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ABSTRACT BOOK

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FREE PAPERS

Eye Trauma, Emergencies & Infections

Dec 15, 2018 (Sat) 08:30 - 10:00

Venue: Ballroom 203

Change in Nationwide Incidence of Post-Cataract Surgery Endophthalmitis: Korean Cohort Study from 2002 to 2013

*First Author: Baek-Lok **OH***
*Co-Author(s): Hyeong Gon **YU***

Purpose: To investigate the change in nationwide incidence of endophthalmitis following cataract surgery in Korea from 2002 to 2013.

Methods: Cases of postoperative endophthalmitis between 2002 and 2013 were identified from a national sample cohort (n = 1,025,340).

Results: From 70,719 cases of cataract surgery, 49 incidents of endophthalmitis were reported, yielding an incidence of 0.069% (95% confidence interval [CI], 0.051-0.092%). Overall, the endophthalmitis incidence decreased from 0.103% in 2002–2005 to 0.045% in 2010–2013. corresponding to an annually decreasing time-trend (0.902, 95% CI, 0.827-0.984). In diabetic patients, however, the incidence was 0.128% and did not change (time trend, 1.015; 95% CI, 0.828-1.245).

Conclusions: This study revealed the incidence of endophthalmitis decreased during a 12-year period, but remained constant in diabetic patients.

Dec 15, 2018 (Sat) 08:30 - 10:00

Venue: Ballroom 203

Clinical Characteristics, Prognostic Factor, Visual Acuity and Globe Survival in Posterior Segment Intraocular Foreign Body

*First Author: Sanjita **SHARMA***

Purpose: Because of the variation of potential findings, early and full assessment of patients with possible intraocular foreign body retention based on the early signs is important to provide an effective and proper management and treatment plan, intraoperative proceedings, achieve a better prognosis, and provide counseling to the patients regarding the vision, ocular status and the globe survival.

Methods: This was a retrospective clinical records of cases with penetrating eye injury with intraocular foreign body for a duration of 3 years from 2012 to 2014.

Results: The total number of eyes analyzed were 30. There were 24 (80%) male and 6 (20%) female patients, with a mean age of 27.7 years (range, 2-52 years). Of 30 eyes, 19 (63.3%) had injury at zone 1 and 11 (36.7%) eyes had injury at zone 2. The mean time spent between primary repair following surgery and intraocular foreign body removal was 15.47 days, with a median of 8.5 days. Retinal detachment and endophthalmitis prior to intraocular foreign body removal was present in 30 % of eyes. We looked for correlation between postoperative phthisis bulbi with zone of injury and preoperative endophthalmitis and preoperative retinal detachment, but the P value was more than 0.552 and 0.815 respectively.

Conclusions: Eyes with posterior segment intraocular foreign bodies showing clinical features of preoperative endophthalmitis, retinal detachment and involving the various zones of injury have a major impact on the vision but it does not have any direct significance with globe survival. A large prospective study is warranted for further analysis.

Dec 15, 2018 (Sat) 08:30 - 10:00

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Clinical and Morphological Characteristics of Intraocular Foreign Body Presented to a Tertiary Care Center of Khyber Pakhtunkhwa

*First Author: Mohammad **IDRIS***

Purpose: To determine the clinical and

morphological characteristics of intraocular foreign body in penetrating ocular injury presented to a tertiary care center of Khyber Pakhtunkhwa for management.

Methods: This was a prospective, interventional case series. A total of 37 cases with intraocular foreign body from outdoor department were admitted for management at Department of Ophthalmology, Lady Reading Hospital, Peshawar from July 1, 2011 to January 31, 2013. Patients were examined after detailed history was taken and important findings were noted.

Results: The study sample was comprised of 37 cases. The majority (70.2%) were male, and the mean age was 33 ± 12 years. A total of 23 (62.2%) patients have small foreign body of 1 mm or less. Twenty-two (59.5%) intraocular foreign bodies were elongated in shape; 19 (51.4%) were found on retinal surface and 15 (40.5%) were found to be metallic. Perception of light to no perception of light vision was noted in 20 (54.1%) cases. Counting fingers or better vision was noted in 17 (45.9%) cases. Bomb blast injury and late presentation were the common reasons for poor visual outcome.

Conclusions: Intraocular foreign body is a common and important clinical problem. Small, elongated foreign bodies were common although any sort of foreign body can enter the eye. Foreign bodies like wood and stone were strongly associated with endophthalmitis. Visual prognosis was poor in the majority of the eyes, with delayed presentation and bomb blast injuries as the top reasons.

Dec 15, 2018 (Sat) 08:30 - 10:00

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Epidemiology and Clinical Features of Post-Traumatic Endophthalmitis with Intraocular Foreign Bodies in Children in South China: A 13-Year Review

*First Author: Yao **YANG***
*Co-Author(s): Xiaofeng **LIN***

Purpose: To investigate epidemiologic and clinical features and prognostic factors of endophthalmitis with intraocular foreign body (IOFB) in children.

Methods: Information from 116 eyes with endophthalmitis selected from 484 eyes of children (age ranged from 1 to 17 years) with IOFB in Zhongshan Ophthalmic Center over a 13-year period was reviewed. The clinical characteristics and endophthalmitis spectrum were described. Factors affecting development of endophthalmitis were analyzed statistically.

Results: Endophthalmitis represented 23.97% of all pediatric IOFB patients. The mean age at presentation was 8.74 ± 4.39 years. Firecracker (136 eyes; 28.1%), iron nail injury (59 eyes, 12.19%), and explosion (57 eyes, 11.78%) were the most common causes of injury. Zone I was the most common type of wounds. Non-metal foreign bodies account for 78.4% of all IOFBs in patients with endophthalmitis. Common presentation features were traumatic cataract (89.7%), hypopyon (50%), retinal detachment (42.2%). Metal, iris or choroid prolapse, hematophthalmia were significant protective factors in the development of endophthalmitis.

Conclusions: Endophthalmitis among children with IOFBs is more prevalent in school-age boys. Metal IOFB, iris or choroid prolapse, and hematophthalmia were significant protective factors, while zone II wound and trauma cataract appeared to be associated with increased risk of endophthalmitis development.

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Eye Worm Swimming Live in Anterior Chamber: How to Remove Live Nematode Without Damaging Eye Structure? First Report From South Borneo, Indonesia

*First Author: Irma **SADIKIN***
*Co-Author(s): Ersyad **HAMDA**, Dr.husni **THAMRIN***

Purpose: We report a case of a worm swimming live in anterior chamber (AC), which was difficult to be removed due to its wriggling movement. It also needs to be carefully removed without damaging the ocular structure.

Methods: A 21-year-old male presented with

a sudden onset of pain in the right eye for 5 days. The complaint was accompanied with irritation and photophobia. On examination, visual acuity was 6/6.5 with his best corrected, with circumcorneal congestion. We performed slit-lamp examination on the AC and witnessed a thin, white motile object with wriggling movement and swimming live in AC.

Results: The worm was removed surgically from AC by using forceps and adding lidocaine with sodium chloride 0.9% intracorneal to stop its movement. The worm was sent to pathological anatomy department to be examined microscopically.

Conclusions: The method of using lidocaine as a chemoparalysis substance has been proven effective to facilitate an easy removal of the worm so as to prevent major harm to the ocular structure.

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Incidence and Risk Factors of Intraocular Foreign Body–Related Endophthalmitis in Southern China

*First Author: Fang **DUAN***
*Co-Author(s): Xiaofeng **LIN**, Yao **YANG***

Purpose: To investigate the incidence and risk factors of intraocular foreign body (IOFB)–related endophthalmitis.

Methods: A total of 1701 patients diagnosed with IOFB between January 1, 2005 and June 30, 2015 were included. Two groups of patients were defined according to the presence or absence of endophthalmitis, and a comparison of personal information, IOFB characteristics and wound location were performed.

Results: In total, 279 patients (16.4%) developed endophthalmitis, older age (P = 0.01) was a risk factor. IOFBs retained in the crystal lens or wall of the eyeball conferred lower risks (P = 0.01 and 0.04, respectively) compared with the vitreous chamber. The coexistence of different IOFB types and plant IOFBs conferred higher risks (P = 0.02 and 0.03, respectively), while glass/plastic IOFBs conferred a lower risk (P = 0.03) compared to metallic IOFBs.

Conclusions: Age, IOFB locations and types were related to development of endophthalmitis, while IOFB number, size or timing of primary repairs were not related.

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Intravitreal Injection of Povidone-Iodine for *Candida albicans* Endophthalmitis in Rabbits

*First Author: Seung Min **LEE***
*Co-Author(s): Ik Soo **BYON**, Ji Eun **LEE**, Sungwho **PARK**, Jongho **PARK***

Purpose: To investigate the efficacy of intravitreal povidone-iodine (PI) in the treatment of *Candida albicans* endophthalmitis.

Methods: A total of 36 New Zealand white rabbits were divided into 4 groups (n = 10, 10, 12 and 4 for group A, B, C and controls, respectively). After the induction of endophthalmitis using *Candida albicans*, groups A, B, and C received single intravitreal injections of 0.1% voriconazole, 0.3% PI, and combination of voriconazole and PI, respectively. Eyes with sham injections were controls. Fundus photography, vitreous culture, electroretinography, and histologic examinations of the retina were conducted on day 7. The severity of anterior chamber flare and vitreous opacity were scored as grade 0 to 3. Fungal growth was expressed as colony forming units (CFU) per milliliter.

Results: The mean scores of vitreous opacity were 2.7 in group A, 2.7 in group B, 2.5 in group C, and 3.0 in controls. The mean scores of anterior chamber flare were 1.0 in group A, 1.1 in group B, 0.91 in group C, and 2.5 in controls. Group 1 and 3 showed less score than controls in anterior chamber flare (P = 0.019, 0.040). In vitreous culture, bacterial growth was found in 2 eyes in group A (22%), 1 eye in group B (10%), 3 eyes in group C (27%) and 4 eyes in controls (100%). Electroretinography was reduced in all groups. Histologic examination indicated mild retinal damage in

the treated group and severe retinal damage in the control group.

Conclusions: Intravitreal injection of PI was as effective as voriconazole for the treatment of *Candida albicans* endophthalmitis, although vitreous opacity was remained.

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Venue: Ballroom 203

Klebsiella pneumoniae Endogenous Endophthalmitis Following Chronic Calculous Cholecystitis: A Case Report

*First Author: Janice Marie **JORDAN-YU***
*Co-Author(s): Romeo Laurent **APOSTOL**, Kent **WEE***

Purpose: To report a rare case of a 60-year-old Filipino male who developed unilateral *Klebsiella pneumoniae* endogenous endophthalmitis which followed a history of chronic calculous cholecystitis.

Methods: Case report.

Results: At presentation, a 60-year-old Filipino male with uncontrolled diabetes complained of progressive left eye pain accompanied with swelling and blurring of vision associated with fever starting a week prior to consultation. Examination of the left eye revealed a visual acuity of light perception, severe chemosis, periorbital swelling, hypopyon and corneal edema with limited view of the fundus. Interim history revealed that he was previously hospitalized for 21 days post-cholecystectomy for chronic calculous cholecystitis. B scan revealed vitreous opacities with thickened choroid and sclera. The patient underwent pars plana vitrectomy of the left eye with intravitreal injection of vancomycin and ceftazidime. Blood and vitreous sample culture and sensitivity revealed growth of *Klebsiella pneumoniae*. Computed tomography (CT) of the abdomen ruled out hepatic abscess in this case.

Conclusions: Bacterial endogenous endophthalmitis is rare in that it represents 2-6% of all endophthalmitis cases. *Klebsiella pneumoniae* endogenous endophthalmitis is an uncommon metastatic infection associated with poor visual prognosis. Diabetes is a predisposing risk factor and liver abscesses is known to be the major source of infection for most cases. This was not represented in this case, as the CT of the abdomen was negative. *Klebsiella pneumoniae* bacteremia was, however, proven through blood cultures.

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Know Your Enemy: The Many Faces of Central Retinal Artery Occlusion

*First Author: Ritu **SHAH***
*Co-Author(s): Apoorva **AYACHIT**, Lanin **CHEN**, Chinmay **NAKHWA**, Sundaram **NATARAJAN**, Sonali **VERMA***

Purpose: To report a case series of central retinal artery occlusion (CRAO) treated with a variety of modalities.

Methods: A total of 16 eyes of 14 patients affected with CRAO were evaluated. The mean age, time of presentation, best-corrected visual acuity (BCVA) at the time of presentation and risk factors for CRAO were evaluated. A variety of treatment modalities were used and the improvement in BCVA was noted.

Results: The mean age was 58 years. The male:female ratio was 5:2. The average BCVA at the time of presentation was counting fingers close to the face. Seven patients had reported within 48 hours of vision loss; 2 patients were reported to have a bilateral CRAO. Risk factors could be analyzed in 12 patients as carotid stenosis (n = 5), hyperhomocysteinemia (n = 3), raised CRP (n = 2). One patient had a history of dengue and 1 was a known case of HUGHES syndrome. Three were treated with ocular massage alone and 3 others were treated with paracentesis+ocular massage. Three underwent paracentesis alone. Diamox+ocular massage+paracentesis was done in 3 patients. One patient took oral steroids. Vitrectomy surgery was done for 2 patients of which 1 showed improvement in BCVA. Only 3 patients in this case series showed improvement in the visual acuity on follow-up.

Conclusions: Our case series of CRAO show

diverse etiologies for CRAO apart from well-established vascular etiologies viz. collagen vascular disease and dengue. Aggressive work-up for systemic disease or embolic source must be undertaken for management. Prognosis of CRAO depends on the timing of presentation. Treatment for CRAO remains controversial.

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Retinal Hemorrhage after Blood Transfusion in Patients with Chronic Severe Anemia

*First Author: Anuj **SONI***
*Co-Author(s): Pooja **LAL***

Purpose: To report 2 cases of retinal and subhyaloid hemorrhage post whole blood and packed red cell transfusion in patients with chronic severe anemia.

Methods: Non-interventional case series.

Results: Patients with chronic severe anemia/ pancytopenia who complained of sudden loss of vision after whole blood or packed cell transfusion were studied via fundus photographs. It was found that they developed subhyaloid and intraretinal hemorrhages.

Conclusions: The hemodynamic status of retinal vasculature is regulated in such a way as to redistribute oxygen supply to vital structure, ie, fovea. In such state blood transfusion leads to circulatory overload which may further result in retinal hemorrhage predominantly involving posterior pole. Although this complication is rare, we should bear in mind that retinal examination should be done both before and after blood transfusion.

Dec 15, 2018 (Sat) 08:30 - 10:00

Venue: Ballroom 203

Clinical Characteristics, Prognostic Factor, Visual Acuity and Globe Survival in Posterior Segment Intraocular Foreign Body

*First Author: Sanjita **SHARMA***

Purpose: Because of the variation in potential findings, quick and full assessment of patients with possible intraocular foreign body retention based on the early signs is important to provide early management and treatment plan, intraoperative guidance, prognosis, and counseling.

Methods: This study was based on retrospective clinical records of cases with penetrating eye injury with intraocular foreign body which underwent pars plana vitrectomy (PPV) for its removal from 2012 to 2014.

Results: The total number of eyes analyzed were 30. There were 24 (80%) male and 6 (20%) female patients, with a mean age of 27.7 years (range, 2-52 years). Of 30 eyes, 19 (63.3%) had injury at zone 1 and 11 (36.7%) eyes had injury at zone 2. The mean time between primary repair following surgery and intraocular foreign body removal was 15.47 days. Retinal detachment and endophthalmitis prior to intraocular foreign body removal was present in 9 (30%) eyes. When we used chi square test to look for any possible association between pre- and post-treatment visual acuity was not statistically significant. We also looked for correlation between postoperative phthisis bulbi with zone of injury and preoperative endophthalmitis and preoperative retinal detachment. However, the P value for the above correlation was more than 0.552 and 0.815 respectively which was statistically not significant.

Conclusions: Eyes with posterior segment intraocular foreign bodies showing clinical features of preoperative endophthalmitis, retinal detachment and the zone of injury also did not have any direct significance with globe survival. Large-scale prospective studies with foreign body details are warranted.

Intraocular Inflammation, Uveitis & Scleritis

Dec 16, 2018 (Sun) 13:40 - 15:10

Venue: Ballroom 104 - 105

Characteristics of Eyes Which Developed Central Serous Chorioretinopathy during the Treatment of Uveitis

*First Author: Sankeert **GANGAKHEDKAR***
*Co-Author(s): Jay **CHHABLANI**, Abhilash **GOUD**, Padmamalini **MAHENDRADAS**, Sruthi **SURENDRAN***

Purpose: To evaluate the characteristics of eyes which developed central serous chorioretinopathy (CSCR) during the treatment of uveitis.

Methods: Retrospective analysis of patients with uveitis on treatment with steroids or immunosuppressive agents who developed CSCR was done in 2 tertiary eye care centers. Demographic details, details about the uveitis, time interval of development of CSCR and optical coherence tomography (OCT) characteristics were collected.

Results: Eighteen eyes of 18 patients with uveitis who developed CSCR were included in the study. Among study patients, anterior uveitis was present in 3 eyes, intermediate in 6 eyes, and posterior in 8 eyes. Route of steroid administration was topical (3 eyes), periocular (1 eye) and oral (10 eyes). The mean time interval of development of CSCR after steroid initiation was 0.96 ± 1 months. The mean BCVA and mean CMT at the time of development of CSCR was 0.34 ± 0.33 logMAR and 332 ± 222.5 μ respectively. The mean NSD height was 294 ± 135.6 μ at baseline. Eight patients continued on steroid administration in view of active uveitis and 10 eyes were stopped on steroid. However, 3 eyes underwent micropulse laser and achieved complete resolution.

Conclusions: The mean interval of development of CSCR after starting steroid therapy in uveitis patients was 0.96 ± 1 months. Discontinuation of steroids as well as micropulse laser was successful in resolution of CSCR. However, further exploration of predictive factors for incidence and treatment outcome needs large number of patients with longer follow-up.

Dec 16, 2018 (Sun) 13:40 - 15:10

Venue: Ballroom 104 - 105

Choroidal Change in Acute Anterior Uveitis Associated with Human Leukocyte Antigen-B27

*First Author: Seong Joon **AHN***
*Co-Author(s): Byung Ro **LEE***

Purpose: To evaluate choroidal changes in eyes with acute anterior uveitis associated with human leukocyte antigen (HLA)–B27.

Methods: In 44 patients with first-onset, unilateral, acute-onset (<1 week) anterior uveitis for which diagnostic work-ups revealed positivity only for HLA-B27, wide-field 3-dimensional volumetric raster scan using swept-source optical coherence tomography was performed for both eyes. Choroidal thickness was measured by automated segmentation and thickness mapping and compared between eyes with uveitis and the fellow eyes at baseline. Choroidal thickness was compared before and after topical and/or systemic corticosteroid therapy. Relative choroidal thickening was defined as the choroidal thickness of the uveitic eye minus that of the corresponding eye and correlated with the degree of intraocular inflammation.

Results: Compared with the fellow eyes, eyes with acute anterior uveitis showed significant choroidal thickening on the subfoveal and parafoveal areas at baseline (all $P < 0.05$). En face choroidal imaging showed dilation of large choroidal vessels on the macula. Relative choroidal thickening significantly correlated with the degree of anterior chamber inflammation at baseline (correlation coefficient = 0.341, $P = 0.023$). After treating inflammation, the choroid on the macula thinned significantly (from 262.1 ± 66.5 to 239.5 ± 61.0 μm in the subfoveal choroid, $P < 0.001$). Increased choroidal vascularity was observed in the eyes with acute uveitis, which subsequently decreased after treatment.

Conclusions: Eyes with HLA-B27-associated

anterior uveitis showed significant choroidal thickening at acute phase that subsequently decreased after treatment, indicating subclinical choroidal inflammation in the eyes. Choroidal thickness might indicate disease activity in acute anterior uveitis associated with HLA-B27.

Dec 16, 2018 (Sun) 13:40 - 15:10

Venue: Ballroom 104 - 105

Clinical Features and Outcomes of Patients with Tubercular Vasculitis

*First Author: Ling **CHEN***

Purpose: To describe the clinical features and outcomes of presumed tubercular retinal vasculitis.

Methods: This was a retrospective cohort study of consecutive patients with tubercular retinal vasculitis at a tertiary referral eye center. Patients with suspected intraocular signs, positive T-spot, and positive tuberculin skin test were labeled with presumed tubercular uveitis. Standard anti-tubercular treatment and oral steroid were given and outcomes were analyzed.

Results: Patients with presumed tubercular vasculitis were predominantly male and had bilateral involvement. Recurrent vitreous hemorrhage was the most common presentation. Wide-field fluorescein angiography had values to detect peripheral capillary non-perfusion and retinal neovascularization. Good response to anti-tubercular therapy can be observed as early as 3 months post treatment. Retinal neovascularization as a common complication could be managed with photocoagulation or anti-VEGF therapy.

Conclusions: Tubercular retinal vasculitis is typically occlusive in nature, characterized by perivascular cuffing, capillary non-perfusion and retinal neovascularization. A high index of clinical suspicion and timely presumptive treatment are crucial to salvaging the vision in patients with intraocular tuberculosis.

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Venue: Ballroom 104 - 105

High-Resolution In-Vivo Imaging Using Adaptive Optics in Patients with Uveitis

*First Author: Arpitha **PEREIRA***
*Co-Author(s): Mukund **AKKALI**, Ankush **KAWALI**, Harika **KOLLIPARA**, Padmamalini **MAHENDRADAS**, Rohit **SHETTY***

Purpose: To quantify foveal damage in Behcets, Vogt Koyanagi Harada disease (VKH), serpiginous-like choroiditis (SLC) patients by adaptive optics (AO) imaging and to compare with normal age-matched controls.

Methods: Cross-sectional observational study of AO imaging was done in 10 eyes with Behcets, 12 eyes with VKH, 18 eyes with SLC, and 20 eyes of healthy subjects. The central 4-degree area from fixation was scanned. The mean cone count was calculated in all the cases.

Results: The mean cone cell count was 3811 in 10 eyes with Behcet's, 7905 in 12 eyes of VKH patients, 15,546 in 18 eyes with SLC, and 24,598 in 20 healthy eyes.

Conclusions: AO can be used as an additional quantifying imaging modality to assess the foveal changes in the form of decreased cone cell count in Behcet's, VKH, SLC entities. To the best of our knowledge, cone cell loss in various uveitic entities has not been reported earlier in the literature.

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Venue: Ballroom 104 - 105

Inflammatory Choroidal Neovascular Membrane Associated with Vogt Koyanagi Harada Disease in Active and Chronic Stage: A Retrospective Study

*First Author: Hitesh **AGRAWAL***
*Co-Author(s): Rajeev **PAPPURU**, Mudit **TYAGI***

Purpose: To study clinical findings, management and long-term follow-up of inflammatory choroidal neovascular membrane (CNVM) in patients with Vogt Koyanagi Harada disease (VKH).

Methods: In this retrospective study we went through all the folders diagnosed as VKH and inflammatory CNVM, and collected the data related to demographics, diagnosis and modes of treatment with its response. Most of the patients underwent ocular coherence tomography (OCT), fundus fluorescein angiography and OCT angiography.

Results: We found 10 patients with active inflammatory CNVM associated with VKH. Seven patients had pari-papillary CNVM, 2 had sub-foveal and one had juxta foveal CNV. Nine patients were treated with only intravitreal bevacizumab injection. One patient treated with intravitreal ranibizumab injection. Recurrence of CNVM was noted in 2 patients (after 1.5 and 2 years). Five patients had improved vision, 2 had no change and 3 patients had decreased vision after healing of CNVM. Three patients who have decreased vision had sub-foveal and juxta-foveal CNVM.

Conclusions: Peri-papillary location of CNV is more common in inflammatory CNVM with VKH. Most of these patients respond well with intravitreal anti-VEGF injection.

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Venue: Ballroom 104 - 105

Ocular Presentation in a Patient with Rickettsiosis

*First Author: Kiran **CHANDRAN***
*Co-Author(s): Mahantesh **BIRAJDAR**, Yogish S **KAMATH**, Shailaja **SHENOY***

Purpose: To report ocular findings in a patient with rickettsiosis.

Methods: A 30-year-old male with sepsis and multi-organ dysfunction syndrome, presented with redness, photophobia and burning sensation of the right eye for the past 2 days. His best-corrected visual acuity was 6/12 in the right eye and 6/6 in the left eye. Anterior segment of right eye showed conjunctival and ciliary congestion with fine keratic precipitates and grade 2 anterior chamber reaction suggestive of nongranulomatous uveitis while the left eye was within normal limits. On fundus examination of the right eye, perivascular sheathing, few large cotton wool spots with surrounding dot and blot hemorrhages and white dot lesions were present near the macula, and the left eye showed perivascular sheathing, cotton wool spots and few streak hemorrhages near macula. Optic discs in both eyes were normal and there was no vitritis.

Results: Investigations showed Weil-Felix OX2 titer of 1:160 along with lepta IgM positivity. Serology for chikungunya and dengue were negative. He was started on oral and IV antibiotics in view of systemic status. Schirmer's test showed severe dryness in both eyes. Steroid QID, cycloplegic BD for the right eye and lubricant eye drop QID for both eyes were started. On review 1 month later, he was symptomatically better, vision in the right eye improved to 6/6P and the fundus lesions resolved leaving only a subretinal scar in right eye.

Conclusions: It was difficult to ascertain if retinal findings in this case were due to rickettsia alone or whether leptospira component had a role. The visual prognosis was good.

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Venue: Ballroom 104 - 105

Optical Coherence Tomography Angiography and Fundus Fluorescein Angiography Findings in Patients with Takayasu Arteritis with No Ocular Symptoms

*First Author: Mohit **DOGRA***
*Co-Author(s): Ramandeep **SINGH**, Rajesh **VIJAYVERGIYA***

Purpose: To report fundus fluorescein angiography (FFA) and optical coherence tomography angiography (OCTA) findings of asymptomatic Takayasu arteritis (TA) patients.

Methods: All patients of TA with no ocular symptoms were included. Patients with visual loss, history of Takayasu retinopathy (TR), retinal laser or retinal surgery were excluded.

Results: Sixteen eyes of 8 patients (5 females, 3 males) were included. Their mean age was 28 years (range, 17-42 years). The best-corrected

visual acuity (BCVA) was 6/6 in all eyes. Clinical examination detected retinopathy in 7 eyes (43.75%), FFA detected changes in 8 eyes (50%) whereas OCTA picked up alterations in the foveal avascular zone (FAZ) in all 16 eyes (100%). FFA was normal in 8 eyes (50%), showed stage II TR in 2 eyes (12.5%), stage 1 TR in 2 eyes (12.5%), stage IV TR in 1 eye (6.25%) and hypertensive retinopathy changes in 4 eyes (25%). OCTA revealed enlarged FAZ in the deep capillary plexus (DCP) in all eyes (100%). Three eyes (18.75%) had decreased vessel density in superficial capillary plexus (SCP), DCP and choriocapillaris (CC) slabs. Nine eyes (56.25%) had enlarged FAZ in DCP as the only positive finding.

Conclusions: OCTA is more sensitive than clinical examination and FFA in detecting fundus abnormalities in TA patients. OCTA detects subclinical changes of retinal and choroidal vasculature. An OCTA-based classification of TR may be proposed so that subtle changes are picked up and appropriate ocular and systemic therapy can be instituted.

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Venue: Ballroom 104 - 105

Pediatric Vogt Koyanagi Harada Disease: Remission, Recurrences and Complications

*First Author: Komal **AGARWAL***
*Co-Author(s): Soumyava **BASU**, Sashwanthi **MOHAN**, Rajeev **REDDY**, Mudit **TYAGI***

Purpose: To evaluate remissions, recurrences and development of complications in pediatric patients presenting with Vogt Koyanagi Harada disease (VKH).

Methods: This was a retrospective review of patients younger than 16 years who were diagnosed with VKH. Demographic details, presenting symptoms and signs, and treatment details were noted. Rate of remission, duration of remission from start of treatment was recorded for all patients. Number of recurrences, site of recurrence, interval between recurrence and discontinuing treatment and treatment for recurrence were evaluated. Best-corrected visual acuity at presentation and on last follow-up was noted. Development of any complications on follow-up visits were evaluated.

Results: A total of 37 patients (74 eyes) were included; 86.4% were females. The minimum age at presentation was 8 years (mean, 13.6 years). All patients were treated with steroids either intravenously or orally and with systemic immunosuppression. Of the patients, 63.5% had a BCVA better than 20/40 at final follow-up. Remission was achieved in 26 out of 37 patients and oral steroids was stopped. Nineteen (51.3%) patients presented with at least one episode of recurrence of inflammation. Duration of recurrence ranged from 5 to 60 days (median, 30 days). 50 percent of eyes developed at least one complication. Fundus depigmentation was noted in 45 eyes. Cataract was the most common complication. Band-shaped keratopathy was not noted in any eyes.

Conclusions: In this study, VKH in pediatric patients tends to be aggressive and chronic course. Remission is low and recurrences are common, hence mandating the use of strong and prolonged treatment to suppress the immune activity.

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Venue: Ballroom 104 - 105

Posterior Scleritis: Clinical Profile, Risk Factors and Visual Outcome in a Series of 32 Patients

*First Author: Krishnendu **NANDI***

Purpose: To evaluate the etiology, clinical features, risk factors for poor visual outcome of eyes with posterior scleritis.

Methods: It was a retrospective case series at a tertiary care center in East India. Data regarding age, sex, clinical profile and management of patients with the diagnosis of posterior scleritis between January 2008 and December 2016 were reviewed. Patients were treated with intravenous methylprednisolone, oral steroids, immunosuppressive agents (azathioprine, cyclophosphamide, mycophenolate mofetil)

either as a single therapy or in combination. Outcome measures were defined as recurrences, visual acuity at last follow-up.

Results: A total of 32 patients were diagnosed to have posterior scleritis; 81% of the patients were female. The mean age at onset was 39.18 years. The mean duration of symptoms was 2.77 months. Vision at presentation ranged from perception of light to 6/6. The mean follow- up period was 18.33 months. Majority of the patients presented with choroidal folds. Pain was not an associated feature in 47% of patients. Only 22% of patients had associated anterior scleral inflammation and 47% of cases showed presence of T-sign on USG. Vision at last follow-up varied from counting fingers to 6/6. Patients with delayed presentation (P = 0.05) and evidence of optic nerve involvement (P = 0.015) needs aggressive anti-inflammatory therapy with systemic immunosuppressive agents.

Conclusions: All patients with posterior scleritis are at an increased risk of visual loss. Combination therapy of intravenous methylprednisolone, oral steroids and immunosuppressive agents can be effectively used in cases with disc edema along with posterior scleritis.

Dec 16, 2018 (Sun) 13:40 - 15:10

Venue: Ballroom 104 - 105

Study on Clinical Implication of Triamcinolone Acetonide in Aqueous Humor after Subconjunctival Injection

*First Author: Fang **LIU***

Purpose: To determine the triamcinolone (TA) concentration in the aqueous humor after anterior subconjunctival injection versus posterior subconjunctival injection and the possible association between the levels of TA in the aqueous and complications.

Methods: This was a prospective case series of 46 patients. All patients had diabetic retinopathy and planned to take vitrectomy later on. They were divided into 2 groups, anterior injection group and posterior injection. 20-mg TA were given 3 days before surgery. The aqueous humor was sampled and TA quantitated after anterior subconjunctival injection or posterior subconjunctival injection in a cohort of patients. Patients' intraocular pressures (IOPs) were measured before and up to 3 months after TA injection.

Results: The mean aqueous humor TA concentration in the eyes was significantly higher after an anterior subconjunctival injection than that after a posterior subconjunctival injection (anterior subconjunctival injection 133.8G 149.2 ng/mL and posterior subconjunctival injection 10.2G 10.9 ng/mL, respectively) ($P < 0.0001$). After anterior and posterior subconjunctival injection, the mean IOP was significantly at 1 month and 3 months than at baseline ($P < 0.05$ and $P > 0.05$, respectively, paired Student t test). The levels of TA in the aqueous humor had a significant positive association with the elevation in IOP ($\beta = 0.12$, $P = 0.026$).

Conclusions: The TA level in aqueous humor was associated with IOP elevation after subconjunctival application. Posterior subconjunctival injection with a small injection volume of concentrated suspension offered a better targeted delivery and might significantly reduce steroid-associated IOP elevation.

Dec 16, 2018 (Sun) 13:40 - 15:10

Venue: Ballroom 104 - 105

The Use of Optical Coherence Tomography and Auto Fluorescence to Monitor Primary Vitreoretinal Lymphoma Treated with Intraocular Methotrexate

*First Author: Nicholas **FUNG***
*Co-Author(s): Wai-Ching **LAM**, Kwan Ho, Anthony **MAK***

Purpose: To describe the use of optical coherence tomography (OCT) and fundus autofluorescence (FAF) in monitoring response to intravitreal methotrexate (MTX) treatment for patients with primary vitreoretinal lymphoma (PVRL).

Methods: All patients treated with intravitreal

MTX from the period of January 2016 to December 2017 were reviewed for visual acuity (VA), treatment regimen, side-effects, response, biweekly OCT, and FAF features before and after injections.

Results: Patient 1 was a 65-year-old male with high-grade B cell lymphoma. His VA was counting fingers, 0.05 and 1/15 at presentation, 1-week and 3-month follow-up respectively. OCT showed Intraretinal hyper-reflective spots above RPE with rim of SRF, which reduced after 1st week, and IS/OS disruption occurred after 2 months. Patient 2 was a 69-year-old male with NK/T cell lymphoma. He had bilateral intravitreal MTX treatment and had side-effects of corneal toxicity after 4th weekly injection. His VA was 0.1, 0.2 bilaterally, R 0.1 / L 0.4 at presentation, 1-week and 3-month follow-up respectively. OCT showed bilateral rippling of RPE layers with disruption between retinal layers which resolved after 2 weeks of commencing treatment. Patient 3 was a 57-year-old male with negative histology. His VA was 0.1, 0.3, 0.4 at presentation, 1-week and 3-month follow-up respectively. OCT showed peripapillary thickening of RPE and subretinal hyper reflective material which improved after 2 weeks of treatment, and resolved after 5 weeks of injection.

Conclusions: Due to the multiple side-effects of the disease and treatment, response may not be reflected with VA and clinical activity alone. OCT and FAF features are useful in the diagnosis and assessment of response in intravitreal MTX for PVRL.

Dec 16, 2018 (Sun) 13:40 - 15:10

Venue: Ballroom 104 - 105

Validation of Proposed Diagnostic Criteria for Presumed Intraocular Tuberculosis

*First Author: John Philip **UY***
*Co-Author(s): Jessica Marie **ABAÑO**, Juan **LOPEZ***

Purpose: To validate newly proposed diagnostic criteria and to set a scoring system that will aid in the diagnosis of presumed intraocular tuberculosis (TB).

Methods: The diagnostic accuracy of the proposed criteria was retrospectively calculated for the development of a scoring system in a group of 60 patients with uveitis (27 intraocular TB and 33 non-intraocular TB). The criteria were: (1) healed TB scar on chest radiograph, (2) tuberculin skin test, (3) interferon gamma release assay, (4) living in household with active TB, (5) high-risk occupation, and (6) characteristic clinical lesion.

Results: Multiple logistic regression analysis calculated the coefficient per variable, which was used as basis of the scoring system. Three points were allotted to parameter (1), 2 points for parameter (2), 1 point for parameters (4) and (6). The parameters (3) and (5) were disregarded due to insufficient data. The sensitivity, specificity, positive likelihood ratio, and area under the curve of the proposed criteria were 92.59%, 66.67%, 2.78, 0.887 (95% confidence interval, 0.772-0.951, P = 0.0001), respectively, when >3 points was used as cut-off.

Conclusions: The computed diagnostic values denote that the accuracy of the proposed scoring system has adequate discriminative ability to recognize patients with presumed intraocular TB that will likely respond to anti-TB treatment.

Neuroscience, Stem Cells & Regenerative Medicine

Dec 15, 2018 (Sat) 10:30 - 12:00

Venue: Ballroom 202

Induced Ocular Hypertension in Rats: Anterior Chamber Injection of 0.5% Carbomer Suspension

*First Author: Jingkang **ZHAO***
*Co-Author(s): Yuan **HE***

Purpose: To describe a simple method for artificially inducing a rat model of elevation in intraocular pressure (IOP) without secondary effects. IOP was induced by injection of 0.5% Carbomer 940 suspension into the anterior chamber to occlude aqueous outflow in rats.

Methods: A total of 30 male SD rats weighing approximately 300 g were used. The right eye was the experimental eyes, and the left eye as healthy control. 0.5% Carbomer suspension was neutralized by 10% sodium hydroxide solution. The control eye received an equivalent saline injection. The needle was introduced into the conjunctiva near the corneal limbus and then penetrated into the anterior chamber. The needle was pulled out to make the aqueous leakage. Then the needle was introduced into the anterior chamber from previous wound. Carbomer suspension was injected into the anterior chamber until it ran out from the wound. IOP was measured everyday and anterior segment photography taken every week. HE staining was used to calculate the RGCs loss.

Results: The mean and peak IOP of the injected eyes were elevated significantly higher than those of the control eyes for 12 weeks. In most rats, IOP was different in the day and night. The mean daytime IOP was 11.23 ± 0.97 mm Hg and 11.56 ± 1.20 mm Hg at night. In the experimental group, the mean IOP was 14.25 ± 1.38 mm Hg during the day and 16.20 ± 3.89 mm at night. Most of the IOP in the experimental group dropped to normal within 6 weeks, a few maintained to 12 weeks.

Conclusions: Anterior chamber injection of 0.5% Carbomer suspension was an effective and reproducible method to produce chronic IOP elevation and glaucomatous neuropathy in rats.

Dec 15, 2018 (Sat) 10:30 - 12:00

Venue: Ballroom 202

Intraperitoneal Administration of Adipose Tissue–Derived Stem Cells for the Rescue of Retinal Degeneration in a Mouse Model via Indigenous CNTF Up-Regulation by IL-6

*First Author: Sang Joon **LEE***
*Co-Author(s): Jeong Hoon **HEO**, Byeng Chul **YU***

Purpose: We investigated whether transplantation of mouse adipose tissue-derived stem cells (mADSC) into the intraperitoneal space has a rescue effect on $NaIO_3$-induced retinal degeneration in mice.

Methods: Retinal degeneration was induced by intraperitoneal injection of $NaIO_3$ (40 mg/kg) on 8 C57BL6 mice. At 3 days and 1 weeks after the induction, mADSCs ($5x10^5$ cells/100 μL) were transplanted into the intraperitoneal space (stem cell treatment group; STx) and normal saline was used in the retinal degeneration group (RD). At 3 to 4 weeks after transplantation, 8 mice were sacrificed and enucleated. The area of photoreceptor outer and inner segment (IS/OS), outer nuclear layer, and inner nuclear layer were analyzed. Electroretinogram (ERG) was used for functional test. RT-PCR were performed to compare mRNA level.

Results: mADSC transplantation recovered visual function and preserved the retinal outer layer structure compared to the control group without any integration of mADSC into the retina. Endogenous ciliary neurotrophic factor (CNTF) was elevated in the retinas of mADSC-treated mice. We found that lipopolysaccharide (LPS) or LPS-stimulated monocyte supernatant induced the secretion of granulocyte colony stimulating factor (GCSF), CD54, CXCL10, interleukin-6 (IL-6), and CCL5 from the mADSC by cytokine array. Based on bioinformatics data, the expression of IL-6 was related to the expression of CNTF. Additionally, intravitreal injection of IL-6 in rats produced up-regulation of endogenous CNTF in the retina.

Conclusions: mADSC had a rescue effect on retinal degeneration through the up-regulation of endogenous CNTF by IL-6. Thus, transplantation of mADSC could be a potential treatment option for retinal degeneration.

Dec 15, 2018 (Sat) 10:30 - 12:00

Venue: Ballroom 202

Localized Retinal Degeneration by Intravitreal Injection of N-methyl-N-nitrosourea after Vitrectomy in the Rabbit

*First Author: So Min **AHN***
*Co-Author(s): Seong-Woo **KIM**, Jaeryung **OH**, Tae Kwann **PARK**, Cheolmin **YUN***

Purpose: To develop and characterize the outer retinal degeneration induced by intravitreal injection of a N-methyl-N-nitrosourea (MNU) after vitrectomy in rabbit.

