month post-operation. For those who could not avoid frequent activities involving eye/head

movement, shorter follow-up duration would be necessary.

Simulation of the Refraction Error of the Incident Light at the Surface of the Retina in Patients with Epi-retinal Membrane

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Purpose: To simulate the refraction error of the incident light at the surface of the retina in patients with epi-retinal membrane (ERM) using spectral domain-optical coherence tomography (OCT).

Methods: Thirty-five eyes from 35 patients with ERM were included in the study. Ten fellow eyes without macular disease were included as normal controls. A total of 256 OCT Bscan images (DRI OCT Triton, TOPCON®) in the range of 7 x 7 mm around the macula was to analyze to outline the boundary of vitreous and inter limiting membrane (ILM), external limiting membrane (ELM) RPE line using the detection tool with a manual correction, and tangents and normals on the ILM surface was drawn to calculate to light deviation amount (LDA) at the ELM level. Calculations are based on the Shell's Law and a refractive index of 1.335 for the vitreous and 1.359 for the retina with assuming ERM interface to ILM distance of 300 μm. The correlations between LDA and visual acuity and MCHART score were then evaluated

Results: The average of LDA in the vertical and horizontal directions in the ERM group was found to be 0.67 μm and 0.61 μm, respectively, which are significantly larger than those of normal control, and the maximum LDA was 5.75 and 6.91 μm, respectively. We could not find any significant correlation with LDA and MCHART score and visual acuity.

Conclusions: Incident light is abnormally refracted at the surface of ILM in patients with ERM. However, it is too small to affect the MCHART score.

Surgical Outcome of Full Thickness Macular Hole in Idiopathic Type 2 Macular Telangiectasia

*First Author: Syed **ABDUL KHADAR***
*Co-Author(s): Reddy **Y. C.***

Purpose: To describe surgical outcomes of full-thickness macular holes (FTMH) in idiopathic macular telangiectasia (MacTel) Type 2 in 3 eyes of 2 patients.

Methods: Retrospective interventional case series with a review of medical records, including optical coherence tomography and fluorescein angiography, done in a tertiary eye care center in south India.

Results: Two eyes of 1 patient and 1 eye of another patient underwent cataract extraction and intraocular lens (IOL) implantation, along with pars plana vitrectomy, internal limiting membrane peeling, gas tamponade, and prone positioning. In patient who underwent bilateral surgery, 1 eye had hole closure and the other eye did not. The second patient had hole closure after surgery. The eyes that achieved closure had thickened cystic margins with less atrophy or flattened atrophic margin, and had better visual improvement compared to the failed eye.

Conclusions: Prognosis of surgery for full thickness macular hole in MacTel Type 2 is guarded than typical idiopathic FTMH because of the intrinsic nature of the disease. The amount of tissue atrophy at the edges and configuration of the MH on optical coherence tomography can provide insight about the surgical prognosis.

The Effect of SF6 Tamponade in Idiopathic Epiretinal Membrane Surgery: 1-year Follow-up Result

*First Author: Sung Jin **LEE***

Purpose: To compare the effects and safeties of SF6 (Sulfur Hexafluoride) tamponade and no gas tamponade on visual acuity and central macular thickness (CMT) after vitrectomy for idiopathic epiretinal membrane (ERM).

Methods: A total of 75 eyes of 75 patients who underwent vitrectomy for idiopathic ERM and who were followed up with 12 months or longer after vitrectomy were retrospectively studied. The patients were divided into 2 groups; Group I (40 eyes, no gas tamponade), Group II (35 eyes, SF6 tamponade). Ophthalmic examination including best corrected visual acuity (BCVA) and CMT using optical coherence tomography (OCT) were measured at baseline and 1, 3, 6, and 12 months after surgery.

Results: Preoperatively, the mean BCVA was 0.34 ± 0.25 in Group I, 0.27 ± 0.29 in Group II, and the mean CMT was 434.15 ± 77.31 in Group I, 432.77 ± in Group II. There was no statistically significant difference (BCVA; P = 0.18, CMT; P = 0.625). The mean BCVA in Group I at postoperative 1 month was significantly better than Group II (Group I; 0.30 ± 0.30, Group II; 0.43 ± 0.29, P = 0.024). There was no statistically significant difference in BCVA between the 2 groups except 1 month after surgery. Postoperatively, the mean CMT was significantly decreased in both groups, but there was no statistically significant difference between the 2 groups at all follow-up periods.

Conclusions: SF6 tamponade had no different effects on BCVA and CMT compared with no gas tamponade after idiopathic ERM surgery. However, the mean BCVA in Group II at postoperative 1 month was significantly poor compared with Group I. SF6 had transient and reversible retinal toxicity.

Twenty-five-gauge Pars Plana Vitrectomy in Management of Advanced Proliferative Diabetic Retinopathy

*First Author: Bhuvan **CHANANA***
*Co-Author(s): Sudhank **BHARTI***

Purpose: To study the anatomical and functional outcomes of 25-gauge pars plana vitrectomy in advanced proliferative diabetic retinopathy (PDR).

Methods: Twenty-eight eyes of 22 patients with advanced PDR, who underwent 25-gauge pars plana vitrectomy (PPV) over a period of 24 months by a single surgeon, were included in this retrospective intervention study.