Methods: At first, the right eyes of 13 male New Zealand white rabbits received intravitreal injection of 0.05, 0.1, 0.3, and 0.5 mg MNU or sham to determine the proper dose to develop the outer retinal degeneration after vitrectomy. In preliminary experiment, ultra-widefield color fundus photographs (FP) and fundus autofluorescence (AF) images, spectral-domain optical coherence tomography (OCT) were performed at baseline and 1 month after intravitreal injection. Histological examinations with hematoxylin and eosin (H&E) stain were performed on selected rabbit eyes at 1 month after injection. In the second efficacy study, based on the preliminary results, 0.2 mg MNU/0.05 mL was injected into the right eyes of 10 rabbits after vitrectomy.

Results: In preliminary experiment, while there were no significant changes in the retina in 0.05 and 0.1 mg of drug-injected eyes, outer retina atrophy was observed in all 0.3 mg of MNU-injected eyes in OCT. In the 0.5 mg MNU-injected eyes, whole layer retinal atrophy was found 1 month after injection in OCT. The fundus AF of the vitrectomized eye showed the homogenously localized hyper AF area with strong linear hyper AF border. In the second efficacy study, localized outer retinal degeneration was developed in all of 10 rabbits after 0.2-mg MNU injection.

Conclusions: Vitrectomized rabbit model with intravitreally injected MNU induced homogenously localized outer retinal degeneration with 0.2-mg dose of MNU.

Dec 15, 2018 (Sat) 10:30 - 12:00

Venue: Ballroom 202

PLIN2 and PLIN3 in Human-Induced Pluripotent Stem Cell-Derived Retinal Pigment Epithelium

First Author: Rifa ***WIDYANINGRUM***
Co-Author(s): Hsiang-Po ***HUANG****, Guan-Yi* ***LIN****, Leo* ***TSUI****, I-Jong* ***WANG****, Tsung-Jen* ***WANG***

Purpose: To investigate the expression patterns and the role of PLIN2 and PLIN3 lipid droplet associated protein in human-induced pluripotent stem cell-derived retinal pigment epithelium (hiPSC-RPE) developed for the treatment of age-related macular degeneration (AMD).

Methods: Using the modified protocol, we differentiated hiPSC into RPE by application of Y-27632, SB-431542 and CKI-7. Characterization marker of hiPSC-RPE was observed by confocal microscopy. Assessment of protein and gene expression was done by TAE gel electrophoresis, immunoblotting and qRT-PCR. To further clarify the role of PLIN2 and PLIN3 we treated the cells with all-trans-retinol, ox-LDL and ox-LDL with CD36.

Results: PLIN3 and PLIN2 were co-localized with lipid droplets in hiPSC-RPE. QRT-PCR and immunoblotting demonstrated that the mRNA and protein levels of PLIN2 and PLIN3 significantly increased in hiPSC-RPE 40 and 60 days after differentiation. Human RPE cell line demonstrated increased PLIN2 associated lipid droplet formation and gene expressions after treatment with all-trans-retinol and ox-LDL, and significantly decreased number after blocking with CD36. There was significantly increased number of PLIN3 associated lipid droplet formation and gene expressions after treatment with ox-LDL, and significantly decreased number after blocking with CD36.

Conclusions: For the first time, PLIN2 and PLIN3 were characterized in hiPSC-RPE. The expression is gradually increased as the maturation of hiPSC-RPE. PLIN2 and PLIN3 might play an important role in lipid storage in RPE. PLIN2 probably plays a role in regulating the storage of all-trans-retinol in visual cycle.

Dec 15, 2018 (Sat) 10:30 - 12:00

Venue: Ballroom 202

The Role of Wnt/β-catenin Signaling in the Restoration of Induced Pluripotent Stem Cell-Derived Retinal Pigment Epithelium after Laser Photocoagulation

*First Author: In Hwan **CHO***
*Co-Author(s): Si Hyung **LEE**, Seung Kwan **NAH**, Ha Yan **PARK**, Tae Kwann **PARK**, Jin Young **YANG***

Purpose: To investigate the role of Wnt/β-catenin signaling pathway in the restoration of human-induced pluripotent stem cell-derived retinal pigment epithelium (hiPSC-RPE) after laser photocoagulation.

Methods: After differentiation of RPE cells from hiPSCs, laser photocoagulation was performed. Activation of Wnt/β-catenin signaling at day 1 and 5 after laser photocoagulation was evaluated by expression of β-catenin. Cell proliferation and alteration in cell-to-cell contact at day 5 after laser photocoagulation with or without Dickkopf-1 (Dkk-1) treatment were studied using ethynyl-2′-deoxyuridine (EdU) assay and zonula occludens-1 (ZO-1) expression analysis, respectively. The mRNA levels of Wnt genes at day 5 after laser photocoagulation were evaluated by quantitative real-time polymerase chain reaction (qRT-PCR).

Results: Activation of Wnt/β-catenin signaling at day 1 and 5 after laser photocoagulation was confirmed by β-catenin accumulation in the cytoplasm and nucleus of hiPSC-RPE. Many EdU-positive cells also expressed β-catenin and the number of EdU-positive cells was decreased at day 5 after laser photocoagulation after Dkk-1 treatment, indicating that Wnt/β-catenin signaling mediated hiPSC-RPE proliferation. ZO-1 expression was not decreased with Dkk-1 treatment at day 5 after laser photocoagulation, indicating that Wnt/β-catenin signaling mediated hiPSC-RPE restoration. At day 5 after laser photocoagulation, mRNA levels of Wnt2b, Wnt3, Wnt5a, Wnt7a, and Wnt10b were increased.

Conclusions: Wnt/β-catenin signaling has a crucial role in restoration of hiPSC-RPE proliferation after laser photocoagulation. Manipulation of Wnt/β-catenin signaling while elucidating the underlying mechanisms of RPE restoration might have a therapeutic potential in retinal degenerative diseases.

Ocular Imaging

Dec 14, 2018 (Fri) 17:00 - 18:30

Venue: Ballroom 201

Choroidal Thickening in Advanced Retinopathy and Choroidal Thinning in Advanced Nephropathy in Patients with Type 2 Diabetes

*First Author: Jee Taek **KIM***
*Co-Author(s): Min Kyu **CHOI***

Purpose: To analyze the effects of systemic and ocular profiles on subfoveal choroidal thickness in naïve eyes with diabetic retinopathy (DR), using swept-source optical coherence tomography (SS-OCT).

Methods: This study was a retrospective, cross-sectional, observational study. This study included the patients with naïve DR who did not receive any treatment for DR or diabetic macular edema (DME), and who underwent routine laboratory evaluations including complete blood cell count, admission battery, stat battery, and urine analysis. Systemic and ocular factors that were associated with the change of ChT in eyes with DR, were analyzed using univariate and multivariate linear regression models.

Results: A total of 238 eyes from 127 patients with diabetes, and 40 eyes from 28 age-matched healthy control, were recruited. The mean SFCT in eyes with naïve PDR (320.9 ± 82.6 μm) or severe NPDR (291.7 ± 78.5 μm) had thicker choroid, compared with normal control (278.1 ± 54.5 μm). The existence of DME had no effect on ChT in respective DR group. Univariate and multivariate regression analysis showed that the SFChT in naïve eyes with DR had a positive correlation with DR grade ($R = 23.194$, $P < 0.001$), and negative correlation

with serum level of phosphorus (R = –24.696, P = 0.009), estimated glomerular filtration rate (R = 0.665, P < 0.001).

Conclusions: The choroid was affected by several factors including DR stage, and kidney functions. The advanced stage of retinopathy makes the choroid thickening, and concomitant severity of nephropathy makes the choroid thinning.

Dec 14, 2018 (Fri) 17:00 - 18:30

Venue: Ballroom 201

Choroidal Vascular Features in 52 Eyes with Central Serous Chorioretinopathy: A Prospective Study

*First Author: Pukhraj **RISHI***
*Co-Author(s): Rupesh **AGRAWAL**, Neha **KHANDELWAL**, Pradeep **MANCHEGOWDA**, Ekta Anand **RISHI***

Purpose: To study the clinical profile, and choroidal vascular features in patients presenting with treatment-naïve central serous chorioretinopathy (CSCR).

Methods: This was a prospective, cross-sectional study of 52 eyes presenting with first episode of treatment-naïve, unilateral CSCR between August 2016 and March 2018. Patients underwent comprehensive eye examination followed by swept-source optical coherence tomographic scan. Three-dimensional 6 × 6 mm scans with 400 × 400 axial scans or 12 × 12 mm scans with 500 × 500 axial scans were obtained. Parameters studied were subfoveal choroidal thickness (SFCT), choroidal vascularity index (CVI), ocular perfusion pressure, and choroidal vessel dilatation pattern (diffuse/focal). Two observers measured the parameters independently and had good agreement. Image J software was used to measure CVI. Total choroidal area (TCA) of subfoveal region and luminal area (LA) were measured. Ratio of LA to TCA determined the CVI. Statistical analysis was carried out using SPSS version 14 (SPSS Inc, Chicago IL). Pearson correlation coefficient and *t* test were used to test the relationship between different variables.

Results: The mean age at presentation was 40.1 ± 7.2 years. The mean SFCT was 429.4 ± 85.7 µm. The mean CVI was 60.39 ± 1.12%; 61.10% in Haller›s layer, 59.68% in Sattler's layer. Choroidal vessel dilatation was seen in Haller's layer (n = 90% eyes; diffuse pattern in 64% eyes) and Sattler's layer (n = 50% eyes; diffuse pattern in 89% eyes). The mean SFCT had positive correlation with Sattler's layer dilatation.

Conclusions: This study demonstrates marked diffuse dilation of choroidal vasculature and an increase in CVI in patients with CSCR. These findings help in better understanding of the disease pathophysiology.

Dec 14, 2018 (Fri) 17:00 - 18:30

Venue: Ballroom 201

Comparison of 'Standard' vs 'Panorama' vs Novel 'Ultrawide-Field' Optical Coherence Tomography Angiography in Serpiginous-Like Choroiditis

*First Author: Rakesh **JUNEJA***
*Co-Author(s): Ahmed **ALKWAGA**, Sonal **DUA**, Navneet **MEHROTRA**, Manish **NAGPAL**, Sachi **WACHASUNDAR***

Purpose: To analyze the optical coherence tomography angiography (OCTA) characteristics of serpiginous-like choroiditis (SLC) by novel ultrawide-field imaging (UWF) and to compare these findings with standard and panoramic imaging.

Methods: A total of 38 eyes with SLC were included in prospective cross-sectional study during the 1-year study duration. All eyes underwent optical coherence tomography (OCT), fluorescein angiography (FA), indocyanine green angiography (ICGA) and 3 different OCTA imaging techniques; standard (3x3 mm), panorama (12x9 mm) and UWF (18x16 mm) which were compared in terms of number and extent of lesions covered and morphological features.

Results: On OCTA, active lesions appeared as flow void areas or areas of decreased decorrelation signal beneath RPE-Bruchs

membrane layer at the level of choroid due to choriocapillaris hypo-perfusion. In healing phase lesions appeared as reduced flow void areas or areas with improvement in decreased decorrelation signals due to restoration of choriocapillaris and improved blood flow. The UWF technique provided images extending beyond arcades capturing maximum lesions, which were missed on panoramic and standard OCTA images.

Conclusions: The novel UWF OCTA is an alternative non-invasive tool to ICGA that provides widest field and captures maximum lesions in SLC cases, more than standard and panorama images while maintaining the 'similar resolution'.

Dec 14, 2018 (Fri) 17:00 - 18:30

Venue: Ballroom 201

Evaluation of Choroidal Structural Changes in Eyes of Healthy Smokers Using Choroidal Vascularity Index (CVI)

*First Author: Dilys **LEE***
*Co-Author(s): Manisha **AGARWAL**, Rupesh **AGRAWAL**, Neha **KHANDELWAL**, Sumit **KUMAR**, Wei **XIN***

Purpose: Cigarette smoking is a known risk factor for vascular dysfunction. This study aimed to evaluate choroidal structural change in healthy smokers using choroidal vascularity index (CVI) derived from image binarization on spectral-domain optical coherence tomography scans with enhanced depth imaging (EDI-OCT).

Methods: This cross-sectional study included 39 healthy smokers and 44 non-smokers. Choroidal images on EDI-OCT were binarized into luminal area (LA) and stromal area (LA). CVI was calculated as the ratio of LA to total choroid area (TCA). CVI, subfoveal retina thickness (SFRT) and subfoveal choroidal thickness (SFCT) between smokers and non-smokers were compared using likelihood ratio test with linear mixed model.

Results: Compared with subjects with >10 pack-years of cigarette smoking, non-smokers and those with 1-10 pack-years of smoking had higher CVI of 1.6% and 0.5%, respectively. The effect of cigarette smoking on CVI was statistically significant (P = 0.0285). There was no significant association between cigarette smoking and SFRT/SFCT. The effect of age on CVI/SFRT/SFCT was also not statistically significant.

Conclusions: Cigarette smoking is associated with decreased choroidal vascularity in healthy subjects and this association appears to be dose dependent. CVI might be a non-invasive marker of vascular health in smokers.

Dec 14, 2018 (Fri) 17:00 - 18:30

Venue: Ballroom 201

Making Choroidal Neovascularization Visible: New Insights from OCT Angiography Imaging in Neovascular AMD

*First Author: Paul **MITCHELL***
*Co-Author(s): Gemmy **CHEUNG**, Gerald **LIEW**, Tien-Yin **WONG***

Purpose: To determine the visibility and characteristics of choroidal neovascular (CNV) membranes using optical coherence tomography angiography (OCTa) in neovascular age-related macular degeneration (nAMD) patients.

Methods: Over a 4-month period, 160 consecutive nAMD cases seen at Sydney West Retina had macular OCTa performed (Zeiss Plex-Elite 9000): these included 29 treatment-naïve and 131 previously treated subjects. En-face OCTa, segmented to image outer retina / choriocapillaris levels were assessed for visibility of CNV fronds, apparent source, size, and other characteristics, including presence of subclinical CNV lesions.

Results: In 131/160 subjects, CNV was visible on OCTa (82%) in at least one eye. Causes for non-visibility included geographic atrophy, RPE tear, large RPE detachment, or movement artifact. Visible CNVs ranged in size from 0.2 disc areas (DA) to >5 DA, and averaged 1.5 DA. The most frequent CNV appearance was a 'tree', followed by 'bush', 'Medusa'-like and 'net' patterns. Some fronds were extremely

extensive, often in patients with good VA, suggesting incorporation into macular perfusion. They were particularly well shown in fluorescein-defined type I ('occult' CNV) cases. The majority of CNVs appeared to arise from nasal to the fovea; most fronds did not cross the central fovea. In 8 of 73 (11%) subjects with unilateral nAMD who were asymptomatic without sub- or intra-retinal fluid in the fellow eye, OCTa revealed subclinical CNV; PCV cases were also differentiated.

Conclusions: OCTa provides unparalleled visibility of CNV membranes in a non-invasive, easily repeatable technique. OCTa can be used to assess presence, risk, development, course and response to treatment for nAMD, representing a major advance.

Dec 14, 2018 (Fri) 17:00 - 18:30

Venue: Ballroom 201

Morphologic Features of Retinal Pigment Epithelium and Retinal Vascular Flow in Eyes with Early Age-Related Macular Degeneration and Reticular Pseudodrusens: Optical Coherence Tomography Angiography Study

*First Author: Cheolmin **YUN***
*Co-Author(s): So Min **AHN**, Seongmin Jang **JANG**, Seong-Woo **KIM**, Jaeryung **OH***

Purpose: To investigate the morphologic characteristics of retinal pigment epithelium (RPE) on optical coherence tomography (OCT) and its association with retinal vascular density in eyes with early age-related macular degeneration (AMD) with reticular pseudodrusens (RPDs).

Methods: We retrospectively reviewed medical records of consecutive patients with early AMD with RPDs. We classified the morphology of RPE into 3 types; type 1, flat RPE; type 2, shallow pigment epithelial detachments (PED) with sub-RPE deposits and type 3, wedge-shaped hollow PED based on OCT. The retinal vessel densities of the superficial capillary plexus (SCP) and deep capillary plexus (DCP) were calculated from the 3 x 3 mm area OCT angiography images. The mean retinal thickness of 3 mm zone were measured on the OCT.

Results: We included 80 eyes and classified 33, 27 and 20 into type 1, 2 and 3, respectively. The retinal vascular densities of the SCP of type 3 (21.93 ± 2.70%) and type 2 (22.29 ± 2.80%) were lower than that of type 1 (23.93 ± 2.26%, P = 0.010), while those of the DCP of type 3 (20.63 ± 2.42%) was lower than type 2 (21.94 ± 2.42%) and type 1 (23.54 ± 1.78%, P < 0.001). The mean retinal thickness of type 3 (274.86 ± 20.62 μm) was lower than that of type 2 (285.29 ± 21.88 μm) and type 1 (298.26 ± 13.81 μm, P = 0.001).

Conclusions: Loss of retinal vascular flow and retinal thinning varied according to the RPE morphologies in eyes with early AMD and RPDs.

Dec 14, 2018 (Fri) 17:00 - 18:30

Venue: Ballroom 201

Multimodal Imaging of Malattia Leventinese with Choroidal Neovascularization

*First Author: Yuhong **GAN***
*Co-Author(s): Feng **WEN**, Xiongze **ZHANG***

Purpose: To describe the image features of malattia leventinese with choroidal neovascularization (CNV).

Methods: Case report.

Results: A 36-year-old woman suffered from metamorphopsia in both eyes for 2 months. Her visual acuity was 20/20 in the right eye and 20/25 in the left eye. Slit lamp examination revealed yellow-white drusen of different sizes located in the peripapillary and macular areas with pigmentary changes in both eyes and there was a subretinal hemorrhage in the macular area of the left eye. The large drusen appeared with round or irregular shape and the small drusen were radially arranged. Fundus autofluorescence frames revealed an intense autofluorescence of large drusen, whereas small ones were faintly visible. On fluorescein angiography, the large drusen showed hypofluorescent to hyperfluorescent while the small radial drusen progressively decreased their fluorescence. In the left eye,

however, besides the appearance of drusen, there was heterogeneous hyperfluorescence with leakage in late phases, which suggested active CNV. On indocyanine green angiography of the left eye, corresponding to the leakage on FFA, there was also a hyperfluorescent areas observed in the late phase. On the optical coherence tomography angiography frames, the CNV in the left eye could be clearly shown by a hyperflow signal of flow. After all the examinations, the diagnosis of CNV secondary to malattia leventinese in the left eye was made.

Conclusions: Malattia leventinese is a rare, hereditary disease. Formation of CNV is infrequently reported in patients with malattia leventinese, but with the assistance of the multimodal imaging, it would be easier for the doctor to make an accurate diagnosis and intervention.

Dec 14, 2018 (Fri) 17:00 - 18:30

Venue: Ballroom 201

Ocular Surface Squamous Neoplasia: Angiographic Characteristics and Response to Subconjunctival/Perilesional 5-Fluorouracil Injection

*First Author: Rui **HUA***

Purpose: To investigate the angiographic characteristics of ocular surface squamous neoplasia (OSSN) and to evaluate the efficacy of subconjunctival/perilesional 5-fluorouracil injection on OSSN.

Methods: Six eyes of 6 patients with primary OSSN, received perilesional, subconjunctival, 25-mg/mL 5-fluorouracil injections at certain intervals. Anterior segment digital photography images, anterior segment optical coherence tomography (AS-OCT), and conjunctival indocyanine green angiography (ICGA) were obtained simultaneously with fluorescein angiography (FA).

Results: The mean best-corrected vision acuity was improved significantly after treatment. At baseline, the average largest thickness of OSSN was 718 (456–1870) μm on AS-OCT. There was an abrupt transition between normal and abnormal epithelium, a thickened hyperreflective epithelium, and a sharp plane of cleavage between the lesion and underlying tissue. The angiographic characteristics of OSSN included focal or seafan-shaped intratumoral and conjunctival feeding vessels in ICGA, and abnormal vascular leakage in FA. The median time to tumor regression after treatment was 35 (34–56) days in 5 eyes without recurrence, and only one eye was recovered partially 40 days after treatment.

Conclusions: This is the first report of the angiographic characteristics of OSSN and its response to subconjunctival/perilesional 5-fluorouracil injection on OSSN by simultaneous conjunctival angiography and AS-OCT. The improved subconjunctival/perilesional 5-fluorouracil injection was an effective therapy for OSSN in both best-corrected vision acuity gain and anatomic outcomes.

Dec 14, 2018 (Fri) 17:00 - 18:30

Venue: Ballroom 201

Optical Coherence Tomography Angiography Biomarkers Correlating Disease Status in Branch Vein Occlusion

*First Author: Mohamed **AHMED***

Purpose: To objectively assess the macular vascular flow and density changes together with morphological changes in patients with branch vein occlusion using optical coherence tomography angiography (OCTA) automated software algorithms.

Methods: A total of 20 eyes from patients having branch vein occlusion (including upper and lower temporal branches) with 20 eyes of normal individuals as controls were examined using OCTA (RTVue-XR Avanti; Optovue, Inc, Fremont, CA). Foveal avascular zone (FAZ) area, macular vessel density together with corresponding thickness and visual acuity (expressed as the logarithm of the minimum angle of resolution; logMAR) were measured and compared in both groups. Different biomarkers, size of the cleared-out

areas, sprouted new collaterals and vascular morphological distortion could be identified and used to assess severity as well as treatment effects.

Results: The mean FAZ (non-flow) area was significantly enlarged in all patients and showed positive correlation with the logMAR visual acuity. Statistically significant negative correlation between flow area and foveal thickness (r = –0.45, P = 0.0033) was found. Statistically significant positive correlation between UCVA and foveal thickness (r = 0.47, P = 0.025) was also found.

Conclusions: Optical coherence tomography angiography provides a non-invasive imaging modality and helpful tool to quantify and follow macular micro-vascular changes in patients with branch vein occlusion. It could settle treatment guidelines based on biomarkers and indices detected in different cases.

Dec 14, 2018 (Fri) 17:00 - 18:30

Venue: Ballroom 201

Optical Coherence Tomography Angiography Evaluation of the Foveal Avascular Zone in Healthy Adults and Its Relationship with Ocular Factors

*First Author: Dominic **TING***
*Co-Author(s): Louis **LIM**, Colin **TAN***

Purpose: To determine the size and characteristics of the superficial and deep foveal avascular zone (FAZ) in healthy adults by using optical coherence tomography angiography (OCT-A), and to ascertain the effects of demographic and ocular parameters on the FAZ size.

Methods: In a prospective cohort study of 117 healthy volunteers, foveal-centered 3 × 3-mm OCT-A scans were manually graded by certified graders to determine the size of the superficial and deep FAZ. Multiple linear regression analyses were performed to evaluate the impact of demographics and ocular factors, including central retinal thickness (CRT), choroidal thickness, axial length (AL), and spherical equivalent (SE) on superficial and deep FAZ areas.

Results: The mean age of the participants was 22.5 years, with a mean AL of 25.4 mm and mean SE of –4.3 diopters. The mean CRT was 262.8 μm (range, 220-316 μm). The mean superficial FAZ area was 0.24 mm^2, while the deep FAZ area was 0.38 mm^2 (P < 0.001). Females had a larger superficial (P < 0.001) and deep FAZ (P < 0.001). On univariate linear regression, both superficial and deep FAZ areas had significant correlations with CRT, sex, AL, and SE, but not with age. By multiple linear regression analysis, in normal eyes, superficial FAZ area varied significantly with CRT and sex. Among eyes with high myopia, both superficial and deep FAZ varied significantly with CRT, sex, and choroidal thickness.

Conclusions: The superficial and deep FAZ areas varied significantly among healthy eyes. Factors such as CRT, sex, SE, AL, and choroidal thickness influence FAZ size.

Dec 14, 2018 (Fri) 17:00 - 18:30

Venue: Ballroom 201

Role of Intravitreal Dexamethasone Implant for Macular Hard Exudates

*First Author: Girish **VELIS***
*Co-Author(s): Sachin **MAHULI***

Purpose: To study efficacy of intravitreal dexamethasone implant in cases with extensive macular hard exudates secondary to diabetic macular edema resistant to anti-vascular endothelial growth factor (VEGF) injections.

Methods: A total of 15 cases with extensive hard exudates in diabetic macular edema post at-least 3 anti-VEGF injections were analyzed. Routine eye examination, fundus photography and optical coherence tomography (OCT) were performed to document hard exudates and macular thickness before and after injections. All patients received intravitreal dexamethasone implant under local anesthesia, with a minimum of 6 months' follow-up. Monthly follow-up was done to record visual acuity, intraocular pressure, cataract progression, fundus photography and OCT.

Results: Fifteen eyes of 15 cases who had received at least 3 anti-VEGF injections were analyzed. These included 6 female and 9 male patients with a history of diabetes for a minimum of 10 years. Their mean age was 64 years. Five cases were phakic and 10 were pseudophakic. Three cases had increased intraocular pressure following implant which was controlled with anti-glaucoma medications. All cases showed 2-line improvement in Snellen visual acuity and mean reduction of 105 microns of macular thickness was noted. Three cases had sub-foveal exudates which were reduced post-dexamethasone implant. Photographic evidence of decrease in hard exudates was documented in all cases.

Conclusions: Intravitreal dexamethasone implant results in significant reduction of hard exudates and macular edema, leading to better anatomic restoration of macula and improved visual acuity. Potential side-effects like glaucoma and cataract need to kept in mind. A large case series and randomized controlled trial would be required to establish definitive role in such cases.

Dec 14, 2018 (Fri) 17:00 - 18:30

Venue: Ballroom 201

The Importance of Signal Strength in Quantitative Assessment of Retinal Vessel Density Using Optical Coherence Tomography Angiography

*First Author: Hyung Bin **LIM***
*Co-Author(s): Young Joon **JO**, Jung Yeul **KIM**, Yong Woo **KIM***

Purpose: To investigate the effect of signal strength (SS) on optical coherence tomography angiography (OCTA) measurements and minimum SS level that could be considered optimal.

Methods: A total of 446 normal eyes from 230 young, healthy subjects were included. Macular OCTA images using a 6×6 mm angiography scan were acquired from all participants using the Zeiss Cirrus 5000 with Angioplex OCTA. All subjects were divided into 4 groups according to the SS (SS 7, SS 8, SS 9, and SS 10) of the OCTA image. Vessel density (VD), perfusion density (PD), and foveal avascular zone (FAZ) metrics of the superficial capillary plexus among the 4 groups were compared, and analyses of relationships between various factors and OCTA measurements were performed.

Results: A total of 292 eyes of males and 154 eyes of females were included. The mean age of all subjects was 25.91 ± 8.24 years. As the SS increased from 7 to 10, the VD of the total area (12.71 ± 2.53, 14.56 ± 1.91, 16.18 ± 1.53, and 17.17 ± 1.12 mm^{-1}), the PD of the total area (0.296 ± 0.063, 0.343 ± 0.048, 0.384 ± 0.039, and 0.410 ± 0.028), and the FAZ area (0.082 ± 0.066, 0.161 ± 0.100, 0.231 ± 0.107, and 0.250 ± 0.097 mm^2) also increased significantly (all, $P < 0.001$). Correlation analysis between the SS and each parameter showed a high correlation coefficient (VD, $r = 0.668$; PD, $r = 0.671$; FAZ area, $r = 0.570$; all, $P < 0.001$).

Conclusions: The measurements of VD, PD, and FAZ using OCTA varied significantly with the SS. The maximal possible SS is recommended for OCTA, and the physician should be careful in the analyses of OCTA measurements showing different values of the SS.

Dec 14, 2018 (Fri) 17:00 - 18:30

Venue: Ballroom 201

The Relationship of Retinal and Choroidal Thickness to Central and Peripheral Retinal Function in Retinitis Pigmentosa

*First Author: Harvey **UY***
*Co-Author(s): Pik Sha **CHAN-UY***

Purpose: To determine the structural and functional relationship of retinal and choroidal thickness to visual acuity and visual field parameters among patients with retinitis pigmentosa (RP).

Methods: This was an observational case series of 18 eyes of 10 RP patients (mean age, 45.4 ± 18.3 years) from the Peregrine Eye and Laser Institute, Makati, Philippines. Eyes with cystoid macular edema were excluded. The patients underwent manifest refraction to obtain best-corrected visual acuity (BCVA),

swept-source optical coherence tomography (Triton, Topcon Corporation, Tokyo, Japan) to measure CRT, central choroidal thickness (CCT); and automated visual field measurement (HFA, Zeiss Meditec, Jena, Germany) to derive mean deviation (MD) and pattern standard deviation (PSD). The linear associations between structural (CRT, CCT) and functional (BCVA, MD, PSD) parameters were analyzed using Pearson correlation coefficient, *r*. The P value at 5% level of significance was calculated.

Results: The mean ± standard deviation values were: CRT, 170 ± 76 µm; CCT, 227 ± 92 µm; MD, -28.0 ± -4.2 dB, and PSD, 7.6 ± 3.6 dB. The *r* values were: CRT with BCVA, $r = 0.66$ (P = 0.007); CRT with MD, $r = 0.83$ (P = 0.0004); CRT with PSD, $r = 0.60$ (P = 0.04); CCT with BCVA, $r = –0.52$ (P = 0.039); CCT with MD, $r = –0.41$ (P = 0.14); CCT with PSD, $r = –0.09$ (P = 0.774). The association of CRT with CCT was, $r = –0.45$ (P = 0.09).

Conclusions: CRT is positively correlated with BCVA, MD and PSD. CCT is negatively correlated with BCVA. Both CRT and CCT are potential non-invasive, structural markers for RP disease status and progression.

Dec 15, 2018 (Sat) 10:30 - 12:00

Venue: Ballroom 202

Accuracy of a Deep Convolutional Neural Network in Detection of Glaucoma and Retinal Detachment on Ultrawide-Field Images

*First Author: Hiroki **MASUMOTO***
*Co-Author(s): Naofumi **ISHITOBI**, Masahiro **KAMEOKA**, Shunsuke **NAKAKURA**, Hideharu **OHSUGI**, Hitoshi **TABUCHI***

Purpose: Evaluating the discrimination ability of a deep convolution neural network (DNN) for ultrawide-field pseudocolor imaging (UWPC) of glaucoma (Gla) and retinal detachment (RD).

Methods: This was a single-facility, cross-sectional study. A total of 4527 UWPC images (963, Gla; 819, RD; 2745, other) of patients who visited the Department of Ophthalmology, Tsukazaki Hospital were used. Other included not only healthy eyes but also other diseases. We used K-fold cross validation in this study. The image data were divided into K groups (K = 5). Then, (K-1) groups were used as training data, and one group was used as validation data. This process was repeated K times until each of the K groups became a validation data set. Image augmentation to training data increased the amount of data learning by 18-fold.

Results: The overall accuracy was 90.3% (95% CI, 89.4%-91.2%). The accuracy of Gla was 82.3% (95% CI, 79.8%-84.7%). The accuracy of RD was 91.5% (95% CI, 89.3%-93.3%). The accuracy of other was 92.8% (95% CI, 91.8%-93.8%).

Conclusions: Using the proposed DNN model, Gla and RD can be distinguished from non-Gla and non-RD eyes with a certain accuracy. It can be used as screening of Gla and RD for patients living in remote areas who has the difficulty of reaching an ophthalmic medical center.

Dec 15, 2018 (Sat) 10:30 - 12:00

Venue: Ballroom 202

Application of Deep Learning Image Assessment Software VeriSee™ for Diabetic Retinopathy Screening

*First Author: Yi-Ting **HSIEH***
*Co-Author(s): Chang-Hao **YANG**, Chung-May **YANG***

Purpose: To validate the accuracy of a deep learning image assessment software VeriSee™ in the grading of the severity of diabetic retinopathy (DR) and compare it with the diagnosis by ophthalmologists and internal physicians.

Methods: Diabetic patients who had received nonmydriatic single-field 45-degree color fundus photography in the Diabetes Education Center of National Taiwan University Hospital between July 2007 and June 2017 were retrospectively recruited. A total of 7524 judgeable fundus pictures were collected and were graded for the severity of DR by senior ophthalmologists. Among these pictures, 5649 of them along with another 31,612 color fundus

images from the EyePACS dataset were used for model training of VeriSee™. The other 1875 pictures were graded for the severity of DR by internal physicians, junior ophthalmologists and VeriSee™, respectively; the sensitivity and specificity for the diagnosis of DR were compared among them.

Results: The sensitivity for diagnosing any DR and the sensitivity for diagnosing proliferative diabetic retinopathy (PDR) by VeriSee™ (91.0% and 97.0%, respectively) were both higher than those by internal physicians (62.1% and 20.6%) and those by junior ophthalmologists (86.9% and 89.1%). VeriSee™ also had good specificity for diagnosing any DR and PDR (95.5% and 94.4%, respectively) when compared to internal physicians (71.1% and 99.5%) and junior ophthalmologists (97.5% and 99.8%).

Conclusions: VeriSee™ was validated to have good sensitivity and specificity in grading the severity of DR for color fundus pictures. It might offer clinical assistance to internal physicians for screening of DR with nonmydriatic color fundus photography.

Dec 15, 2018 (Sat) 10:30 - 12:00

Venue: Ballroom 202

Detection Capability of Microaneurysms in Diabetic Retinopathy Eyes Improves Using Averaged Optical Coherence Tomography Angiography Image

*First Author: Yoshihiro **KAIZU***
*Co-Author(s): Mitsuru **ARIMA**, Junji **KISHIMOTO**, Koh-Hei **SONODA**, Iori **WADA**, Shintaro **NAKAO***

Purpose: We compared the microaneurysm (MA) detecting capability between the single unaveraged optical coherence tomography angiography (OCTA) image and averaged OCTA image.

Methods: Patients with diabetic retinopathy (DR) who underwent fluorescein angiography (FA) were enrolled. 3x3 mm OCTA images centered on the fovea were obtained using 2 devices (RTVue XR Avanti: Optovue Inc, and OCT HS-100: Canon Inc,). OCTA imaging using OCT HS-100 were performed 10 times in a row. We prepared 3 types of OCTA images (type A: RTVue XR Avanti, type B and C: single unaveraged image of OCT HS-100, and averaged image which generated using 10 single scan images). Two masked, independent graders assessed 3 types of OCTA images and detected all MA-like microvascular structures. All detected points which both of these graders regarded as MA-like microvascular structures were confirmed whether they were actually MAs using early phase of FA image. MA visualizing and detecting capability were compared among 3 types of OCTA images using McNemar's test.

Results: We analyzed 15 eyes of 12 patients. When comparing type A and C, the number of MAs which were correctly detected both of types, only in type A, and C were 57, 28, 55 respectively, and MA-detecting capability of type C was higher than that of type A (P = 0.003). When comparing type B and C, the number of MAs which were correctly detected both of types, only in type B, and C were 58, 33, 59 respectively, and MA-detecting capability of type C was higher than that of type B (P = 0.007).

Conclusions: MA detecting capability could be improved by averaging OCTA image.

Dec 15, 2018 (Sat) 10:30 - 12:00

Venue: Ballroom 202

Development of Deep Learning System for Diagnosis of Diabetic Retinopathy by Ultrawide Fundus Photography

*First Author: Hae Min **KANG***
*Co-Author(s): Holden Yoon Seung **KIM**, Kangrok **OH**, Kyoung Yul **SEO**, Sangchul **YOON**, Moi **YOUN***

Purpose: To investigate deep learning system for diagnosis of diabetic retinopathy (DR) by using ultrawide fundus photography images.

Methods: A maximally stable extremal regions (MSER)-based image transformation method and convolutional neural networks (CNN) were used to detect and classify the retinal regions of DR by using ultrawide fundus photography.

Results: A total of 7659 image blocks were obtained from ultrawide fundus photography

of DR. These included 4956 image blocks of retinal hemorrhages (dot microaneurysms and blot retinal hemorrhages) and 2703 image blocks of exudates (soft and hard exudates). The MSER-based image transformation method provided image subregions, which may contain lesions with different sizes and shapes. The average accuracy of deep learning system was 90.6% for retinal hemorrhages and 99.2% for exudates. The area under the receiver operating characteristic curve (AUC) was 0.961 for retinal hemorrhages and 0.999 for exudates, respectively.

Conclusions: By using deep learning system, DR can be diagnosed by using ultrawide fundus photography. Because ultrawide fundus photography of DR provides more retinal lesions at mid- and far-periphery than conventional fundus photography, our deep learning system may be helpful in the diagnosis of DR.

Dec 15, 2018 (Sat) 10:30 - 12:00

Venue: Ballroom 202

Novel Technique of a Low-Cost Video Indirect Ophthalmoscope

*First Author: Ashish **AHUJA***

Purpose: We aimed to make a low-cost optical system including the camera to be used to convert a regular indirect ophthalmoscope (IO) into a video IO.

Methods: We made a prototype of a low-cost video IO using an IO, telephoto lens and a small spy camera (Mini Wireless HD 1080P SPY Hidden Camera Wifi Module video recorder) which can either be mounted on a uni-ocular eye piece of the IO or using a beam splitter as well. We also used a butter paper over the light source to create a diffuse illumination.

Results: We obtained good resolution of images using this technique of the posterior pole as well as the peripheral retina and the data could be directly viewed via an application using the smartphone which could be transferred via wifi. The device cost was Rs 4000. We could record high-definition videos or capture still images using this technique. Other applications for such retinal imaging would be for training purpose in OPD or in operating rooms in which medical students may view the surgery on a screen through the perspective of the surgeon. An additional advantage was the ability to record audio narration while examining patients.

Conclusions: This device can be used for documentation purpose, tele-ophthalmology, and education of patients and physicians.

Dec 15, 2018 (Sat) 10:30 - 12:00

Venue: Ballroom 202

Smartphone-Guided Wide-Field Imaging for Retinopathy of Prematurity: A Novel Cost-Effective Initiative for a Developing Country

*First Author: Anubhav **GOYAL***
*Co-Author(s): Anantharaman **GIRIDHAR**, Mahesh **GOPALAKRISHNAN***

Purpose: To design a low-cost, non-contact, wide-field smartphone-based screening system in retinopathy of prematurity (ROP) and to illustrate its potential clinical application as a teleophthalmology system.

Methods: A neonatal intensive care unit-based bed-side ROP documentation was done between January 2018 and May 2018. Images were captured by using a smartphone and non-contact +40D, +28D or +20D indirect condensing lenses. Coaxial light source of the phone was used to acquire digital image of the fundus. With our usual smartphone-based camera we extracted wide-field, high-quality, still images from the video clip.

Results: A total of 228 eyes of 114 infants were screened for ROP in 17 referral centers, between January 2018 and May 2018 (5 months). The incidence of total ROP was 23.68% out of which, incidence of type 1 ROP was 8.77%. We used smartphone imaging to document ROP in 28 eyes out of 55 eyes having ROP. The image quality was "good" in 89.28% of eyes. Field of view varied from 30 degrees, 55 degrees and 90 degrees with +20D, +28D and +40D indirect condensing lenses,

respectively. Association of smartphone with MIIRETCAM and condensing lens assembly gave a cost-effective, handy and portable way of ROP documentation for non-institutional practice and single ophthalmic practitioners, and needed a small learning curve.

Conclusions: The currently described system was able to take consistently high-quality, wide-field fundus photographs for bed-side documentation of ROP. It is good for medico-legal documentation of ROP and also can be used as telescreening device especially in developing countries like India, where cost is still a major economic concern.

Dec 15, 2018 (Sat) 10:30 - 12:00

Venue: Ballroom 202

The Comparison of Multicolor Imaging and Color Fundus Photography in the Detection of Pathological Findings in Eyes with Polypoidal Choroidal Vasculopathy

*First Author: Anna Cs **TAN***
*Co-Author(s): Gemmy **CHEUNG**, Yasuo **YANAGI***

Purpose: To assess the sensitivity, specificity and agreement of multicolor imaging (MC) or color fundus photography (CFP) to detect pathological findings in eyes with polypoidal choroidal vasculopathy (PCV).

Methods: A total of 20 eyes with PCV, imaged with both MC and CFP were graded by 3 independent, masked retinal specialists. The presence of pathological features such as blood, exudation, polyps, pigment epithelial detachments (PED) and atrophy were graded. Multi-modal imaging including optical coherence tomography, fluorescein and indocyanine green angiography was used as the gold standard to confirm the presence of the specified findings.

Results: Comparing the MC grading versus CFP, there was a higher mean sensitivity to detect blood (0.81 vs 0.59) and PED (0.75 vs 0.54), lower mean sensitivities to detect exudation (0.43 vs 0.56) and similar to detect polyps (0.47 vs 0.44). The mean specificity to detect blood was higher for the MC grading (0.72 vs 0.52) and similar for exudates, polyps, PED and atrophy. On MC imaging, subretinal blood appears more reddish than sub-retinal pigment epithelial (RPE) blood which appears more greenish red, while both subretinal blood and sub-RPE blood appear dark red on CFP. Polyps appeared as small, dark green, round lesions which had higher contrast on MC compared to small orange appearance seen on CFP.