Results: Out of the 28 eyes, 18 (64%) were males and 10 (36%) were females, with a mean age of 54 years. All eyes had tractional retinal detachment involving the macula, with 8 eyes (28.6%) having severe dense fibrovascular adhesion along the retinal arcades. A total of 24 eyes (85.7%) had associated vitreous or subhyaloid hemorrhage. The mean best corrected visual acuity (BCVA) was < 20/800 (1.75 logMAR). All eyes received intravitreal Ranibizumab 3-5 days prior to vitrectomy. 25-gauge PPV was performed, with air as tamponading agent in 14 eyes (50%) and perfluorocarbon in 14 eyes (50%). At mean follow-up of 10.3 months, anatomical success was seen in all cases (100%). The BCVA at 1 month, 3 months, and 6 months were 20/160, 20/80, and 20/63, respectively. The mean BCVA at last follow-up improved significantly to 20/60 (0.50 logMAR). Four eyes developed secondary glaucoma, which was controlled on topical anti-glaucoma medications. Two eyes developed re-bleed 2 months postoperatively. Hemorrhage in 1 eye resolved spontaneously, and the other required vitreous lavage.

Conclusions: Twenty-five-gauge PPV in advanced PDR is safe, effective, and more controlled as compared to larger-gauge vitrectomy. Perfluorocarbon or air are effective tamponading agents in managing advanced proliferative diabetic retinopathy with smaller-gauge vitrectomy.

Ultra-wide Field Fluorescein Angiography Findings in Patients with Multiple Retinal Holes

*First Author: Sohee **JEON***

Purpose: To evaluate the ultra-widefield fluorescein angiography (UWFA) findings in patients with multiple retinal holes.

Methods: Seventy-three eyes, each with more than 2 retinal holes, underwent a comprehensive ophthalmologic examination, including UWFA, along with 39 age-matched control eyes with no retinal holes. The

UWFA was scored according to a system suggested by the Angiography Scoring for Uveitis Working Group (ASUWG). UWFA findings from the patients with retinal holes were compared with those of the control group without retinal holes. Factors associated with a high ASUWG score were also evaluated.

Results: Patients with multiple retinal holes showed a significantly higher prevalence of retinal vascular staining/leakage, capillary leakage at the posterior pole, and capillary leakage at the periphery when compared to the control group ($P < 0.001$, for each of them). Univariate analysis revealed that logMAR best corrected visual acuity (BCVA) ($r = 0.271$, $P = 0.027$), spherical equivalent ($r = -0.275$, $P = 0.021$), and number of retinal holes ($r = 0.271$, $P = 0.027$) were associated with a higher ASUWG score. After adjustments for age, gender, and logMAR BCVA, multivariate regression analysis revealed that the spherical equivalent was independently associated with a higher ASUWG score ($r2 = 0.161$, $P = 0.001$). Vitreous tractions were detected by optical coherence tomography on the edge of retinal holes.

Conclusions: Patients with multiple retinal holes showed profound peripheral vascular leakages on UWFA findings, suggesting the presence of chronic retinal traction induced by equatorial scleral elongation.

Using Indocyanine Green Angiography to Observe the Persistent Fundus Fluorescence After Internal Limiting Membrane Peeling Assisted by Indocyanine Green

*First Author: Keren **ZHANG***

Purpose: To investigate the residual time of Indocyanine green (ICG) in fundus and its side effects after macular epiretinal membrane removal.

Methods: A prospective study was conducted in 45 eyes of patients diagnosed as idiopathic macular anterior membrane from January 2018 to July 2019. All operations were performed by 1 surgeon, and we mainly analyzed the fluorescence imaging status of fundus and the complications after operation.

Results: ICG hyperfluorescence was mainly detected at the nerve fiber layer around the optic disc in all affected eyes, which gradually narrowed along the direction of the optic nerve and converged at the optic disc. The above phenomena could still be observed 1 year after surgery.

Conclusions: The persistence duration of fluorescence from ICG is positively correlated with the staining time and the concentration of ICG. Indocyanine green remains in the eye for a long time. The toxic effect of indocyanine green on eyes should not be neglected. But at present, there is little research on this aspect. Its metabolism and toxicity need to be further studied.

Vitreous Flow Rates of 23-gauge High Speed Vitrectomy Probes (10,000 cpm)

*First Author: Dina Joy **ABULON***

Purpose: This study characterized porcine vitreous flow rates associated with 23-gauge dual-pneumatic probes under various duty cycle modes and high-speed cut rates (up to 10,000 cpm).

Methods: The CONSTELLATION® Vision System was tested with Advanced UltraVit® vitrectomy probes at 450 mm Hg vacuum (Alcon Laboratories, Inc.). Six 23-gauge probes were evaluated at 3 duty cycle modes and at various cut rates (2,500 - 10,000 cpm). An electronic balance (Mettler Toledo MS 2014S) was used to measure volume of removed vitreous during simulated vitrectomy. Average vitreous flow rates were calculated using the change in weight and duration of aspiration.

Results: In the biased-open duty cycle mode at 450 mm Hg vacuum, the vitreous flow rates of 23-ga probes increased from 3.16 ± 0.39 to 3.33 ± 0.21 cc/min as cut rate increased from 2,500 to 10,000 cpm. With the 50% port open duty cycle, vitreous flow rates also increased as cut rate increased from 2.44 ± 0.24 cc/min at 2500 cpm to 3.41 ± 0.16 cc/min at 10,000 cpm. In the biased-closed duty cycle, vitreous flow rates increased from 2.03 ± 0.56 cc/min at 2500 cpm to 3.23 ± 0.37 cc/min at 10,000 cpm.

For all 3 duty cycle modes, maximum vitreous flow was observed at the 10,000 cpm cut rate setting.

Conclusions: Vitreous flow rates generally increased with increasing cut rates for all duty cycle modes. Vitreous aspiration of high-speed dual-pneumatic 23-gauge vitrectomy probes appear to be most efficient at the maximum cut rate of 10,000 cpm.