Conclusions: Polyps can be identified non-invasively using both MC and CFP in about half of the cases. MC may be more sensitive in detecting blood and PED but less sensitive in detecting exudation and may be considered as an alternative to CFP.

Dec 16, 2018 (Sun) 13:40 - 15:10

Venue: Ballroom 202 - 203

A Novel Optical Coherence Tomography Angiography (OCTA) Finding at the Vitreoretinal Interface in MacTel Type 2

*First Author: Apoorva **AYACHIT***
*Co-Author(s): Guruprasad **AYACHIT**, Srinivas **JOSHI***

Purpose: To report a novel finding of an epiretinal vascular plexus (EVP) in cases of macular telangiectasia (MacTel) type 2 and describe the clinical and multimodal imaging findings.

Methods: Patients diagnosed as MacTel type 2 by clinical and imaging findings were included. Best-corrected visual acuity (BCVA), fundus photography, spectral-domain optical coherence tomography, autofluorescence, fundus fluorescein angiography, and optical coherence tomography angiography (OCTA) were done in all patients of MacTel type 2. Length of ellipsoid zone disruption (EZ), external limiting membrane (ELM) disruption, size of the EVP and central macular thickness (CMT) were noted. The finding of an epiretinal membrane on optical coherence tomography and a well-defined vascular plexus in vitreoretinal interface on OCTA in patients of MacTel type 2 was considered as evidence of an EVP.

Results: A total of 68 eyes of MacTel underwent multimodal imaging, of which 7 eyes of 4 patients were identified to have EVP, with male:female ratio of 1:1 (n = 4), and unilateral in 1 patient and bilateral in 3. The mean age 56.75 ± 10.71 years. The mean BCVA was 0.74 ± 0.39 logMAR. Retinal pigment and dipping venule were present in 100% of eyes. The mean CMT was 150.28 ± 40.21. The mean ELM disruption and EZ disruption were 2208.28 ± 837.80 μ and 2369.29 ± 773.49 μ respectively. OCTA revealed a vascular plexus owing to EVP at the vitreoretinal interface. The mean EVP size was 0.44 ± 0.248 mm^2. This vascular net had a communication with the intraretinal abnormal vascular plexus in 6/7 eyes.

Conclusions: We demonstrate a hitherto undescribed finding of EVP in MacTel best visualized using OCT and OCTA. These membranes can have intraretinal connections with abnormal MacTel capillaries.

Dec 16, 2018 (Sun) 13:40 - 15:10

Venue: Ballroom 202 - 203

Central Serous Chorioretinopathy in Elderly Subjects: Angiographic and Tomographic Characteristics

*First Author: Kunho **BAE***

Purpose: To investigate the angiographic, tomographic, and clinical characteristics of idiopathic central serous chorioretinopathy (CSC) in elderly patients.

Methods: The patients were divided into 2 groups according to a cutoff age of 60 years at baseline. Patients underwent spectral-domain optical coherence tomography, fluorescein angiography, and indocyanine green angiography. Angiographic and tomographic features were compared between the 2 groups (young vs elderly group).

Results: Of 176 patients, 26 patients (15.1%) were 60 years or older. Complete resolution of subretinal fluid after treatment was noted in 72.0% of the elderly group and 90.8% of the young group (P = 0.021). The elderly group showed worse baseline and final vision, more bilateral involvement, and lower male preponderance than the young group (P < 0.05, respectively). The elderly group was also associated with a higher frequency of retinal pigment epithelium depigmentation, foveal thinning, and double layer sign compared with the young group (P < 0.05, respectively).

Conclusions: CSC in elderly patients was associated with a lower resolution of serous detachment, increased impairment of retinal pigment epithelial layers, foveal thinning, and worse visual outcome, suggesting a chronic insult to the choroidal vessels involving more severe damage to the outer retinal layers.

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Venue: Ballroom 202 - 203

Classification of Indirect Choroidal Rupture Based on Morphological Pattern by Optical Coherence Tomography and Its Relation to Choroidal Neovascularization

*First Author: Sunil **GANEKAL***

Purpose: To study the morphological types of indirect choroidal rupture (ICR) using spectral-domain optical coherence tomography (SD-OCT) and their relation to the risk of choroidal neovascularization.

Methods: A prospective study of 24 eyes of 24 patients with a history of blunt ocular trauma causing choroidal rupture. All patients underwent detailed ophthalmic evaluation and SD-OCT examination.

Results: The mean age of the patients was 34 ± 7.6 years. Based on morphology 3 types of choroidal ruptures were seen on SD-OCT. The first type (type 1 ICR) was a forward protrusion of the retinal pigment epithelium-choriocapillaris (RPE-CC) layer with an acutely angled pyramidal or dome shape and was associated with a small loss of continuity of the RPE layer or the elevated RPE-CC projection, accompanied by a significant quantity of sub-retinal hemorrhage. The second type (type 2 ICR) was a larger area of disruption of the RPE-CC, photoreceptor inner segment-outer segment junction and external limiting

membrane with a posteriorly directed concave contour depression at that area and downward sliding of overlying tissues into the defect. Type 3 ICR is the combination of type 1 and type 2. Of the 24 eyes, 10 were observed to have type 1 ICR, 8 had type 2 ICR at presentation and 6 had type 3 ICR. Of these eyes, 5 developed choroidal neovascularization (20.8%) of which 1 eye belonged to type 1 ICR, 2 eyes to type 2 ICR, and 2 eyes to type 3 ICR.

Conclusions: Three distinct morphological patterns of choroidal rupture identified on SD-OCT. Type 2 and 3 choroidal rupture carry increased risk of choroidal neovascular membrane.

Dec 16, 2018 (Sun) 13:40 - 15:10

Venue: Ballroom 202 - 203

Diagnostic Value of Optical Coherence Tomography Angiography for Choroidal Neovascularization Secondary to Choroidal Osteoma

*First Author: Junya **KITAHARA***
*Co-Author(s): Ken **HOSHIYAMA**, Toshinori **MURATA**, Masaaki **TANAKA**, Noriko **YOSHIDA***

Purpose: Choroidal osteoma (CO) is a rare benign osseous tumor of the choroid, in which choroidal neovascularization (CNV) may lead to severe visual impairment in about half of the patients. We report a case of CO whose CNV was detected by optical coherence tomography angiography (OCTA) immediately after vision deterioration and was successfully treated with anti-VEGF therapy.

Methods: A case report.

Results: A 20-year-old female presented with metamorphopsia in the left eye. Her best-corrected visual acuity was 1.2 in both eyes. A fundus examination of the right eye was unremarkable, whereas, in the left eye, it revealed an elevated yellowish-orange lesion in the macula. It was diagnosed as CO based on well-defined lesion with bone density in the macula demonstrated by ultrasonography and computed tomography. Three months later, her left vision was decreased to 0.4. Fluorescein and indocyanine angiography (FA/IA) revealed hyperfluorescent foci suggesting CNV, but was not conclusive in the high background tumor associated hyperfluorescence. On the other hand, OCTA clearly demonstrated fine vascular structure of CNV without being obscured with leakage. After obtaining informed consent, intravitreal injections of bevacizumab was performed. CNV regression was confirmed with both OCTA and FA/IA, and her left vision improved to 1.0. Subretinal fluid was absorbed and CNV did not recur during 6-month follow-up.

Conclusions: OCTA was useful to detect and follow-up CNV in CO, which was not clearly visualized in FA/IA.

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Venue: Ballroom 202 - 203

Effect of Panretinal Photocoagulation on Retinal Vasculature and Foveal Avascular Zone in Diabetic Retinopathy Using Optical Coherence Tomography Angiography

*First Author: Kaveh **FADAKAR***
*Co-Author(s): Fatemeh **BAZVAND**, Fariba **GHASSEMI**, Reza **MIRSHAHI***

Purpose: This investigation evaluated retinal hemodynamics using optical coherence tomography angiography (OCTA) in patients with diabetic retinopathy following pan-retinal photocoagulation (PRP).

Methods: A total of 11 eyes of 7 patients with severe nonproliferative diabetic retinopathy (NPDR) or early proliferative diabetic retinopathy (PDR) were recruited in this prospective interventional pilot study. All patients underwent OCTA imaging at baseline and flow surface area, foveal avascular zone, retinal thickness, and vascular density were measured at baseline. Three months after treatment, OCTA was repeated and the alteration in variables was analyzed by generalized estimating equation model.

Results: A reduction in FAZ area was observed following treatment, especially at the deep layer. Retinal thickness increased along with an

increase in vascular density in superficial and deep fovea area, and the macular temporal sector. Flow surface area was relatively unchanged.

Conclusions: OCTA is a promising method to evaluate retinal hemodynamic. Pan-retinal photocoagulation results in an increase of vascular density and probably reduces ischemia in the fovea, as measured by a reduction in FAZ size.

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Venue: Ballroom 202 - 203

Extended Field Image by Attachment Involving 20 Diopter Lens on Wide Optical Coherence Tomography Angiography

*First Author: Osamu **SAWADA***
*Co-Author(s): Yusuke **ICHIYAMA**, Masashi **KAKINOKI**, Takamasa **MORI**, Shumpei **OBATA**, Masahito **OHJI***

Purpose: To evaluate clinical usefulness of field images extended by the attachment involving 20 diopter lens on wide-angle optical coherence tomography angiography (OCTA).

Methods: Normal subjects without any history or systemic disease were recruited. They underwent wide-angle OCTA with 12 x 12 mm center field using the PLEX Elite 9000® and the same-angle OCTA using by the attachment involving 20 diopter lens. We measured the area of 12 x 12 mm center field OCTA images and the corresponding field images extended by the attachment, respectively. The ratio between the area of 12 x 12 mm center field and that of the extended field was calculated.

Results: Ten eyes of 5 participants (mean age, 27.8 years; female/male, 5/0) were evaluated. The average area of the 12 x 12 mm center field image was 125 ± 34 disc areas and that of the corresponding extended by the attachment was 210 ± 66 disc areas. The average ratio between the area of center field and that of the extended field was 1.67 ± 0.20.

Conclusions: The wide-angle OCTA with the attachment involving 20 diopter lens seems to be clinically useful.

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Venue: Ballroom 202 - 203

Foveal and Parafoveal Choroidal Thickness Pattern Measured by Swept-Source Optical Coherence Tomography

*First Author: Pear **PONGSACHAREONNONT***
*Co-Author(s): Buravej **ASSAVAPONGPAIBOON**, Theerada **CHITAMARA**, Maytavee **CHUNTARAPAS**, Thanapong **SOMKIJRUNGROJ**, Disorn **SUWAJARAKORN***

Purpose: To evaluate the choroidal thickness (CT) in foveal and parafoveal regions in Thai adults using swept-source optical coherence tomography (SS-OCT).

Methods: We enrolled healthy volunteers of 18 years or older from King Chulalongkorn Memorial Hospital, Thailand, during September 2015 to March 2016. Optical coherence tomography (OCT) of the macula was performed, and subfoveal CT was measured manually using a line scan. The mean thicknesses of retinal and choroidal layers in regions of the Early Treatment Diabetic Retinopathy Study grid were measured automatically. A multivariate analysis was conducted to determine correlations between CT in the foveal and parafoveal regions and retinal layers.

Results: A total of 280 eyes from 140 subjects (28 men, 112 women; mean age, 41.6 years) were studied. The mean foveal CT was 267.3 ± 76 μm. It was thicker in the temporal fovea than in the nasal fovea ($P < 0.001$) and thicker in men than in women. Multivariate analysis showed that age and sex were significantly negatively correlated with the thickness of the retina, ganglion cell layer, outer retinal layer, and choroid but not of the nerve fiber layer. Regression analysis revealed that the CT decreased approximately 1.7 μm per year.

Conclusions: Age and sex significantly influence CT. Macular CT in a healthy eye thins with age. Choroidal thickness decreases with age faster at distances away from the foveal center than at the center. Subfoveal CT was greater than the mean CT. Parafoveal CT should be evaluated to identify specific retinal-choroidal disease.

Dec 16, 2018 (Sun) 13:40 - 15:10

Venue: Ballroom 202 - 203

Longitudinal Vascular Changes in the Perifoveal Region Following Macular Hole Surgery

*First Author: Akira **FUKUTOMI***
*Co-Author(s): Motohiro **KAMEI**, Kotaro **TSUBOI***

Purpose: To describe dynamic changes of the perifoveal capillary plexus on optical coherence tomography angiography (OCTA) following idiopathic macular hole (MH) surgery.

Methods: A total of 33 patients with unilateral MH who underwent successful repair with pars plana vitrectomy, internal limiting membrane peeling and gas tamponade were retrospectively studied. OCTA scans of 3×3 mm were obtained preoperatively and at 2 weeks, 1, 3 and 6 months postoperatively. Foveal avascular zone (FAZ) area and parafoveal vascular density (VD) of the superficial capillary plexus (SCP) and the deep capillary plexus (DCP) were evaluated.

Results: The FAZ area at 2 weeks after surgery was significantly smaller than the preoperative one (P = 0.0026). The FAZ area at 3 and 6 months after surgery was significantly greater than those at 2 weeks after surgery (P = 0.0096 and P = 0.0047, respectively). The VD was significantly less at 2 weeks postoperatively compared with the preoperative in the SCP (P = 0.0016), whereas there was no difference in the DCP at any time.

Conclusions: These results suggest that the parafoveal vasculature and structure continuously changes after macular hole surgery. The parafoveal tissue might shrink once and then revert.

Dec 16, 2018 (Sun) 13:40 - 15:10

Venue: Ballroom 202 - 203

Macular and Peripapillary Perfusion in Myopic Eyes of Young Chinese Adults by Optical Coherence Tomography Angiography

*First Author: Dawei **YANG***
*Co-Author(s): Dan **CAO**, Jianqing **LAN**, Cheng **YANG**, Jin **ZENG**, Liang **ZHANG***

Purpose: To compare the macular and peripapillary perfusion in different degrees of myopic eyes of young Chinese adults using optical coherence tomography angiography (OCTA) and to evaluate the association of macular and peripapillary perfusion with axial length and retinal nerve fiber layer (RNFL) thickness.

Methods: A total of 128 eyes (mild myopia, 42; moderate myopia, 45; severe myopia, 41) underwent OCTA imaging. Parameters were vessel densities in superficial capillary plexus (SCP), deep capillary plexus (DCP) of macular area and vessel density and RNFL thickness of peripapillary area as well as fovea thickness and foveal avascular zone (FAZ) size (mm^2).

Results: Significant differences were found in perfusion among 3 groups ($P < 0.05$). Vessel density in SCP, DCP of macular area and peripapillary area were 51.79% ± 2.66%, 55.74% ± 5.86% and 52.31% ± 2.45% in mild myopia, 51.01% ± 2.23%, 51.28% ± 6.71% and 50.76% ± 3.12% in moderate myopia, and 50.27% ± 2.89%, 50.82% ± 5.38% and 50.13% ± 4.01% in high myopia. Axial length was significantly associated with vessel density in macular area (SCP: $r = –0.249$, $P = 0.008$; DCP: $r = –0.398$, $P < 0.001$), peripapillary area ($r = –0.204$, $P = 0.028$), FAZ size ($r = 0.309$, $P < 0.001$), and foveal thickness ($r = 0.354$, $P < 0.001$). Negative correlations were found between axial length and peripapillary perfusion as well as RNFL thickness at nasal superior, nasal inferior and inferior nasal quadrants.

Conclusions: Varying degrees of myopia affect macular perfusion, peripapillary perfusion and RNFL thickness in young healthy adults.

The high myopic group had the lowest vessel density in SCP, DCP of macular area and in peripapillary area. With the elongation of axial length, macular perfusion, peripapillary perfusion, RNFL thickness and FAZ size reduced while foveal thickness increased.

Dec 16, 2018 (Sun) 13:40 - 15:10

Venue: Ballroom 202 - 203

Optic Nerve Head Perfusion Changes Preceding Peripapillary Retinal Nerve Fiber Layer Thinning in Preclinical Diabetic Retinopathy

*First Author: Dan **CAO***
*Co-Author(s): Dawei **YANG**, Liang **ZHANG***

Purpose: To investigate microcirculation and microstructural differences of optic nerve head (ONH) between diabetic eyes without clinically evident retinopathy and healthy controls using optical coherence tomography angiography (OCTA).

Methods: In this cross-sectional observational study, 60 eyes of 60 patients with type 2 diabetes and without clinically evident retinopathy and 60 eyes of 60 age-matched healthy controls were included. Peripapillary retinal nerve fiber layer (RNFL) thickness and capillary perfusion density inside the ONH and in the peripapillary region were measured by means of OCTA (RTVue-XR Avanti; Optovue, Fremont, CA, USA).

Results: Vessel density values in both peripapillary and inside the disc were significantly lower in diabetic patients without diabetic retinopathy (DR) when compared to normal controls. The reduction of vessel density was prominent in all 8 peripapillary sectors in diabetic eyes (all $P < 0.05$). Thinning of RNFL thickness was significant in the nasal superior ($P < 0.001$), inferior nasal ($P = 0.023$) and superior nasal quadrant ($P < 0.001$) in diabetic eyes in comparison to normal controls.

Conclusions: In this study, ONH perfusion and peripapillary RNFL thickness were significantly decreased in preclinical DR patients compared to normal controls. Microvascular alterations in ONH may occur earlier than peripapillary RNFL defect in the course of DR.

Dec 16, 2018 (Sun) 13:40 - 15:10

Venue: Ballroom 202 - 203

Optical Coherence Tomography Angiography Analysis of Changes in the Retina and the Choroid after Hemodialysis

*First Author: Yong Un **SHIN***
*Co-Author(s): Hee Yoon **CHO**, Eun Hee **HONG***

Purpose: To evaluate the effect of hemodialysis on perfused vessel density (PVD), choroidal thickness (CT), and retinal thickness in end-stage renal disease (ESRD) using optical coherence tomography angiography (OCTA).

Methods: We studied 22 eyes of 29 ESRD patients by ophthalmologic examination and OCTA before and after hemodialysis. The color-coded perfusion density maps were generated and PVD calculated. Changes in systemic and other ocular parameters such as retinal and choroidal thickness were measured and analyzed.

Results: The total PVD decreased significantly after hemodialysis in the choriocapillaris; it was not significantly different in the superficial capillary plexus (SCP) and the deep capillary plexus (DCP). The total CT decreased significantly, but total retinal thickness was not significantly different. There was no significant correlation between choriocapillaris PVD and CT. The reduction in choriocapillaris PVD correlated with the decrease in systolic and mean arterial blood pressures. The decrease in CT correlated with the ultrafiltration volume. There were no significant systemic and ocular factors affecting change in retinal thickness and PVD of SCP and DCP.

Conclusions: This is the first study to assess the effect of hemodialysis on blood flow changes using OCTA; changes may be more prominent in the choroidal compared to the retinal layer.

Dec 16, 2018 (Sun) 13:40 - 15:10

Venue: Ballroom 202 - 203

Perioperative Intraretinal Fluid Observed on Optical Coherence Tomography in Epiretinal Membrane

*First Author: Jae Jung **LEE***
*Co-Author(s): Ik Soo **BYON**, Hanjo **KWON**, Ji Eun **LEE**, Sungwho **PARK***

Purpose: To investigate incidence and clinical implications of the intraretinal fluid (IRF) observed on optical coherence tomography in epiretinal membrane (ERM).

Methods: The medical records of patients who were performed vitrectomy for idiopathic ERM between June 2015 and December 2016 were retrospectively reviewed. The rate of IRF was analyzed before operation and at postoperative 1, 3 and 6 months. Various factors such as age, sex, baseline visual acuity, central significant macular thickness (CSMT), lens status and surgical factors were evaluated to find a correlation to IRF. The effect of IRF on visual acuity was analyzed.

Results: A total of 170 eyes of 170 patients were included in this study. Fifty-one eyes of 51 patients (30.0%) had preoperative IRF and new IRF developed in 49 eyes. Preoperative IRF positive patients had significantly lower visual acuity than preoperative IRF-negative group (0.54 ± 0.31 vs 0.42 ± 0.23, P = 0.007). The difference of visual acuity between the 2 groups was maintained during the entire follow-up period. After excluding the patients with preoperative IRF, 119 patients were divided into 2 groups; postoperative new IRF group (49 eyes, 41.2%) and no IRF group (70 eyes, 58.8%). The baseline visual acuity was significantly lower in the new IRF group (0.48 ± 0.28 vs 0.37 ± 0.18, P = 0.016). However, vision gain was significantly higher in the new IRF group, and there was no difference at 6 months.

Conclusions: The IRF being associated with ERM was frequently observed before and after surgery. Perioperative IRF was related to preoperative lower visual acuity, but not postoperative visual acuity or recovery of vision.

Dec 16, 2018 (Sun) 13:40 - 15:10

Venue: Ballroom 202 - 203

The Correlation of Morphology of Branched Vascular Network between OCT-A, ICGA and FAG in Polypoidal Choroidal Vasculopathy

*First Author: Shangte **MA***

Purpose: To investigate the association between morphology and characteristics of branched vascular network (BVN) based on different diagnostic imaging tools such as optical coherence tomography angiography (OCT-A), indocyanine green angiography (ICGA), and fluorescein angiography (FAG).

Methods: Patients who were diagnosed with polypoidal choroidal vasculopathy (PCV) and were followed up for more than 6 months at National Taiwan University Hospital from January 2015 to December 2017 were enrolled. A retrospective review of age, sex, total treatment episodes and BVN characteristics detected by different imaging tools were conducted. The PCV was categorized into type A (interconnecting channels on ICGA), B (BVN without leakage) and C (BVN with late leakage) based on the characteristics on FAG and ICGA proposed by Tan et al. We also divided the BVN morphology by OCT-A into 3 subtypes (type 1: trunk, type 2: glomerulus, and type 3: stick). The correlation of 2 different classification systems was investigated.

Results: A total of 58 eyes from 58 patients were reviewed. Of these, 11 eyes (19.0%) were type A, 9 eyes (15.5%) were type B, and 38 eyes (65.5%) were type C. The mean age of the 3 groups were 63.9, 65.3 and 69.7 years, respectively (P = 0.04). Type C had the highest recurrence rate (57.8%) among the 3 subtypes with borderline statistical significance (P = 0.053). When correlated with BVN morphology by OCT-A, the dominant morphology was stick form in type A, glomerulus in type B, and trunk in type C, respectively (P = 0.04).

Conclusions: The correlation between characteristics and morphology by different

imaging tools may aid in better prediction of prognosis. Patients with type-C PCV and stick-form BVN accounted for the highest recurrence rate.

Ocular Oncology & Pathology

Dec 15, 2018 (Sat) 08:30 - 10:00

Venue: Ballroom 203

Scoring System for Diagnosing Vitreoretinal Lymphoma

*First Author: Junwon **LEE***

Purpose: To construct a scoring system for diagnosing vitreoretinal lymphoma (VRL).

Methods: A total of 43 patients who underwent diagnostic vitrectomy for suspected VRL were retrospectively reviewed. Patients finally diagnosed with VRL and non-lymphoma were compared with ophthalmic evaluation, cytology, interleukin (IL)-6 and -10 levels, and immunoglobulin heavy chain (IGH) and kappa chain (IGK) clonality assays.

Results: Sub-RPE (retinal pigment epithelium) infiltration and veil-pattern vitreous opacity were specific vitreoretinal findings in patients with VRL. The area under the receiver operating characteristic (ROC) curve (AUC) of the IL-10-to-IL-6 ratio and of IL-10 levels was 0.972 and 0.931, respectively. Combined IGH and IGK assay showed increased sensitivity, while the determined specificity of IGK, at 94.12%, was much higher than the 78.95% of IGH. Patients with VRL with atypically elevated IL-6 levels showed extensive and severe sub-RPE infiltration. We developed a scoring system that correctly classified all cases.

Conclusions: The scoring system consisting of various variables may be useful for the diagnosis of VRL. Newly screened IGK clonality assays would be useful to distinguish VRL with high specificity. When sub-RPE or retinal infiltration findings are severe and extensive, the IL-10-to-IL-6 ratio may not be typical and should be carefully interpreted.

Dec 15, 2018 (Sat) 08:30 - 10:00

Venue: Ballroom 203

Uniocular Squamous Papilloma in the Setting of Bilateral Cicatricial Pemphigoid

*First Author: Leo **MANUEL***

Purpose: To discuss a rare case (3 published cases worldwide) of a uniocular squamous papilloma associated with bilateral mucous membrane pemphigoid in a 42-year-old female, and its clinical approach, differential diagnosis, diagnostics and updates on treatment.

Methods: Observational case report.

Results: A 42-year-old female complained of 22 years of chronic tearing with associated gradual blurring of vision in both eyes. Upon physical examination, she had chronic bilateral cicatricial conjunctivitis and brown papillaeform mass in the right eye that revealed squamous papilloma. Inferior forniceal tissue biopsy was sent for direct immunofluorescence, which confirmed mucous membrane pemphigoid. Due to high dropout rates with Dapsone, she was started on mycophenolate mofetil and on close follow-up using revised MMPDAI.

Conclusions: This is a case of uniocular squamous papilloma, a life-threatening condition due to its risk of malignant degeneration in the setting of bilateral ocular cicatricial pemphigoid, a rare autoimmune disease. This is the first documented case in our institution: first to use a fornieceal specimen for DIF, first to use MMPDAI for standardized patient monitoring and outcome measures, and first to be treated with mycophenolate mofetil, with good control. There is a great interest in finding causal relation between these 2 distinct disease entities. Worldwide database search from major research and case study databases in turn revealed that if published, this will be the 4th reported case worldwide.

Ophthalmic Epidemiology

Dec 15, 2018 (Sat) 10:30 - 12:00

Venue: Ballroom 202

Diabetic Retinopathy in Youth-Onset Diabetes

First Author: Dipak ***NAG***
Co-Author(s): Afsana ***HABIB****, Rinku* ***PAUL****, Pankaj* ***ROY***

Purpose: To report the prevalence of diabetic retinopathy (DR) in young age (≤30 years) and to see the retinopathy pattern in this diabetic age-group patients.

Methods: Data were used from the visit of all diabetic patients presenting to the diabetic retinopathy screening service at a tertiary care hospital in Bangladesh from November 2014 to July 2018. Patients who attended the service underwent non-mydriatic color fundus photography. Images were taken and graded at the time of acquisition in optimize software according to the National Screening committee (NSC), UK guidelines.

Results: Among 16,385 diabetic patients enrolled in the service, 469 (2.86%) were aged ≤30 years (62.8% [295] were type 1 DM and 37.2% [174] were type 2). Age of the young patients ranged from 9 to 30 years with a median of 28 years. The median duration of diabetes diagnosis among all young diabetic patients was 3 years with 3 years interquartile range (IQR) and that for retinopathy was 2 years with IQR 2 years. The prevalence of diabetic retinopathy was 18.3% (95% confidence interval [CI], 14.74%-21.86%). It was found that 44 (51.2%) had background retinopathy, 2 (2.3%) had pre-proliferative and 40 (46.5%) patients had proliferative retinopathy. Regarding maculopathy, 74 (86%%) had vision-threatening maculopathy. Prevalence of developing diabetic retinopathy was significantly high in type 1 DM ($P < 0.001$).

Conclusions: Young patients with type 1 or type 2 DM showed a substantial risk of DR and should undergo regular checkup for DR. This study shows these concerns shouldn't be overlooked in those with the condition.

Dec 15, 2018 (Sat) 10:30 - 12:00

Venue: Ballroom 202

Ocular Manifestation and Correlation with CD4+ T Cells Count among Adult HIV/AIDS Patients Attending Bangabondhu Sheikh Mujib Medical University (BSMMU), Bangladesh

First Author: Shah-Noor ***HASSAN***

Purpose: To evaluate the ophthalmological manifestations among adult HIV-infected patients attending at BSMMU and correlate the findings with CD-4+ T cell count.

Methods: This observational cross-sectional study was conducted on 110 HIV positive patients at the department of community ophthalmology BSMMU. Purposive sampling technique was applied to enroll the patients. Data were collected by relevant history taking and clinical examinations, ocular examinations included visual acuity, slit lamp biomicroscopy, indirect ophthalmoscopy with +90D (diopter) and +20D, IOP and laboratory investigations.

Results: Of 110 patients, 67 were male and 43 were female with a mean age of 37.63 ± 8.16 years. Of them, 58 patients were on HAART and 52 were ART naive. The mean CD4+ T cell count was 410 ± 281.65 cells/μL. Fifty-three patients had HIV-related ocular manifestations and the rest had no manifestation. Among the ocular manifestations 22% had ocular adnexal, 9% had anterior segment and about 30% had posterior segment and neuro-ophthalmological manifestations.

Conclusions: Less than 200 CD4+T cells/μL was found as a risk factor of developing HIV-related ocular manifestations and may lead to permanent blindness. Therefore, strategies for screening of high-risk populations for HIV-related ocular disease are needed as well as provision for the management and treatment of these conditions once detected.

Dec 15, 2018 (Sat) 10:30 - 12:00

Venue: Ballroom 202

The Health Care Cost of Diabetic Retinopathy in Indonesia: Current Estimates and Projection for 2025

*First Author: Muhammad **SASONGKO***
*Co-Author(s): Angela **AGNI**, Supanji **SUPANJI**, Firman **WARDHANA**, Tri Wahyu **WIDAYANTI***

Purpose: To estimate the health-care cost of diabetic retinopathy (DR) in type 2 diabetes in Indonesia in 2017 and its projection for 2025.

Methods: A prevalence-based model was constructed to estimate the health-care cost of DR and projection for 2025 was derived from estimated diabetes population in 2025. Direct treatment costs were estimated from the perspective of health care while patient's costs were obtained through interview including only transportation cost and loss of working days related to treatment. We developed 4 cost-of-illness models according to DR severity level, DR without any necessary treatment, DR needing laser treatment, DR with laser+intravitreal (IVT) injection and DR with laser+IVT+vitrectomy. All costs were estimated in 2017 and in US dollars.

Results: The total health-care costs of DR in Indonesia were estimated to be $2.4 billion in 2017 and $8.9 billion in 2025. The total cost in 2017 consisted of cost for no DR and mild-moderate non-proliferative DR (NPDR) requiring eye screening ($25.9 million), severe NPDR or proliferative DR (PDR) requiring laser treatment ($0.25 billion), severe NPDR or PDR requiring both laser and IVT injection ($1.75 billion) and advance level of PDR requiring vitrectomy ($0.44 billion).

Conclusions: The cost of DR in Indonesia was estimated to be nearly US$2.4 billion, which was projected to increase significantly to US$8.9 billion in 2025. The highest cost may incur for DR requiring both laser and IVT injection. Therefore, public health intervention to delay or prevent severe DR may substantially reduce the health-care cost of DR in Indonesia and possibly other developing countries.

Other (General Ophthalmology)

Dec 15, 2018 (Sat) 13:40 - 15:10

Venue: Ballroom 201

A Choice of Lenses Varies with the Outcome of Ophthalmoscopy

*First Author: Pradeep **KUMAR***

Purpose: To emphasize the usage of appropriate biomicroscopy and indirect ophthalmoscopy lenses as this may reduce the burden of ophthalmic investigations necessary for accurate diagnosis.

Methods: This was a prospective, observational study. Consecutive patients undergoing fundus evaluation by 2 ophthalmologists (observer 1 and 2) using slit lamp biomicroscopy and indirect ophthalmoscopy were evaluated. Patients were randomized to group 1 (conventional +90 D and +20 D lenses followed by new approach using range of multiple lenses) and group 2 (new approach followed by conventional). Alternate patients in each group were examined by observer 1 and observer 2. Fundus evaluation outcomes were compared. Number of imaging investigations ordered after the first evaluation was compared.

Results: A total of 168 patients were included: 84 in group 1 and 84 in group 2. In group 1, the fundus evaluation findings increased in 38 patients by the new approach. In group 2, findings increased in 3 cases only. The evaluation in group 2 was superior to group 1 ($P < 0.05$). Imaging investigations ordered by group 2 were lesser than group 1 after initial examination ($P < 0.05$).

Conclusions: A range of multiple slit lamp biomicroscopy and indirect ophthalmoscopy lenses improves accuracy of fundus evaluation and reduces number of imaging investigations.

Dec 15, 2018 (Sat) 13:40 - 15:10

Venue: Ballroom 201

Association between Non-Glaucomatous Localized Retinal Nerve Fiber Layer Defects and Cardiovascular Risk Factors

*First Author: Joo Youn **SHIN***
*Co-Author(s): Suk-Ho **BYEON**, Chan Joo **LEE**, Jonghyun **LEE**, Sungha **PARK***

Purpose: To identify the relationship between non-glaucomatous localized retinal nerve fiber layer defects (RNFLDs) and cardiovascular risk factors and vascular biomarkers.

Methods: Eyes of 1316 individuals registered in the Cardiovascular and Metabolic Disease Etiology Research Center-High Risk Cohort who had no clinical evidence of cardiovascular disease and underwent ophthalmic examination were included. Examined vascular biomarkers included central hemodynamics, carotid-femoral pulse wave velocity (cfPWV), left ventricular hypertrophy (LVH) status, and coronary artery calcium score (CACS).

Results: RNFLDs without glaucomatous optic disc changes were detected in 637 eyes of 440 subjects. In multivariate logistic regression, the presence of RNFLDs was significantly associated with a higher glycated hemoglobin level (odds ratio [OR] 1.289, 95% confidence interval [CI] 1.13-1.47, $P < 0.001$), higher 24-h mean systolic blood pressure (SBP; OR 1.013, 95% CI 1.004-1.022, $P = 0.005$), and a lower estimated glomerular filtration rate (eGFR; OR 0.995, 95% CI 0.991-0.998, $P = 0.005$). In terms of vascular biomarkers, RNFLDs were not associated with LVH, central pulse pressure, or cfPWV after adjusting for blood pressure. However, RNFLDs were associated with an elevated CACS (OR 1.44, 95% CI 1.04-2.00, $P = 0.029$).

Conclusions: There was a significant association of non-glaucomatous localized RNFLDs with several known risk factors and biomarkers for cardiovascular disease. Therefore, evaluating RNFLDs with fundus imaging may be useful for assessing cardiovascular disease risk.

Dec 15, 2018 (Sat) 13:40 - 15:10

Venue: Ballroom 201

Causes of Papilloedema in a Pediatric Age Group: An 8 Years' Hospital-Based Study in Northeastern India

*First Author: Hiranmoyee **DAS***

Purpose: To study the various causes of papilloedema in a pediatric age group (<18 years) in Northeastern India.

Methods: A total of 140 cases of papilloedema from January 2010 to December 2017 were studied prospectively. Detailed history, clinical examination, and neuroimaging (mostly computed tomographic scan) were done in all cases. Cases were followed up to 3 months.

Results: The cases were divided into 3 age groups: preschool children (0-3 years), pre-adolescents (4-12 years), and adolescents (13-18 years). Headache, fever and vomiting were the most common presenting symptoms. Of the cases, 42.86% were infection, 33.57% space-occupying lesion, 10.71% otogenic intracranial complication (brain abscess and sigmoid sinus thrombosis following middle ear infection), 8.57% pseudotumor cerebri, and 4.29% hypertension. In the infective group, 25.72% were tuberculosis, 10.71% viral, 5.00% bacterial, and 1.43% fungal etiology. In the space-occupying lesion, 10.72% were tumors, 10.72% tuberculoma, 5.71% intracranial hematoma, 3.57% brain abscess, and 2.86% neurocysticercosis. Earliest regression of papilloedema was seen at the end of 1 month and it was maximum in infective group. 15.6% of cases died during the study period due to the disease. The mortality rate was highest in the cases with tumors.

Conclusions: In this study, important findings were: (1) tuberculosis (tubercular meningitis and tuberculoma) is the most common cause of papilloedema; (2) middle ear infection is due to the higher altitude location of the region; (3) neurocysticercosis is due to the habit of taking smoked pork. This geographic area is located 5000 feet above the sea level. Knowledge of common causes of papilloedema will guide

us in early diagnosis and management of cases with headache in this tribal-dominated, underdeveloped area.

Dec 15, 2018 (Sat) 13:40 - 15:10

Venue: Ballroom 201

Establishment of Ocular Hypertension Model in Rats by Cauterizing Episcleral Veins

*First Author: Shuangyu **HAN***
*Co-Author(s): Yuan **HE***

Purpose: To establish a rat model of ocular hypertension with stable intraocular pressure (IOP) by cauterizing episcleral vessels and observe diurnal changes of IOP in rats.

Methods: Thirty Sprague Dawley rats weighing 250 ± 50 g were included in this study. The elevated IOP was induced by cauterization of 3 episcleral veins in right eyes while the left eyes kept untouched for comparison. The IOP was measured for 3 days before surgery and immediately after cauterization, every day in first week and every week after the surgery until sacrificed. Optical coherence tomography (OCT) examination was measured before surgery and 4 weeks after surgery. The count of retinal ganglion cells (RGCs) and the thickness of the retina were measured in retinal sections stained with hematoxylin-eosin (H&E) after OCT examination.

Results: The average of normal nighttime IOP was higher than daytime IOP significantly ($P < 0.05$). After the surgery, the IOP reached a maximum of 12.53 (± 4.90) mm Hg and then slowly decreased. The mean IOP of the cauterized eyes were obviously higher than the control eyes for 3 weeks after experiment. There was significant change between postoperative and preoperative inner retinal thickness measured by OCT examination ($P < 0.05$). The number of RGCs in the experimental eyes was reduced about 25% compared with the control eyes ($P < 0.05$). There were significant changes in the inner, middle and outer layers of the retinal thickness between experimental eyes and control eyes, and the changes in the inner layer were most obvious.

Conclusions: Episcleral vein cauterization method could be considered to establish a stable model of ocular hypertension in rats.

Dec 15, 2018 (Sat) 13:40 - 15:10

Venue: Ballroom 201

Fundus Visual Acuity Using the Super-Retinal Imaging Display Based on Scanning Laser Technology

*First Author: Satoshi **ISHIKO***
*Co-Author(s): Tomoko **MASE**, Kazuhiro **SUGAWARA**, Mitsuru **SUGAWARA**, Makoto **SUZUKI**, Akitoshi **YOSHIDA***

Purpose: Using scanning laser ophthalmoscopy (SLO) technology, Landolt ring images can be projected onto the retina without refractive error correction. We developed a new super-retinal imaging display (SRID) based on SLO with a program that estimates the fundus visual acuity (FVA). We compared the FVA and the standard VA, i.e., the uncorrected VA (UCVA) and best-corrected VA (BCVA).

Methods: Fourteen eyes of 14 subjects (9 men, 5 women; mean age ± standard deviation [SD], 32.0 ± 9.5 years) were included in this study. Eyes with myopia exceeding –6 diopters (D) were excluded. The standard UCVA and BCVA up to 1.0 were examined, as the maximal value estimated by the SRID was 1.0. The FVA was estimated by the average result of 3 examinations. For statistical analyses, the VA values were converted to the logarithm of the minimum angle of resolution values.

Results: The refractive errors ranged from -5.5 to +1.25 D (average, -2.05 ± 1.90 D). The BCVAs of all subjects were 0.00. The FVA (mean ± SD, 0.01 ± 0.02) was significantly ($P < 0.01$) better than the UCVA (0.52 ± 0.49) and did not differ significantly ($P > 0.05$) from the BCVA. Furthermore, the examination time for the FVA was less than 1 minute (mean ± SD, 56.8 ± 21.1 minutes).

Conclusions: The FVAs estimated by the SRID were almost equivalent to the BCVA without refractive error correction. Clinical application of this device for home healthcare is expected.

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Venue: Ballroom 201

Mitochondrial Morphology Change and the Expression of Mitochondrial Fission/Fusion Genes in RPE Cells under Oxidative Stress

*First Author: Xu **LIU***
*Co-Author(s): Yuan **HE***

Purpose: To assess the expression of mitochondrial fission genes (*Fis1*, *Dnmp1*, *MTP18*) and fusion genes (*Mnf1*, *Mnf2*) in different concentrations of hydrogen peroxide (H_2O_2) under the oxidative damage in ARPE-19 cells.

Methods: The obtained ARPE-19 cells were divided into normal control group and oxidative damage groups treated by different concentrations of H_2O_2. The oxidative damage groups were treated by H_2O_2 at the concentrations of 75, 150 and 200 μmol/L respectively for 24 hours. MTT assay was applied for cell viability. The cell morphology change was observed by phase contrast microscope. The mitochondrial morphology change was recorded by transmission electron microscope. The mRNA levels of mitochondrial fission genes (*Fis1*, *Dnmp1*, *MTP18*) and fusion genes (*Mnf1*, *Mnf2*) were measured by RT-PCR and real-time PCR.