VIDEOS

Eye Trauma, Emergencies & Infections

An Intraocular Thelazia Callipaeda Infection Causing Sudden Vision Loss

First Author: Ke ***HU***
Co-Author(s): Yan ***JI****, Wenjuan* ***WAN****, Liang* ***XIONG****, Peizeng* ***YANG***

Purpose: To report a case of a retinal alive Thelazia callipaeda infection.

Methods: Since we noticed that the parasite was alive and moved from the retinal vascular arcade to the macular region within 1 day, we performed a literature review to find a suitable way to remove the worm from the retina as well as discuss thelaziasis's symptoms, treatment, and prognosis.

Results: Patients' symptoms are related to the site of infection of the eye, and most patients present with a creeping sensation, tearing, itching, pain, red eyes, and increased secretions. The best treatment plan is a mechanical removal. Removal from the infected conjunctiva is relatively simple and can be performed under local anesthesia. Removal of the nematode from the vitreous or retina necessitates a vitrectomy procedure, and visual prognosis depends on the involved site within the retina.

Conclusions: Thelaziasis is a zoonotic disease caused by an infection with a parasitic nematode, Thelazia callipaeda. Because it mainly occurs in South Asia, especially China, it is known as oriental eye worm. Thelazia callipaeda is released by flies on the ocular surface, and subsequently infects the conjunctiva and lacrimal glands. Intraocular infection, especially those involving the retina, are very rare. Risk factors include household pets or the use of untreated water, and the treatment is surgical removal.

Diffuse Unilateral Subacute Neuroretinitis: Dancing with the Worm!

First Author: Bhavik ***PANCHAL***
Co-Author(s): Navya ***CHERUKURI****, Avinash* ***PATHENGAY***

Purpose: The aim was to make every ophthalmologist aware of diffuse unilateral subacute neuroretinitis (DUSN) and simplify it in such a manner that he or she can diagnose and treat this blinding condition with ease.

Methods: In this video - we plan to showcase the etiology, clinical signs, symptoms, and various features of acute and chronic DUSN. By means of a case presentation, we would like to highlight how the worm enters the human body, its life cycle, the different ways to identify a live worm - big and small variant - and to discuss the treatment modalities. The technique of LASER to the live worm would be demonstrated along with medical management. Ocular coherence tomography angiogram (OCTA) of the live worm is an important highlight in our video.

Results: NA

Conclusions: DUSN is a simple condition to diagnose and treat. Early intervention can save permanent vision loss.

Early Vitrectomy in Fungal Retinitis Halts Progression to Endogenous Endophthalmitis

First Author: Nitin ***KUMAR***
Co-Author(s): Reema ***BANSAL****, Suryaprakash* ***SHARMA***

Purpose: This video highlighted the role of early vitrectomy in fungal retinitis, halting the progression to endogenous endophthalmitis.

Methods: A 45-year-old male presented with decreased vision (6/60) in left eye for 4 days, following an episode of H1N1 (Influenza) infection. Fundus examination revealed a coin-shaped retinitis lesion at fovea. Considering macular retinitis secondary to influenza, oral corticosteroids were started. However,

the lesion worsened, with spreading of the exudates on the retinal surface and infiltration into the vitreous cavity. An immediate pars plana vitrectomy was done with complete removal of posterior hyaloid membrane (PHM). A 45-year-old male presented with decreased vision (6/60) in left eye for four days, following an episode of H1N1 (Influenza) infection. Fundus examination revealed a coin-shaped retinitis lesion at fovea. Considering macular retinitis secondary to influenza, oral corticosteroids were started. However, the lesion worsened, with spreading of the exudates on the retinal surface and infiltration into the vitreous cavity. An immediate pars plana vitrectomy was done with complete removal of posterior hyaloid membrane (PHM).

Results: The KOH mount of exudates lifted from the retinal surface revealed septate hyphae (Candida albicans on BLAST analysis). Following oral antifungal therapy, the lesion healed with scarring and vision 6/24. An early vitrectomy in this case with PHM removal arrested the progression of fungal retinitis and prevented the development of endogenous endophthalmitis.

Conclusions: An early vitrectomy in this case with PHM removal arrested the progression of fungal retinitis and prevented the development of endogenous endophthalmitis.

Endoscopy in Endophthalmitis

*First Author: Vivek **DAVE***
*Co-Author(s): Rajeev **REDDY***

Purpose: To describe the application of endoscopic visualization in endophthalmitis.

Methods: In this series of videos, we demonstrated the application of endoscopic visualization and endoscopic vitrectomy in the management of endophthalmitis with hazy cornea precluding vitrectomy by conventional visualization.

Results: We demonstrated a video with endophthalmitis, where peripheral exudates and horseshoe tears were managed with endoscopy, a case of severe endophthalmitis with keratitis undergoing endoscopic vitrectomy and sequential keratoplasty, a case of keratitis with endophthalmitis with self resolution of keratitis, a fungal endophthalmitis with retro-iridal fungal ball treated with endoscopy, and a retained intraocular foreign body with corneal edema retrieved endoscopically.

Conclusions: Endoscopy is a useful tool in the armamentarium of the vitreoretinal surgeon for managing complex cases of endophthalmitis with poor visualization.

Perfluorocarbon Liquid for the Glass Intraocular Foreign Body Removal

*First Author: Kiet-Phang **LING***
*Co-Author(s): Hui-Wen **LIM***

Purpose: To demonstrate the benefits of perfluorocarbon liquid in the removal of large glass intraocular foreign body (IOFB).

Methods: Surgical video

Results: A 21-year-old male presented after a motor vehicle accident with zone I open globe injury and large glass IOFB in the right eye. Intraoperatively, multiple attempts were made to remove the IOFB with forceps but it was unable to get a good hold of the IOFB given its large size and smooth, slippery edge. The perfluorocarbon liquid was used to slide the glass IOFB outside of the macula and to displace the IOFB in a vertical position which facilitated a secure grasp of the object. The IOFB was then removed from the anterior chamber via a new corneal incision.

Conclusions: Perfluorocarbon liquid can be a useful surgical adjunct to pars plana vitrectomy in the removal of glass IOFB.

Removal of Live Gnathostoma Spinigerum from Vitreous Cavity by Pars Plana Vitrectomy: A Case Report of Late Diagnosis

*First Author: Mominul **ISLAM***
*Co-Author(s): Sarwar **ALAM**, Parthapratim **DUTTA MAJUMDER***

Purpose: This case illustrated a long-standing Gnathostoma spinigerum infection in a 27-year-old female. Due to the lack of comprehensive eye checkups, this case was treated as

intermediate uveitis for a long time. The author shared this experience to develop awareness among ophthalmologists for proper eye examinations.

Methods: Case report

Results: A 27-year-old female presented with dimness of vision in the left eye for 6 months. She was being treated with topical corticosteroid and cycloplegic. On examination, her visual acuity was 6/60 in the left eye and right eye was normal. Slit-lamp examination of the left eye showed plenty of cells in anterior chamber and anterior vitreous. Fundus examination, left eye revealed dense vitritis obscuring the fundus details. Her laboratory investigations were within normal limits. She was started on oral corticosteroid with a tapering dose. After 2 weeks decrease in vitreous haze and a small whitish motile worm floating in the vitreous cavity and a traction band from the optic disc to macular region. Pars plana vitrectomy was performed and the worm was removed alive. That worm was sent for microscopic examination and based on its morphology, it was identified as Gnathostoma spinigerum.

Conclusions: After 3-months follow-up, she was symptomatically better, though her visual acuity remained 3/60. Fundus examination of the left eye revealed retinal scar with glial tissues involving macula. Early management can give more good results. The presence of the worm for a longer duration inside the eye was missed due to the lack of a comprehensive eye examination.

Sewing Machine Technique for Traumatic Iridodialysis Repair

*First Author: Bojie **HU***

Purpose: The aim of this study was to report a case of iridodialysis with the surgical management of sewing machine technique.

Methods: Clinical data were collected from a 52-year-old male who developed traumatic iridodialysis. We described a case about traumatic subtotal iridodialysis and introduced the surgical technique named as "sewing machine technique".

Results: As a result, the detached iris was attached in the limbus.

Conclusions: Sewing machine technique is a effective method to repair irisodialysis and coreoplasty.

Triple Treat to a Trauma Threat

*First Author: Syed **ABDUL KHADAR***
*Co-Author(s): Sherin Haroon M. **HAROON**, Sharan **KUMAR**, Syed **SAIFUDEEN ADEEL**, Vinit **SHAH***

Purpose: To demonstrate combined management of retinal dialysis, sub-luxated lens, and uncontrolled glaucoma in a single sitting by a complex of surgical procedures done in a case of closed globe injury.

Methods: A 36-year-old male police officer presented to us after 1 month following blunt trauma to his left eye. On evaluation, the best corrected visual acuity (BCVA) in RE was 6/6 and in the LE was 5/60 assessed on Snellens chart. Right eye examination was within normal limits. Left eye anterior segment examination showed lens subluxation > 270 degrees and angle recession with intraocular pressure (IOP) of 57 mm Hg. Fundus examination revealed peri-papillary choroidal rupture with macular atrophy and scarring. Superior retinal dialysis (12 o'clock to 3 o'clock) with adjacent retinal detachment was also noted. The IOP was not controlled with maximally tolerated medical therapy. The patient underwent pars plana vitrectomy, pars plana lensectomy with SFIOL implantation (Scharioth's technique), retinal dialysis repair with fluid air exchange, endolaser, and AADI implantation with tube placement in vitreous cavity for the left eye. This video demonstrated the various surgical steps involved in this complex procedure.

Results: Four months postoperatively, left eye visual acuity remained the same with well centered SFIOL, AADI implant tube in vitreous cavity, well-controlled IOP (12 mm of Hg on single anti-glaucoma medication), and well-attached retina.

Conclusions: Simultaneous management of retinal dialysis, sub-luxated cataracts, and uncontrolled glaucoma can be done in a single sitting on selected cases by experienced hands to avoid multiple interventions, to minimize surgical trauma, and to preserve the eye.

Ocular Oncology & Pathology

Endoresection of a Choroidal Hemangioma

*First Author: Hussain **KHAQAN***

Purpose: To demonstrate the safety and efficacy of pars plana vitrectomy, endoresection of choroidal hemangioma for the treatment of exudative retinal detachment, secondary to choroidal hemangioma.

Methods: A 30-year-old female presented with exudative retinal detachment secondary to supronasal and nasal choroidal hemangioma. The girl could not be treated with PDT, and had already lost the other eye for end-stage neovascular glaucoma secondary to choroidal hemangioma. 23 gauge pars plana vitrectomy, retinectomy, resection of hemangioma with scissors, and endotamponade of 5000 cs silicone oil.

Results: The retina completely reattached with improvement of vision from light perception to counting fingers at 2 feet (20/2000, +2) with silicone oil, at 4 weeks follow-up.

Conclusions: Pars plana vitrectomy, choroidal hemangioma endoresection, and endodiathermy may be considered an efficient surgical option for the management of exudative retinal detachment secondary to choroidal hemangioma in patients non-responding or non-suitable for photodynamic therapy.

Minimally Invasive Subretinal Biopsy for Primary Vitreo-retinal Lymphoma

*First Author: Mohit **DOGRA***
*Co-Author(s): Sahil **JAIN**, Ramandeep **SINGH**, Simar Rajan **SINGH***

Purpose: To describe a modification of the surgical technique of diagnostic vitrectomy in patients suspected of primary vitreoretinal lymphoma (PVRL).