Results: With the increased concentration of H_2O_2, cells were shrinking aggravatingly and cell death increased. The mitochondrial structures were destroyed with membranes and cristae. RT-PCR results showed the decreased expression of ***Fis1*** gene, compared with normal control group in different H_2O_2 treatment ($P < 0.05$). The expression of other genes showed no significant change. Real-time PCR results demonstrated that the expression of *Fis1* gene decreased with different concentrations of H_2O_2 treatment, whereas the expression of *Mfn2* gene increased in the treatment of 200 μM H_2O_2. There were no significant differences of other genes expression.

Conclusions: The abnormal expression of mitochondrial fission gene *Fis1* and fusion gene *Mfn2* caused mitochondrial dysfunction in ARPE-19 cells, indicating the imbalance of mitochondrial dynamics, which might participate for these cell death in oxidative stress environment.

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Venue: Ballroom 201

Nonarteritic Anterior Ischemic Optic Neuropathy is Associated with Cerebral Small Vessel Disease

*First Author: Min Seok **KIM***
*Co-Author(s): Chi Kyung **KIM**, Kyu Hyung **PARK**, Sang Jun **PARK**, Se Joon **WOO***

Purpose: We investigated cerebral small vessel disease (SVD) in patients with nonarteritic anterior ischemic optic neuropathy (NAION) and compared with normal controls.

Methods: We retrospectively reviewed 76 NAION patients and 2749 normal controls who underwent careful medical interviews, ophthalmic examination, and brain magnetic resonance imaging (MRI). We assessed and compared the degree of cerebral SVD in MRI.

Results: The patients with NAION presented cerebral SVD more frequently compared with controls (72% vs 37%, respectively, $P < 0.001$), which were also observed in both younger group aged <60 years (61% vs 18%, respectively, $P < 0.001$) and older group (83% vs 48%, respectively, $P < 0.001$). As the NAION patients tended to have hypertension, diabetes mellitus, and dyslipidemia more frequently compared to controls (47% vs 34%, $P = 0.016$; 29% vs 15%, $P = 0.001$; 18% vs 13%, $P = 0.132$, respectively) we compared the degree of SVD after matching 5 controls to each NAION patient by the use of presence of hypertension, diabetes mellitus, and dyslipidemia. The NAION patients also had higher prevalence of cerebral SVD (<60 years, 61% vs 24%, $P < 0.001$; ≥60 years, 83% vs 54%, $P = 0.001$).

Conclusions: Patients with NAION have an association with cerebral SVD even after adjusting for age and medical diagnoses. Clinicians should consider brain MRI for NAION patients to prevent neurological impairment

after cerebral SVD.

Pediatric Retina

Dec 15, 2018 (Sat) 13:40 - 15:10

Venue: Ballroom 201

Analysis of Choroidal Thickness Using Spectral-Domain Optical Coherence Tomography in Children with Congenital Aniridia

*First Author: Hui **CHEN***
*Co-Author(s): Weirong **CHEN**, Haotian **LIN**, Feng **WEN***

Purpose: To compare the subfoveal, parafoveal, and peripapillary choroidal thickness in eyes with congenital aniridia and control eyes.

Methods: This institutional study involved 64 eyes from 32 patients with congenital aniridia and 80 eyes from 40 healthy children, aged 6 to 17 years. All patients underwent central macular thickness (CMT) and choroidal thickness measurement at 7 retinal sites with spectral-domain optical coherence tomography (OCT). Statistical analysis was performed to compare the CMT and choroidal thickness of eyes with congenital aniridia and control eyes.

Results: The mean CMT was 251.15 ± 23.07 μm in eyes with congenital aniridia and 203.05 ± 21.83 μm in controls ($P < 0.05$). The mean subfoveal choroidal thickness was 197.25 ± 21.03 μm in eyes with aniridia and 302.13 ± 65.31 μm in controls ($P < 0.001$). The choroidal thickness of the subfoveal area and at 750-μm intervals temporal and nasal to the fovea was significantly thinner in eyes with congenital aniridia than in controls ($P < 0.05$). There was a significant negative correlation between the mean choroidal thickness and the axial length in the eyes with congenital aniridia ($r = –0.47$, $P < 0.001$).

Conclusions: This study demonstrated that patients with congenital aniridia had significantly thicker central macula than children in the control group. However, subfoveal choroidal thickness in eyes with congenital aniridia was significantly thinner than in control eyes.

Dec 15, 2018 (Sat) 13:40 - 15:10

Venue: Ballroom 201

Bilateral, Sequential, Sudden-Onset Vision Loss in a Patient with Waardenburg Syndrome Phenotype and Usher Syndrome Genotype

*First Author: Shailaja **SHENOY***
*Co-Author(s): Katta **GIRISH**, Puneeth H **SOMASHEKHAR**, Yogish S **KAMATH**, Vijaya **PAI H**, Anju **SHUKLA***

Purpose: To report a case of bilateral, sequential, sudden-onset vision loss in a patient with Waardenburg syndrome phenotype and Usher syndrome genotype.

Methods: An 18-year-old male with congenital hearing defect presented with sudden-onset decrease in vision in the left eye associated with pain. He was examined by an ophthalmologist, a neurologist and a medical geneticist.

Results: On examination, his visual acuity was 6/9 in the right eye and counting fingers at 1 meter in the left eye, iris hypochromia in both eyes and relative afferent pupillary defect in the left eye. Dilated fundus examination showed albinotic fundus in both eyes, and disc edema in the left eye with dilated telangiectatic vessels. His magnetic resonance imaging was normal. VEP was suggestive of demyelinating optic neuritis. A month later the patient presented with similar clinical picture in the right eye. He had phenotypic features suggestive of Waardenburg syndrome such as bilateral severe-to-profound hearing loss, heterochromia iridis/hypopigmented iris, premature graying of hair. WES revealed novel pathogenic variant, c.1608C>G [p.(Tyr536Ter)] in ADGRV1, known to cause Usher syndrome 2C. In addition, he had a known missense variant c.575C>A (p.Ser192Tyr) in TYR, known to cause oculocutaneous albinism type 1.

Conclusions: The variant in ADGRV1 explains hearing defect and eye abnormalities found in him. Variant in TYR may explain the

pigmentation abnormalities noted in him. Therefore, our patient has a blended phenotype of Usher syndrome and hypopigmentation, which presented as Waardenburg syndrome. However bilateral optic neuritis is a rare presentation in patients with Ushers syndrome.

Dec 15, 2018 (Sat) 13:40 - 15:10

Venue: Ballroom 201

Changes in the Course of Retinopathy of Prematurity (ROP) over Time

*First Author: Rinku **PAUL***
*Co-Author(s): Afsana **HABIB**, Dipak **NAG**, Pankaj **ROY***

Purpose: To demonstrate the changes of the demographic and characteristics of retinopathy of prematurity (ROP) over time.

Methods: As part of routine ROP screening, we evaluated data from November 2014 to November 2017. Risk factors were evaluated in univariate analysis first, while adjusted finally for universally known risk factors e.g. gestational age [GA], low birth weight [BW] and statistically significant risk factors that were found in univariate analysis in multiple logistic regression model. Demographic features, ROP characteristics and its risk factors were compared with published data of regional and western countries over time.

Results: It has been observed that higher gestational age, mean 29.96 ± 2.36 weeks (23-38) and heavier babies, mean 1287.11 ± 302.91 g (600-2500) developed ROP. Among 610 screened babies, incidence of ROP was 37.5%. AP-ROP was significantly high (15.72%) with a few came with RD (6.99%) due to delayed first presentation for screening. After adjusting for possible confounders, it has been identified that apart from birth weight and gestational age, apnea and blood transfusion were found as independent risk factors for developing ROP. Treatable ROP was found in 27.54%.

Conclusions: This study shows the demographic characteristics, ROP features and risk factors are different from that of the earlier study reports which indicates the necessity of the improvement of perinatal care.

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Venue: Ballroom 201

Early Versus Late Presentation of Aggressive Posterior Retinopathy of Prematurity

*First Author: Simar Rajan **SINGH***
*Co-Author(s): Mangat **DOGRA**, Mohit **DOGRA**, Sabia **HANDA**, Savleen **KAUR**, Deeksha **KATOCH***

Purpose: To report the disease spectrum and treatment outcomes in early versus late presentation of aggressive posterior retinopathy of prematurity (APROP).

Methods: This was a retrospective chart review of all treatable ROP eyes between January 2012 and March 2017. APROP eyes were identified and divided into early presentation (≤28 days – group A) and late presentation (>28 days – group B).

Results: During the study period, 430 eyes of 224 premature infants were treated for ROP with laser. Of the 430 eyes, 235 had APROP. 39.6% of treatable APROP presented early at ≤28 days of life. The mean birth weight was 1307.8 ± 297.7 g in group A and 1193.9 ± 354.8 g in group B (P = 0.009). Group A had a mean gestational age (GA) of 29.7 ± 2.5 weeks compared to 28.4 ± 1.9 in group B (P = 0.000). Large avascular loops were significantly higher in group A (P = 0.000). Final outcome was comparable in the 2 groups at a minimum of 3 months of follow-up.

Conclusions: APROP presents early in preterm infants with higher birth weight and GA. This has implications for early screening guidelines for ROP at places where higher birth weight infants are developing APROP.

Dec 15, 2018 (Sat) 13:40 - 15:10

Venue: Ballroom 201

Maternal and Infantile Risk Factor Profile of Preterm Infants Screened for Retinopathy of Prematurity in a Tertiary Hospital

*First Author: Maynard Sam **LAZO***
*Co-Author(s): Corpus **KRISTINE***

Purpose: To identify maternal and infantile risk factors for retinopathy of prematurity (ROP)

among preterm infants screened in a tertiary hospital from 2014 to 2017.

Methods: This was a retrospective study that included the ROP databank of a tertiary hospital from 2014 to 2017. This study included medical records of all premature infants screened for ROP and excluded those who had incomplete data or other ocular pathologies other than ROP. Risk factors were analyzed using univariate analysis. Odds ratio (OR) and 95% confidence interval (CI) were also calculated with significant P value set at <0.05.

Results: Among the 455 infants screened for ROP, 118 (25.9%) had any stage of ROP while 23 (5.0%) had treatment-warranted ROP (TW-ROP). Univariate regression analysis showed that the top 5 infantile risk factors associated with any stage of ROP and TW-ROP were low birth weight (97.5% and 100%, respectively), prematurity (87.3% and 100%, respectively), history of blood transfusion (21.2% and 13%, respectively), sepsis (21.2% and 17.4%, respectively), and oxygen supplementation (16.1% and 8.7%, respectively). After multivariate analyses, the most important adjusted risk factors associated with any stage of ROP included low birth weight (OR = 52, CI = 16.20-166.96, P = 0.001), prematurity (OR = 25.73, CI = 14.10-46.95, P = 0.001), and history of blood transfusion (OR = 8.79, CI = 4.08-18.96, P = 0.0001).

Conclusions: The most significant infantile risk factors associated with any ROP include low birth weight, prematurity, and history of blood transfusion. There were no significant probable maternal risk factors. Timely ROP screening is recommended especially among infants with any of these risk factors in their profile.

Dec 15, 2018 (Sat) 13:40 - 15:10

Venue: Ballroom 201

Retinal Vessels: Just the Tip of the Iceberg: A Case of Wyburn-Mason Syndrome

First Author: Paula ***FERNANDEZ***

Purpose: To describe the presentation, diagnosis, and management in a 13-year-old Filipino patient who had Wyburn-Mason syndrome.

Methods: A descriptive case report of a patient with arteriovenous malformation (AVM).

Results: A 13-year-old male complained of severe headache, accompanied by gradual progressive blurring of vision of the left eye. Visual acuity was 20/25 in the right eye, and NLP in the left eye. There was bruit in the left orbit, and no evidence of proptosis. Fundus examination showed large tortuous vessels over the entire fundus. Cerebral angiography showed presence of abnormal vessels in the right parasellar region extending to the left posterior orbit, consistent with findings of AVM.

Conclusions: Simultaneous occurrence of multiple vascular malformations involving the orbit, brain and/or face is extremely rare. Wyburn-Mason syndrome is a rare, nonhereditary phakomatosis characterized by unilateral congenital ipsilateral retina, brain and facial angiomas, affecting 0.14% of the general population. Ocular manifestations include decreased visual acuity, visual field defect, proptosis, or mass effect with compression effect. Retinal lesion consists of a markedly dilated and tortuous arteriole contiguous with a similar vein involving the optic disc and retina. One of the more recent treatment options is stereotactic radiosurgery. When a malformation is treated, a pathologic process appears to be induced that is similar to the response-to-injury model of atherosclerosis. Radiation injury to the vascular endothelium is believed to induce the proliferation of smooth-muscle cells and the elaboration of extracellular collagen, which leads to progressive stenosis and obliteration of the AVM nidus thereby eliminating the risk of hemorrhage.

Dec 15, 2018 (Sat) 13:40 - 15:10

Venue: Ballroom 201

Retinopathy of Prematurity: Dawn to Dusk in Developing Countries

*First Author: Sanyam **BAJIMAYA***
*Co-Author(s): R.V. Paul **CHAN**, Nick **KOURGIALIS***

Purpose: The module of retinopathy of prematurity (ROP) screening system in developing countries like Nepal would help early diagnosis and prevent preterm babies to go needlessly blind. The ROP Project in Kathmandu Valley has introduced an innovative approach aiming to improve the quality of care provided to preterm babies that can be scaled up across the health system.

Methods: Tilganga Institute of Ophthalmology (TIO) worked in close collaboration with Helen Keller International (HKI) and 3 selected hospitals of Kathmandu valley and has established a system that can identify and treat babies at risk of ROP, and ensure the ongoing provision of care for children. The project has adapted the successful use of telemedicine wherein trained technical staff traveled to the respective hospitals with a portable retina camera (Forus, 3Nethra-Neo) to conduct screenings. All fundus photographs were uploaded into the ROP software (NeoCare) for grading by pediatric ophthalmologists and retina specialists of TIO and University of Illinois Chicago (UIC).

Results: At first quarter of the project, NICU assessment and capacity development was focused by providing training and workshops at various levels of health personals. A total of 339 preterm babies with birth weight ≤1700 g and gestational age ≤35 weeks had undergone ROP screening from May 2017 to April 2018. Low birth weight, comorbidities such as neonatal infection, multiple blood transfusion and prolong use of oxygen remained as risk factors for development of ROP.

Conclusions: The holistic approach for prevention and treatment of ROP with the use of telemedicine is of paramount importance in management of the disease.

Dec 15, 2018 (Sat) 13:40 - 15:10

Venue: Ballroom 201

Supplemental Laser for Eyes Treated with Bevacizumab Monotherapy in Severe Retinopathy of Prematurity

*First Author: Vishal **M Y***

Purpose: To evaluate the safety and efficacy of a deferred laser treatment after intravitreal bevacizumab (IVB) monotherapy in cases of severe retinopathy of prematurity (ROP) infants.

Methods: Infants diagnosed with severe ROP received immediate IVB. Laser photocoagulation was done, at which time anterior growth of the vessels was arrested. This was seen clinically either with the formation of a demarcation line or when no growth of vessels was seen subjectively on 2 subsequent clinical examinations over a period of 2 weeks. Primary outcome measures were the ability to prevent ROP recurrence and the anatomic outcome at the last follow-up visit.

Results: Of the 3792 patients screened, 14 patients (28 eyes) were diagnosed with APROP and 15 patients (30 eyes) were diagnosed with ROP in zone 1 and zone 2 posterior with plus disease. Recurrence of ROP was noted in 4 eyes of 2 patients. The adjusted age at which recurrence occurred was 35.0 ± 2.8 weeks (range, 33-37 weeks) and laser treatment was done at the adjusted age of 44.0 ± 4.2 weeks. The mean duration between IVB and laser was 9.0 ± 7.1 weeks. None of the eyes developed recurrence after laser treatment at 1-year follow-up period nor developed an unfavorable anatomic outcome.

Conclusions: In our small series, using our treatment protocol, devastating complications and associated blindness related to reactivation of the disease were not seen. Our proposed protocol of IVB monotherapy with deferred laser treatment can be used in severe ROP patients with poor compliance.

Retina (Medical)

Dec 14, 2018 (Fri) 13:40 - 15:10

Venue: Ballroom 201

Association between Hyperreflective Dots on Spectral-Domain Optical Coherence Tomography and Early Recurrence of Diabetic Macular Edema having Insufficient Response to Bevacizumab after Intravitreal Dexamethasone Implantation

*First Author: Kyung Tae **KIM***
*Co-Author(s): Ju Byung **CHAE**, Dong Yoon **KIM***

Purpose: To investigate the associations between hyperreflective dots (HRDs) on spectral-domain optical coherence tomography (SD-OCT) and early recurrence of macular edema after intravitreal dexamethasone implantation in eyes with refractory diabetic macular edema (DME) to bevacizumab.

Methods: A retrospective review was conducted involving patients with refractory DME to bevacizumab, who underwent intravitreal dexamethasone implantation and with 12-month follow-up. Eyes with increased central macular thickness (CMT) at 3 months compared with CMT of the first month after intravitreal dexamethasone implantation and those with CMT of over 300 μm on SD-OCT were categorized into early recurrence group and the others into late recurrence group. Best-corrected visual acuity, CMT, and the number of HRDs were analyzed.

Results: A total of 26 patients (29 eyes: 16 eyes in early recurrence group and 13 eyes in late recurrence group) were included in this study. The total number of HRDs and the number of inner retinal HRDs at baseline in the early recurrence group (11.38 ± 3.07 in total HRDs, 8.75 ± 1.84 in inner retinal HRDs) were significantly greater than that in the late recurrence group (7.54 ± 3.60, P = 0.006 in total HRDs, 6.23 ± 2.52, P = 0.007 in inner retinal HRDs). Multivariate logistic regression analysis showed that total number of HRDs (odds ratio = 1.477, P = 0.023) increased the risk of early recurrence after intravitreal dexamethasone implantation.

Conclusions: The total number of HRDs on SD-OCT may be a predictive indicator of early recurrence of macular edema after intravitreal dexamethasone implantation for DME having insufficient response to bevacizumab.

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Venue: Ballroom 201

Choroidal Neovascularization (CNVM) as a Consequence of Combined Hamartoma of Retina and Retinal Pigment Epithelium (CHRRPE): A Case Series

*First Author: Rajan **GUPTA***
*Co-Author(s): Jay **CHHABLANI**, Rajeev K **PAPPURU***

Purpose: To describe the optical coherence tomography (OCT) features of 3 cases of CNVM associated with CHRRPE.

Methods: A retrospective analysis of 21 patients diagnosed with CHRRPE of which 3 were found to be associated with CNVM. Color fundus photos, OCT (swept source / spectral domain), optical coherence tomography angiography (OCTA), fundus fluorescein and indocyanine green angiography features of these 3 cases of CNVM associated with CHRRPE were analyzed.

Results: Of 21 cases diagnosed with CHRRPE, 10 were juxtapapillary, 10 were macular and 1 was equatorial in location, of which 3 were associated with CNVM. All 3 cases had a juxtapapillary pigmented lesion. Full-thickness retinal disorganization, RPE hypertrophy, disruption of ellipsoid zone, ERM and cystoid changes were the OCT findings common to all 3 cases. Of note was the characteristic mound/elevation of RPE with intraretinal hyperreflective band (Bridge Sign) which was seen in all 3 cases. There was no evidence of subretinal fluid (SRF) / neurosensory detachment, serous / fibrovascular / hemorrhagic pigment epithelial detachment (PED) in the cases reported.

Conclusions: This case series gives an insight into the pathogenesis and the predisposing factors leading to CNVM formation in peripapillary CHRRPE. Lack of typical markers

of CNVM (SRF / PED) in CHRRPE highlights the utility of OCTA and the subtle OCT findings such as "Bridge Sign" that could be instrumental in early diagnosis of CNVM in CHRRPE.

Dec 14, 2018 (Fri) 13:40 - 15:10

Venue: Ballroom 201

Decoding Retinal Microvasculature Changes in Dry ARMD with OCT Angiography

First Author: Sherine ***BRAGANZA***
Co-Author(s): Thirumalesh ***M B****, Sushil* ***PATIL****, Akhila* ***SRIDHARAN****, Bhujang* ***SHETTY***

Purpose: To study the retinal microvasculature in dry AMD patients using optical coherence tomography angiography (OCTA).

Methods: A cross-sectional study with 40 patients with clinically diagnosed dry ARMD and 40 normal subjects was done. The age of the patients with AMD ranged from 50 to 82 years with a mean age of 62.6 ± 8.85 years. In the control group, the mean age was 58.1 ± 6.42 years. The retinal microvasculature of subjects was tested by measuring vessel density using OCTA. The vessel spacing and foveal avascular zone (FAZ) area between patients and controls were compared and $P < 0.001$ was considered significant.

Results: In the superficial layer, FAZ area was significantly ($P < 0.001$) higher in dry AMD patients compared to normal group. However, the quantification of vascular parameters imply that superficial layer was not significantly affected in dry AMD which was obvious from equal large vessel spacings and greater vessel density among AMD as compared to normal group. In the deep layer, FAZ area was equal in both groups. The deep retinal plexus of dry AMD group had a density which was significantly ($P < 0.001$) lower compared to the age-matched normal subjects. This proves that vascular parameters in the deep layer could be a good indicator to monitor disease progression.

Conclusions: Studies have shown that vascular factors are important in AMD pathogenesis. In our study using OCTA, we show that both superficial and deep retinal plexuses are altered among patients affected by AMD.

Dec 14, 2018 (Fri) 13:40 - 15:10

Venue: Ballroom 201

Differential Expression and Localization of Human Tissue Inhibitors of Metalloproteinases in Proliferative Diabetic Retinopathy

First Author: Ahmed ***ABU EL-ASRAR***

Purpose: Tissue inhibitors of metalloproteinases (TIMPs) block the catalysis by matrix metalloproteinases (MMPs) and have additional biologic activities, including regulation of cell growth and differentiation, apoptosis, angiogenesis and oncogenesis. We investigated the expression levels of all the 4 human TIMPs and correlated these levels with those of MMP-9 and vascular endothelial growth factor (VEGF) in proliferative diabetic retinopathy (PDR).

Methods: Vitreous samples from 38 PDR and 21 nondiabetic control patients and epiretinal membranes from 14 patients with PDR and 10 patients with proliferative vitreoretinopathy were studied by enzyme-linked immunosorbent assay, Western blot analysis and immunohistochemistry.

Results: TIMP-1 TIMP-4, MMP-9 and VEGF levels were significantly higher in vitreous samples from PDR patients than in nondiabetic controls ($P < 0.0001$ for all comparisons), whereas TIMP-2 and TIMP-3 levels did not differ significantly. TIMP-1, TIMP-4, MMP-9 and VEGF levels in PDR with active neovascularization were significantly higher than those in inactive PDR ($P < 0.0001$, 0.001, 0.013, 0.004, respectively). Significant positive correlations existed between levels of TIMP-1 and levels of TIMP-4, MMP-9 and VEGF, between levels of TIMP-4 and levels of MMP-9 and VEGF and between levels of MMP-9 and VEGF. TIMP-1 and TIMP-3 were expressed in vascular endothelial cells in PDR epiretinal membranes and in myofibroblasts and leukocytes in PDR and PVR epiretinal membranes.

Conclusions: The differential expression of TIMPs in PDR suggest that among the 4 TIMPs, TIMP-1 and TIMP-4 may be possible biomarkers of disease activity.

Dec 14, 2018 (Fri) 13:40 - 15:10

Venue: Ballroom 201

Efficacy, Safety and Appropriate Timing of Intravitreal Dexamethasone Implant in Diabetic Macular Edema

*First Author: Ajay **AURORA***
*Co-Author(s): Anisha **GUPTA**, Dr Charu **MALIK**, Neeraj **SANDUJA***

Purpose: To evaluate efficacy and safety of Ozurdex implant in eyes with diabetic macular edema (DME) and compare visual and anatomical improvement in eyes receiving Ozurdex as primary treatment versus secondary treatment following poor response to intravitreal (IV) anti-VEGF therapy.

Methods: Sixteen eyes (14 patients) with DME, best-corrected visual acuity (BCVA) <6/9 were evaluated. Of these 10 eyes (group A) who received IV anti-VEGF primarily and showed subnormal response were given IV Ozurdex implant. Six eyes (group B, treatment-naive) received Ozurdex as primary treatment. All patients were evaluated at baseline and monthly for 4 months with BCVA, intraocular pressure (IOP), central macular thickness (CMT), optical coherence tomography (OCT) and fundus fluorescein angiography (FFA).

Results: The mean age of the patients was 57.93 ± 4.98 years, with 5 females and 11 males. In subgroup A, the mean BCVA of 0.21 ± 0.09 improved to 0.266 ± 0.156 at 1 month (P = 0.07) and 0.27 ± 0.16 at 4 months (P = 0.06). The mean CMT decreased from 520.5 ± 154.2 μ to 231 ± 56.75 μ at 1 month (P = 0.000) and 246.3 ± 67.7 μ at 4 months (P = 0.000). In subgroup B, the mean BCVA of 0.15 ± 0.06 improved to 0.33 ± 0.11 at 1 month (P = 0.002) and 0.346 ± 0.13 at 4 months (P = 0.001). The mean CMT decreased from 475.16 ± 105.8 μ to 251.66 ± 51.25 μ at 1 month (P = 0.02) and 240.83 ± 86.3 μ at 4 months (P = 0.000). The CMT reduction was statistically significant in both groups but the BCVA improvement was significant only in subgroup B.

Conclusions: Ozurdex implant is a safe and efficacious treatment modality for DME. Eyes treated early showed better visual improvement than eyes treated after poor response to anti-VEGF. Hence, Ozurdex should be considered early in cases of suspected poor response to anti-VEGF.

Dec 14, 2018 (Fri) 13:40 - 15:10

Venue: Ballroom 201

Indian Urban Rural Diabetic Retinopathy Eye Study Using Low-Cost Fundus Camera

*First Author: Gaurav **MATHUR***
*Co-Author(s): Deependra V **SINGH***

Purpose: In our study we compared prevalence of diabetic retinopathy, risk factors, socioeconomic status and knowledge on retinal diseases between rural and urban diabetic subjects.

Methods: The study was conducted in India at one urban and one rural center. All first-time type 2 diabetes were considered eligible. Four field retinal photography using low-cost fundus camera was undertaken. Grading of diabetic retinopathy and macular edema was done according to revised international classification. All participants underwent a detailed interview on the history of diabetes, hypertension, heart disease, neuropathy and nephropathy, socioeconomic status, knowledge of retinal diseases and some blood tests.

Results: A total of 560 urban and 500 rural subjects were included. Prevalence of diabetic retinopathy was 7% in the urban group and 15% in the rural group. Risk factors in both groups that had significant association with prevalence of diabetic retinopathy were duration of diabetes, HBA1c, FBS, and hypertension. Amongst the risk factors, FBS, HBA1c and hypertension were significantly higher in the rural group. Presence of DR, PDR, and severe DME was significantly higher in rural group. There was no statistical difference between the 2 groups on knowledge and awareness about

diabetic retinopathy.

Conclusions: Prevalence of diabetic retinopathy among rural population was significantly higher compared to urban population. The risk factors for developing diabetic retinopathy that caused higher prevalence patterns in rural population were uncontrolled sugars, higher prevalence of hypertension. Lack of education and lower socioeconomic status are other factors for delayed, incomplete or lack of treatment leading to patients presenting with sight-threatening diabetic retinopathy in the rural group.

Dec 14, 2018 (Fri) 13:40 - 15:10

Venue: Ballroom 201

Long-Term Treatment Outcomes of Pachychoroid Neovasculopathy: Real-World Evidence in an Indian Population

*First Author: Jay **SHETH***
*Co-Author(s): Giridhar **ANANTHARAMAN**, Shruti **CHANDRA***

Purpose: The aim of our study was to evaluate 1-year outcomes in pachychoroid neovasculopathy (PCN) eyes treated with PRN regimen of intravitreal anti-vascular endothelial growth factor (VEGF) therapy with/without photodynamic therapy (PDT).

Methods: This was a retrospective analysis of 9 PCN eyes undergoing anti-VEGF monotherapy (ranibizumab/bevacizumab; group 1: 6 eyes) or in combination with PDT (group 2: 3 eyes). All eyes underwent multimodal imaging including EDI-OCT, DFA and ICGA (Spectralis). Changes in best-corrected visual acuity (BCVA), subfoveal choroidal thickness (SFCT), CT at pachyvessel (CTPv), central macular thickness (CMT), intraretinal fluid (IRF), subretinal fluid (SRF), dimensions of shallow irregular PED (double layer sign: DLS; height, base-diameter) were analyzed at baseline and 12 months.

Results: The mean age of the patients was 69.00 ± 7.29 years with a mean follow-up of 23.8 ± 13.2 months. Compared with baseline, significant improvement was noted in BCVA (baseline: 0.78 ± 0.42 µm; 12-month: 0.48 ± 0.28 µm; P = 0.02), SFCT (baseline: 359.33 ± 85.03 µm; 12-month: 315.00 ± 101.63 µm; P = 0.009), DLS height (baseline: 88.11 ± 44.28 µm; 12-month: 56.56 ± 34.15 µm; P = 0.02) and SRF height (baseline: 210.33 ± 234.57 µm; 12-month: 33.22 ± 37.32 µm; P = 0.01) respectively. 80% and 44.4% of eyes had complete resolution of IRF and SRF respectively. Improvement was seen in PED width and CMT although not significantly. None of the eyes showed resolution of DLS or pachyvessels. The mean number of injections in all eyes was 5 ± 2.8. In group 1, 3 eyes received only bevacizumab (3.67 ± 3.05) while 2 eyes received only ranibizumab (6.5 ± 0.7). In group 2, 2 eyes received both IVA and IVR while 1 eye received only IVR. No significant difference was noted between the 2 groups in all parameters.

Conclusions: In real-world scenario, treatment with either anti-VEGF monotherapy or in combination with PDT showed good efficacy for PCN with good BCVA at 12 months. Additionally, it is associated with significant reduction in choroidal thickness and promising anatomic outcomes on the micromorphometry of PED, besides achieving a dry macula with an acceptable safety profile.

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Venue: Ballroom 201

Multimodal Imaging of Macular Telangiectasia Type 2A and Its Correlation with Visual Function

*First Author: Apoorva **AYACHIT***
*Co-Author(s): Guruprasad **AYACHIT**, Srinivas **JOSHI**, Lakshmipriya **UDAY REDDY***

Purpose: To study the multimodal imaging of macular telangiectasia type 2A and correlation of existing staging systems with multifocal electroretinogram (mfERG).

Methods: This was a retrospective chart review. Best-corrected visual acuity (BCVA) in logMAR, anterior segment evaluation, slit lamp biomicroscopy, fundus photography, spectral-domain optical coherence tomography (SD-OCT), fundus fluorescein angiography (FFA), OCT angiography (OCTA), fundus

autofluorescence (FAF) mfERG were done. Central macular thickness (CMT), external limiting membrane (ELM) disruption and ellipsoid zone (EZ) disruption were noted. Intraretinal, subretinal spaces, intraretinal pigment were also noted. Clinical examination, FAF, OCT, FFA, OCTA staging were done (Toto et al) and mfERG staging was done by dividing ring 1 (R1) and ring 2 (R2) P1 amplitudes in quartiles.

Results: A total of 29 eyes of 16 patients were included (bilateral 13, unilateral 3). Their mean age was 56.87 ± 11.64 years, with female:male ratio of 2.25:1. The mean BCVA was 0.38 ± 0.29 logMAR. There were subretinal spaces in 24.1% (n = 7); intraretinal spaces in 55.2% (n = 17), collapse sign in 69% (n = 20). The mean CMT was 147.7 µ, mean EZ disruption was 1110.0345 ± 892.60 µ, mean ELM disruption was 1156.65 ± 917.31 µ. In SD-OCT, 41.4% (n = 12) were stage 3, 37.9% (n = 11) stage 2 and 20.7% (n = 6) stage 0. SD-OCT staging showed a positive correlation with FFA [correlation coefficient (cc) - 0.747], FAF (cc - 0.775) and R1 P1 (cc - 0. 682) (P < 0.001). CC of OCTA staging was 0.395 with FFA and 0.375 with R1P1. R1P1 had positive correlation with all the imaging modalities viz. OCT, OCTA, FAF and FFA.

Conclusions: Functional abnormalities in macular telangiectasia have significant correlation with the existing staging systems in multimodal imaging. Structural data gleaned from multimodal imaging can be used as proxies for quantifiable functional loss.

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Venue: Ballroom 201

PLANET Study: Two-Year Anatomical and Morphological Outcomes with Intravitreal Aflibercept Monotherapy Versus Aflibercept Plus Rescue Photodynamic Therapy Assessed by Optical Coherence Tomography

*First Author: Gemmy **CHEUNG***

Purpose: To describe anatomical and morphological outcomes in patients with polypoidal choroidal vasculopathy (PCV) receiving intravitreal aflibercept (IVT-AFL) monotherapy or IVT-AFL plus rescue photodynamic therapy (PDT) in the PLANET study. Outcomes were assessed by optical coherence tomography (OCT) and measured by reading center assessment (RCA), then compared with outcomes evaluated by investigator assessment (IA).

Methods: Exploratory analysis included percentage of patients with subretinal fluid (SRF) assessed by OCT and presenting with serous/hemorrhagic pigment epithelial detachment (PED). These outcomes were evaluated (PED by RCA only, SRF by IA and RCA) for both IVT-AFL monotherapy and IVT-AFL plus rescue PDT groups at week 96.

Results: At week 96, the percentage of patients with no SRF on OCT was similarly high for IVT-AFL monotherapy and IVT-AFL plus rescue PDT: 73.5% versus 70.1% (RCA) and 83.1% versus 81.0% (IA), respectively. The percentage of patients presenting with PED (RCA only) was similar in both treatment groups: 4.4% versus 4.1%. The most frequent ocular adverse events were conjunctival hemorrhage (6.4%) in the IVT-AFL monotherapy group and dry eye (6.8%) in the IVT-AFL plus rescue PDT group.

Conclusions: Results from the 2-year PLANET study of patients with PCV showed positive outcomes, which were similar by RCA or IA evaluation for SRF, in both IVT-AFL monotherapy and IVT-AFL plus rescue PDT treatment groups. These findings support the overall PLANET results in which treatment decisions were primarily driven by IA.

Dec 14, 2018 (Fri) 13:40 - 15:10

Venue: Ballroom 201

Predictive Analysis of the 12-Week Dosing Status at Week 48 for Patients Receiving Brolucizumab: Results from the HAWK and HARRIER Studies

*First Author: Yuichiro **OGURA***
*Co-Author(s): David **BROWN**, Pravin **DUGEL**, Gabriele **LANG**, Sam Razavi **RAZAVI**, Andreas **WEICHSELBERGER***

Purpose: HAWK and HARRIER are prospective,

phase III studies in which patients receiving brolucizumab could be maintained on an exclusive 12-week (q12w) dosing interval to week 48 (Wk48). In this study, the predictive value of the first q12w interval in identifying q12w dosing suitability for brolucizumab 6 mg is presented.

Methods: Patients were randomized 1:1:1 in HAWK [brolucizumab 3 mg (n = 358) and 6 mg (n = 360) or aflibercept 2 mg (n = 360)], or 1:1 in HARRIER [brolucizumab 6 mg (n = 370) or aflibercept 2 mg (n = 369)]. After 3 loading doses, brolucizumab patients were treated every 12 weeks, with an option to adjust to 8-week (q8w) dosing during the first q12w interval and at each scheduled q12w visit; aflibercept was dosed in a fixed q8w regimen. Key secondary endpoints were the proportion of patients on q12w treatment at Wk48 and the predictive value of the first q12w interval for maintenance of a q12w regimen up to Wk48.

Results: For the brolucizumab 6 mg arm, 57% and 52% of patients were maintained on a q12w interval up to Wk48 in HAWK and HARRIER, respectively. Patients receiving brolucizumab 6 mg who successfully completed the first q12w interval had an 87.1% and 82.5% probability of remaining on q12w treatment until Wk48 in HAWK and HARRIER, respectively.

Conclusions: Once identified as suitable for q12w dosing in the first q12w interval, patients receiving brolucizumab 6 mg have a high probability of remaining on q12w up to Wk48. The ability to predict suitable treatment intervals for patients may help reduce treatment burden.

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Short-Term Outcomes of Intravitreal Conbercept for Diabetic Macular Edema in Real-World Setting

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Purpose: To determine the visual and anatomical outcomes of intravitreal conbercept for center-involving diabetic macular edema (DME).

Methods: A total of 55 consecutive DME patients who had at least 6 months' follow-up receiving pro-re-nata conbercept treatment between June 2015 and June 2018 were evaluated. Visual acuity (VA) and central macular thickness (CMT) at baseline, 3 months and 6 months after initiating treatment were collected.

Results: The mean VA improved significantly from 42.5 ± 17.6 letters at baseline to 46.6 ± 15.8 letters 6 months following treatments ($P < 0.001$). The CMT decreased from 438.22 ± 105.36 μm at baseline to 295.51 ± 46.87 μm at 6 months ($P < 0.001$). Patients underwent a mean of 2.5 injections during the follow-up of 6 months. No severe ocular or systemic adverse events were observed.

Conclusions: This real-life practice proved intravitreal conbercept to be an effective and safe treatment for patients with DME over 6 months of follow-up.

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Venue: Ballroom 201

Timing of Complete Absence of Polypoidal Lesions Following Fixed Dosing Aflibercept Treatments in Polypoidal Choroidal Vasculopathy

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Purpose: To explore the timing of complete absence of polypoidal lesions on indocyanine green angiography (ICGA) following intravitreous aflibercept treatments in polypoidal choroidal vasculopathy (PCV).

Methods: Eyes with newly diagnosed PCV, by EVEREST criteria, between April 2016 and December 2017 were included. Eligible eyes received fix-dosing aflibercept injections (3 monthly injections then every 8 weeks) for 12 months. ICGA was performed at baseline and every 8 weeks (week 8, 16, 24, 32, 40, 48,

52). Two ophthalmologist graders reviewed ICGA at each visit and determined polypoidal status i.e., complete regression (absence of polypoidal lesions), incomplete regression (partial absence of polypoidal lesions), or no regression (no change on ICGA). Final decision made by agreements of both graders with open adjudications.

Results: Among 45 study eyes, results of 34 eyes with complete 1-year follow-up were presented here. Of 34 eyes (32 participants; 100% Thai, 56% female, mean [SD] age 65 [± 7.5] years) included serous (21%), serosanguinous/exudative (41%), and hemorrhagic (38%) maculopathies. Baseline number of polypoidal lesions on ICGA included: >5 (72%); 2-5 (25%), and 1 (3%). The median duration of complete regression was 2 months (interquartile range: 2 to 5). Rate of complete regression at 2, 4, 6, 12 months was 42%, 49%, 58%, and 70%. At 1 year, 26% had partial regression and 3% had no regression.

Conclusions: Following aflibercept treatment without PDT, most eyes with PCV had complete regression of polypoidal lesions on ICGA before 6 months, few had no regression at 1 year. These findings support consideration of aflibercept for PCV initially without PDT.

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Treatment Outcomes and Predictive Factors in Macular Edema Secondary to Central Retinal Vein Occlusion with Poor Baseline Visual Acuity

*First Author: Deven **DHURANDHAR***
*Co-Author(s): Jay **CHHABLANI**, Niroj **SAHOO**, Sumit **SINGH***

Purpose: To study the treatment outcome and predictors of anti-VEGF monotherapy in naïve eyes with macular edema secondary to central retinal vein occlusion (CRVO) with poor baseline visual acuity (VA) (worse than 20/320) at 12 months.

Methods: In a single-center retrospective study, 26 eyes with the above-mentioned inclusion criteria were retrospectively reviewed. Demographic details, duration of the disease, VA, optical coherence tomography parameters including central macular thickness (CMT), inner layer hyper-reflectivity at baseline, 3 months and 12 months along with number of injections were collected. Univariate and multivariate regression was used to find predictors for final visual outcome.

Results: The mean baseline VA and final VA was 1.85 ± 0.4 logMAR and 1.76 ± 1.2 logMAR. The mean CMT at baseline and 12 months was 991.7 ± 378.4 and 429 ± 313.1 respectively. The mean number of injections was 2.38 ± 1.4. The mean change in VA was 0.087 ± 1.1, with 12 eyes improved more than 3 lines. Factors, such as age (P = 0.22), duration of disease (P = 0.74), severity of inner retinal hyper-reflectivity at baseline (P = 0.8), CMT at baseline (P = 0.76), number of injections (P = 0.51) did not correlate with the visual outcome after 12 months on univariate analysis. Only baseline best-corrected visual acuity (BCVA) (P = 0.03) and BCVA at 3 months (P = 0.01) were found to correlate with final visual outcome at 12 months and was found to be significant.

Conclusions: CRVO patients with poor initial visual acuity (worse than 20/320) had a good visual outcome with intravitreal anti-VEGF monotherapy. Baseline BCVA and optical coherence tomography features are not predictors of visual outcome, however, BCVA at 3 months can act as a prognostic indicator of visual acuity at 12 months.

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Yellow (577 nm) Micropulse Laser Versus Half-Dose Verteporfin Photodynamic Therapy in Eyes with Chronic Central Serous Chorioretinopathy: Results of the Pan-American Collaborative Retina Study (PACORES) Group

*First Author: Lihteh **WU***
*Co-Author(s): Maria **BERROCAL**, Jose **ROCA**, Francisco **RODRIGUEZ**, Jans **FROMOW-GUERRA***

Purpose: To compare the functional and

anatomical outcomes of eyes with chronic central serous chorioretinopathy treated with yellow micropulse (MP) laser versus half-dose verteporfin photodynamic therapy (PDT).

Methods: This was a multicenter, retrospective comparative study of 92 eyes treated with yellow MP laser and 67 eyes treated with half-dose PDT.

Results: In the MP group, at 12 months of follow-up, the mean best-corrected visual acuity (BCVA) improved from the logarithm of the minimum angle of resolution (logMAR) of 0.41 ± 0.27 at baseline to 0.21 ± 0.26 ($P < 0.0001$), 48.9% (45/92) of eyes had an improvement of ≥3 lines of BCVA from baseline, 48.9% (45/92) of eyes remained within 2 lines of baseline BCVA, and only 2.2% (2/92) of eyes lost ≥3 lines of BCVA from baseline. In the PDT group, at 12 months of follow-up, the mean BCVA changed from logMAR of 0.50 ± 0.34 at baseline to 0.47 ± 0.34 ($P = 0.89$), 19% (13/67) of eyes had an improvement of ≥3 lines of BCVA from baseline, 73% (49/67) of eyes remained within 2 lines of baseline BCVA, and 7% (5/67) of eyes lost ≥3 lines of BCVA from baseline. There were no adverse events attributable to the yellow MP laser treatment. One eye in the PDT group developed choroidal neovascularization, which was treated with 3 intravitreal bevacizumab injections.

Conclusions: Both PDT and MP are effective in restoring the macular anatomy. In places where PDT is not available, yellow MP laser may be an adequate treatment alternative.

Dec 15, 2018 (Sat) 10:30 - 12:00

Venue: Ballroom 201

Ten-Year Outcome of Polypoidal Choroidal Vasculopathy and Typical Neovascular Age-Related Macular Degeneration

*First Author: Young Joo **PARK***
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Purpose: To compare clinical characteristics and long-term visual outcome of patients with polypoidal choroidal vasculopathy (PCV) and typical neovascular age-related macular degeneration (nAMD) in the real-world setting.

Methods: The medical records of patients diagnosed with nAMD including PCV at Seoul National University Bundang Hospital were reviewed retrospectively. Basic clinical characteristics including age, sex, and underlying diseases and annual changes in best-corrected visual acuity (BCVA) were collected.

Results: A total of 193 eyes of 177 patients with PCV and 596 eyes of 518 patients with typical nAMD were included. The mean follow-up period of total patients was 4.05 ± 2.67 years. In both PCV and typical nAMD group, treatment strategy had changed from 'PDT' to 'anti-VEGF injection' or 'PDT combined with anti-VEGF injection' since 2006. Onset age were younger in the PCV group than in the typical nAMD group (67.4 ± 7.9 vs 71.9 ± 8.1, $P < 0.001$). BCVA was better in the PCV group than the typical nAMD group at the initial visit (0.56 ± 0.51 vs 0.78 ± 0.60, $P < 0.001$) and at the final visit (0.69 ± 0.71 vs 1.01 ± 0.76, $P < 0.001$). Both groups showed initial visual improvement followed by gradual decline up to 10 years. The BCVA change of the PCV group showed the greater initial improvement and lesser deterioration than the nAMD group controlling effects of age, sex, and initial BCVA.

Conclusions: Long-term visual acuity gradually deteriorated in both the PCV and typical nAMD group in the real-world setting, but the PCV group showed better visual outcome than the nvAMD group. The change of treatment strategy from PDT to anti-VEGF injections improved the visual outcome in both groups.

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Venue: Ballroom 201

A 10-Year Incidence of Progression from Intermediate to Exudative Age-Related Macular Degeneration and Its Risk Factors: Bundang AMD Cohort Study Report 1

*First Author: Kwang Sic **JOO***
*Co-Author(s): Kyu Hyung **PARK**, Sang Jun **PARK**, Se Joon **WOO***

Purpose: To investigate the 10-year incidence of progression from intermediate age-related macular degeneration (AMD) to exudative form and to identify genetic and environmental factors influencing the progression in Korean population.

Methods: This was a retrospective cohort study of 632 eyes of 418 patients aged 50 years or older with intermediate AMD. The incidence of exudative AMD was assessed from fundus photographs and optical coherence tomography (OCT) annually. Lifestyle variables, habitual dietary intake and genotyping data (CFH rs800292 and rs1061170, ARMS2 rs10490924) were analyzed at first visit. Cumulative incidence of exudative change was estimated using the Kaplan-Meier analysis and risk factors were analyzed by univariate and multivariate Cox regression models.

Results: The mean follow-up period was 3.99 ± 2.85 years. Cumulative incidence of progression to exudative AMD was 5.6% at 2 years, 14.8% at 5 years, 20.1% at 7 years and 28.4% at 10 years. In a univariate Cox analysis, exudative change of intermediate AMD was positively correlated with age, male sex, family history, pre-existing exudative AMD in the opposite eye, and smoking. Vitamin supplement, green tea intake, hormone replacement therapy and rs800292 in CFH showed the protective effect on the AMD progression In a multivariate Cox analysis, pre-existing exudative AMD in the opposite eye (HR = 3.498, P < 0.001) was identified as a significant risk factor and green tea intake (HR = 0.573, P = 0.029) was a protective factor for exudative progression.

Conclusions: The long-term progression rate from intermediate to exudative AMD in the Korean population was 2.8% per year, which is comparable to that of the Caucasians. Among modifiable factors, green tea intake shows a protective effect on exudative change.

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Venue: Ballroom 202

A Novel Variant in BEST1 Gene in a Chinese Family with Autosomal Recessive Bestrophinopathy

*First Author: Panpan **YE***

Purpose: Autosomal recessive bestrophinopathy (ARB) is a retinal disorder caused by *BEST1* mutation with autosomal recessive inheritance. In this study, we aimed to identify the novel mutation of *BEST1* gene in a consanguineous Chinese family with ARB.

Methods: Ophthalmic examinations were performed on affected patients with ARB in a consanguineous family. Target capture sequencing was initially performed to screen causative mutations in known retinal disease-causing loci. Whole genome sequencing (WGS) was applied for identifying novel disease-causing variants. RT-PCR and Sanger sequencing were performed to evaluate the splicing-altering effect of identified *BEST1* variants.

Results: Patients from this family are featured by low vision, subretinal fluid, macular edema, and hyperopia with coincidental angle closure. WGS identified a rare variant that affect mRNA slicing of *BEST1* gene. RT-PCT and Sanger sequencing confirmed the variant.

Conclusions: Our results found a novel disease-associated variant in *BEST1* in a consanguineous Chinese family with ARB. Our data expand the mutation spectrum of the *BEST1* gene and further support the broad phenotypic variability observed clinically.

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Venue: Ballroom 202

A Single-Arm, Single-Dose Study to Evaluate the Effect of Intravitreal Dexamethasone Implant on Hard Exudates of Diabetic Macular Edema

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Purpose: To evaluate the efficacy of intravitreal dexamethasone implant (Ozurdex) for hard exudate (HE) of diabetic macular edema (DME).

Methods: Patients having DME and HE were recruited in 8 tertiary medical centers. All study eyes received intravitreal dexamethasone implant after screening evaluation and at 4-month or 5-month visit. From 8 to 11 months, third injection was performed if needed. Fundus photography (FP) and optical coherence tomography (OCT) scan were taken every visit. HE area within 1500 μm of the fovea (HE 1500) and within arcade (HE macula) were detected from FP using ImageJ software semi-automatically.

Results: A total of 35 patients finished study finally. Of them, 24 patients (69%) underwent Ozurdex injection 3 times. The average (SD) HE 1500 has decreased from 0.160 (0.253) mm^2 at first visit to 0.031 (0.829) mm^2 at last visit (80% decrease, P = 0.001). HE 1500 diminished in 29 of 30 (97%) finally. HE macula was 1.403 mm^2 at first visit and 84% of area resolved to 0.211 mm^2 finally (P = 0.001). The average (SD) central macular thickness (CMT) were 455.8 (23.6) μm and 366.8 (31.1) μm at first and last visit respectively (P = 0.009). Twelve of 35 (34.3%) patients showed CMT of less than 290 μm finally. Visual acuity was 49.6 (18.5) letters initially and increased to 53.8 (20.4) letters (difference 4.2 letters) (P = 0.014). Visual acuity was correlated with CMT and HE 1500 in multivariable analysis.

Conclusions: Using intravitreal dexamethasone implant 2 times fixed dosing once as needed regimen, HE area in DME decreased continuously for 1 year.

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Anti-Vascular Endothelial Growth Factor A/ Anti-Angiopoietin-2 Bispecific Antibody RG7716 in Diabetic Macular Edema: Efficacy and Safety Results from the Phase 2 BOULEVARD Randomised Clinical Trial

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*Co-Author(s): Meike **PAULY-EVERS**, Shamil **SADIKHOV**, Jayashree **SAHNI**, Piotr **SZCZESNY**, Rober **WEIKERT***

Purpose: RG7716 is the first bispecific antibody designed for intraocular use, and simultaneously binds and neutralizes angiopoietin-2 and vascular endothelial growth factor A (VEGF-A). The efficacy and safety of RG7716 versus ranibizumab in diabetic macular edema (DME) was evaluated.

Methods: The phase 2, prospective, multicenter BOULEVARD trial (NCT02699450) recruited patients with center-involving DME, who received monthly intravitreal 0.3 mg ranibizumab, or 1.5 mg or 6.0 mg RG7716 for 20 weeks, followed by a 16-week off-treatment observation period. The primary efficacy outcome measure was mean change in best-corrected visual acuity (BCVA) from baseline to week 24 in treatment-naïve DME patients.

Results: A total of 168 treatment-naïve and 61 previously anti-VEGF treated patients were enrolled. In treatment-naïve patients, BCVA improved in all arms, with 6.0 mg RG7716 resulting in statistically significantly greater BCVA gain than ranibizumab (+3.6 letters, P = 0.03). At week 24, the proportion of patients gaining ≥15 letters increased by 32% with 6.0 mg RG7716 relative to ranibizumab, and CST improved in all arms. The proportion of patients experiencing a ≥2 step diabetic retinopathy severity score improvement was greater with 1.5 mg RG7716 (28%) and 6.0 mg RG7716 (39%) than with ranibizumab (12%), as were the proportions maintaining disease stability in the off-treatment period. RG7716 was well-tolerated, with a safety profile comparable with ranibizumab.

Conclusions: BOULEVARD met its primary

endpoint, with 6.0 mg RG7716 demonstrating clinically meaningful and statistically significant greater visual acuity gains versus ranibizumab in patients with DME. These results support further investigation of the efficacy, safety and durability of RG7716.

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Venue: Ballroom 201

Assessing Relationship between Plasma 25-Hydroxyvitamin D (25-OHD) Levels and Age-Related Macular Degeneration in Yogyakarta, Indonesia

First Author: Supanji ***SUPANJI***
Co-Author(s): Angela ***AGNI****, Dian* ***CATURINI****, Muhammad* ***SASONGKO****, Firman* ***WARDHANA****, Tri Wahyu* ***WIDAYANTI***

Purpose: Plasma 25-hydroxyvitamin D (plasma 25-OHD) have immunomodulatory and antiangiogenic properties suggesting a biologically plausible role in the pathogenesis of age-related macular degeneration (AMD). This study was conducted to determine the relationship between plasma 25-OHD levels and the cases of AMD disease.

Methods: This was a case-control ongoing study involving 13 AMD patients and 12 matched non-AMD (healthy) subjects. All subjects were examined by the vitreoretinal specialist to have ophthalmoscopy, fundus photograph, and ocular coherence tomography (OCT) examination for the diagnosis of AMD. We collected the information related to medical history along with blood samples. Plasma 25-OHD were examined using DRG Elisa kit. The data were analyzed statistically using Stata/IC 13.0 software to determine the odds ratios (ORs) with 95% confidence intervals (CIs) for the association of plasma 25-OHD and AMD.

Results: The levels of plasma 25-OHD (mean ± SD) were higher in AMD patients (35.36 ± 12.7 ng/mL) compared to non-AMD subjects (28.21 ± 16.8 ng/mL; P = 0.247). The levels of 25-OHD were classified into 3 groups (sufficient ≥30 ng/mL, insufficient 20-30 ng/mL, and deficient 10-20 ng/mL. Most AMD patients have sufficient level of 25-OHD, while non-AMD patients have an insufficient level.

Conclusions: There was an inverse relationship between plasma 25-OHD and AMD in the population of Yogyakarta, Indonesia. The study is still ongoing involving more subjects to confirm the correlation between vitamin D and AMD further.

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Venue: Ballroom 203

Association of Smoking with Diabetic Retinopathy: A Study on 300 Diabetic Patients

First Author: Shaila ***SHARMIN***
Co-Author(s): Syed ***JABED***

Purpose: The role of smoking on development and progression of retinopathy has not been clearly described. Although most previous studies have failed to demonstrate significant relationship between smoking and diabetic retinopathy, some recent studies have proved some association. This study was done to assess the relationship between smoking and the presence and severity of diabetic retinopathy in our region.

Methods: This observational study was conducted among diabetic patients attending Chittagong Eye Infirmary & Training Complex (CEITC). Epidemiological data and other information were recorded in predesigned case record form. Patients' history of smoking was obtained. All patients underwent detailed eye examination and fundus photography to diagnose the presence and severity of diabetic retinopathy. Data were analyzed using SPSS 20.

Results: A total of 300 diabetic patients were enrolled and 31% (n = 94) had a history of smoking. 5% of female smoked in contrast to 54% of male. Retinopathy was identified in 57% (n = 172) of patients. Smokers had significantly higher incidence of retinopathy than non-smokers (68% vs 52%). Severe non-proliferative retinopathy and proliferative retinopathy was found in 17% and 14% of smokers and 7% and 12% of non-smokers respectively. Higher incidence of maculopathy were also observed

in the smoker group (51% vs 32%).

Conclusions: Although the association of smoking with diabetic retinopathy has still been a controversial and debatable issue, this study showed significant positive relationship. Further study considering other established risk factors should be commenced for better understanding and future hypothesis.

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Venue: Ballroom 202

Attenuation of Choroidal Neovascularization by Dietary Intake of ω-3 Long-Chain Polyunsaturated Fatty Acids and Lutein in Mice

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Purpose: Dietary ω-3 long-chain polyunsaturated fatty acids (LCPUFAs) and the lutein each protect against age-related macular degeneration (AMD). We examined the effects of ω-3 LCPUFAs and lutein supplementation in a mouse model of AMD.

Methods: Mice were fed a diet enriched in ω-3 LCPUFAs 2 weeks before disease induction, and received lutein via an intragastric cannula 1 week before disease, induction of choroidal neovascularization (CNV) by laser photocoagulation. The area of CNV was evaluated in choroidal flat-mount preparations. The concentrations of cytokines and chemokines were determined with a multiplex assay system. Reactive oxygen species (ROS) in chorioretinal lesions were detected by staining with dihydroethidium, and expression of NADPH oxidase 4 (Nox4) in the retina was detected by immunohistofluorescence and immunoblot analyses.

Results: The area of CNV was significantly reduced in mice fed with ω-3 LCPUFAs or lutein compared with those fed with the control diet, and it was additively reduced in those fed with both ω-3 LCPUFAs and lutein. The concentrations of various inflammatory mediators were reduced in the retina and choroid of mice fed with ω-3 LCPUFAs or lutein, but there was no apparent synergistic effect. ROS generation and Nox4 expression in the retina were attenuated by ω-3 LCPUFAs and lutein in a synergistic manner.

Conclusions: Dietary intake of ω-3 LCPUFAs and lutein attenuated CNV in a synergistic manner and in association with suppression of ROS production and Nox4 expression. Dietary supplementation with both ω-3 LCPUFAs and lutein warrants further study as a means to protect against AMD.

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Venue: Ballroom 201

Choriocapillaris Changes by OCT Angiography after Photodynamic Therapy for Chronic Central Serous Chorioretinopathy

*First Author: Sungrae **NOH***
*Co-Author(s): Eung-Suk **KIM**, Kiyoung **KIM**, Seung Young **YU***

Purpose: To evaluate the choriocapillaris using optical coherence tomography (OCT) angiography after photodynamic therapy for chronic central serous chorioretinopathy.

Methods: A retrospective study was performed on 11 patients who underwent photodynamic therapy with chronic serous chorioretinopathy from May 2016 to December 2017. The central retinal thickness and central choroidal thickness were measured by OCT before the photodynamic therapy and at 1 week, 1 month, and 3 months after the photodynamic therapy. Changes of flow void in choriocapillaris layer was calculated using the Image J.

Results: The visual acuity (logMAR) after photodynamic therapy significantly improved from 0.21 ± 0.15 to 0.16 ± 0.15, and the central retinal thickness significantly decreased from 391.7 ± 88.9 μm to 269.1 ± 86.5 μm and the central choroidal thickness significantly decreased from 426.8 ± 44.6 μm to 407.5 ± 40.9 μm. Flow voids of choriocapillaris layer were 37.6 ± 7.41% before photodynamic therapy and significantly increased to 39.5 ± 5.89% one week after photodynamic therapy.

However, there was no significant difference between pre-therapy and post-therapy 1 month (36.1 ± 6.2%) and 3 months (36.4 ± 8.35%). Wide photodynamic therapy area showed a significant correlation with flow voids, but central choroidal thickness before treatment did not show any significant correlation with flow voids.

Conclusions: Perfusion of choriocapillaris layer showed decrease 1 week after PDT, but recovered after 1 month. Degree of perfusion decrease was significantly correlated with PDT area.

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Venue: Ballroom 201

Clinical Outcomes and Treatment Response of Polypoidal Choroidal Vasculopathy According to Choroidal Vascular Morphology

*First Author: Jiwon **BAEK***
*Co-Author(s): Won Ki **LEE***

Purpose: To determine the impact of choroidal vascular morphology of polypoidal choroidal vasculopathy (PCV) on clinical outcomes.

Methods: A retrospective cohort study was conducted. Sixty-six eyes with PCV were subdivided according to choroidal vascular morphology on OCT en face images: diffuse (n = 26) vs focal (n = 40) pachyvessels. All patients were treated with intravitreal ranibizumab pro re nata with or without rescue photodynamic therapy (PDT) during the 12-month follow-up period. The best-corrected visual acuity (BCVA), central macular thickness (CMT), and response to treatments were compared between groups.

Results: The mean BCVA at baseline, 3, 6, and 12 months differed between groups (P = 0.312, 0.011, 0.026, and 0.046) whereas the mean CMT did show significant difference between groups (P = 0.889, 0.853, 0.431, and 0.478). The response rate to IVR did not differ between groups (85% vs 73%, P = 0.251). Among responders, the number of treatments during the 12 months was lower in the diffuse group (4.86 vs 6.14, P = 0.33). Rescue PDT was required in 15 eyes (5 diffuse and 10 focal). The injection-free period after PDT was longer in the diffuse group (23.6 months vs 7.0 months, P = 0.018).

Conclusions: PCV eyes with diffuse pattern of pachyvessels showed better visual outcome during the 12-month follow-up period and longer disease-free period after rescue PDT.

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Venue: Ballroom 202

Comparison of Intravitreal Ziv-Aflibercept and Bevacizumab Monotherapy in Treatment-Naïve Polypoidal Choroidal Vasculopathy

*First Author: Jay **CHHABLANI***
*Co-Author(s): Niroj **SAHOO**, Sumit **SINGH**, Nallamasa **ROHIT***

Purpose: To report the visual and anatomical outcomes of intravitreal ziv-aflibercept (IVZ) and bevacizumab (BVZ) monotherapy in treatment-naïve polypoidal choroidal vasculopathy (PCV).

Methods: This was a retrospective case series of 16 eyes (8 eyes each in IVZ and BVZ groups). The study period was from January 2016 to March 2018. The inclusion criteria were treatment-naïve PCV patients who were treated with either IVZ or BVZ monotherapy on pro-re-nata (PRN) protocol and followed up monthly for 6 months. The change in best-corrected visual acuity (BCVA), central macular thickness (CMT) and pigment epithelial detachment (PED) height were measured at baseline and 6 months.

Results: A total of 16 eyes were studied. IVZ group had an improvement in BCVA by 0.15 logMAR (approximately 1.5 lines) at 6 months while BVZ group had a reduction in BCVA by 0.21 logMAR (approximately 2 lines) (P = 0.027). Five and 1 patients in IVZ and BVZ group respectively had ≥5 letters gain of BCVA respectively. The IVZ group had significant reduction of PED height (P = 0.048) while the change in CMT was not significant at 6 months (P = 0.681). The mean number of injections (2.87 ± 0.83 in IVZ and 2.25 ± 0.89 BVZ group; P = 0.168) and longest treatment-free interval (3.00 ± 2.20 months in IVZ and 2.12 ± 1.96

months in BVZ group; P = 0.41) were not significantly different.

Conclusions: The visual and anatomical outcomes in terms of PED reduction in treatment-naïve PCV patients were better in IVZ group. IVZ monotherapy is a viable, cost-effective alternative in these patients with good safety profile.

Dec 15, 2018 (Sat) 13:40 - 15:10

Venue: Ballroom 203

Comparison of Optical Coherence Tomography Angiographic Manifestations between Untreated Polypoidal Choroidal Vasculopathy and Untreated Exudative Age-Related Macular Degeneration in a Chinese Population

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

Purpose: To compare the qualitative and quantitative features between untreated polypoidal choroidal vasculopathy (PCV) and untreated exudative age-related macular degeneration (eAMD) using optical coherence tomography angiography (OCTA).

Methods: Images of OCTA were obtained using Optovue, Fremont CA, USA. Quantitative measurements and morphologic features were analyzed, including retina thickness (ILM-RPE), subfoveal choroid thickness, vessel density, FAZ dimensions and morphology of NV lesion.

Results: A total of 23 eyes from 23 PCV subjects and 20 eyes from 20 eAMD subjects were included. The mean age of PCV was 66.32 ± 6.72 years, and that of eAMD was 71.5 ± 10.42 years. The logarithm of the minimal angle of resolution (logMAR) BCVAs of PCV and eAMD were 0.77 ± 0.43 and 0.86 ± 0.57, respectively. CRT was statistically significantly different between PCV and eAMD ($P < 0.05$). The thickness of SFCT in eAMD was statistically significantly thinner than PCV ($P < 0.05$). Vessel density and FAZ dimensions were not statistically significantly different between PCV and eAMD. Cross-sectional OCTA showed a diffuse hyperflow signal in all 20 (100.0%) eyes with eAMD, whereas a localized subretinal pigment epithelium hyperflow signal was detected in 18/23 (78.3%) eyes with PCV. En face OCTA detected a nodular hyperflow signal in 12/23 (52.2%) eyes with PCV, whereas we did not find the nodular hyperflow signal in eAMD.

Conclusions: OCTA is a new, noninvasive imaging modality that can be used to perform qualitative and quantitative analyses of NV lesions. There are some different manifestations on OCTA between PCV and eAMD. In the future, OCTA may provide biomarkers of distinguish between PCV and eAMD.

Dec 15, 2018 (Sat) 10:30 - 12:00

Venue: Ballroom 201

Comparison of Safety and Efficacy between the Use of Micropulse and End-Point Management Laser Therapy in the Treatment of Central Serous Chorioretinopathy

*First Author: Mahdi **ROSTAMIZADEH***
*Co-Author(s): Victor **GONZALEZ***

Purpose: To directly compare the efficacy of Micropulse 577 from Iridex and End-Point Management (EPM) 532 from Pascal for the treatment for central serous chorioretinopathy (CSR).

Methods: This was a retrospective chart study including 27 patients who initially presented with CSR. Patients were divided into 3 groups: 10 patients were put under observation; 10 patients were treated with EPM laser therapy and 7 patients were treated with Micropulse. Patients treated with EPM were initially titrated to a faint burn with the EPM software turned off, this was considered 100% pulse energy, treatment was then applied over the area of serous detachment at 30% pulse energy. For patients treated with Micropulse, they were initially titrated to a faint burn with Micropulse on and full treatment was applied at area of serous detachment at 50% of titration power.

Results: Patients treated with Micropulse and EPM laser therapy (6.7 weeks and 12 weeks respectively) had a much quicker resolution or subretinal fluid compared to the observation

group (29 weeks) (P = 0.167). Patients treated with Micropulse laser therapy had the highest change in central macular thickness at 282 microns compared to the changes in EPM 140 microns and observation 277 (P > 0.5). Visual acuity showed improvement or remaining stable in all patients (P > 0.5). Review of optical coherence tomography and autofluorescence in all patients showed no signs of retinal scarring.

Conclusions: The time of resolution was faster in patients treated with subthreshold laser therapies, however these results were not statistically significant due to small sample size. Subthreshold laser therapy provides a safe and effective alternative to the resolution of CSR.

Dec 15, 2018 (Sat) 08:30 - 10:00

Venue: Ballroom 202

Correlation of Systemic Arterial Stiffness with Changes in Retinal and Choroidal Microvasculature in Type 2 Diabetes

*First Author: Mirinae **KIM***
*Co-Author(s): Young-Hoon **PARK***

Purpose: To assess whether systemic arterial stiffness, indicated by cardio-ankle vascular index (CAVI), is related to changes in the microvasculature of the retina and choroid in diabetes mellitus (DM).

Methods: This retrospective cohort study included 113 patients with a confirmed diagnosis of type 2 DM. Among them, 18 patients did not have diabetic retinopathy (DR), 71 had non-proliferative DR (NPDR), and 24 had proliferative DR (PDR). Pearson's correlation test was used to investigate the associations between CAVI and retinal and choroidal vascular parameters.

Results: The mean age at enrollment was 59.0 ± 8.9 years, and 46 (40.71%) were male. The mean CAVI was 7.58 ± 1.41 in no DR, 8.72 ± 1.47 in NPDR, and 8.43 ± 1.25 in PDR group (P = 0.012). Of the 113 eyes, 42 (37.2%) were classified as abnormal CAVI group (CAVI ≥ 9). This group had significantly higher cardiac autonomic neuropathy risk index score (P = 0.018), decreased central choroidal thickness (P = 0.002), and decreased choroidal vascularity index (CVI) (P = 0.041). Deep foveal avascular zone area was higher in the abnormal CAVI group (P = 0.005). After adjustment for possible confounding factors, CAVI showed negative correlation with the CVI (r = –0.247, P = 0.013).

Conclusions: There was a significant correlation between arteriosclerosis and choroidal vascular changes in DR. We suggest prompt ophthalmic evaluation in patients with systemic arteriosclerosis. If the ophthalmologist notes advanced DR, the patient should be referred to a cardiovascular clinic for detailed evaluation of systemic arteriosclerosis.

Dec 15, 2018 (Sat) 08:30 - 10:00

Venue: Ballroom 202

Depression and Anxiety of Patients with Neovascular Age-Related Macular Degeneration Refractory to Anti-VEGF

*First Author: Jin Young **KIM***
*Co-Author(s): Dong Yoon **KIM**, Eun Kyoung **LEE**, Han Gyul **YOON***

Purpose: To compare the degree of depression and anxiety in neovascular age-related macular degeneration (nAMD) according to the response to anti-VEGF.

Methods: This retrospective, interventional, comparative study included 90 patients with nAMD. The patients were divided into 3 groups (group A: 30 patients, good response to anti-VEGF; group B: 30 patients, resistance to anti-VEGF; group C: 30 patients, normal control group). Resistance was defined as having multiple recurrences or persistence of IRF or SRF. The Korean version of the Beck Depression Inventory (BDI) and the Beck Anxiety Inventory (BAI) questionnaire scores were compared.

Results: BDI in group A, B, and C were 10.9 ± 4.3, 14.8 ± 5.2, 8.2 ± 3.7, respectively. BAI in group A, B, and C were 5.8 ± 5.6, 8.3 ± 4.4, 4.8 ± 3.6. BDI and BAI in nAMD were higher than those in the control group. BDI and BAI in group B were significantly higher than those in group A.

Conclusions: This study provides evidence

that refractory nAMD patients are more depressed and anxious. Medical treatment for refractory nAMD as a clinician is important, but psychological considerations are also more needed. It is necessary to increase the satisfaction and compliance of treatment by emotional support and making concrete communication about the uncertainty of the treatment.

Dec 15, 2018 (Sat) 13:40 - 15:10

Venue: Ballroom 203

Development of Macular Atrophy in Patients with Neovascular Age-Related Macular Degeneration Treated with Ranibizumab or Aflibercept Using a Treat-and-Extend Regimen: Primary Results from the RIVAL Study, a Randomized Clinical Trial

*First Author: Mark **GILLIES***
*Co-Author(s): Jennifer **ARNOLD**, Robyn **GUYMER**, Alex **HUNYOR**, Ian **MCALLISTER**, Francois **PECHEUR***

Purpose: To compare the development of macular atrophy (MA) in patients treated for neovascular age-related macular degeneration (nAMD) with ranibizumab 0.5 mg (RBZ) and aflibercept 2.0 mg (AFL) using a treat-and-extend regimen.

Methods: The RIVAL was a 24-month, partially masked, multicenter study that randomized 281 eyes (1:1) to RBZ or AFL arms. The primary endpoint was the mean change in square-root area of MA at month 24 (M24).

Results: A total of 278 patients (RBZ, n = 141; AFL, n = 137) were included in the analysis. Of these, 225 (81%) patients (117 [83%] RBZ; 108 [79%] AFL) completed the study. Baseline characteristics were comparable. From baseline to M24, the proportion of patients with MA increased from 7% (10/141) to 37% (43/117) for RBZ and from 6% (8/137) to 32% (35/108) for AFL. The mean ± SD square-root area of MA increased from 0.02 ± 0.10 mm (n = 140) to 0.40 ± 0.73 mm (n = 114) and from 0.05 ± 0.23 mm (n = 137) to 0.35 ± 0.65 mm (n = 106), respectively. The mean ± SD injections over 24 months was 17.7 ± 6.4 for RBZ and 17.0 ± 6.3 for AFL. With random effect mixed modeling, the mean (95% CI) change in square-root area of MA from baseline at M24 was 0.36 mm (0.27, 0.45) for RBZ and 0.28 mm (0.19, 0.37) for AFL (P = 0.24). A survival analysis of patients without MA at baseline found that respectively 27.5% (36/131) and 23.3% (30/129) of these patients in the RBZ and AFL arms developed MA within 24 months (hazard ratio [95% CI]=1.08 [0.66, 1.77]; P = 0.75).

Conclusions: The RIVAL study found no significant difference between RBZ and AFL in the development of MA in patients with nAMD over 24 months, with a similar number of injections.

Dec 15, 2018 (Sat) 13:40 - 15:10

Venue: Ballroom 203

Dexamethasone Implant for Diabetic Macular Edema in Naive Compared to Refractory Eyes. The International Retina Group Real-Life 24-Month Multicentre (IRGRel-DEX) Study

*First Author: Adrian **FUNG***
*Co-Author(s): Catharina **BUSCH**, Matias **IGLICKI**, Anat **LOEWENSTEIN**, Mali **OKADA**, Dinah **ZUR***

Purpose: To investigate the real-life efficacy and safety of intravitreal dexamethasone (DEX) implants for diabetic macular edema (DME) over 24 months, comparing eyes that were treatment-naive with eyes refractory to anti-VEGF treatment.

Methods: This was a multicenter international retrospective study. Primary outcome measures were the change in best-corrected visual acuity (BCVA) and central subfield thickness (CST) at 24 months of patients who received DEX implants. Safety data (intraocular pressure rise and cataract surgery) were recorded.

Results: A total of 130 eyes from 125 patients were included. Baseline BCVA and CST were similar for naive (n = 71) and refractory eyes (n = 59). Both groups improved significantly in vision after 24 months (P < 0.001). However, naive eyes gained significantly more vision than refractory eyes (+11.3 ± 10.0 versus 7.3 ± 2.7 letters, P = 0.01) and were more like to

gain ≥10 letters (OR 3.31, 95% CI 1.19-9.24, P = 0.02). At 6, 12 and 24 months, CST was significantly decreased compared to baseline in both naive and refractory eyes. CST was lower in naive compared to refractory eyes at 12 months (CST 268 ± 60 versus 326 ± 131 microns, P = 0.01), but by 24 months this was no longer statistically significant (CST 279 ± 61 versus 313 ± 125 microns, P = 0.10).

Conclusions: Over a follow-up of 24 months, vision improved in DME eyes after treatment with dexamethasone implants, both in eyes that were treatment naive and eyes refractory to anti-VEGF treatment; however improvement was greater in naive eyes.

Dec 15, 2018 (Sat) 08:30 - 10:00

Venue: Ballroom 202

Early Recurrent Hemorrhage in Submacular Hemorrhage Secondary to Retinal Angiomatous Proliferation (Type 3 Neovascularization): Incidence and Influence on Visual Prognosis

*First Author: Jae Hui **KIM***

Purpose: To evaluate the incidence of early recurrent hemorrhage in submacular hemorrhage secondary to retinal angiomatous proliferation (RAP) and its influence on visual prognosis.

Methods: This retrospective study included 32 eyes with submacular hemorrhage secondary to RAP that underwent anti-vascular endothelial growth factor (VEGF) therapy. The eyes exhibiting an increase in the extent of hemorrhage within 6 months after hemorrhage development were included in the early recurrent hemorrhage group, and the remaining eyes were included in the non-early recurrent hemorrhage group. The best-corrected visual acuity (BCVA) measured at the time of hemorrhage development and at 12 months was compared between the 2 groups.

Results: During the follow-up period, 8 eyes underwent vitrectomy to clear vitreous hemorrhage, and the remaining 24 eyes underwent anti-VEGF monotherapy. In the early recurrent hemorrhage group (n = 12), the mean logarithm of the minimal angle of resolution BCVA at the time of hemorrhage development and after 12 months was 1.17 ± 0.40 (Snellen equivalents: 20/295) and 2.35 ± 0.59 (20/4477), respectively. In the non-early recurrent hemorrhage group (n = 20), the corresponding values were 1.07 ± 0.43 (20/234) and 1.44 ± 0.71 (20/550), respectively. The BCVA at 12 months was significantly worse in the early recurrent hemorrhage group (P = 0.003) despite comparable BCVA at diagnosis between the 2 groups (P = 1.000).

Conclusions: Early recurrent hemorrhage was noted in 37.5% of eyes with submacular hemorrhage secondary to RAP and was closely associated with a poor prognosis.

Dec 15, 2018 (Sat) 13:40 - 15:10

Venue: Ballroom 203

Efficacy of an Indigenous Intravitreal Ranibizumab Biosimilar for Macular Edema Management

*First Author: Chaitra **JAYADEV***
*Co-Author(s): Bharathi **BAVAHARAN**, Naresh Kumar **YADAV***

Purpose: To study the efficacy of an intravitreal ranibizumab biosimilar (Razumab; Intas Pharmaceuticals, India) for the management of macular edema.

Methods: This was a single-center, retrospective study of 129 eyes who underwent monthly injections of Razumab for macular edema. The corrected distance visual acuity (CDVA) and central macular thickness (CMT) was assessed at baseline, and at 4, 8 and 12 weeks.

Results: The most common indication was diabetic macular edema (31%) followed by age-related macular degeneration and retinal vein occlusion. 65.89% were treatment-naïve eyes. The baseline CDVA of 0.66 ± 0.495 (mean ± SD, logMAR) improved to 0.46 ± 0.406, 0.39 ± 0.306 and 0.37 ± 0.313 at 4, 8 and 12 weeks respectively. The baseline CMT (μm) of 543.69 ± 134.595 improved to 407.84 ± 95.666,

358.97 ± 105.029 and 344.78 ± 112.776 at 4, 8 and 12 weeks respectively. The mean IOP was 14.34 ± 2.802 mm Hg at 12 weeks.

Conclusions: Razumab is a viable and affordable option for macular edema treatment, with good clinical outcomes and compliance.

Dec 15, 2018 (Sat) 13:40 - 15:10

Venue: Ballroom 203

Evaluation of Indocyanine Green Angiographic Features in Symptomatic Macular Polypoidal Choroidal Vasculopathy over 24 Months: Results from the EVEREST II Study

*First Author: Colin **TAN***
*Co-Author(s): Tock-Han **LIM**, Soumil **PARIKH***

Purpose: To evaluate changes in polyps and the branching vascular network (BVN) in patients with symptomatic macular polypoidal choroidal vasculopathy (PCV).

Methods: EVEREST II was a 24-month, randomized, multicenter study. A total of 322 patients diagnosed with PCV were randomized 1:1 to ranibizumab (RBZ) and verteporfin photodynamic therapy (vPDT) combination therapy (n = 168) or RBZ monotherapy (n = 154). Indocyanine green angiography (ICGA) were graded by the central reading center at baseline, months 3, 6, 12, and 24.

Results: At baseline, the number of polyps in both treatment arms was comparable. At month 12, combination therapy was superior to RBZ monotherapy in achieving complete polyp regression (CPREG; 69.7% vs 33.8%; P < 0.0001) and this superiority was maintained at 24 months (56.6% vs 26.7%; P < 0.0001). In the combination arm, the proportions of patients with CPREG were comparable at months 3, 6, and 12 (71.4%, 71.3% and 69.7%, respectively) with a slight decrease at month 24 (56.6%). In the monotherapy arm, the proportion increased from 21.7% at month 3 to 30.4% at month 6 and 32.6% at month 12, decreasing slightly at month 24 (26.7%). The percent reduction in polyp size from baseline was numerically higher in the combination arm than in the monotherapy arm: 65.2% vs, 32.8% at month 12 and 52.3% vs 33.7% at month 24. Active BVN size increased from baseline in both treatment arms.

Conclusions: RBZ and vPDT combination therapy was superior to RBZ monotherapy in PCV patients in terms of CPREG and was more effective in reducing polyp size and regulating BVN size over 24 months.

Dec 15, 2018 (Sat) 08:30 - 10:00

Venue: Ballroom 202

Going Green: Treatment Outcome and Safety Profile of Chronic Central Serous Chorioretinopathy Treated with Subthreshold Green Laser (532 nm)

*First Author: Anadi **KHATRI K C***
*Co-Author(s): Roshija **KHANAL RIJAL**, Muna **KHAREL**, Bal Kumar **KHATRI**, Eli **PRADHAN**, Sweta **SINGH***

Purpose: Subthreshold lasers have gained popularity in the treatment of central serous chorioretinopathy (CSCR) and yellow (577 nm) lasers have completely revolutionized the treatment. However, there is very little literature regarding the use of a more common and conventional green (532 nm) subthreshold laser for the treatment of chronic CSCR. We report the use of green laser (532 nm) for the treatment of chronic CSCR and its outcome.

Methods: Eyes with non-resolving CSCR were treated with green subthreshold laser and evaluated at the end of 5 months. Visual acuity, central macular thickness (CMT) and macular volume (MV) at baseline and at 5 months following treatment were evaluated.

Results: A total of 13 eyes with chronic CSCR were treated with green laser in SP-Mode™. The mean duration of CSCR was 7.64 ± 3.77 months at the time of treatment. The median age of the patients was 41 years (35-57 years). The baseline mean best-corrected visual acuity (BCVA) was 0.96 logMAR ± 0.17, with mean baseline CMT of 503.8 ± 181.9 µm and MV of 12.8 ± 3.81 mm^3. The mean CMT at 5 months was 211 ± 31.7 µm and mean MV was 9.65 ± 0.60 mm^3, correlating to a mean decrease of

292 ± 79 μm of CMT and mean decrease of 3.18 ± 1.87 mm^3 in the MV from baseline (P < 0.05). The mean BCVA after treatment was 0.18 ± 0.09 logMAR (P < 0.05). Two cases of CSCR with pigment epithelial detachment (PED) also had complete resolution at 5 months.

Conclusions: Subthreshold green laser is a safe and effective modality for treatment of chronic CSCR with very good and stable outcomes. It may also be beneficial in the treatment of PEDs.