Methods: A standard 25G 3-port pars plana vitrectomy was done and an undiluted vitreous specimen was taken under air at a cut rate of 600 cpm. After detaching the posterior hyaloid, 25G endo-diathermy was used to create a retinotomy adjacent to the chosen site of sub-retinal biopsy. Soft tip cannula was introduced through the retinotomy, and the sub-retinal infiltrates were passively aspirated. The vitreous and sub-retinal aspirate was immediately sent for cytological examination in an icebox. The retinotomy site was lasered and short-acting gas/air tamponade was given. Five patients with suspected PVRL, were subjected to this procedure that we call "minimally invasive sub-retinal biopsy".

Results: All 5 eyes were diagnosed to have PVRL of B-cell type. Cytological analysis of sub-retinal aspirate showed increased cellularity of lymphoma cells as compared to vitreous fluid. Vitreous cytology detected PVRL in only 2 of 5 eyes (40%), whereas cytology of sub-retinal aspirate diagnosed PVRL in all 5 eyes (100%). None of the patients had any intra or postoperative complications related to the surgery.

Conclusions: This novel technique of sub-retinal biopsy through a small retinotomy increased the sensitivity of diagnostic vitrectomy for PVRL. It is minimally invasive and doesn't require large retinectomies and/or silicone oil tamponade for diagnosing PVRL.

Pediatric Retina

Poppy Persistent Fetal Vasculature (PFV)

*First Author: Sushma **JAYANNA***
*Co-Author(s): Subhadra **JALALI***

Purpose: To report the management of unusual presentation of persistent fetal vasculature.

Methods: A 2-year-old male child, previously diagnosed as phthisical right eye elsewhere, came to us for second opinion. Patient had leukocoria due to cataracts. B scan showed hyperechoic membrane connecting posterior surface of lens to disc. Diagnosis of persistent fetal vasculature with total cataract was made and was posted for lens aspiration with pars plana vitrectomy. During the surgery, after lensectomy, the presence of blood in Berger's space was noted obscuring the view resembling a poppy flower. We went ahead with vitrectomy clearing the surrounding vitreous and the bleed, finally exposing the anterior attachment of PFV, which was separated from surrounding vitreous attachment. Posterior extent was trimmed, and the remnant part near the disc was cauterized.

Results: One week post-surgery, retina was well attached with healthy fovea and disc.

Conclusions: Unusual presentation of PFV can sometimes put us into a diagnostic dilemma. It is important to be aware of these presentations, as it can be treated with a good visual prognosis if diagnosed at the right time.

Retina (Medical)

Light at the End of the Tunnel: Evaluating Flecked Retina and Night Blindness

*First Author: Sharat **HEGDE***
*Co-Author(s): Bhavik **PANCHAL***

Purpose: In this video, we aimed to make the audience aware of the various retinal conditions associated with flecks in the retina. Also, most of the flecked retinal disorders present with night blindness, few of them stationary, few progressive, and few reversible night blindness. Both these objectives of approach to flecked retinal disorders and night blindness would be showcased with the help of a rare case of late-onset retinal macular degeneration.

Methods: NA

Results: NA

Conclusions: Accurate diagnosis of the etiology of night blindness can help in early intervention and rehabilitation.

Retina (Surgical)

Bimanual Vitrectomy for Severe Proliferative Diabetic Retinopathy

*First Author: Yanhua **CHU***

Purpose: To show the treatment of diabetic retinopathy with extensive proliferative membrane by bimanual manipulation.

Methods: Cataract phacoemulsification combined with vitrectomy was performed on diabetic retinopathy with extensive proliferation. The proliferative membrane was removed by membrane segmentation and resection with bimanual manipulation.

Results: The retina was reattached after operation and the best corrected visual acuity was 0.1.

Conclusions: Membrane segmentation by bimanual manipulation was efficient for the treatment of complex diabetic retinopathy.

Diabetic Vitrectomy: Tips and Tricks

*First Author: Muhammad **MONIRUZZAMAN***
*Co-Author(s): Mst. **SAYEDATUNNESSA**, Md. **ISLAM**, Niaz **KHAN**, Abul **SHEIKH***

Purpose: Among all diabetic vitrectomy has maximum variations due to its diversified presentation, like non-resolving vitreous hemorrhages, traction retinal detachment involving the macula, combined traction, and rhegmatogenous retinal detachment, etc. With the development of surgical tools, vitrectomy techniques are also changing rapidly in order to

help the surgeon succeed in these challenging cases.

Methods: Posterior vitreous detachment (PVD) induction: Inducing PVD in diabetic cases may be more difficult than other cases and may present as a sheet of membrane. Forceps may be helpful, but pulling should be gentle and careful to avoid iatrogenic tear. Removing fibrovascular membrane (FVM): Besides conventional techniques of segmentation and delamination of FVM "Lift and shave" techniques with high speed improvised cutter became popular. Non-resolving vitreous hemorrhage (VH): preoperative B scan is helpful to avoid iatrogenic retinotomy during getting into sub hyaloid space. Besides suction, continuous reflux mode of upgraded machine is also very helpful to blow away RBC from macular area. Scleral indentation during base shaving and peripheral laser is helpful for meticulous surgery and better postoperative outcome.

Results: Upgraded techniques are reducing per operative complications, making the surgery easier, reducing postoperative complications, and increasing the success rate.

Conclusions: Diabetic vitrectomy is challenging. Getting maximum benefit of developed technology by upgrading surgical techniques is important for successful surgery and enabling meaningful visual rehabilitation, even in severe cases.