Dec 15, 2018 (Sat) 10:30 - 12:00

Venue: Ballroom 201

Incidence Rate of Massive Submacular Hemorrhage and Its Risk Factors in Polypoidal Choroidal Vasculopathy and Typical Neovascular Age-Related Macular Degeneration

*First Author: Soo Chang **CHO***
*Co-Author(s): Joon Hee **CHO**, Kyu Hyung **PARK**, Se Joon **WOO***

Purpose: To investigate the incidence rate of massive subretinal hemorrhage (SMH) over time and its risk factors in patients with polypoidal choroidal vasculopathy (PCV) and typical neovascular age-related macular degeneration (tnAMD).

Methods: A total of 465 patients diagnosed with PCV (n = 245) or tnAMD (n = 220) from 2003 to 2014 were retrospectively reviewed. Cumulative incidences of massive SMH occurrence in PCV and tnAMD were calculated. The risk factors associated with the development of massive SMH were also analyzed.

Results: Massive SMH developed in 32 patients with PCV and 9 patients with tnAMD. Massive SMH occurred within 1, 3, 5, and 10 years after the first visit in 2.45%, 6.17%, 11.09%, and 29.85% of PCV patients, respectively. Survival analysis in tnAMD revealed the incidence rates of massive SMH were 1.82%, 3.46%, 4.27%, and 9.90% of eyes within 1, 3, 5, and 10 years after the initial visit, respectively. The incidence rates of massive SMH in PCV were significantly higher than those in tnAMD (log rank test, P = 0.007). Cox regression analysis revealed that the occurrence of significant SMH (hazard ratio [HR], 3.61; P < 0.001), mean number of anti-VEGF injections per year (HR, 1.35; P < 0.001), and mean number of PDTs per year (HR, 3.69; P < 0.001) were significantly associated with the risk of massive SMH.

Conclusions: The incidence rate of massive SMH in PCV was significantly higher than that in tnAMD. The occurrence of significant SMH, and mean number of anti-VEGF injections or that of PDTs per year were significantly associated with the risk of massive SMH.

Dec 15, 2018 (Sat) 08:30 - 10:00

Venue: Ballroom 202

Influence of Axial Length Greater Than 30 mm on Prevalence of Myopic Maculopathy in a Cohort of Highly Myopic Eyes

*First Author: Quan **HOANG***
*Co-Author(s): Gemmy **CHEUNG**, Shu Yen **LEE**, Gavin, Siew Wei **TAN**, Chee-Wai **WONG**, Ian **YEO***

Purpose: To determine if highly myopic (HM) eyes with axial length (AL) >30 mm have a higher prevalence of myopic macular degeneration (MMD) than HM eyes with AL <30 mm.

Methods: A consecutive series of HM patients (<–6.00D and/or >25 mm AL in the right eye) who were clinically diagnosed with staphyloma or MMD, were seen between January 2017 and October 2017. All patients underwent dilated retinal examination, AL measurement, fundus photography/autofluorescence and swept-source optical coherence tomography. The cohort was stratified into eyes with AL of 25-30 mm and those >30 mm.

Results: The right eyes of 316 HM patients (69% female, 62 ± 14 years, range 19-92 years) were evaluated. AL was 29.5 ± 2.2 mm (25.3-35.2 mm). Using the Meta-analysis of Pathologic Myopia classification to assess the MMD, the severity of MMD was higher in the longer AL group than the shorter AL group with 36%, 45%, 12%, and 7% of eyes in MMD category

1, 2, 3 and 4 respectively in the short AL group versus 2%, 46%, 31% and 21% in the long AL group. The longer AL group was found to have significantly higher prevalence of: foveoschisis (Chi-square statistic 6.00, P = 0.018), past or present lamellar or full-thickness macular hole (5.5068, P = 0.019), vitreomacular traction (10.6594, P = 0.0011), dome-shaped macula (13.252, P < 0.0001), epiretinal membrane (17.4044, P < 0.0001) and myopic choroidal neovascularization (5.3921, P = 0.0202).

Conclusions: HM eyes with AL >30 mm have a higher prevalence of various vision-threatening myopic macular pathologies as compared to HM eyes of 25-30 mm. This is consistent with the idea that longer eyes are at greater risk of vision loss from HM.

Dec 15, 2018 (Sat) 10:30 - 12:00

Venue: Ballroom 201

Intravitreal Aflibercept Treat-and-Extend Dosing for Wet Age-Related Macular Degeneration: ALTAIR 96-Week Results

*First Author: Masahito **OHJI***
*Co-Author(s): Masato **KOBAYASHI**, Annabelle **OKADA**, Yasuhiro **TERANO**, Kanji **TAKAHASHI***

Purpose: To evaluate 96-week efficacy and safety of intravitreal aflibercept (IVT-AFL) injection with 2 different treat-and-extend (T&E) dosing regimens in Japanese patients with wet age-related macular degeneration.

Methods: This was a randomized, open-label phase 4 study conducted in Japan. Patients received 3 initial monthly IVT-AFL injections, and were randomized 1:1 to T&E groups with 2-week adjustment (2W-Adj) and 4-week adjustment (4W-Adj) at week 16.

Results: A total of 246 patients were included. Baseline demographics were similar between groups. The mean change in best-corrected visual acuity from baseline to week 96 was 7.6 versus 6.1 Early Treatment Diabetic Retinopathy Study letters in the 2W-Adj and 4W-Adj groups, respectively. The proportion of patients who could be extended to 16 weeks and not shortened was similar between groups (41.1% vs 42.3%, respectively). Incidence of any ocular serious adverse events (SAE) in the study eye was 3.2% vs 1.6%, respectively. The most common ocular SAE was cataract (2.4% vs 1.6%, respectively).

Conclusions: Improved visual acuity with an extended dosing interval was seen with 2 different T&E dosing regimens of IVT-AFL. The safety profile of IVT-AFL was consistent with previous reports.

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Venue: Ballroom 202

Intravitreal Aflibercept in Treating Naïve and Refractory Diabetic Macular Edema

*First Author: Amelia **LIM***
*Co-Author(s): Hanizasurana **HASHIM***

Purpose: To describe intravitreal aflibercept treatment response in treatment-naïve and ranibizumab refractory diabetic macular edema (DME) cases.

Methods: Case series.

Results: This was a retrospective review of IVA response in 4 cases who were diagnosed with central involving DME in year 2016-2018. Two patients were naïve to anti-vascular endothelial growth factors (case 1 and 2) while the other 2 patients (case 3 and 4) were refractory to ranibizumab injections. In treatment-naïve patients, they received 5 and 6 IVA injections respectively in both eyes over a 6-month period. At 6 months, they experienced visual acuity (VA) gain of 2-3 lines together with significant reduction in central retinal thickness (CRT) of 50-60% in both eyes. Subsequently their VA and CRT remained stable without requiring further treatment. However, both cases developed left eye foveal atrophy at the end of treatment. In refractory cases, case 3 showed tremendous visual gain of >3 lines and CRT improvements of >50% in the right eye in the first 3-monthly IVA injections while the left eye VA improved by 1 line and CRT reduction of about 20%. Nonetheless, the treatment response became minimally responsive to IVA in the following 7 months' follow-up, with a

total of 8 and 5 IVA injections in the right and left eye respectively. Meanwhile in case 4, we observed minimal improvements in VA and CFT despite 7 IVA injections given to the right eye.

Conclusions: Treatment-naïve patients showed good response with fewer IVA injections in the later months, while the response in the ranibizumab refractory patients could be variable.

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Venue: Ballroom 201

Intravitreal Conbercept for Symptomatic Retinal Arterial Macroaneurysm

*First Author: Qiang **ZHOU***

Purpose: To evaluate the therapeutic effect of intravitreal conbercept injection for symptomatic retinal arterial macroaneurysm.

Methods: The study included 5 patients (5 eyes) with symptomatic retinal arterial macroaneurysm. Conbercept was injected at the initial visit, followed by as-needed monthly reinjection. Before every injection, 0.05 mL aqueous humor was obtained through anterior chamber penetration. Best-corrected visual acuity (BCVA), central macular thickness and cytokines in aqueous humor (VEGF, IL6, IL10, vcam) were documented and analyzed.

Results: The mean follow-up period for all subjects was 6 months. The mean number of injections for the treated group was 3.6. The mean logarithm of the minimal angle of resolution (logMAR) of BCVA improved at the last follow-up compared with baseline. The mean central macular thickness decreased from the first injection compared with baseline and recovered after the last injection. The concentration of the cytokines in aqueous humor decreased after the first injection and closed to normal after the third injection.

Conclusions: Intravitreal conbercept injection could be an effective treatment option for symptomatic retinal arterial macroaneurysm.

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Venue: Ballroom 203

Long-Term Visual/Anatomic Outcome in Patients with Macular Involving Fibrovascular Pigment Epithelium Detachment Presenting Choroidal Neovascularization on Optical Coherence Tomography Angiography

*First Author: Dong Yoon **KIM***
*Co-Author(s): Ju Byung **CHAE**, Jisu **KIM**, Kyung Tae **KIM***

Purpose: To analyze long-term visual/anatomic outcome in patients with macular involving fibrovascular pigment epithelium detachment (FV-PED) presenting choroidal neovascularization (CNV) on optical coherence tomography angiography (OCTA).

Methods: This retrospective review included exudative age-related macular degeneration (exudative-AMD) patients with macular involving FV-PED on SD-OCT. Among them, patients with FV-PED presenting CNV on OCTA and with more than 2 years' follow-up duration were included in this study. The anti-VEGF dosing methods for exudative-AMD was treatment and extent. The best-corrected visual acuity (BCVA) before anti-VEGF injection and 3 times, 6 months, 1 year, and 2 years after injection were analyzed. And we also analyzed central subfield retinal thickness (CST), FV-PED thickness, photoreceptor thickness at the fovea and presence of subretinal fluid.

Results: Thirty patients (34 eyes) were enrolled in the study. Compared with pre-treatment BCVA (logMAR, 0.71 ± 0.37), the BCVA was significantly improved after the third anti-VEFG injection (0.52 ± 0.40, $P < 0.001$) and it was maintained until 2 years (treatment and extend phase) (0.59 ± 0.53). The mean CST also improved significantly ($P < 0.001$) after 3 times of anti-VEGF injections (217.1 ± 69.6), compared with pre-treatment (437.2 ± 108.0) ($P < 0.001$) and it also showed the consistency well maintained. When SD-OCT findings were compared between 3 times after anti-VEGF injection and 2 years after injection, there was no significant difference in the photoreceptor thickness and the FV-PED thickness.

Conclusions: In patients with macular involving FV-PED presenting CNV on OCTA, the improved BCVA after loading anti-VEGF injection was maintained well up to 2 years and photoreceptor thickness was not significantly decreased.

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Venue: Ballroom 202

Matrix Metalloproteinase-14 is a Biomarker of Angiogenic Activity in Proliferative Diabetic Retinopathy

*First Author: Ahmed **ABU EL-ASRAR***

Purpose: Matrix metalloproteinase-14 (MMP-14) is a transmembrane MMP that plays a critical role in promoting angiogenesis. We investigated the expression levels of MMP-14 and correlated these with clinical disease activity and with the levels of the angiogenic factors vascular endothelial growth factor (VEGF) and MMP-9 in proliferative diabetic retinopathy (PDR). To reinforce the findings at the functional level, we examined the expression of MMP-14 in the retinas of diabetic rats.

Methods: Vitreous samples from 34 PDR and 18 nondiabetic patients, epiretinal membranes from 13 patients with PDR and retinas of rats were studied by enzyme-linked immunosorbent assay, immunohistochemistry, Western blot analysis and RT-PCR.

Results: MMP-14, VEGF and MMP-9 levels were significantly higher in vitreous samples from PDR patients than in nondiabetic controls ($P < 0.001$ for all comparisons). MMP-14 levels in PDR with active neovascularization were significantly higher than those in inactive PDR ($P < 0.001$). There were significant positive correlations between levels of MMP-14 and levels of VEGF ($r = 0.3$; $P = 0.032$) and MMP-9 ($r = 0.54$; $P < 0.001$). In epiretinal membranes, MMP-14 was expressed in vascular endothelial cells, leukocytes and myofibroblasts. Significant positive correlations were detected between the numbers of blood vessels expressing CD31 and the numbers of blood vessels ($r = 0.74$; $P = 0.004$) and stromal cells ($r = 0.72$; $P = 0.005$) expressing MMP-14. Significant increases of MMP-14 mRNA and protein were detected in rat retinas after induction of diabetes.

Conclusions: These results suggest that MMP-14 is involved in PDR angiogenesis.

Dec 15, 2018 (Sat) 08:30 - 10:00

Venue: Ballroom 202

Outcome of Intravitreal Ziv Aflibercept (Zaltrap) Injection on Retinal Disorders in Sri Lanka

*First Author: Dayawansa **KEEMBIYAGE***

Purpose: To evaluate the indications, patient demographics, safety of drug and postoperative outcomes on off-label use of Ziv aflibercept in Sri Lanka community and this is the first-time evidence of this drug in Sri Lanka.

Methods: This was a retrospective analysis of case notes of all patients who had Ziv aflibercept at 2 centers in Sri Lanka from March to June 2018 by a single surgeon Patient demographics, indications for treatment, surgical complications, safety of drug and postoperative outcomes were evaluated. 0.05 mL of Ziv Aflibercept equal to 1.25 mg drawn from the vial of 4 mL (100 mg in 4 mL) was injected with a 30-gauge needle under sterile conditions. Multiple doses obtained from single vial were used on different patients.

Results: A total of 75 eyes of 71 patients were included, and 60% were females. The main indication for treatment was diabetic macular edema (40%) and retinal vein occlusions (35%). No intraoperative complications were noted and no postoperative drug reactions or infections were noted with a great majority showed significant anatomical improvement of the macula. Less than 10% needed repeat injections in diabetic macular edema group.

Conclusions: This is the first-time experience of Ziv aflibercept on Sri Lankan community, and the result is promising with no complications and with great improvement of retinal functions. It is a great alternative to Aflibercept especially

because of the cost factor and will be useful in low-income countries.

Dec 15, 2018 (Sat) 13:40 - 15:10

Venue: Ballroom 203

PEDF Protects Human Retinal Pigment Epithelial Cells against Oxidative Stress by Up-Regulating Expression of UCP2

*First Author: Yuan **HE***

Purpose: To investigate the protective function of pigment epithelium-derived factor (PEDF) against oxidative stress in ARPE-19 cells.

Methods: ARPE-19 cells were divided into oxidative stress groups with different concentrations of H_2O_2 (0, 75, 150, and 200 μmol/L) for 24 hours. For the protective group, 200 ng/mL of PEDF was applied to these cells. LDH assay, PI staining, CCK-8 and cell growth curve experiments were conducted. The apoptotic genes and the level of UCP2 gene expression were detected by RT-PCR. We also induced an oxidative stress injury animal model in both C57BL/6 mice and BALB/c mice by injecting 5 μg of PEDF pretreatment in the vitreous cavity and injecting 150 μM H_2O_2 after 24 hours. HE staining and UCP2 immunofluorescent labeling were conducted.

Results: The numbers of apoptotic cells increased with higher concentrations of H_2O_2, while this effect was reversed by PEDF. The expression of apoptosis genes caspase3 and Bax were inhibited, whereas anti-apoptotic gene *Bcl2* was improved by PEDF. Significant differences were found in the level of UCP2 gene expression between the PEDF-treated group and H_2O_2 alone. Labeling of the UCP2 detector in the confocal images confirmed a decreased UCP2 protein staining both retinal pigment epithelial (RPE) cells and RPE layers under H_2O_2 injury, whereas we found an inhibition of this effect by PEDF. The thickness of the RPE layer and the number of RPE cells significantly increased with PEDF treatment under oxidative stress.

Conclusions: PEDF increased UCP2 gene expression in both ARPE-19 cells and animal RPE layers under oxidative stress, indicating that PEDF may protect RPE cells and tissues under oxidative injury.

Dec 15, 2018 (Sat) 08:30 - 10:00

Venue: Ballroom 202

Parafoveal Telangiectasia Type 2 with CNVM/CME: What to do Next — Role of Intravitreal Bevacizumab

*First Author: Achyut **PANDEY***

Purpose: To study the cases and role of intravitreal bevacizumab with features of choroidal neovascular membrane (CNVM) and/or cystoids macular edema (CME) in parafoveal telangiectasia (PFT) type II on multimodal imaging.

Methods: A review of 40 cases of suspected PFT type 2 which underwent fundus fluorescein angiography (FFA) and indocyanine green (ICG) angiography from August 2015 to May 2016 was performed. History, best-corrected visual acuity (BCVA), optical coherence tomography, FFA and ICG findings were evaluated. All cases were enrolled in 2 groups: PFT with CNVM (group 1) and PFT with CME (group 2). All were treated with intravitreal bevacizumab.

Results: In group 1, the male:female ratio was 1:1, with a mean age of 56.27 ± 8.49 years. In group 2, there was female preponderance of patients, with a mean age of 53. 5 ±7.18 years. In group 1, there was a statistically significant improvement in the mean BCVA before injecting bevacizumab and in the mean central foveal thickness (CFT) ($P = 0.001$). In group 2, there was no significant improvement in the mean BCVA ($P = 0.453$), but statistically significant improvement was noticed in the mean CFT ($P = 0.001$) .Transient hyperemia and subconjunctival hemorrhage were noticed in 2 patients in both group 1 and 2, while an increase in blood pressure was observed in 2 patients in group 1 and 4 patients in group 2.

Conclusions: In PFT type II complicated by CNVM, definite short-term improvement in the visual acuity (approaching statistical significance) and significant reduction of

CFT following intravitreal bevacizumab were found. In those patients complicated by CME, significant reduction of CFT without improvement in the visual acuity was noted.

Dec 15, 2018 (Sat) 13:40 - 15:10

Venue: Ballroom 203

Prognostic Factors for the Response to Intravitreal Bevacizumab Treatment in Patients with Central Serous Chorioretinopathy

*First Author: Sungjae **YANG***

Purpose: To evaluate prognostic factors associated with good response to intravitreal bevacizumab (IVB) treatment in patients with central serous chorioretinopathy (CSC).

Methods: We retrospectively reviewed 94 eyes of 94 CSC patients who received IVB injection (0.05 mL, 1.25 mg) as a first-line treatment. Patients were divided into 2 groups as good responders and poor responders based on optical coherence tomography (OCT) findings 6 weeks after the first injection of IVB. Good responders were defined as complete resolution of subretinal fluid on OCT 6 weeks after IVB. We compared baseline visual acuity, duration of symptom, angiographic findings on fluorescein angiography, central retinal thickness (CRT), macular volume (MV), and subfoveal choroidal thickness (SFCT) between the 2 groups.

Results: In total, 42 eyes were included as good responders and 52 eyes as poor responders. The mean age was 47.8 ± 7.4 years in good responders and 50.6 ± 7.8 years in poor responders. Baseline visual acuity (logMAR) was better in good responders than poor responders, 0.19 ± 0.19 and 0.29 ± 0.19 respectively (P = 0.015). SFCT was significantly thicker in good responders than poor responders 419.7 ± 103.2 μm and 376.0 ± 99.0 μm respectively (P = 0.040). Prevalence of chronic cases was higher in poor responders (33/52) than good responders (15/42) (P = 0.012). There was no statistical significance in age, sex, CRT, and MV between the 2 groups.

Conclusions: Intravitreal injection of bevacizumab can be a potential option for the treatment of CSC patients, especially in case of recent onset, good visual acuity with thicker choroid on OCT.

Dec 15, 2018 (Sat) 13:40 - 15:10

Venue: Ballroom 203

Progressive Retinal Neurodegeneration and Microvascular Change in Diabetic Retinopathy: A Longitudinal Study Using Optical Coherence Tomography Angiography

*First Author: Kiyoung **KIM***
*Co-Author(s): Eung-Suk **KIM**, Seung Young **YU***

Purpose: To investigate the association between progressive macular ganglion cell/inner plexiform layer (mGCIPL) thinning and change of optical coherence tomography angiography (OCT-A) derived microvascular parameters in early stage of diabetic retinopathy (DR).

Methods: A total of 41 eyes presented with no DR or mild non-proliferative DR at baseline and 20 healthy controls were recruited. All participants underwent structural-domain OCT and OCT-A at baseline and 6, 12, 18 and 24 months. Change of mGCIPL thickness and OCT-A metrics including FAZ area and FAZ circularity, vessel density and perfusion index were measured. Correlations between mGCIPL thickness and OCT-A metrics were explored using regression models.

Results: The average progressive mGCIPL loss was 0.45 μm per year. Three microvascular parameters were significantly impaired over 24 months compared to baseline (FAZ area: 0.34-0.36 mm^2, VD: 18.9-18.5/mm, PI: 0.35-0.34). A strong positive correlation was found between loss of mGCIPL and vessel density from baseline to 24 months. Multivariable regression analysis showed that thinner baseline mGCIPL (B = 0.658, P < 0.001) and greater loss of mGCIPL thickness (B = 0.658, P < 0.001) were significantly associated with change of vessel density.

Conclusions: In early stage of DR, progressive structural retinal neurodegeneration and

parafoveal microvascular change seems to be a highly linked process. Advanced mGCIPL thinning might precede microvascular impairment in early DR.

Dec 15, 2018 (Sat) 13:40 - 15:10

Venue: Ballroom 203

RGC-IPL Thickness and Choroidal Thickness in SD-OCT as a Tool for Early Prediction of Hydroxychloroquine Retinal Toxicity

First Author: Remya ***PAULOSE***

Purpose: We aimed to detect early predictors of hydroxychloroquine (HCQ) retinal toxicity before it is clinically evident using spectral-domain optical coherence tomography (SD-OCT). The objectives of this study were (1) to compare choroidal thickness and retinal ganglion cell-inner plexiform (RGC-IPL) layer thickness in HCQ patients and control group, and (2) to detect the correlation between the choroidal thickness and RGC-IPL thickness with duration of HCQ intake and cumulative dose.

Methods: This was a prospective case-control study conducted from February 2017 to June 2018. A total of 100 eyes of 50 patients on treatment with HCQ with no clinical evidence of retinopathy were assigned in the study group, and they were compared with a control group. Further subgroup analysis was done in patients with "flat foveal pit" and those with no foveal pit flattening. Presence of disorders such as diabetes mellitus, neurodegenerative diseases, glaucoma etc were excluded.

Results: The mean RGC-IPL thickness of the HCQ group (77.88 ± 8.7 μm) was significantly thinner than that of the control group ($P < 0.05$). The mean choroidal thickness of the HCQ group (303.54 ± 63.78 μm) was also significantly thinner than the control group ($P < 0.05$). There was positive correlation between patients in "flat foveal pit" group with respect to the choroidal thickness. However negative correlation was found between the cumulative dose and the RGC-IPL thickness.

Conclusions: The HCQ group showed significant thinning of the choroid and RGC-IPL thickness and hence may be used as an objective parameter to assess early HCQ-induced retinal toxicity.

Dec 15, 2018 (Sat) 10:30 - 12:00

Venue: Ballroom 201

Relationship between Mean Platelet Volume and Central Retinal Vein Occlusion in Hypertensive Patients

First Author: Pritam ***BAWANKAR***

Purpose: To study the relationship between mean platelet volume (MPV) and central retinal vein occlusion (CRVO) in hypertensive patients.

Methods: This was a hospital-based, retrospective, case-control study. A total of 100 patients with a known history of hypertension diagnosed with CRVO served as the sample group, and 100 age- and sex-matched patients with the sample group having a sole history of hypertension without any other systemic diseases and the best-corrected visual acuity of 20/20 in both eyes served as the control group. CRVO was diagnosed based on clinical examination. All cases and control subjects underwent complete ocular examination. MPV, platelet count, hemoglobin, white blood cell count and hematocrit parameters were recorded in both groups. Data of patients with CRVO were compared with the control subjects. The confidence interval was set at 95% with a P value of <0.05.

Results: MPV was significantly higher among hypertensive cases diagnosed with CRVO when compared with the hypertensive control group (8.059 ± 0.016 vs 7.442 ± 0.15 fL, respectively; $P < 0.001$). The platelet count was lower in the control group but the difference did not reach a statistically significant level. The systolic blood pressure was significantly higher in the hypertensive cases group with CRVO.

Conclusions: Our study concluded that MPV was statistically increased in CRVO patients who were hypertensive. The present study showed that platelet activation has a crucial role in the pathogenesis of CRVO in hypertensive cases and further studies are mandatory regarding

its potential use as a prognostic biomarker in patients of CRVO.

Dec 15, 2018 (Sat) 10:30 - 12:00

Venue: Ballroom 201

The Effect of Intravitreal Dexamethasone Implantation in Diabetic Macular Edema Refractory to Intravitreal Anti-Vascular Endothelial Growth Factor Treatment

*First Author: Sanghyu **NAM***
*Co-Author(s): Eung-Suk **KIM**, Kiyoung **KIM**, Seung Young **YU***

Purpose: To evaluate the efficacy and safety of intravitreal dexamethasone (DEX) implantation for diabetic macular edema (DME) that did not respond to previous anti-VEGF treatments.

Methods: This was a prospective interventional series of 91 eyes with persistent or recurrent diabetic macular edema after previous anti-VEGF treatments. All patients were followed for at least 12 months. Best-corrected visual acuity (BCVA), central macular thickness (CMT), macular volume, and intraocular pressure were measured at baseline and bimonthly after DEX implantation.

Results: The mean number of intravitreal DEX implantation was 2.1 ± 0.8, prior anti-VEGF treatment was 4.9 ± 5.0. Overall, 26 eyes (28.9%) received 1, 31 eyes (34.4%) received 2, and 34 eyes (36.7%) received 3 injections for 12 months. BCVA was significantly improved in the first 6 months (58.9 letters) after DEX implantation (55.7 letters). Both CMT (374 vs 307 μm) and macular volume (11.6 vs 10.8 mm^3) were significantly decreased after DEX implantation and maintained until 12 months. Two- and 3-DEX received group had significantly more prior anti-VEGF injection than 1-DEX received group (6.0 and 5.5 vs 3.0).

Conclusions: Two-thirds of refractory DME cases required less than 2 DEX implantations to maintain dry macula for 12 months. To obtain optimal effect of DEX implantation, early switching from anti-VEGF is recommended in persistent DME.

Dec 15, 2018 (Sat) 13:40 - 15:10

Venue: Ballroom 203

The Protection of Mitochondria-Targeted Antioxidant Peptide on ARPE-19 Cells under Oxidative Damage

*First Author: Yun **XU***
*Co-Author(s): Yuan **HE***

Purpose: To investigate the effect of SS31 on human retinal pigment epithelium cells (ARPE-19 cells) in vitro oxidative damage.

Methods: ARPE-19 cells were treated with different concentrations of H_2O_2 (0, 100, 200, 250, 300 μmol/L) respectively. The cell activity of ARPE-19 cells was measured by MTT assay and the optimal concentration of H_2O_2-injured cells was determined. The apoptotic model was constructed with 200 μmol/L H_2O_2 treatment. The cells were divided into blank control group, H_2O_2-damage group, 10 nmol/LSS31 + H_2O_2 group, 100 nmol/LSS31 + H_2O_2 group and 1 μmol/LSS31 + H_2O_2 group. MTT assay was used to detect the survival rate of the cells and evaluate the optimal SS31 concentration for sequential study, the cellular morphology was observed by inverted phase contrast microscope.

Results: Cells disposed in H_2O_2 were sparse and shrinkage, whereas it could be reversed by adding of SS-31. MTT assay showed that the cells viability of H_2O_2-damage group at different concentrations was lower than the normal group. The cell viability of H_2O_2 group treated with 200 μmol/L was 63.45% (± 4.18), which was lower than normal control (100%) ($P < 0.05$).The cell viability in 10 nmol/LSS31 + H_2O_2, 100 nmol/LSS31 + H_2O_2 and 1 μmol/LSS31 + H_2O_2 were 68.87% (± 8.47), 79.38% (± 7.70) and 80.78% (± 6.65), respectively, which were higher than H_2O_2-damage group. A highest survival rate was 80.78% (± 6.65) in the concentration of 1 μmol/L SS-31 + H_2O_2 group, which was statistically significant in comparison with H_2O_2 alone ($P < 0.05$).

Conclusions: We propose that SS-31 can prevent ARPE-19 cells death from oxidative damage.

Dec 15, 2018 (Sat) 10:30 - 12:00

Venue: Ballroom 201

To Evaluate Treatment Responses by Assessing the Changes in Functional and Anatomical Parameters in Taiwanese Patients with nAMD Treated with Ranibizumab 0.5 mg: A Subgroup Analysis from the RACER Study

*First Author: Chien Liang **WU***
*Co-Author(s): Jiann-Torng **CHEN**, Cheng-Kuo **CHENG**, Ching-Yao **TSAI**, Wen-Chuan **WU***

Purpose: To assess the correlation of treatment responses at 3 and 12 months in terms of best-corrected visual acuity (BCVA) and central retinal thickness (CRT) in the 12-month, multicenter, observational RACER study.

Methods: A post-hoc subgroup analysis was conducted in patients who received 3 loading ranibizumab injections over 3 months to evaluate the correlation of treatment responses of BCVA (defined as ≥5-letter gain and <5-letter gain) at 3 months concerning the functional and anatomical parameters at 3 and 12 months.

Results: The mean (95% confidence interval) BCVA (letters) change from baseline was higher in patients who gained ≥5 letters (n = 41) compared with those who gained <5 letters (n = 65) at 3 months [+14.2 (11.4, 16.9) vs −1.2 (−2.5, 0.1); intergroup P < 0.001] and at 12 months [+6.5 (1.2, 11.7) vs +0.4 (−3.4, 4.2); intergroup P = 0.0564]. Both subgroups received similar number of ranibizumab injections (4.7 ± 1.6 and 4.8 ± 1.6, respectively). No intergroup difference was observed with regard to CRT change (± SD) at 3 months in patients with ≥5-letter and <5-letter gain [-92.2 (78.8) and -63.1 (100.7) μm, respectively]. Similar mean (± SD) CRT by BCVA response was achieved at 3 months, which sustained until 12 months [312 (79.8) μm and 325 (144.7) μm, respectively].

Conclusions: The results from this post-hoc subgroup analysis of the RACER study showed that changes in BCVA at 3 months was associated with gains in BCVA over 12 months. The reduction in CRT was comparable in the good (≥5-letter gain) and poor (<5-letter gain) BCVA response subgroups.

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Venue: Ballroom 203

Validation of a Deep Learning System for Diabetic Retinopathy and Other Eye Diseases in a Real-World Endocrinology Outpatient Setting

*First Author: Gavin **TAN***
*Co-Author(s): Daniel **TING**, Tien-Yin **WONG**, Haslina **HAMZAH***

Purpose: To evaluate the performance of a deep learning system (DLS) in detecting diabetic retinopathy (DR), age-related macular degeneration (AMD) and glaucoma disc suspect in a real-world outpatient diabetic retinopathy screening service.

Methods: Patients who attended the telemedicine diabetic retinopathy screening service at an outpatient endocrine clinic had their fundus images assessed by humans graders and a DLS-based automated software. Referable DR was defined as moderate non-proliferative (NP) DR or worse using the International Classification Diabetic Retinopathy Scale. Glaucoma disc suspect was defined as a vertical cup–to–disc ratio of 0.7 or worse and AMD was defined as intermediate AMD or worse according to the Age-Related Eye Disease Study grading system. Performance of the DLS was compared with the human graders by image graded.

Results: A total of 437 patients (n = 874 images) attended the DR screening service. Of these, 2.1% of images were ungradable. The prevalence of referable diabetic retinopathy on human telemedicine grading was 7.9%, glaucoma disc suspect was 6.5% and AMD was 1.6%. The AUC of the DLS for referable diabetic retinopathy was 0.937 (0.898, 0.975), sensitivity was 86.1% (95% CI, 75.9%-93.1%), and specificity was 85.7% (95% CI, 83.0%-88.0%). For glaucoma disc suspect, AUC was 0.907 (95% CI, 0.872-0.941), sensitivity was 84.2% (95% CI, 72.1%-92.5%), and specificity was 83.8% (95% CI, 81.1%-86.3%). For AMD, AUC

was 0.936 (95% CI, 0.904-0.967), sensitivity was 100.0% (95% CI, 76.8%-100.0%), and specificity was 85.6% (95% CI, 83.5%-88.3%).

Conclusions: In a real-world outpatient clinical setting, a DLS-based diabetic retinopathy screening system is feasible and performs well.

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Venue: Ballroom 203

Visual and Anatomic Outcomes in Taiwanese Neovascular Age-Related Macular Degeneration Patients with Pigment Epithelium Detachment: A Subgroup Analysis of the Real-World RACER Study

*First Author: Pei-Chang **WU***
*Co-Author(s): Jiann-Torng **CHEN**, Yun-Dun **SHEN**, Ching-Yao **TSAI**, Wen-Chuan **WU***

Purpose: To assess the impact of pigment epithelial detachment (PED) on visual acuity (VA) and anatomic outcomes in patients with neovascular age-related macular degeneration (nAMD) treated with ranibizumab 0.5 mg in the 12-month, multicenter, observational RACER study.

Methods: Enrolled treatment-naïve Taiwanese patients (N = 161) were classified into 2 groups based on the PED (n = 55) or non-PED (n = 94) at baseline. Mean (± SD) changes in best-corrected VA (BCVA; letter) and mean (± SD) central retinal thickness (CRT; μm) were evaluated. Among the PED group, the subgroups were further analyzed based on PED response at 3 months (persistent or flattened).

Results: The mean BCVA significant improvement at 3 months was similar in the PED and non-PED group (5.5 ± 9.4, P < 0.001 and 4.9 ± 13.6, P < 0.001; intergroup P = 0.8405) with similar mean CRT reduction (−80.0 ± 108.7 and −88.1 ± 99.0); the trend remained until 12 months. In the PED-persistent and PED-flattened subgroups, the mean BCVA changes were similar at 3 months (6.2 ± 11.1, ns and 4.9 ± 8.8, P = 0.0037; inter-subgroup P = 0.6893). The mean CRT change was −55.4 ± 98.9 (P = 0.028) and −118.9 ± 112.3 (P < 0.001) at 3 months (inter-subgroup P = 0.1190) and −72.9 ± 80.7 (P = 0.0134) and −87.8 ± 79.0 (P = 0.0014) at 12 months (inter-subgroup P = 0.6773).

Conclusions: Patients with or without PED at baseline had similar BCVA improvement and CRT reduction with ranibizumab treatment at 3 and 12 months. The CRT of PED-persistent and flattened subgroups both reduced at 3 and 12 months.

Dec 16, 2018 (Sun) 13:40 - 15:10

Venue: Ballroom 201

A Case of Central Retinal Artery Occlusion with Cilioretinal Artery Sparing in a Patient with Vitreopapillary Traction

*First Author: Mohd.Anash **PATHAN***
*Co-Author(s): Gauree **GATTANI**, Gulam Ali **KAMDAR**, Vivek **SINGHAL**, Pallavi **AGARWAL***

Purpose: To report a case of central retinal artery occlusion with cilioretinal artery sparing in a patient with vitreopapillary traction (VPT).

Methods: A 60-year-old female presented with complaints of sudden painless diminution of vision in the left eye for the last 2 days. She is a known case of diabetes and hypertension controlled on oral medications and was evaluated.

Results: On examination, her best-corrected vision was 6/6, N.6 in the right eye and 6/36, N.36 in the left eye. Anterior examination of both eyes was unremarkable and intraocular pressure was 19 in the right eye and 13 in the left eye. Fundoscopy showed whitening of retina especially over posterior pole except a small area temporal to optic disc including fovea. Left eye had thick epiretinal membrane with vitreopapillary traction with hyper-reflectivity of inner retinal layers sparing the foveal region on optical coherence tomography. Fluorescein angiography showed delayed filling of the central retinal artery with normal filling of cilioretinal artery in the left eye.

Conclusions: We describe a case of central retinal artery occlusion with cilioretinal artery sparing in a patient with underlying VPT which may have a possible role in the pathogenesis of

the entity. Further case studies and evaluation may help in establishing the connection between the 2 entities.

Dec 16, 2018 (Sun) 13:40 - 15:10

Venue: Ballroom 201

Acute Visual Loss and Exudative Maculopathy after Reduced-Fluence Photodynamic Therapy Combined with Intravitreal Aflibercept for Age-Related Macular Degeneration

*First Author: Takeya **KOHNO***
*Co-Author(s): Michiko **HIRABAYASHI**, Shigeru **HONDA**, Tomoko **TAMACHI**, Manabu **YAMAMOTO***

Purpose: To report acute visual loss associated with exudative maculopathy after reduced-fluence photodynamic therapy (PDT) combined with intravitreal aflibercept injections (IAI) in 3 cases of age-related macular degeneration (AMD) that were refractory to IAI.

Methods: This was a retrospective case series, including 2 patients with typical AMD and 1 patient with polypoidal choroidal vasculopathy who were continuously administered IAI for more than 1 year, and serous retinal detachment (SRD) was prolonged.

Results: The 3 patients developed vision loss within 2 days after PDT. Decimal visual acuity (VA) before PDT was 1.2, 0.6, 0.9, and VA 1 month later was 0.6, 0.3, 0.6, respectively. On day 3, optical coherence tomography showed SRD was increased with the hyperreflective materials and the subretinal septae likely made up of inflammatory products such as fibrin. Choroid was markedly thickened. One month later, the SRD almost disappeared, and the choroidal thickening returned before PDT. The mean central foveal thickness was 233 μ before PDT, 497 μ on day 3 and 174 μ at 1 month. The mean central choroidal thickness was 199 μ before PDT, 315 μ on day 3 and 195 μ at 1 month.

Conclusions: PDT may be one of the helpful treatments for AMD refractory to IAI monotherapy. However, acute visual loss associated with inflammatory reaction occurred in some cases. These risks should be considered as supplementary treatment with PDT.

Dec 16, 2018 (Sun) 08:30 - 10:00

Venue: Ballroom 201

Anti-Vascular Endothelial Growth Factor-A/Anti–Angiopoietin-2 Bispecific Antibody RG7716 in Neovascular Age-Related Macular Degeneration: Results of Phase 2 Trials

*First Author: Timothy **LAI***
*Co-Author(s): Karen **BASU**, Aaron **OSBORNE**, Shamil **SADIKHOV**, Jayashree **SAHNI**, Piotr **SZCZESNY***

Purpose: RG7716 is the first bispecific antibody designed for intraocular use, and simultaneously binds and neutralizes both angiopoietin-2 (Ang-2) and vascular endothelial growth factor-A (VEGF-A). The efficacy and safety of RG7716 has been evaluated in 2 phase 2 trials in patients with choroidal neovascularization (CNV) secondary to neovascular age-related macular degeneration (nAMD).

Methods: AVENUE (NCT02484690) and STAIRWAY (NCT03038880) are multi-center, randomized, comparator-controlled, parallel-group phase 2 trials that enrolled patients with CNV due to nAMD. In AVENUE, patients (n = 273) were randomized 3:2:2:2:3 to 5 arms: 0.5 mg ranibizumab q4w (every 4 weeks); 1.5 mg RG7716 q4w; 6.0 mg RG7716 q4w; 6.0 mg RG7716 for 4 doses at q4w followed by q8w (every 8 weeks); or 0.5 mg ranibizumab for 3 doses at q4w followed by 6.0 mg RG7716 q4w. In STAIRWAY, patients (n = 76) were randomized 2:2:1 to 3 arms: 6.0 mg RG7716 for 4 doses at q4w followed by q12w (every 12 weeks) or q16w (every 16 weeks); or 0.5 mg ranibizumab q4w. The primary efficacy endpoint was mean best-corrected visual acuity (BCVA) change from baseline at week 36 in AVENUE and at week 40 in STAIRWAY.

Results: The AVENUE and STAIRWAY trials recruited 273 and 76 nAMD patients, respectively. Both trials have completed, with 36-week primary endpoint data from AVENUE and 52-week full data from STAIRWAY now available.

Conclusions: The RG7716 nAMD phase 2 program assessed the safety, efficacy and durability of RG7716. Results from the phase 2 trials, assessing dual VEGF/Ang-2 inhibition by the bispecific RG7716 antibody, will be presented.

Dec 16, 2018 (Sun) 08:30 - 10:00

Venue: Ballroom 201

Aqueous Humor Inflammatory Cytokine Levels and Choroidal Thickness in Patients with Macular Edema Associated with Branch Retinal Vein Occlusion

*First Author: Yong-Kyu **KIM***
*Co-Author(s): Sung Pyo **PARK***

Purpose: To investigate whether aqueous humor (AH) inflammatory cytokine levels are associated with treatment outcomes in patients with macular edema (ME) associated with branch retinal vein occlusion (BRVO) and to investigate the association between choroidal thickness (CT) and AH inflammatory cytokine level.