Gundersen-like Internal Limiting Membrane Flap for Refractory Macular Hole

*First Author: Yi-Ting **HSIEH***

Purpose: To present a novel surgical technique for macular hole refractory to primary internal limiting membrane (ILM) peeling.

Methods: A highly myopic eye with macular hole had received ILM peeling with superior ILM flap covering the macular hole. After the operation, however, the ILM flap was lost and the macular hole remained open. During the second operation, a Gundersen-like ILM flap was created from the superior perifoveal area with bilateral hinges at nasal and temporal perifoveal areas. The ILM flap then was pulled to cover the macular hole.

Results: Postoperatively, the macular hole was closed with overlying ILM flap. The best corrected visual acuity improved from 20/200 preoperatively to 20/100 at 3 months postoperatively.

Conclusions: For refractory macular hole after primary ILM peeling, Gundersen-like ILM flap is an effective method for macular hole closure. It provides bilateral hinges and may have less chance of postoperative ILM flap loss.

Hitting Two Nails with a Single Hammer!

*First Author: Sherine **DSOUZA***
*Co-Author(s): Jivitesh **SINGH***

Purpose: To highlight the surgical management in a unique case of Type 3 retinochoroidal coloboma (not involving disc and macula) in a young female of 28 years with a full-thickness macular hole.

Methods: A 28-year-old female presented with iris coloboma, a full-thickness macular hole with macular hole index of 0.43 and a Type 3 retinochoroidal (RC) coloboma with visual acuity of 3/ 60 in her right eye. Left eye examination was within normal limits, and had vision of 6/6. Macular hole was managed with vitrectomy and internal limiting membrane peeling (ILM). Endolaser was performed in 3-4 rows around the coloboma while sparing the papillo-macular bundle in order to stabilize it.

Results: Vitrectomy with careful and complete induction of posterior vitreous detachment led to a complete Type 1 closure of the macular hole. Margins of retinochoroidal coloboma were well stabilized using endolaser, done in 3 to 4 rows around its borders and sparing the papillo-macular bundle. Three months post-op visual acuity had significantly improved and was recorded as 6/12 in her right eye.

Conclusions: Full-thickness macular hole can be treated with vitrectomy and ILM peeling along with endolaser of RC coloboma borders in a single surgery. Closing macular hole

improves vision significantly, and performing laser to borders of coloboma decreases the risk of retinal detachment.

Macular Buckle as a Surgical Choice in Myopic Tractional Maculopathy: An Introspection

*First Author: Pradeep **SUSVAR***

Purpose: Myopic tractional maculopathy (MTM) causes insidious but profound loss of vision in pathological myopia. Surgical management of MTMs vary between observation, vitrectomy, and macular buckle (MB). The decision to operate depends on factors like the duration of symptoms, tractional force, and severity of posterior staphyloma. Various types of buckle materials are being used by surgeons across the world. This video presentation attempted to give an introspection of surgical strategy, using one such commercially available material for macular buckling in the management of MTM in staphyloma associated pathological myopic eye.

Methods: This video presentation described the patho-mechanism interplaying at the macula in myopic eyes having posterior staphyloma, indications for macular buckling surgery, surgical steps using T-shaped implant (morin-devin wedge) as buckle element, and its outcomes.

Results: MB helped in correcting the anatomical relationship of the retina and the retinal pigment epithelium in the macular area by reducing the tractional forces acting at the posterior staphyloma in eyes having high myopia.

Conclusions: Presentation described video-based algorithm in the management of staphyloma associated myopic tractional myopathy by macular buckling. This video helps the viewer to understand and introspect the nuances of the surgery, the actual role, and its 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 situations, 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 (miOCT) Assisted Autologous Neurosensory Retinal Transplant for a Large Full Thickness Macular Hole (FTMH)

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Purpose: To describe successful closure of a large full-thickness macular hole (FTMH) using miOCT assisted autologous neurosensory retinal transplant.

Methods: An 11-year-old male child presented with a post-traumatic total retinal detachment.

He was taken up for pars plana vitrectomy. Intraoperatively, a large full-thickness macular hole was noted and documented with the help of mi-OCT. On completion of vitrectomy, internal limiting membrane (ILM) peeling was done under perfluorocarbon liquid (PFCL). An autologous neurosensory retinal graft was harvested from peripheral retina and tucked into the macular hole. Proper placement of the graft was verified with help of mi-OCT. The graft site was lasered. PFCL-silicone oil exchange was done.

Results: Postoperative graft uptake was excellent as demonstrated by OCT. The visual acuity improved from perception of light to counting fingers at 1 meter.

Conclusions: The use of neurosensory retinal autograft for refractory or large macular holes is well-known. In this case, large FTMH was noticed intraoperatively, and the presence of retinal detachment made graft harvesting easier. Use of mi-OCT throughout the surgery ensured proper graft placement, leading to excellent anatomical and favorable functional outcomes.

Minimally Invasive Surgery for Massive Subretinal Hemorrhage in Polypoidal Choroidal Vasculopathy

*First Author: Haoyu **CHEN***

Purpose: Polypoidal choroidal vasculopathy (PCV) may complicate with subretinal hemorrhage and vitreous hemorrhage and require vitreoretinal surgery. It is a dilemma on whether the subretinal hemorrhage should be drained or not. If the subretinal hemorrhage is drained internally, a large retinotomy may be needed and proliferative vitreoretinopathy and retinal detachment may complicate. If the subretinal hemorrhage is left alone, vision may be severely affected. Here, we described a minimally invasive technique for drainage of subretinal hemorrhage.

Methods: This article was a video demonstration of a surgery. A case of PCV with vitreous hemorrhage was treated with vitrectomy. After removal of the vitreous, a large amount of subretinal hemorrhage was found. Heavy liquid was used to push the subretinal hemorrhage to the peripheral retina. Then a 23G trocar was transconjunctivally incised at 10 mm posterior to the limbus to the subretinal space. A large amount of dark red hemorrhage is drained from the trocar. More heavy water is injected into the vitreous cavity to further push the subretinal hemorrhage to the peripheral retina. The cannula was removed after there was no more blood drained. Finally, the silicone oil was filled after fluid-gas exchange.

Results: Most of the subretinal hemorrhage can be drained from the trocar. Only a small amount of subretinal hemorrhage remained after surgery. Visual acuity improved from light perception preoperatively to 0.1 at 2 months after surgery.

Conclusions: Transconjunctival drainage of subretinal hemorrhage using 23G trocar is a minimally invasive and effective technique to manage massive subretinal hemorrhage in PCV.

Modified Fovea-sparing Internal Limiting Membrane Peeling Techniques for Myopic Foveoschisis

*First Author: Jiao **LYU***
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Purpose: The video demonstrated a series of modified techniques to facilitate fovea-sparing internal limiting membrane (ILM) peeling for myopic foveoschisis.

Methods: 1. Modified donut-shaped ILM peeling: The ILM tear was made at perifoveal area by an Eckardt forceps. With the ILM flap being lifted and folded, ILM peeling was performed in a circular fashion continuously and tangentially to form a donut-shaped contour. The preserved epi-fovea ILM sheet is trimmed with a vitreous probe. 2. Multiple parafoveal curvilinear ILM peeling: ILM peeling is centered away from the central fovea and performed in a continuous curvilinear manner in 4 quadrants of parafoveal area. Small areas of residual ILM between the 4 peeled circular areas were peeled off, and they join together to form a donut. 3. The combined technique: In case of

breakage of an ILM flap during modified donut-shaped peeling, we performed the combined parafoveal curvilinear ILM peeling at the endpoint of flap to restart or extend peeling.

Results: The techniques were smoothly performed in 18 eyes with myopic schisis and yielded a well preserved ILM sheet in foveal area. Resolution of schisis were observed 3 months after surgery.

Conclusions: The techniques simplify conventional fovea-sparing ILM peeling manipulations, enable better surgical control, and yield promising anatomical results.

Pars Plana Vitrectomy with Small-sized Autologous Internal Limiting Membrane Flap for Optic Disc Pit Maculopathy

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Purpose: To describe the outcome of pars plana vitrectomy with autologous ILM flap for optic disc pit maculopathy.

Methods: Case series

Results: We presented 2 cases of consistent resolution of optic disc pit maculopathy after sealing the optic disc pit with autologous inverted ILP flap during 23-gauge pars plana vitrectomy. The outcome of this case showed that this procedure could be considered as the treatment of choice for optic disc pit maculopathy.

Conclusions: Pars plana vitrectomy with autologous ILM peeling flap can be the treatment of choice for optic pit maculopathy,

Submacular Hemorrhage: Treatment Algorithm

*First Author: Mohit **DOGRA***
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Purpose: To highlight the pathophysiology and step-wise management approach for submacular hemorrhages.

Methods: Optical coherence tomography (OCT) helps to differentiate submacular hemorrhages into sub-retinal or sub-RPE. It also provides invaluable information about the thickness of the bleed. Duration and cause of submacular hemorrhage are important prognostic factors, and dictate what kind of management option is needed.

Results: Sub-retinal hemorrhages need intervention, while sub-RPE ones can be observed. Small and thin hemorrhages may be treated with intravitreal anti-VEGF agents, while larger sub-retinal hemorrhages may require pneumatic displacement, with or without tissue plasminogen activator (tPA). Sub-retinal hemorrhages > 4DD may vitrectomy with intravitreal/sub-retinal tPA and gas tamponade with prone posturing. Hemorrhages extending up to the equator require iatrogenic 180-degree giant retinal tear creation followed by drainage/evacuation of the clotted blood from the sub-retinal space followed by silicone oil tamponade.

Conclusions: Judicious preoperative evaluation, combined with OCT-based characteristics of submacular hemorrhages, are of paramount importance to decide the appropriate surgical procedure needed to tackle this sight-threatening condition.

Subscleral Sclerectomy for Successful Management of Recurrent Uveal Effusion Syndrome

*First Author: Nitin **KUMAR***
*Co-Author(s): Reema **BANSAL***

Purpose: To highlight the role of subscleral sclerectomy for successful management of recurrent uveal effusion syndrome.

Methods: A 46-year-old male presented in 2010 with bilateral uveal effusion syndrome (UES, Type 2). Following a waxing and waning course, his right eye recovered spontaneously with 6/6 vision. For persistent choroidal detachment and subretinal fluid in left eye, subscleral sclerectomy (SSS) was done in inferior 2 quadrants (August 2011). Scleral biopsy confirmed glycosaminoglycans deposition on Alcian blue stain. The submacular fluid resolved completely with 6/6 vision. About 4 years later,

left eye developed recurrence of choroidal effusion and retinal detachment (counting fingers vision). SSS was now done in opposite superior quadrants (January 2016).

Results: Forty months (April 2019) following the second procedure, the left eye retinochoroid is flat with 6/18 vision and mild nuclear sclerosis.

Conclusions: SS is an effective treatment for UES Types 1 and 2, producing an anatomic improvement in approximately 83% of treated eyes after a single procedure, and in about 96% after 1 or 2 procedures.

Tackling Diabetic Membranes: Stepwise Approach

*First Author: Rajiv **GANDHI***

Purpose: To demonstrate stepwise approach in tackling membranes in a diabetic vitrectomy to enhance the surgical outcomes.