Methods: A total of 37 BRVO ME patients (37 eyes) who underwent intravitreal anti-VEGF or dexamethasone implant injections were recruited. AH inflammatory cytokines levels were measured using multiplexed sandwich ELISAs. Factors associated with visual gain and central macular thickness (CMT) decrease at 3 months were analyzed using multiple linear regression. Patients were divided into 2 groups according to the baseline CT (250 μm) and treatment outcomes were compared between the 2 groups.

Results: Baseline visual acuity (standardize β = 0.429, P = 0.007), IL-8 (standardize β = 0.567, P = 0.003), and sICAM-1 (standardize β = –0.381, P = 0.027) were associated with visual gain at 3 months. Baseline CMT (standardize β = 0.623, P < 0.001) and PDGF-AA (standardize β = 0.399, P = 0.010) were associated with CMT decrease at 3 months. Baseline CT was associated with IL-8 (standardize β = 0.403, P = 0.013), while no significant associations were found between baseline clinical factors such as age, sex, prior treatment history, visual acuity, CMT, CT and other inflammatory cytokines. Those with thicker CT showed higher levels of AH sVEGFR-2 and IL-8 compared to those with thinner CT and thicker CT group showed better visual gain and greater CMT decrease at 2 months.

Conclusions: AH cytokine might be a useful indicator of early treatment outcome in BRVO ME patients. Baseline CT was associated with the level of IL-8 and thicker CT group showed good functional and anatomical outcomes.

Dec 16, 2018 (Sun) 08:30 - 10:00

Venue: Ballroom 201

Assessing Activities of Daily Living in Patients with Retinitis Pigmentosa and Stargardt Disease by a Customized Virtual Reality Device

*First Author: Chetan **RAO***
*Co-Author(s): Rajiv **RAMAN***

Purpose: This study aimed to develop a virtual reality (VR) platform for the assessment of activities of daily living and develop a scoring system to categorize them based on functional parameters which are assessed by the VR platform.

Methods: Focus-group discussion was conducted on patients with Stargardt and retinitis pigmentosa disease to understand the problems faced by people with low vision. Based on the inputs, a story board incorporating bank scenarios was created and a task was assigned to each scenario. Each task had various metrics for assessment and a unique scoring. In this study, 53 normal subjects and 30 patients with low vision underwent an assessment using the VR platform.

Results: A VR platform was developed to assess activities of daily living and a composite vision scoring system was created. Based on the parameters of the normative data obtained from the VR assessment, a scoring system was developed to generate a composite score at the end of the assessment for each subject. The scores were assessed and there was a significant difference in the scores between the

normal and low-vision subjects. The median scores for the normal group versus peripheral vision loss subjects were 87% compared to 56.8% (P < 0.001) and the median scores for the normal group versus the central vision loss subjects were 87% compared to 63.25% (P < 0.001).

Conclusions: This platform was created to assess activities of daily living in a realistic environment to quantify the functional vision using VR technology which may help to plan and prioritize rehabilitative interventions.

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Venue: Ballroom 201

Change in Health Care Policy Improves the Visual Outcome in Diabetic Macular Edema Treated with Ranibizumab

*First Author: Tso-Ting **LAI***
*Co-Author(s): Yi-Ting **HSIEH**, Chang-Hao **YANG**, Chung-May **YANG***

Purpose: To evaluate the effect of health care policy change in the treatment outcome of diabetic macular edema (DME) treated with ranibizumab.

Methods: This was a retrospective case-control study including all DME patients treated under National Health Insurance reimbursement from July 2013 to January 2015 and April 2016 to June 2017, before and after a major health care policy change (increased reimbursement from 5 to 8 injections) announced in February 2016. Best-corrected visual acuity (BCVA) and central foveal thickness (CFT) measured with optical coherence tomography (OCT) were collected at baseline and at month 3, 6, and 12.

Results: A total of 182 eyes (119 eyes treated before and 63 eyes after policy change) were included in the study. The average injection number in 1 year changed from 4.36 ± 1.87 to 6.54 ± 2.11 (P < 0.001). The baseline BCVA (logMAR) were 0.74 ± 0.30 before and 0.68 ± 0.32 after policy change (P = 0.27), and improved to 0.64 ± 0.37 and 0.44 ± 0.33 at month 12 respectively (P < 0.001). The CFT improved from 446.5 ± 117.6 μm to 338.1 ± 113.8 μm (P < 0.001) and 404.0 ± 102.5 to 277.3 ± 66.4 (P < 0.001) in both old and new policy group at month 12. In linear regression, greater visual improvement at month 12 was significantly associated with worse baseline BCVA, treatment after policy change, treatment-naive patient, and presence of subretinal fluid on baseline OCT, but not with the total injection number.

Conclusions: Our study showed a significant impact of health care policy on the treatment outcomes of DME in the real-world condition, with significantly better final BCVA and BCVA improvement after increased reimbursement in the first year.

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Venue: Ballroom 201

Changes in Aqueous Cytokine Levels Following Treatment with Aflibercept in Treatment-Naïve Patients with Diabetic Macular Edema

*First Author: Rajeev **MUNI***
*Co-Author(s): Motaz **BAMAKRID**, Verena **JUNCAL**, Michael Ying Kit **MAK***

Purpose: To determine changes in aqueous cytokine levels in treatment-naive diabetic macular edema (DME) patients during intravitreal aflibercept treatment.

Methods: This was an interventional, prospective clinical study. Adult patients with treatment-naïve DME received aflibercept injections monthly for 3 months. At each visit Snellen best-corrected visual acuity (BCVA), SD-OCT, and an anterior chamber paracentesis were performed to collect aqueous fluid prior to each aflibercept injection, subsequently sent for Multiplex immunoassay analysis. A Wilcoxon signed-rank analysis was used to compare change in cytokine levels from baseline to month 2.

Results: A total of 16 patients (10 males, 6 females) with a mean age of 57.4 ± 9.6 years were included. The mean logMAR at baseline and 3 months were 0.41 ± 0.2 and 0.40 ± 0.2 respectively. The central subfield thickness

(CST) and macular volume percentage change between 3 months and baseline was -21.6 ± 13.9% and -9.5 ± 4.1% respectively (P = 0.001, P = 0.001). There were significant increases in TGF-B1 (baseline median = 78.3 pg/mL, month 2 median = 134.5 pg/mL, median % change = 61.0%, P = 0.004), TGF-B2 (baseline median = 18,734.1 pg/mL, month 2 median = 20,163.5 pg/mL, median % change = 7.6%, P = 0.017), IP-10 (baseline median = 105.3 pg/mL, month 2 median = 174.9 pg/mL, median % change = 66.2%, P = 0.011). There were significant decreases in VEGF (baseline median = 106.6 pg/mL, month 2 median = 0 pg/mL, median % change = -100%, P < 0.001), PLGF (baseline median = 4.4 pg/mL, month 2 median = 0 pg/mL, median % change = -100%, P = 0.028), IL-6 (baseline median = 9.9 pg/mL, month 2 median = 5.6 pg/mL, median % change = -43.6%, P = 0.011) and PDGF-AA (baseline median = 38.4 pg/mL, month 2 = 34.2 pg/mL, median % change = -10.9%, P = 0.003).

Conclusions: In treatment-naïve patients with DME, aflibercept resulted in statistically significant reduction in CST and macular volume. VEGF, PLGF, IL-6 and PDGF-AA were significantly reduced. However, there were statistically significant increases in pro-inflammatory cytokines including TGF-B1, TGF-B2 and IP-10.

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Venue: Ballroom 201

Changes in Retinal Vascular Caliber in Diabetic Retinopathy after Laser Photocoagulation

*First Author: Habibah **MUHIDDIN***
*Co-Author(s): Ichsan **ANDI**, Mannyu **BUDU**, Idayani **PANGGALO**, John **ELLIS**, Emanuele **TRUCCO***

Purpose: To assess changes in the caliber of retinal vessels before and after laser photocoagulation in diabetic retinopathy. The caliber of the retinal vessels depends on autoregulation through local mediators. Diabetic retinopathy causes dilatation of the vascular caliber caused by hypoxia and improved oxygen tension leads to narrowing of the retinal vessels. Since photocoagulation aims to increase the oxygen tension in the retina we hypothesize it should be possible to demonstrate narrowing of vessel caliber after laser treatment.

Methods: Retinal vascular caliber changes were analyzed before and 6-8 weeks after photocoagulation in 30 diabetic retinopathy eyes. Central retinal artery equivalent (CRAE) and central retinal vein equivalent (CRVE) were measured using the Vessel Assessment and Measurement Platform software for Images of the REtina (VAMPIRE) manual annotation tool.

Results: Both CRVE and CRAE in diabetic retinopathy patients were significantly greater than control patient values (P < 0.05). There was a significant decrease in CRVE and CRAE after laser photocoagulation (P < 0.05). There was no difference between CRVE and CRAE post laser photocoagulation and control patient values, implying a reduction in caliber towards normal in treated eyes.

Conclusions: Laser photocoagulation decreases retinal vascular caliber, even in the absence of change in the grade of diabetic retinopathy. It seems that retinal vascular caliber is a more sensitive indicator of increased oxygen tension than regression of retinopathy grade features.

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Venue: Ballroom 201

Characteristics of Leakage Site in Recurrent Central Serous Chorioretinopathy

*First Author: Khushboo **CHANDRA***

Purpose: To analyze the characteristics of the leak site in recurrent cases of central serous chorioretinopathy (CSCR).

Methods: A total of 22 eyes of 22 patients with recurrent CSCR were analyzed retrospectively. The eyes were divided on the basis of whether the leak during the recurrence occurred at the same or different site using fluorescein angiography. Various parameters like maximum height of the neurosensory detachment; maximum retinal thickness at the macula;

subfoveal choroidal thickness at baseline and recurrence; type (ink-blot / smoke stack), location (peripapillary / parafoveal) of leak; time taken for recurrence were compared in the 2 groups using independent *t*-test. The baseline patient characteristics and OCT parameters were co-related with the occurrence of a different site leak using logistic regression analysis.

Results: A total of 9 eyes had a leak at a different site while 13 eyes had a leak at the same site. There was a statistically significant increase in the height of the neurosensory detachment in different-site leak than the ones with same-site leak (P = 0.046). Also there was a significant increase in the subfoveal choroidal thickness at recurrence in eyes with a different-site leak (P = 0.028) compared to the eyes with same-site leak. A peripapillary site of leak at initial presentation seemed to predispose to a different-site leak during recurrence (P = 0.009). None of the baseline variables were found to be significant in regression analysis.

Conclusions: A different-site leak in recurrent CSCR acts like a fresh case with increased disease activity and neurosensory detachment.

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Venue: Ballroom 201

Clinico-Experimental Evaluation of Novel Suprachoroidal Injection System

First Author: Ajay ***AURORA***
Co-Author(s): Arjun ***AURORA****, Shalini* ***SINGH***

Purpose: To evaluate the efficacy and safety of Novel Supra Choroidal Injection Device (SCID) using commercially available 30-gauge needle for injecting drugs/ tamponade material into supra choroidal space (SCS) manually or using a mechanized injection system.

Methods: (1) SCS injection was performed on goat and cadaveric eyes using BSS/ Triamcinolone/Healon and assessed with UBM to understand the ease of injection and rapidity of drug distribution using novel SCID. (2) Five human eyes with recalcitrant macular edema, with or without associated glaucoma were injected 0.1/0.2 mL preservative free triamcinolone in SCS and evaluated with sequential SD-OCT, UBM, fundus photography and indirect ophthalmoscopy.

Results: Immediately after injection there was an increase in SCS on UBM followed by rapid distribution of drug posteriorly. Triamcinolone was well tolerated and reduced macular edema in 4/5 eyes without increasing the intraocular pressure even in known glaucoma patients. No eyes developed any retinal or choroidal injury.

Conclusions: This novel SCID is unique for it uses commercially available needle and allows easy, precise and safe injection into the SCS without the need of expensive, specialized micro needle systems. It also allows use of commercially available preservative-free triamcinolone for SCS injection. Triamcinolone injected in the SCS is effective in reducing macular edema without affecting IOP.

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Venue: Ballroom 201

Comparing Outcomes of Standard and Reduced-Fluence Photodynamic Therapy in the Treatment of Polypoidal Choroidal Vasculopathy

First Author: Wei Kiong ***NGO***
Co-Author(s): Tock-Han ***LIM****, Colin* ***TAN***

Purpose: To compare the efficacy and safety between reduced-fluence and standard-fluence photodynamic therapy (PDT) in the treatment of polypoidal choroidal vasculopathy (PCV).

Methods: This was a review of all treatment-naive PCV cases treated with PDT at a tertiary ophthalmology center. Patients treated with reduced and standard-duration PDT were recruited for this study.

Results: Thirty-seven eyes of 37 patients (24 males and 13 females) with a mean age of 69.9 years (range, 50–89 years; SD, 8.9 years) were included. Of these, 29 (78.4%) were treated with standard-fluence PDT while 8 (21.6%) had reduced-fluence PDT. Patients treated with reduced-fluence PDT had better visual acuity (VA) outcomes when compared with standard-

fluence PDT at 6 months (mean logMAR 0.22 vs 0.56) and 12 months (mean logMAR 0.23 vs 0.48). There was no difference between standard-fluence and reduced-fluence groups in terms of the number of rescue anti-vascular endothelial growth factor (VEGF) injections required subsequently (5.6 vs 4.8). Time to quiescence in the standard-fluence group was shorter when compared to the reduced-fluence group (2.8 vs 3.6 months). There was no statistical difference in recurrence of disease activity between the 2 groups (58.6% recurrence in standard-fluence group vs 37.5% in reduced-fluence group). There were no significant adverse events reported in either group.

Conclusions: Reduced-fluence PDT showed better VA outcomes while having comparable need for rescue anti-VEGF injections, recurrence rates and time to disease quiescent when analyzed against standard-fluence PDT in the treatment of PCV.

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Comparison of Anatomical Efficacy of Brolucizumab and Aflibercept in Neovascular Age-Related Macular Degeneration: An Analysis of Weeks 12-16 in the HAWK and HARRIER Studies

*First Author: Tien-Yin **WONG***
*Co-Author(s): Zuhal **BUTUNER**, Pravin **DUGEL**, Robin **HAMILTON**, Andreas **WEICHSELBERGER***

Purpose: HAWK and HARRIER are 2 prospective phase III trials investigating efficacy and safety of brolucizumab versus aflibercept in neovascular age-related macular degeneration (nAMD). We report the anatomic outcomes during the matched phase (wherein both drugs had identical dosing intervals) up to week 16, particularly between weeks 12-16.

Methods: Patients were randomized 1:1:1 to brolucizumab 3 mg (n = 358), 6 mg (n = 360) or aflibercept 2 mg (n = 360) (HAWK), or 1:1 to either brolucizumab 6 mg (n = 370) or aflibercept 2 mg (n = 369) (HARRIER). After 3-monthly loading doses, brolucizumab was administered every 12 weeks (q12w), with an option to switch to 8-week dosing (q8w) during the first q12 interval and at each scheduled q12 treatment visit; aflibercept was dosed in a fixed q8w regimen.

Results: The change in central subfield thickness (CSFT) (LS mean [SE]) during weeks 12–16 for brolucizumab 6 mg and aflibercept 2 mg was 19.2 (2.71) µm versus 21.7 (2.74) µm [difference -2.5 (3.86) µm, P = 0.5209] in HAWK and 20.6 (2.78) µm versus 30.9 (2.80) µm [difference -10.3 (3.95) µm, P = 0.0096] in HARRIER. From weeks 12–16, fewer brolucizumab 6 mg patients versus aflibercept 2 mg had an increase in CSFT of ≥50 µm (HAWK, 13.6% vs 18.2%, P = 0.0928; HARRIER, 14.3% vs 23.0%, P = 0.0025) or ≥75 µm (HAWK, 9.5% vs 13.5%, P = 0.0957; HARRIER, 10.0% vs 15.1%, P = 0.0376). Changes in IRF/SRF and sub-RPE fluid status during the matched phase up to week 16 were similar to patterns seen for CSFT.

Conclusions: During the matched phase, brolucizumab-treated patients had better anatomic outcomes and lower fluctuations in CSFT than aflibercept-treated patients.

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Comparison of Ranibizumab Versus Standard Treatment for Macular Edema Secondary to Branch Retinal Vein Occlusion (BRVO ME) in Patients with Initial Fair Visual Acuity (FAIR VISION STUDY)

*First Author: Na Kyung **RYOO***
*Co-Author(s): Jeeyun **AHN**, Woohyok **CHANG**, Se Woong **KANG**, Kyu Hyung **PARK**, Se Joon **WOO***

Purpose: To compare the efficacy of intravitreal ranibizumab injection and standard treatment of visual impairment due to macular edema secondary to branch retinal vein occlusion (BRVO ME) in patients with initial fair visual acuity.

Methods: In this prospective, randomized and comparative study, treatment-naive patients with BRVO ME (central foveal thickness ≥300

μm) with a relatively fair visual acuity (between ETDRS 63-77 letters) were enrolled. Patients received either 3-monthly injections of intravitreal ranibizumab followed by as-needed injections or underwent sham treatment. The best-corrected visual acuity, central macular thickness, etc. were evaluated up to 1 year after the initial injection.

Results: The best-corrected visual acuity significantly improved from logarithm of the minimal angle of resolution (ETDRS) 70.00 ± 4.59 letters at baseline to 77.00 ± 5.244 at 12 months in the ranibizumab group (n = 10, $P < 0.05$) and from 68.78 ± 4.12 (baseline) to 77.44 ± 9.54 at 12 months in the standard treatment group (n = 9, $P < 0.05$), with no statistically significant difference ($P = 0.91$). However, the ranibizumab injection group showed significant visual acuity improvement starting from 6 months, while the standard group showed improvement at 12 months. The mean reduction in central subfield thickness at 12 months was 191.6 ± 30.8 μm in the ranibizumab group ($P < 0.01$) and 160.5 ± 40.4 μm in the standard treatment group ($P < 0.01$).

Conclusions: In BRVO ME patients with initially fair visual acuity, intravitreal ranibizumab injection significantly improved best-corrected visual acuity and central retinal thickness. However, there was no difference with the standard (sham) treatment group at 1-year follow-up.

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Correlation of Metabolic Profile and Systemic Factors with Morphological Patterns of Diabetic Macular Edema

*First Author: Kushagra **JAIN***
*Co-Author(s): Poornachandra B. B **GOWDA**, Naresh Kumar **YADAV***

Purpose: To study the correlation of the metabolic profile and systemic factors of type 2 diabetes mellitus (DM) patients with different morphological patterns of diabetic macular edema (DME) on optical coherence tomography (OCT).

Methods: This was a retrospective observational study with 448 eyes of 224 type 2 DM patients with diabetic retinopathy and DME. Diffuse retinal thickening, cystoid macular edema (CME), neurosensory detachment, posterior hyaloid traction (PHT) and tractional retinal detachment (TRD) patterns on OCT were correlated with various systemic factors and the metabolic profile.

Results: The mean diastolic blood pressure was significantly higher in CME group ($P = 0.0001$) as compared to other groups. PHT and TRD groups combined had significantly higher mean triglyceride levels ($P = 0.0001$), mean fasting blood sugar levels ($P = 0.0014$) and mean HbA1c levels ($P = 0.003$), as compared to other groups. No correlation was found between DME patterns and any other metabolic or systemic factors like systolic blood pressure, hemoglobin levels, serum urea, creatinine, cholesterol, VLDL, LDL, HDL, homocysteine and urine micro albumin levels.

Conclusions: Morphological patterns of DME on OCT can act as a window to understand the systemic status of patients for better and comprehensive approach to patient management.

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Delineation of Capillary Dropout by Optical Coherence Tomography Angiography in a Patient with Paracentral Acute Middle Maculopathy Exhibiting Normal Fluorescein Angiography Findings

*First Author: Masako **MURATA***
*Co-Author(s): Takao **HIRANO**, Yasuhiro **IESATO**, Toshinori **MURATA**, Yuichi **TORIYAMA***

Purpose: We report the clear delineation of capillary dropout especially in the deep capillary plexus using optical coherence tomography angiography (OCTA) in a chronic case of unexplained scotoma that developed after femoral fracture. The patient exhibited normal fluorescein angiography (FA) findings and a normal retinal appearance.

Methods: A case report.

Results: A 44-year-old Japanese man had been suffering from bilateral, unexplained paracentral scotoma that developed after pulmonary fat embolism secondary to femoral bone fracture. Initial ophthalmological examination revealed unremarkable retinal findings. Goldmann perimetry, FA, and full-field electroretinography showed no pathological changes. Although fat embolism in the retinal vasculature that occurred after femoral fracture was considered, psychosomatic visual field defects could not be ruled out. Fat embolism in the deep retinal capillary plexus is one of the reported mechanisms underlying central/paracentral scotoma in patients with Purtscher's retinopathy. We performed OCTA, which clearly delineated capillary dropout in the deep retinal capillary plexus. A final diagnosis of a chronic stage of paracentral acute middle maculopathy secondary to fat embolism was made on the basis of OCTA findings.

Conclusions: Because conventional FA provides limited depth resolution, capillary dropout restricted within the deep capillary plexus cannot be detected, particularly when the superficial capillary plexus is well preserved. Thus, OCTA can be a useful tool for the detection of capillary dropout in the deep retinal capillary plexus.

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Dropout Rates among Age-Related Macular Degeneration Patients on Anti-Vascular Endothelial Growth Factor Therapy in a Malaysian Private Eye Clinic

*First Author: Eve Lyn **CHONG***
*Co-Author(s): Wen Shih **CHONG**, Yew **WONG***

Purpose: The aim of this study was to assess dropout rates and associated reasons among age-related macular degeneration (AMD) patients on 3 different anti-vascular endothelial growth factor (anti-VEGF) treatments.

Methods: A retrospective review of electronic medical records was carried out to identify eligible patients who were treated from January 2014 to December 2016. Foreign patients were excluded. Those who failed to keep review appointments (dropouts) were selected for telephone interviews based on a standard questionnaire to determine reasons for non-attendance.

Results: A total of 81 (43.32%) of 187 patients were found to have ceased attending follow-up clinics. However, after excluding those who were uncontactable, deceased or had transferred to a different clinic, 45 (24.06%) were included. There was little difference between the types of anti-VEGF therapies. The most common reason for defaulting treatment was the lack of perceivable improvement in visual acuity (42.2%). Of the patients, 33.3% were satisfied with their improved and stable acuity, while 17.8% cited financial constraints. Logistical difficulties, co-morbidities and needle phobia made up the remaining 6.7%.

Conclusions: The dropout rate of patients from this center was lower than expected at 24.06%. These findings offer an insight into real world compliance with anti-VEGF treatment for AMD in this part of Peninsular Malaysia. This survey raises the need for better patient education regarding the expected clinical course of the disease in individual cases and the importance of surveillance to detect early recurrence.

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Effects of Sodium-Glucose Cotransporter-2 Inhibitors and Dipeptidyl Peptidase-4 Inhibitors on Diabetic Retinopathy: A Real-World Korean Study

*First Author: Yoo-Ri **CHUNG***
*Co-Author(s): Kyoung Hwa **HA**, Dae Jung **KIM**, Kihwang **LEE***

Purpose: To compare the effects of sodium-glucose cotransporter-2 inhibitors (SGLT-2is) with those of dipeptidyl peptidase-4 inhibitors (DPP-4is) on the risk of diabetic retinopathy (DR) and its progression in patients with type 2 diabetes.

Methods: We performed a retrospective cohort study among patients with type 2 diabetes who started on an SGLT-2i or DPP-4i from 2014 to 2016 according to the Korean National Health Insurance Service database. Subjects initiated on an SGLT-2i or DPP-4i were matched on a 1:1 basis according to their propensity scores, and Cox proportional hazards regression models were used to calculate the hazard ratios (HR) for the risk of DR and its progression.

Results: After propensity score-matching, 41,430 patients without a history of DR were identified as new users of an SGLT-2i (n = 20,175) or DPP-4i (n = 20,175). The HR [95% confidence interval (CI)] for DR was 0.89 (0.83-0.97) for SGLT-2i initiators compared with DPP-4i initiators. In patients with a history of DR (n = 4663 pairs), there was no significant difference in DR progression between SGLT-2i initiators and DPP-4i initiators (HR 0.94, 95% CI 0.78-1.13).

Conclusions: This real-world cohort study showed that the use of a SGLT-2i was associated with a lower risk of DR than was the use of a DPP-4i. This suggests that SGLT-2is may be preferred to prevent DR in people with diabetes.

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Intravitreal Bevacizumab Injection and Its Effects on Proteinuria

*First Author: Youngho **KIM***
*Co-Author(s): Yoo-Ri **CHUNG**, Kihwang **LEE***

Purpose: To assess the effects of intravitreal bevacizumab injection on proteinuria of diabetic and non-diabetic patients.

Methods: Patients who received intravitreal bevacizumab (IVB) injection without any known nephropathy were included. Samples of urine were prospectively collected before the injection (within 1 month), and after 7 ± 1 days. The concentrations of urine protein, creatinine, and microalbumin were measured. The urine protein–to–creatinine (P/C) ratio as well as urine albumin–to–creatinine (A/C) ratio was calculated before and after IVB injection. Exclusion criteria consisted of IVB treatment within 3 months prior to the study, a history of pars plana vitrectomy (PPV), and undergoing hemodialysis or peritoneal dialysis.

Results: Twelve non-diabetic patients and 33 diabetic patients were studied. The mean concentration differences of urine protein, creatinine, microalbumin were 0.167 mg/dL, 2.975 mg/dL, 0.059 mg/dL in non-diabetic patients and -6.873 mg/dL, -23.848 mg/dL, -4.814 mg/dL in diabetic patients, respectively. The mean urine P/C ratio and A/C ratio were 78.607 mg/g and 7.079 mg/g before injection and 92.398 mg/g and 7.676 mg/g after 7 ± 1 days in non-diabetic patients and 564.088 mg/g and 351.812 mg/g before injection and 578.650 mg/g and 376.436 mg/g after 7 ± 1 days in diabetic patients. There were no statistically significant differences of urine protein, creatinine, microalbumin, urine P/C ratio and urine A/C ratio before and after 7 ± 1 days in non-diabetic or diabetic patients.

Conclusions: Intravitreal bevacizumab injection does not affect the proteinuria within 7 ± 1 days in not only non-diabetic patients but also diabetic patients.

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Intravitreal Triamcinolone Acetonide as an Adjunct to Ranibizumab in Diabetic Macular Edema: A Pilot Study

*First Author: Durgesh **KUMAR***
*Co-Author(s): Pankhuri Johari **JOHARI***

Purpose: To evaluate the effective dose and safety profiles of intravitreal triamcinolone acetonide and its utility as an adjunct to intravitreal ranibizumab in diabetic macular edema cases.

Methods: In our study 649 non-glaucomatous patients with type II diabetes having clinically significant macular edema were examined clinically; visual acuity assessment on Snellen chart was made and applanation tonometry were done. Optical coherence tomography

(OCT) was done in all patients and the mean macular thickness observed was 490 µm. Cases with epimacular membranes were excluded. FFA was done to rule out macular ischemia. 2 mg of triamcinolone acetonide was injected with ranibizumab 0.5 mg in 0.05 mL intravitreally. Post injection follow-up were at 5th day, 2 weeks, 4 weeks and then at monthly intervals.

Results: The mean macular thickness reduced to below 270 µm in 89.2% cases at 2 weeks and 97.7% cases at 4th week which was maintained till 6th month in 68.2% and till 12th month in 44.8% of eyes even without additional anti-VEGF injections. IOP rise of >5 mm Hg was acknowledged only in 5.2% cases. Significant cataract advancement requiring surgical intervention was seen in only 6.1% of 293 phakic cases. Need for additional ranibizumab injections to keep macula dry during the first year was 2 injections in 31% cases and 1 injection in 27% cases.

Conclusions: 2-mg intravitreal triamcinolone acetonide is safe and effective to be used an adjunct to intravitreal ranibizumab in management of diabetic macular edema and reduces the need for anti-VEGF by one third to one fourth.

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Is Retinal Artery Occlusion an Additional and Independent Risk Factor for Coronary Arterial Atherosclerosis? A Case-Control Study

*First Author: Yong Dae **KIM***
*Co-Author(s): Yong-Kyu **KIM**, Se Joon **WOO**, Yeonyee **YOON***

Purpose: To evaluate if retinal artery occlusion (RAO) is an additional and independent risk factor for coronary arterial atherosclerosis.

Methods: A total of 41 patients with RAO and 164 age- and sex-matched controls were retrospectively analyzed. The RAO group was composed of patients with an initial diagnosis of either central or branch RAO between 2004 and 2014. The control group was composed of asymptomatic people who underwent health check in health promotion center. Coronary computed tomographic angiography (CCTA) was performed in all subjects and various factors derived from CCTA were compared between both groups.

Results: Cardiovascular risk factors including age, sex, hypertension, diabetes mellitus (DM), dyslipidemia, obesity, and smoking history were not significantly different between RAO patients and control groups. Coronary plaque was observed in 25 RAO patients (61%) and 86 controls (52%) (P = 0.327). RAO patients showed higher prevalence of severe coronary stenosis of ≥50% luminal narrowing (29% vs 15%, P = 0.028). The mean coronary artery calcium scoring (CACS) showed significant difference between RAO patients (267.86 ± 674.93) and controls (120.22 ± 289.51) (P = 0.034). Multivariable logistic regression for factors associated with severe coronary stenosis showed significant odds ratio in male sex, hypertension, DM, obesity, and severe ICA stenosis.

Conclusions: RAO patients showed significant differences in severe coronary stenosis, maximal diameter constriction, and CACS compared with the control group, but RAO might not be a significant variable for the severe coronary stenosis after adjusting for comorbidities.

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Venue: Ballroom 201

Multimodal Imaging of Linear Lesions in the Fundus of Pathologic Myopic Eyes with Macular Lesions

*First Author: Kuo-Chi **HUNG***
*Co-Author(s): Muh-Shy **CHEN**, Tzyy-Chang **HO**, Shih-Wen **WANG**, Chung-May **YANG***

Purpose: To detect lacquer cracks (LCs) and myopic stretch lines (MSLs) in pathologic myopic eyes with and without macular hemorrhage (MHE) by using multimodal imaging.

Methods: We collected 18 consecutive

pathologic myopic eyes (spherical equivalent ≤ –8.0 diopters) that had presented with linear, yellowish-white lesions in the macula. We categorized the eyes into either the MHE group or the non-MHE group. All underwent fluorescein angiography (FA), near-infrared autofluorescence (NIA), indocyanine green angiography (ICGA), and spectral-domain optical coherence tomography (SD-OCT).

Results: In all 18 eyes, the linear lesions were hyperfluorescent under NIA imaging, but hypofluorescent under ICGA. All 10 eyes in the MHE group had LCs, and 2 had both LCs and MSLs. None of the 8 eyes in the non-MHE group had LCs. Regarding proximity to the MHE, LCs tended to locate closer than MSLs. Incidental perforating scleral vessels were clearly visible on the tracked SD-OCT scanning line, joining the choroid beneath the border of MHE. Sample cases are illustrated using delicate photographs and explanations.

Conclusions: NIA imaging combined with SD-OCT and ICGA can early detect and differentiate the subtle difference between the 2 types of linear lesions in pathologic myopic eyes. Notably MSLs were not associated with MHEs or LCs in our consecutive series.

Dec 16, 2018 (Sun) 08:30 - 10:00

Venue: Ballroom 201

Pachydrusen in Indian Population: A Hospital-Based Study

*First Author: Jay **CHHABLANI***
*Co-Author(s): Abhilash **GOUD**, Sashwanthi **MOHAN**, Avadhesh **OLI**, Mohammed **RASHEED**, Sumit **SINGH***

Purpose: To report the prevalence of pachydrusen in Indian population and their characteristics in relation to subfoveal choroidal thickness (SFCT), choroidal vascularity index (CVI) in comparison to eyes with soft drusen and subretinal drusenoid deposits (SDD) in age-related macular degeneration (AMD).

Methods: This was a retrospective, cross-sectional study involving patients with a diagnosis of dry AMD in at least 1 eye. The diagnosis of soft drusen, SDD and pachydrusen was made on the basis of color fundus photograph and optical coherence tomography (OCT). SFCT and CVI were calculated and compared among the different subtypes of drusen.

Results: A total of 169 eyes (143 dry and 26 wet AMD) of 85 patients with a mean (± SD) age of 67.67 ± 9.57 years were included. In eyes with dry AMD, pachydrusen were seen in 12 eyes (8.4%) with a mean (± SD) SFCT of 289.66 ± 91.01 μ. The difference in SFCT was statistically significant (P = 0.001) using analysis of variance (ANOVA) test. The eyes with pachydrusen had significantly thickened choroid compared to the eyes with SDD (30 eyes; 21.0%) or combination of soft drusen and SDD (29 eyes; 20.3%) and not soft drusen (72 eyes; 50.3%). The difference of CVI in different subgroups was significant (P = 0.03). One eye in wet AMD group had concurrent pachydrusen. Comparison of SFCT and CVI in wet AMD and fellow dry AMD eyes was not significant.

Conclusions: In Indian eyes with dry AMD, prevalence of pachydrusen (8.4%) is slightly lower compared to western literature (11.7%) and is associated with thicker choroid and higher CVI.

Dec 16, 2018 (Sun) 08:30 - 10:00

Venue: Ballroom 201

Ranibizumab and Vascular Endothelial Growth Factor A Levels in Human Breast Milk Following Intravitreal Injection

*First Author: Quratulain **PARACHA***
*Co-Author(s): Motaz **BAMAKRID**, Verena **JUNCAL**, Rajeev **MUNI***

Purpose: This study was conducted to assess the levels of ranibizumab and vascular endothelial growth factor in human breast milk following intravitreal ranibizumab injection.

Methods: This was a prospective study performed at St. Michael's Hospital, Toronto, Canada. A 37-year-old female nursing a 16-month-old child was diagnosed with myopic choroidal neovascularization for which intravitreal ranibizumab was recommended.

Breast milk was collected at baseline (1 hour before first injection) and at days 1-7, 14, 21 and 28 post-injection. Breast feeding was discontinued immediately prior to intravitreal injection and the patient pumped as much breast milk as possible at study time points. Samples were centrifuged immediately at 13,000 rpm at 4°C (fat portion removed) and stored at –80°C. Free ranibizumab and VEGF-A concentrations were measured by ELISA (Alpha Diagnostic Intl. Inc) and an immunoassay (R&D Systems Kit LXSAHM-01) with the Luminex platform respectively.

Results: Ranibizumab levels were not detected in the breast milk at baseline, days 1 and 2. Ranibizumab was detected at day 3 (34.7 ng/mL), with generally increasing levels over time until day 28 (128.9 ng/mL). VEGF-A demonstrated a reduction from baseline already at day 1 (12.3 ng/mL) and was suppressed even further over time (day 28, 4.9 ng/mL).

Conclusions: Ranibizumab is excreted into human breast milk following intravitreal ranibizumab injection with a corresponding significant decline in breast milk VEGF-A levels. The data are important to consider when counseling nursing women who develop retinal diseases requiring anti-VEGF therapy.

Dec 16, 2018 (Sun) 13:40 - 15:10

Venue: Ballroom 201

Red Blood Cell Deformability Correlates with Macular Ischemia in Diabetic Retinopathy

*First Author: Junyeop **LEE***
*Co-Author(s): Inhye **KIM**, Yu Kyung **KIM**, Jun Sung **MOON**, Min **SAGONG***

Purpose: Red blood cell (RBC) deformability, the ability to change its shape under stress, is essential for maintaining normal circulation in capillaries. Increased RBC stiffness is associated with the development of diabetic retinopathy (DR). This study was designed to investigate the correlation between RBC deformability and macular ischemia in DR.

Methods: This prospective study enrolled treatment-naïve DR. Venous samples were taken from the patients' antecubital veins and RBC deformability was measured using microfluidic ektacytometer. Elongation index (EI) was calculated by dividing the sums of the erythrocytes' major and minor axes at 3 pascal (Pa) by their difference (EI@3P). Baseline optical coherence tomography (OCT) and OCT angiography (OCTA) were performed. We analyzed vascular density and foveal avascular zone in superficial and deep capillary plexuses (DCP).

Results: This study reviewed 79 treatment-naïve DR patients (7 mild, 7 moderate, 28 severe non-proliferative DR, and 37 proliferative DR). Compared with the patients with mild or moderate NPDR, patients with severe non-proliferative DR or proliferative DR had a lower RBC EI@3P indicating the impaired RBC deformability. There was no significant difference in RBC EI@3P according to the presence of macular edema. In eyes without macular edema, patients with lower RBC EI@3P tended to show less vascular density and larger foveal avascular zone area of DCP in OCTA.

Conclusions: Impaired RBC deformability is associated with the progression of DR. Macular ischemia correlates with increased RBC stiffness in DR without macular edema. This study suggests that rheological properties of RBC contribute to the retinal capillary closure in diabetes, which leads to the progression of DR and ischemic maculopathy.

Dec 16, 2018 (Sun) 08:30 - 10:00

Venue: Ballroom 201

Single Intravitreal Ranibizumab Injection for Central Retinal Vein Occlusion, is It Enough?

*First Author: Aurora **HUTAGALUNG***

Purpose: To report the visual and anatomic outcome in a 24-year-old man with central retinal vein occlusion (CRVO) treated early with a single intravitreal ranibizumab injection.

Methods: In this case report, the clinical, hematologic and hypercoagulability evaluations were comprehensively carried out.

Results: A 24-year-old man presented with blurred vision of his right eye over 2 weeks. His best-corrected visual acuity on presentation was 6/9. Fundus examination revealed flame-shaped hemorrhages in all 4 quadrants, vein tortuosity and papilloretinal edema. Optical coherence tomography (OCT) of the macula showed subretinal fluid and thickening of the retina. No systemic disease has been reported. The hematologic and hypercoagulability evaluation were normal. The patient was treated immediately with a single injection of intravitreal ranibizumab. He gained visual acuity of 6/6 two weeks after injection and maintained 6/6 for 1 year after treatment. Fundus examination showed no hemorrhage and OCT of the macula revealed no macular edema.

Conclusions: CRVO with good baseline visual acuity treated early with a single intravitreal ranibizumab injection may result in excellent visual and anatomic outcome in 1 year after treatment.

Dec 16, 2018 (Sun) 08:30 - 10:00

Venue: Ballroom 201

The Beckman Initiative for Risk Factor Scoring of Age-Related Macular Degeneration: Application to Color Photos and Spectral-Domain Optical Coherence Tomography

*First Author: Neha **KHANNA***

Purpose: Beckman initiative for macular research committee evolved classification of risk factors in age-related macular degeneration (AMD), resulted in risk score on color photography (CF) for early and intermediate AMD. Risk scoring enables us to assess potential risk of developing late AMD. The purpose of this study was to apply this scoring to CF and optical coherence tomography (OCT) to understand if OCT could be as effective as CF.

Methods: Risk score of (1) for ≥1 large drusen (>125 µm) in diameter, (1) for definite pigmentary abnormalities associated with at least some drusen ≤63 µm and (0.5) for drusen 63-125 µm was applied to CF and OCT. Assessment of AMD was done using Wisconsin grading system with ETDRS grid on CF and 7-line raster scan centered at fovea on spectral-domain optical coherence tomography (SD-OC covering 5.9 x 1.56 mm area). A total of 188 eyes were included with a mean age of 66.17 years.

Results: The mean visual acuity logMAR was 0.328 and body mass index was 24.9 kg/m^2. On CF 18 eyes had early AMD and 169 eyes had intermediate AMD. On OCT 8 eyes had early AMD and 179 had intermediate AMD. The risk score on CF was 0 in 2, 0.50 in 12, 1.00 in 126 and 2.00 in 46 eyes. The risk score on OCT was 0 in 6, 0.50 in 9, 1.00 in 96, 1.5 in 2 and 2 in 74 eyes. The mean score was 1.20 on CF and 1.34 on OCT.

Conclusions: OCT offers several advantages, with high resolution images and measure drusen size accurately besides characterizing them and enables easier detection of pigmentary abnormalities. In this study, it was found that risk scoring was significantly higher with OCT compared to CF (P =0.002) and must be further studied for clinical importance.