Methods: All diabetic patients undergoing vitrectomy surgery for complex tractional retinal detachment were recorded after due consent from the patient. A compilation video of each step during surgery was made to demonstrate the appropriate approach while managing such cases to enhance the surgical outcome.

Results: Proper preoperative evaluation and preoperative anti-VEGF injection in complex diabetic membranes minimize intraoperative complications like bleeding and enhance surgical outcomes. Performing each step meticulously and tackling membranes by identifying the correct plane and with advanced small guage instruments has improved the surgical outcome.

Conclusions: In this anti-VEGF era, with new improved vitrectomy machines and advanced functions and smaller gauges, it has become easy to tackle complex diabetic membranes, which has improved the surgical outcome.

Vitrectomy and Perfluorocarbon Liquid Combined with Phaco for the Treatment of Dislocated Hard Lens Nuclear

*First Author: Chunhui **JIANG***

Purpose: To describe management of dislocated hard lens nuclear using vitrectomy, perfluorocarbon liquid combined with phacoemulsification.

Methods: A 55-year-old man with a progressive cataract in the left eye underwent phaco surgery. During the procedure, lens nuclear dropped into the vitreous cavity. Vitrectomy through pars plana and phacoemulsification was then performed. Standard three-port 23G PPV was first performed, then the vitreous was cleaned and the peripheral vitreous cortex was then carefully removed. PFCL was injected and the dislocated lens nuclear was floated to the iris plane. The anterior chamber was filled with viscoelastic (DisCoVisc; Alcon Laboratories, Inc., Fort Worth, TX, USA), and more PFCL was injected through the limbus. Phacoemulsification was performed through the former limbus incision at 12 o'clock. The PECL was removed and the limbus incision was closed with 10-0 nylon suture.

Results: The surgery was completed safely without any intraoperative and postoperative complications. Two weeks after the surgery, the best corrected visual acuity (BCVA) was 0.5. Intraocular pressure (IOP) was 13.5 mm Hg and corneal endothelial cells density 1880 / mm^2.

Conclusions: This surgical technique is safe and efficient, and could be useful in the management of dislocated lens nuclears.

What Is the Pearly White Lesion: An Enigma

*First Author: Jivitesh **SINGH***
*Co-Author(s): Sherine **DSOUZA***

Purpose: To highlight the surgical management of the unknown cause of vitreous hemorrhage in a young male and to reveal the mystery behind a pearly white lesion over macula seen intraoperatively.

Methods: A 39-year-old male presented with loss of vision in the left eye after trivial trauma from a foreign body. The vision was recorded as hand movements in the left eye and 6/6 in the right eye. Vision loss was sudden, painless, and not associated with redness or watering. Ocular examination revealed a clear cornea with a quiet anterior chamber and clear crystalline lens. In fundus examination, retina could not be examined due to vitreous haze. Ultrasound of left eye revealed dispersed, moderate-intensity echoes. The retina appeared attached on ultrasound.

Results: The patient was advised to undergo vitrectomy. Intraoperatively, vitreous hemorrhage was seen and was cleared. This revealed a pearly white colored lesion, that was elevated and covered 3 to 4 disc-diameter area over the macula. The pearly white lesion at sub internal limiting membrane (ILM) level gave the surgeon an enigma. After performing a broad area ILM peeling, the white substance dispersed and was removed with suction. It turned out to be a sub-ILM bleed with de-hemoglobinized blood that was not visible initially due to dense vitreous hemorrhage.

Conclusions: Sub ILM hemorrhage can give a perplexing picture pre and intraoperatively. ILM staining combined with ILM peeling gave good postoperative results. Post-op vision was recorded as 6/5 after perfluoropropane (C3F8) gas resolution.

Remove the Inner Limiting Membrane of Macular Hole and Cover It with a Disposable Finesse Flex Loop

*First Author: Weiqi **CHEN***

Purpose: Assessment of effectiveness and safety of disposable finesse flex loop.

Methods: For the first time, a disposable finesse flex loop was used to remove the inner limiting membrane of macular hole and cover it with the inner limiting membrane.

Results: It can remove the internal limiting membrane in a certain range smoothly, and has good maneuverability. It can retain the internal limiting membrane above the macular hole for covering and has no obvious damage to the retina. The macular hole was closed and the visual acuity was improved after surgery.

Conclusions: Disposable finesse flex loop is effective and safe, the learning curve is short, and it is easy to master.

"Iatrogenic Retinal Breaks" and How to Avoid Them

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Purpose: Iatrogenic retinal breaks in vitreoretinal surgery are not uncommon, even in experienced hands with advanced instrumentation. This video demonstrated various circumstances showing the occurrence of iatrogenic retinal breaks and discussed prevention and management.

Methods: We presented a bouquet of videos demonstrating various situations where iatrogenic retinal breaks are common. Incorrect sclerotomy placement and peripheral vitreous shaving is a common cause for retinal breaks, especially in inexperienced hands. Improper techniques during laser retinopexy or cryopexy also result in multiple small retinal breaks. Complex membrane peeling can lead to multiple retinal breaks, especially in thin ischemic retina due to diabetic tractional retinal detachment. Jet stream injuries are uncommon but can be devastating.

Results: Careful vitreous shaving and orienting the vitrectomy cutter away from the retina is an important tip while peripheral shaving and base dissection of the vitreous. Good understanding of flow dynamic with advanced vitrectomy systems would be helpful. Proper thawing before removing the cryopexy probe can prevent retinal break at the edge of cryopexy. Ischemic retina are very prone to breaks, and bimanual technique helps reduce undue traction and improvised dissection techniques could be helpful. Jet stream injuries can be prevented by prior assurance of free flow and controlled injection.

Conclusions: This video demonstrates the tips and tricks to avoid iatrogenic retinal breaks during vitreoretinal procedures.