Dec 16, 2018 (Sun) 10:30 - 12:00

Venue: Ballroom 201

Treat-and-Extend Regimen with Ranibizumab for Diabetic Macular Edema: 1-Year Real-World Results

*First Author: Chun-Ju **LIN***
*Co-Author(s): Tzyy-Chang **HO**, Yi-Ting **HSIEH**, Chun-Ting **LAI**, Chang-Hao **YANG**, Chung-May **YANG***

Purpose: Ranibizumab has been proven effective in treating diabetic macular edema (DME). The most popular treatment regimen in real world settings involves PRN injections. Studies show that PRN injections result in inferior outcomes. In the treat-and-extend (T&E) regimen, patients are treated with incrementally increasing intervals, with the goal of extending visit-free intervals for a patient. This study presents the 1-year results for the efficacy, safety and practicality of the T&E regimen with ranibizumab for the treatment of DME.

Methods: A non-comparative retrospective study was carried out in 2 tertiary centers. All patients received 3-monthly loading injections of 0.5 mg ranibizumab, followed with a T&E protocol in which the treatment intervals were increased by 1 month after achieving a stable best-corrected visual acuity (BCVA) and a central retinal thickness (CRT) less than 300 μm. All subjects were followed for at least 12 months. The change in BCVA and CRT and the injection numbers were presented.

Results: Forty eyes of 25 patients with DME were enrolled. The mean logMAR BCVA improved from 0.67 ± 0.32 μm at baseline to 0.40 ± 0.32 μm at 12 months ($P < 0.05$). The mean CRT reduced from 425 ± 110 at baseline to 273 ± 50 at 12 months. The mean injection number within 1 year was 8.0 (5 to 11).

Conclusions: T&E regimen with ranibizumab was a feasible treatment option for patients with DME, with the potential to reduce the number of injections, and thus the treatment burden. A longer follow-up period is mandatory for further studying.

Dec 16, 2018 (Sun) 13:40 - 15:10

Venue: Ballroom 201

Treatment Outcome of Cystoid Macular Edema Secondary to Retinitis Pigmentosa

*First Author: Shotaro **SHIMOKAWA***
*Co-Author(s): Kohta **FUJIWARA**, Yasuhiro **IKEDA**, Yusuke **MURAKAMI**, Koh-Hei **SONODA***

Purpose: We reported that topical carbonic anhydrase inhibitor (CAI) is effective for cystoid macular edema (CME) with retinitis pigmentosa (RP). However, some RP patients are resistant to this treatment. The purpose of this study was to evaluate the therapeutic effect of topical steroid, oral CAI, and sub-Tenon's triamcinolone acetonide injection (STTA) as an additional treatment for CME associated with RP.

Methods: We retrospectively studied a total of 119 eyes in 74 patients (21 men, 53 women; mean age, 53.6 years) with CME secondary to RP who were diagnosed with typical RP. We administered topical 0.1% betamethasone, oral CAI, STTA in order if patients were lacking an effective reduction of central foveal thickness (CFT) with topical 1.0% dorzolamide (CAI). We investigated therapeutic effect of each treatment and factors which influence on therapeutic effect. We defined effective treatment as 20% reduction of CFT from beginning of treatment.

Results: CFT effectively decreased in 64 of 108 eyes (59.3%) with topical CAI, 18 of 43 eyes (41.9%) with topical steroid, 13 of 30 eyes (43.3%) with oral CAI, 8 of 16 eyes (50.0%) with STTA. Patients with resistance to each treatment were significantly more frequent in men and thicker CFT at the beginning of treatment. Thicker CFT is a significant risk factor for refractory after adjustment for age and sex ($P = 0.03$).

Conclusions: In addition to topical CAI treatment, topical steroid, oral CAI, STTA are effective for CME secondary to RP. Early treatment might improve the efficacy.

Retina (Surgical)

Dec 14, 2018 (Fri) 08:30 - 10:00

Venue: Ballroom 201

A Short-Term Anatomical and Visual Outcomes of Large Idiopathic Macular Holes (Diameter >1000 μm) Surgery Following Inverted Internal Limiting Membrane Flap Technique

*First Author: Kiran **SHAKYA***

Purpose: To find out the technique of inverted internal limiting membrane (ILM) flaps for the management of large macular holes.

Methods: All 5 macular holes (diameter >1000 μm) were treated with pars plana vitrectomy with inverted ILM flap technique. The procedure for macular hole surgery was pars plana vitrectomy, posterior vitreous removal, ILM peeling with brilliant blue assisted, filling of the vitreous cavity with a gas bubble (C3 F8) and postoperative face-down positioning for 1 week. Spectral-domain optical coherence

tomography (SD-OCT) images were taken preoperative and postoperative 1-month and 3-month follow-up to assess the anatomical outcome of surgery and best-corrected visual acuity (BCVA) was used to evaluate the functional outcome during each visit. The BCVA was recorded using the Snellen chart and was converted to the logarithm of the minimum angle of resolution (logMAR) equivalents.

Results: All 5 eyes had complete anatomical closure. The mean age of patients was 68.2 ± 4.71 years. The mean macular hole base diameter was 1267.2 μm (1052-1526 μm). The mean ± SD preoperative and postoperative BVCA was 1.44 logMAR ± 0.28 and 0.99 log MAR ± 0.142 respectively (P = 0.042). There were no intraoperative or postoperative complications. All the patients were followed up for a period of 3 months.

Conclusions: Inverted ILM flaps for large macular holes is effective for closure of the hole and restoration of functional vision.

Dec 14, 2018 (Fri) 08:30 - 10:00

Venue: Ballroom 201

Autologous Neurosensory Retinal Free Flap Transplantation for Postoperative Huge Refractory Macular Hole

*First Author: Wen-Chuan **WU***

Purpose: To evaluate the anatomical and functional outcomes of autologous neuroretinal transplantation for eyes with huge post-vitrectomized refractory macular hole.

Methods: Autologous neuroretinal transplantation combined with whole blood or viscoelastic materials for the treatment of 4 eyes with huge post-vitrectomized refractory macular hole.

Results: Case I received retinal flap transplantation with viscoelastic and silicone oil tamponade for his right eye. The macular hole was closed and the best-corrected visual acuity (BCVA) was increased from ND/10 cm to 0.12 in 1 month. Case II received retinal flap transplantation with viscoelastic and silicone oil tamponade. The macular hole was closed and the BCVA was increased from ND/10 cm to 0.02 in 24 days. Case III received whole blood coating with retinal flap transplantation and silicone oil tamponade. The macular hole was closed and the BCVA was increased from ND/10 cm to 0.1 in 1 month. Case IV received PPVT+ILM transplantation but in vain. Then he received whole blood coating with retinal flap transplantation and gas tamponade. The macular hole was closed and the BCVA increased from HM/10 cm to 0.4.

Conclusions: Autologous neurosensory retinal free flap transplantation may represent an innovative technique for treatment of huge postoperative refractory macular hole. Further studies with a large number of patients are needed to establish the advantages of this technique and to see whether there are long-term surgery-related complications.

Dec 14, 2018 (Fri) 08:30 - 10:00

Venue: Ballroom 201

Closure of Large Chronic Macular Hole by Scleral Imbrication and Retinal Expansion

*First Author: Yodpong **CHANTARASORN***
*Co-Author(s): Patrinee **THAMSRISWADI***

Purpose: To describe a new technique for the treatment of large chronic macular holes (MHs) using scleral imbrication and retinal expansion, and to report the outcomes of MH closure.

Methods: This retrospective study demonstrated a procedure for correcting the disproportion between an area of stiff neurosensory retina and the inner scleral wall. Six-mm scleral imbrications were performed in the superotemporal and inferotemporal quadrants shortly after an induction of the macular detachment. Baseline MH parameters were collected. The MH closure rate, visual outcomes, and biometry were reported at 6-month follow-up.

Results: The MH closure was achieved in 6 (85.7%) out of 7 patients. The mean minimal hole diameter, base hole diameter and MH index were 712 ± 136.8 μm, 1440 ± 444 μm,

and 0.27 ± 0.08 respectively. At 6-month follow-up, the median corrected distance visual acuity significantly improved from 20/320 [interquartile range (IQR) = 20/200-20/800] preoperatively to 20/100 (IQR = 20/80-20/125) postoperatively (P = 0.018; Wilcoxon signed-rank test). An effect of median axial length shortening was 0.7 mm (IQR = 0.53-1.02).

Conclusions: This technique provided both satisfactory hole closure rates and acceptable structural outcomes.

Dec 14, 2018 (Fri) 08:30 - 10:00

Venue: Ballroom 201

Comparison of Temporal Inverted Internal Limiting Membrane Flap Technique with Classic Inverted Internal Limiting Membrane Flap Technique in Large Macular Holes

*First Author: Diva **MISRA***
*Co-Author(s): Pushkar **DHIR**, Ronel **SOIBAM**, Awaneesh **UPADHYAY***

Purpose: To evaluate the efficacy of standard inverted flap technique in comparison to temporal inverted internal limiting membrane (ILM) flap technique for the treatment of large idiopathic macular hole (>700 µm).

Methods: In this prospective, comparative and interventional study, patients with idiopathic macular holes larger than 700 microns were included. In group 1, 15 eyes of 15 patients underwent standard inverted flap technique. In group 2, 15 eyes of 15 patients underwent a modification of the standard technique, called the temporal inverted ILM flap technique. We compared changes in best-corrected visual acuity (BCVA) before and after surgery and closure rates of macular hole between the 2 groups.

Results: Preoperative mean visual acuity was 1.059 ± 0.22 logMAR in group 1 and 1.055 ± 0.29 logMAR in group 2. Macular hole closure was observed in 94% of patients in group 1 and in 87% of patients in group 2. The morphology of hole hole closure was documented in detail in both groups.

Conclusions: The temporal inverted ILM flap technique was found to be as effective as the classic inverted ILM flap technique in the management of large (>700 microns) macular holes.

Dec 14, 2018 (Fri) 08:30 - 10:00

Venue: Ballroom 201

Efficacy of Flute-Needle Vacuum Assistant Hole Closure Technique for Large Idiopathic Macular Hole

*First Author: Liu **GUANGFENG***
*Co-Author(s): Yanrong **JIANG**, Lie **MA**, Zhizhong **MA***

Purpose: To evaluate the efficacy of flute-needle vacuum assistant hole closure technique for large idiopathic macular hole.

Methods: This was a retrospective study of 23 cases (25 eyes) of idiopathic macular hole surgery with diameter of more than 400 µm. All patients underwent pars plana vitrectomy with internal limiting membrane (ILM) peeling and flute-needle vacuum assistant hole closure technique. Patients were evaluated by visual acuity changes, OCT findings of hole closure types, and outer retina including ELM and EZ band changes.

Results: 100% hole closure rate was achieved among the 25 large idiopathic macular hole, including 16 U type closure and 9 V type closure. The best-corrected visual acuity (BCVA) significantly improved from preoperative 1.05 ± 0.29 to postoperative of 0.76 ± 0.27 ($P < 0.05$). ELM band defect length were significantly shorter from 1050.00 ± 380.39 µm to 623.32 ± 328.66 µm preoperative and postoperative superlatively. The EZ band defect length was significantly shorter from 1147.28 ± 354.41 µm to 818.28 ± 247.33 µm preoperative and postoperative superlatively.

Conclusions: Flute-needle vacuum assistant hole closure technique for large idiopathic macular hole could improve hole closure and recovery of ELM and EZ band of outer retina.

Dec 14, 2018 (Fri) 08:30 - 10:00

Venue: Ballroom 201

Efficacy of Intravitreal Injection of Conbercept for Familial Exudative Vitreoretinopathy

*First Author: Li **NAN***

Purpose: To observe the clinical efficacy and safety of intravitreal injection of conbercept in the treatment of familial exudative vitreoretinopathy (FEVR).

Methods: The study included 24 eyes of 13 patients with staging 2 FEVR. All the children were given intravitreal injection of the anti-VEGF drug conbercept 0.25 mg under local anesthesia. At 1, 2, 4, 8, 12, and 24 weeks after treatments, the disappearance of neovascularization and the inflammation in the vitreous cavity were evaluated with RetCom III and the indirect ophthalmoscope.

Results: After 24 weeks of injection, 36 eyes were treated with 1 and 2 times of intravitreal injection. Of these, 34 eyes were cured with only 1 injection, and 2 eyes had received injections twice. The retinal vessels developed to the peripheral serrated edge and the neovascularization disappeared, which accounted for 83.33% of all the eyes. Four eyes had no obvious regression of lesion ridge and supracristal proliferative vessels. However neovascularization occurred again in 2 eyes after receding, accounting for 5.56% of all the affected eyes. No major systemic or ocular complications after injection appeared. All lens remained transparent and there was no iatrogenic retinal hole during the follow-up.

Conclusions: Intravitreal injection of conbercept is effective in the treatment of familial exudative vitreoretinopathy.

Dec 14, 2018 (Fri) 08:30 - 10:00

Venue: Ballroom 201

Foveal Microvascular Structures in Eyes with Silicone Oil Tamponade for Rhegmatogenous Retinal Detachment: A Swept-Source Optical Coherence Tomography Angiography Study

*First Author: Eun Kyoung **LEE***
*Co-Author(s): Jin Young **KIM**, Jong Young **LEE***

Purpose: To investigate the structural changes of the foveal microvasculature using swept-source optical coherence tomography (OCT) angiography (OCTA) in patients with rhegmatogenous retinal detachment (RRD) treated with vitrectomy with silicone oil tamponade.

Methods: Thirty-five patients with unilateral RRD who were treated with vitrectomy and silicone oil tamponade and were followed up for more than 3 months after silicone oil removal were included. Ophthalmologic examinations included visual acuity assessment, ultrawide-field fundus photography, spectral-domain OCT, and swept-source OCTA. Central foveal thickness (CFT) and macular ganglion cell-inner plexiform layer (mGCIPL) thickness were measured. En face OCTA images were obtained at 3 months postoperatively, and foveal avascular zone (FAZ) area and vascular density (VD) in both the superficial (SCP) and deep capillary plexus (DCP) in treated eyes were compared with those of the unaffected contralateral eyes.

Results: The CFT and mGCIPL thickness were significantly lower in eyes with silicone oil tamponade than in the fellow eyes ($P = 0.032$, $P = 0.001$, respectively). The FAZ areas in DCP were larger (0.76 ± 0.32 mm^2 vs 0.63 ± 0.22 mm^2; $P < 0.001$) and VD in DCP was lower ($32.35 \pm 3.93\%$ vs $34.25 \pm 2.14\%$; $P = 0.022$) in eyes with silicone oil tamponade than in the fellow eyes. There was no significant difference in FAZ areas in SCP ($P = 0.173$) and VD in SCP ($P = 0.852$) between treated eyes and fellow eyes. A negative correlation was found between the duration of silicone oil tamponade and the VD in DCP ($r = -0.335$, $P = 0.048$).

Conclusions: In eyes with vitrectomy and silicone oil tamponade for RRD, quantitative OCTA measurements confirm enlarged FAZ area and decreased VD in DCP.

Dec 14, 2018 (Fri) 08:30 - 10:00

Venue: Ballroom 201

Intravitreal Injection of Tissue Plasminogen Activator, Ranibizumab, and C3F8 for Early Submacular Hemorrhage in Polypoidal Choroidal Vasculopathy

*First Author: Zhang **SHUANG***
*Co-Author(s): Sun **XIANYONG**, Jie **ZHANG***

Purpose: To observe the clinical efficacy and safety of intravitreal injection of tissue plasminogen activator (t-PA), ranibizumab and C3F8 for early submacular hemorrhage (SMH) in polypoidal choroidal vasculopathy (PCV).

Methods: Twenty-one consecutive patients (21 eyes) with SMH secondary to PCV were included. All patients were given intravitreal injection of t-PA, ranibizumab and C3F8 treatment, after 2 hours in the supine position and changed to prone position for 3 days. The primary outcome measure was best-corrected visual acuity (BCVA) 6 months after treatment. Secondary outcome measures included SMH absorption, central retinal thickness (CRT) , central epithelial detachment (PED), recurrence rate, and complications.

Results: Submacular hemorrhage ranged in size from 4 to 35 disc diameters. The average intravitreal injection of anti-VEGF drugs was 3.1 ± 0.3 times. The mean logarithm of the minimal angle of BCVA decreased from 1.73 ± 0.91 before treatment to 0.42 ± 0.37 six months after treatment (P = 0.000). CRT decreased from 620 ± 275.75 μm before treatment to 290.15 ± 97.36 μm 6 months after treatment (P = 0.000). The central PED on SD-OCT in 14 patients decreased from 681.36 ± 292.01 μm before treatment to 41.57 ± 78.12 μm 6 months after treatment (P = 0.000). In the study, 16 eyes had completely disappeared (80%) at 6 months, and 4 eyes (20%) were partially disappeared. Vitreous hemorrhage after 1 eye surgery was not included in the statistical study.

Conclusions: Subretinal hemorrhage treatment by intravitreal injection of rt-PA, ranibizumab, and C3F8 is useful to achieve hemorrhage displacement and lesion improvement. Early detection of neonatal hemorrhage and timely injection of anti-VEGF drugs (PRN) in the vitreous cavity is beneficial to reduce recurrence.

Dec 14, 2018 (Fri) 08:30 - 10:00

Venue: Ballroom 201

Iris, Choroid, Retinal Coloboma with Rhegmatogenous Retinal Detachment in a 20-Year-Old Filipino Male

*First Author: Melody Ana **TAN-DACLAN***
*Co-Author(s): Lyll Karen **ARRIOLA**, George Christopher **CHAN**, Jeffrey **LIM***

Purpose: To present a case of a patient with iris, chorioretinal coloboma and rhegmatogenous retinal detachment and to describe its clinical presentation, methods of diagnosis and treatment modalities.

Methods: The clinical data of the patient were collected retrospectively and presented as a case study. The patient was a 20-year-old Filipino male with no known medical comorbidities. He was seen and examined at the institution's outpatient clinic and surgical intervention was done at the same institution.

Results: Coloboma of the iris, choroid and retina is a rare condition that is not frequently documented because it is often asymptomatic. Of special interest are patients who presented with retinal detachment due to a break in the rudimentary retina found in the area of the coloboma. Attaching the rudimentary retina and applying barrier laser to an area with little or no retinal tissue posed a challenge. Retinal holes and detachment at the area of coloboma were left in place; fluid air exchange was used to reattach the normal tissue at the superior area where there was no coloboma.

Conclusions: The patient was diagnosed with iris and chorioretinal coloboma with rhegmatogenous retinal detachment of the left eye. Visual acuity was hand movement.

He underwent PHACO with sulcus intraocular lens, pars plana vitrectomy, fluid air exchange, endolaser with C3F8 injection of the left eye. After 6 months, his best-corrected visual acuity was 6/21. At the area of the coloboma, retina was detached and holes were still present but normal retinal tissue was otherwise attached.

Dec 14, 2018 (Fri) 08:30 - 10:00

Venue: Ballroom 201

The Outcome of Concurrent Silicone Oil Removal and Trabeculectomy in Secondary Glaucoma Following Pars Plana Vitrectomy and Silicone Oil Injection

*First Author: Sindy Boru **SEMBIRING***
*Co-Author(s): Arief **KARTASASMITA***

Purpose: To describe the outcome of concurrent silicone oil removal and trabeculectomy in secondary glaucoma following pars plana vitrectomy (PPV) and silicone oil injection in Cicendo National Eye Hospital.

Methods: A retrospective study was undertaken of the medical records of secondary glaucoma patients following PPV and silicone oil injection in rhegmatogenous retinal detachment that underwent concurrent silicone oil removal and trabeculectomy during January 2016 to April 2018. The main outcome measures were anatomic success and intraocular pressure (IOP). Anatomic success was defined as complete reattachment of the retina. Success in controlling IOP was defined as pressure of 6-21 mm Hg with or without glaucoma medication, but without additional glaucoma surgery. Hypotonia was defined as IOP ≤5 mm Hg.

Results: Twenty eyes were included in this study. Anatomic success was achieved in 70% of eyes. Success in IOP control was achieved in 10% cases at the final follow-up. Failure in IOP control was more likely due to refractory high IOP (14 of 20, 70%) than hypotonia (4 of 20, 20%). Hypotonia was more prevalent in eyes with anatomic failure. However, there was no statistically significant association between hypotonia and anatomical results (Fisher's exact test, P = 0.061).

Conclusions: Concurrent silicone oil removal and trabeculectomy results in a high failure rate in controlling IOP caused by refractory high IOP despite anatomic success.

Dec 14, 2018 (Fri) 08:30 - 10:00

Venue: Ballroom 201

Treatment of Macular Hole Retinal Detachment with Macular Plug in Highly Myopic Eyes: 3-Year Results

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

Purpose: To investigate the long-term outcomes of macular hole retinal detachment (MHRD) following vitrectomy with inverted internal limiting membrane repositioning (ILMR) and autologous blood clot (ABC) in highly myopic eyes.

Methods: A total of 34 cases of highly myopic eyes with MHRD in 34 patients who underwent an initially successful vitrectomy with ILMR and ABC and were followed up at least for 3 years were retrospective reviewed.

Results: The mean age was 61.6 ± 11.0 years. The follow-up was 45.4 ± 8.6 months. The mean axial length was 28.6 ± 2.0 mm. All eyes demonstrated attached retina but 2 eyes (5.9%) developed re-opened macular hole until the last follow-up. Complications of postoperative rhegmatogenous retinal detachment were detected in 2 eyes (5.9%) within 1 year and retinal reattached after the secondary vitrectomy. Two cases (5.9%) of prolonged subretinal fluid more than 1 year were detected but finally absorbed completely. Functionally, the best-corrected visual acuity improved by 0.54 logarithm of the minimum angle of resolution (logMAR) unit 6 months postoperatively (P = 0.012) and continuously remained by 0.76, 0.86, and 0.75 logMAR unit improvement at 1 year (P < 0.001), 2 years (P < 0.001), and 3 years (P < 0.001) postoperatively, respectively. Fourteen eyes (41.2%) of vision worsen from 1 year to 3 years postoperatively were observed and visual deterioration was associated with progression of myopic

maculopathy (P = 0.005), CRT at 3 years (P = 0.037), and the history of glaucoma (P = 0.007).

Conclusions: A vitrectomy with macular pug provided favorable outcomes in the long term.

Dec 15, 2018 (Sat) 17:00 - 18:30

Venue: Ballroom 202

Anatomical and Visual Outcome Following Vitrectomy for Primary Rhegmatogenous Retinal Detachment (RRD) with Proliferative Vitreoretinopathy Grade C

*First Author: Jane **FOO***
*Co-Author(s): Zabri **BIN KAMARUDIN**, Norlelawati **ZAINOL***

Purpose: To describe the anatomical and visual outcome following vitrectomy for cases presenting with primary rhegmatogenous retinal detachment with proliferative vitreoretinopathy grade C (PVR C).

Methods: This was a retrospective case series.

Results: A total of 126 patients with at least 6 months of follow-up after vitrectomy were included. A majority were older than 60 years. Of the patients, 102 (81%) underwent vitrectomy (56% of these had retinectomy), while the rest had combined vitrectomy and buckle. There was high anatomical success rate, with reattachment rate of 117 (91.2%) at final follow-up; 106 (84.1%) were single surgery anatomical success. Visual outcome improved postoperatively. The mean postoperative best-corrected visual acuity (BCVA) was logMAR 1.8 ± 0.9 from mean preoperative BCVA of logMAR 2.7 ± 0.7 (P < 0.05). Improvement of visual outcome was significantly associated with reattached retina, perfluoropropane tamponade and retinectomy equal to or less than 180 degrees. Internal limiting membrane peeling did not show significant association with better visual outcome, as poor visual outcome was likely due to photoreceptor damage which was more common than macular pucker. Of the patients, 48 (38.1%) had removal of silicone oil, of which none had redetachment at the end of follow-up; 63 (50%) had complications, where high intraocular pressure and cataract were the commonest ones. Hypotony was seen in 2 (1.6 %) eyes, of which none had phthisis bulbi.

Conclusions: Surgical intervention remains the treatment modality for this condition which could potentially improve the outcome and prevent long-term complications.

Dec 15, 2018 (Sat) 17:00 - 18:30

Venue: Ballroom 202

Bilateral Lens Subluxation with Unilateral Retinal Detachment in a Child with Marfan Syndrome Treated by Scleral Buckling with Vitrectomy: A Case Report

*First Author: Ronnie **MANAYSAY***
*Co-Author(s): Jocelyn **SY***

Purpose: To describe a case of bilateral lens subluxation with associated unilateral retinal detachment in a child with Marfan syndrome and was managed by scleral buckling, lensectomy and vitrectomy.

Methods: Descriptive clinical case report.

Results: The case was a 12-year-old child diagnosed with Marfan syndrome who had few months' history of blurring of vision of the right eye. He presented to our clinic with a visual acuity of hand movement in the right eye and 20/80 in the left eye. Ophthalmologic examinations showed bilateral supero-temporal lens subluxation, fundus examination showed a total retinal detachment of the right eye with sub-retinal bands and an attached retina of the left eye. He subsequently underwent scleral buckling with 42 silicon band, pars plana vitrectomy, lensectomy, sub-retinal band peeling, and tamponade with 1000 centistoke silicone oil, which attached the retina.

Conclusions: Marfan syndrome can cause multi-organ complications, including the visual system. Retinal detachment and lens complications arising from this connective tissue disease can be successfully managed by scleral buckling, vitrectomy, lensectomy, and 1000 centistoke silicone oil.

Dec 15, 2018 (Sat) 17:00 - 18:30

Venue: Ballroom 202

Clinical Importance of Foveal Avascular Zone of Normal Fellow Eyes in Patients with Unilateral Macular Holes

*First Author: Yoon Jeon **KIM***
*Co-Author(s): June-Gone **KIM**, Joo Yong **LEE**, Young Hee **YOON***

Purpose: To investigate foveal avascular zone (FAZ) using optical coherence tomography angiography (OCTA) of an unaffected fellow eye in patients with unilateral idiopathic macular hole (MH) and to determine its association with functional recovery after MH closure.

Methods: Sixty patients with unilateral MH who were followed for ≥6 months after surgery and 60 age- and sex-matched controls were included. Ophthalmologic evaluations included best-corrected visual acuity (BCVA) and spectral-domain optical coherence tomography (SD-OCT) before surgery and 6 months after surgery. En face OCTA images were obtained for both eyes at pre- and 6 months post-surgery, and the FAZ area was identified.

Results: Compared with the control eyes, the FAZ area was significantly larger in fellow eyes of idiopathic unilateral MH ($P = 0.005$). The FAZ area of the fellow eyes was significantly correlated with the postoperative FAZ area and postoperative BCVA (all $P < 0.05$). There was a correlation between hole diameter and the FAZ area of the fellow eyes (Pearson's coefficient = 0.259, $P = 0.035$). Multivariate regression analysis indicated that the larger FAZ area of the fellow eyes ($P < 0.001$), the larger adjusted hole size parameter ($P < 0.001$), and older age ($P = 0.021$) were significantly associated with the poor postoperative visual outcome ($R^2 = 0.486$).

Conclusions: These results support the idea that patients with MH have unique foveal morphologic features predisposing MH development and suggest that functional recovery after surgical closure might be related to such characteristics.

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Venue: Ballroom 202

Combined Intraocular Lens Explantation and Intrascleral Lens Fixation Using Extraocular Needle-Guided Haptic Insertion Technique (X-NIT)

*First Author: Kalpana **KUMARI***
*Co-Author(s): Nagesha **CHOKKAHALLI***

Purpose: Explantation of faulty rigid intraocular lens (IOL) needs large sclera-corneal tunnels. This limitation can be advantageous in fixing intrascleral IOL (SFIOL) using X-NIT technique there by achieving both purposes in a single setting.

Methods: We retrospectively analyzed 15 eyes who had subluxated IOL or posteriorly dislocated IOL. All underwent 25G pars plana complete vitrectomy, simultaneous IOL explanation (all were single piece) and scleral fixation of IOL (3-piece rigid PMMA lens) using X-NIT technique through 6-mm sclera-corneal section. The intraoperative risks, immediate and late postoperative complications and visual acuity change were analyzed at 1, 3 and 6 months.

Results: In the immediate postoperative period, 4 eyes had transient dispersed vitreous hemorrhage and 2 eyes had transient hypotony and all were managed conservatively. Two eyes on AGM preoperatively were attained normal range post-surgery without AGM and 1 eye developed steroid induced glaucoma. The BCVA improved from mean 0.7 logMAR units to 0.4 logMAR units. The mean cylinder correction was -1.25 diopters. No late complications were noted at 3rd or 6th month.

Conclusions: X-NIT technique is best utilized in cases needing removal of dislocated rigid IOL where simultaneous placement of scleral fixated IOL is very easy and often encounter less complications. The use of 26G needle for haptic exteriorization offers special advantage in preventing entry site-related leakage, hypotony, ciliary body detachment and intraoperative bleeding.

Dec 15, 2018 (Sat) 17:00 - 18:30

Venue: Ballroom 202

Conventional Internal Limiting Membrane (ILM) Peeling Versus Inverted ILM Flap for Macular Hole Surgery

*First Author: Manabjyoti **BARMAN***

Purpose: To compare anatomical and functional outcome after single surgery for large macular holes with 2 different surgical techniques: conventional ILM peeling and inverted ILM flap technique.

Methods: A retrospective analysis of macular hole surgery done by a single surgeon on treatment-naive patients with stage IV macular hole (diameter of >400 μm) was done. Patients were randomized into 2 groups: group A with conventional ILM peeling and group B with inverted-ILM flap technique. Study measurements included pre- and post-operative best-corrected visual acuity and morphology of the hole by ED-OCT.

Results: A total of 41 patients were enrolled (group A: 23, group B: 18). The mean follow-up was 8.3 months. The closure rate was 91.3% in group A and 94.4% in group B. Visual acuity improvement was comparable in both groups, though the inverted-flap technique induced a faster recovery. The morphology of hole closure was documented in both groups. No vision-threatening complication was noted.

Conclusions: Large macular holes are surgical challenges with guarded success rate. The inverted-flap technique is an alternative to conventional technique in cases that may improve the chances of a better outcome. Though both techniques displayed a trend toward anatomical and functional success, inverted-flap technique may have an edge over the conventional technique in terms of slightly higher closure rate and faster visual recovery.

Dec 15, 2018 (Sat) 17:00 - 18:30

Venue: Ballroom 202

Efficacy of Intravitreal Injection of Conbercept in Diabetic Macular Edema: A Preliminary Study

*First Author: Haiyan **XU***
*Co-Author(s): Bing **LI**, Junjie **YE**, Weihong **YU**, Chan **ZHAO**, Huiying **ZHOU***

Purpose: To evaluate functional and structural effects of conbercept in patients with center-involving diabetic macular edema (DME).

Methods: This was a prospective, randomized, double-masked clinical trial. Fifteen eyes of 15 patients with center-involving DME were randomly assigned to the conbercept intravitreal injection group (n = 6),or the grid/focal laser treatment groups (n = 9). Changes of best-corrected visual acuity (BCVA) and central retina thickness (CRT) in the 2 groups were compared at 6 and 12 months. Correlations between BCVA, CRT and macular superficial capillary plexus (SCP) density in both groups were also analyzed.

Results: Patients in the conbercept treatment group had increased BCVA scores than in the laser treatment group at both 6 months (5.5 ± 12.9 vs 2.6 ± 9.3) and 12 months (8.8 ± 13.2 vs 3.3 ± 10.1). At 6 months, patients in the conbercept group had a statistically significant reduction of CRT, compared with the laser treatment group (-221.5 ± 110.0 μm vs -92.4 ± 109.4 μm, P = 0.038). At 12 months, a similar decrease of CRT was also found in the conbercept group, compared with the laser treatment group (-243.6 ± 128.2 μm vs -106.7 ± 124.3 μm). At 12 months, we observed a positive correlation between CRT and SCP density (ρ = 0.97, P = 0.029) in the conbercept group.

Conclusions: In center-involving DME patients, those who underwent conbercept treatment experienced more BCVA improvement and CRT reduction than those who underwent grid/focal laser treatment. After conbercept injection, SCP density was positively correlated with CRT.

Dec 15, 2018 (Sat) 17:00 - 18:30

Venue: Ballroom 202

Horizontal Optical Coherence Tomography–Guided High Myopia Macular Reinforcement Surgery

*First Author: Fangfang **DAI***
*Co-Author(s): Jinfeng **HAN**, Xuemin **JIN**, Mengdi **LI**, Shuangshuang **LI**, Yanting **WANG***

Purpose: To investigate the effect of horizontal optical coherence tomography (OCT) in the treatment of high myopia macular splitting.

Methods: Macular reinforcement was performed on 5 eyes with high myopia macular splitting. The results of optometry, eye axis, panoramic fundus photography, and OCT were collected before surgery. Under general anesthesia, the scleral suture was preset, the reinforced band was initially fixed, and the horizontal OCT was performed to determine the specific position of the reinforced band, and if necessary, the tightness of the suture and the position of the reinforced band were adjusted. Then, allogeneic scleral graft was placed between the reinforcing band and the posterior scleral staphyloma. Finally, the anterior chamber puncture was performed to maintain normal intraocular pressure.

Results: According to the results of the horizontal OCT monitoring, a total of 3 eye reinforced bands were adjusted during surgery. One eye was due to the band being too close to the optic nerve, and the other 2 eyes were due to the deviation of the reinforcing position from the center of the posterior scleral staphyloma. The degree of macular splitting in 4 eyes was observed to be reduced during the surgery. No intraoperative infection occurred due to using horizontal OCT.

Conclusions: Horizontal OCT can play a guiding role in high myopia macular reinforcement surgery, which can not only avoid oppression of the optic nerve, but also directly observe the reinforcement effect.

Dec 15, 2018 (Sat) 17:00 - 18:30

Venue: Ballroom 202

Long-Term Prognostic Factors for Visual Improvement after Epiretinal Membrane Removal

*First Author: Sohee **JEON***
*Co-Author(s): Byung Ju **JUNG**, Won Ki **LEE***

Purpose: To identify prognostic factors that may predict the amount of long-term visual improvement after idiopathic epiretinal membrane (ERM) removal.

Methods: A retrospective study of 114 patients who underwent ERM removal was performed. The central foveal thickness (CFT), inner retinal layer thickness, inner retinal irregularity index (IRII), length of the cone outer segment tip (COST) line defect, and length of the ellipsoid zone (EZ) defect were measured. We determined the optical coherence tomography (OCT) parameters that were associated with the amount of visual improvement at 24 months postoperatively.

Results: In this study, CFT and IRII were not associated with best-corrected visual acuity (BCVA) at 24 months ($P = 0.227$ and $P = 0.544$, respectively), whereas the lengths of COST line defect and EZ defect were associated with worse BCVA at 24 months ($P = 0.015$ and $P < 0.001$, respectively). Univariate regression analysis indicated that CFT and IRII were associated with visual improvement ($P = 0.011$ and $P < 0.001$, respectively). Multivariate regression analysis indicated that IRII, a marker of the inner retinal deformation, was associated with visual improvement after adjusting for age, gender, and other OCT findings ($P < 0.001$).

Conclusions: Patients with preoperative inner retinal deformation were found to have significantly improved long-term visual outcomes after ERM removal.

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Venue: Ballroom 202

Pars Plana Vitrectomy and Internal Limiting Membrane Peeling for Highly Myopic Foveoschisis-Associated Lamellar Macular Hole

First Author: Jialin ***WANG***
Co-Author(s): Yanling ***WANG***

Purpose: To evaluate the outcomes of pars plana vitrectomy and internal limiting membrane (ILM) peeling for highly myopic foveoschisis–associated lamellar macular hole (MH).

Methods: Prospective consecutive cases with highly myopic foveoschisis–associated MH were recruited. There were 8 eyes of 8 patients (3 men and 5 women) included in the study from August 2016 to March 2017, with a mean age of 69.3 ± 5.9 years. All the patients underwent phacoemulsification and intraocular lens implantation, and also 23-gauge or 25-gauge pars plana vitrectomy and ILM peeling. The ILM was peeled off in a small flap and the range of ILM peeling was broadened beyond the vascular arcades. Finally, the vitreous cavity was tamponaded with air. All patients underwent ophthalmologic examinations before surgery and at postoperative 1 month, 3 months, 6 months, and 12 months including the logarithm of the angle of resolution best-corrected visual acuity, slit-lamp microscope, and optical coherence tomography (OCT). The main outcome measures were best-corrected visual acuity and MH closure of the OCT preoperative to postoperative.

Results: All eyes had vision improvement at postoperative 1 month, 3 months, and 6 months. MH closure of the OCT examinations was 100% at postoperative 1 month, 3 months, and 6 months. Myopic foveoschisis was resolved in 3 eyes (3/8) and reduced in 5 eyes (5/8) at postoperative 1 month, 3 months, 6 months, and 12 months. We will continue to follow up the cases.

Conclusions: Pars plana vitrectomy and the range of ILM peeling beyond the vascular arcades could improve the visual function and the rate of MH closure for highly myopic foveoschisis-associated MH.

Dec 15, 2018 (Sat) 17:00 - 18:30

Venue: Ballroom 202

Persistent Subretinal Fluid after Successful Scleral Buckle: Causative Factors and Prognostic Indicators

First Author: Vikram ***KOUNDANYA***
Co-Author(s): Sumit ***KUMAR***

Purpose: To report the natural history, causative factors, optical coherence tomography (OCT) characteristics and functional outcomes of persistent sub-foveal fluid (PSF) after successful scleral buckling (SB) surgery for macula off rhegmatogenous retinal detachment (RRD).

Methods: A prospective study of 28 eyes of 28 patients who underwent SB surgery for macula off RRD was done. Cases were divided in 2 groups based on the mechanism of development of retinal break(s) — group A: posterior vitreous detachment (PVD)–related breaks, group B: PVD-unrelated breaks. OCT was performed in all cases postoperatively at 1, 6 and 12 weeks.

Results: Incidence of PSF was higher in group B (retinal dialysis/atrophic holes). PSF was noted in 18 (55%) eyes out of which 14 (78%) eyes were from group B. The mean time for resolution of PSF was 17 weeks (12-28 weeks). The mean final BCVA was 0.6 logMAR in eyes without PSF while it was 1.0 logMAR in eyes with PSF. Eyes with PSF showed more damage to outer retinal integrity when compared with eyes without PSF. Duration of PSF had strong positive correlation with poor final visual acuity and loss of outer retinal integrity (r = 0.6 and r = 0.8) respectively.

Conclusions: There was a difference in incidence of PSF between the 2 etiological groups suggesting role of PVD and intraocular fluid(s) dynamics in causing PSF. Although PSF resolves on its own, it often leads to progressive outer retinal atrophy and poor visual outcomes. Preoperative assessment of predisposing

factors can help in surgical decision making.

Dec 15, 2018 (Sat) 17:00 - 18:30

Venue: Ballroom 202

Posterior Segment Complications Following Valve Surgery in Vitrectomized Eyes

*First Author: Bhuvan **CHANANA***

Purpose: To describe vision-threatening posterior segment complications and discuss its management, following Ahmed glaucoma valve in eyes with previous vitreous surgery.

Methods: Ahmed glaucoma valve surgery was performed in 2 vitrectomized eyes with intractable glaucoma. The first case was an 8-year-boy with angle-recession glaucoma, who had previously undergone pars plana vitrectomy for dense vitreous hemorrhage in his right eye, following injury with a cricket ball. The intraocular pressure (IOP) in his right eye was not controlled despite maximal medical therapy. The second case, a 63-year-old female who underwent vitrectomy in her right eye for non-resolving vitreous hemorrhage following complicated cataract surgery. The best-corrected visual acuity (BCVA) was 20/80 and IOP was 42 mm Hg on maximum anti-glaucoma drugs and oral acetazolamide.

Results: Both eyes had severe hypotony (IOP <4 mm Hg) on the first postoperative day. The first patient developed pre-macular sub-ILM bleed, which clotted and became more organized with thickening and wrinkling of overlying internal limiting membrane (ILM) after 4 weeks. The second patient developed kissing choroidal detachment, which did not resolve with systemic and periocular steroids. Both cases required further surgical intervention. The thick firmly adherent ILM was removed successfully in the first case, and in the second case suprachoroidal fluid was drained using a modified scleretomy technique.

Conclusions: Ahmed glaucoma valve surgery in vitrectomized eyes can lead to severe vision-threatening complications. The absence of vitreous support in such eyes could be a possible cause of sudden decompression, and severe hypotony leading to posterior segment complications. Both cases in our study were managed successfully.

Dec 15, 2018 (Sat) 17:00 - 18:30

Venue: Ballroom 202

Quantitative Evaluation of Macular Nerve Fiber Layer after Internal Limiting Membrane Peeling in Macular-On Rhegmatogenous Retinal Detachment

*First Author: Dong Heun **NAM***
*Co-Author(s): Youjeong **KIM**, Dae Young **LEE**, Jonghwan **LEE***

Purpose: To assess the quantitative changes in the macular nerve fiber layer (NFL) area by spectral-domain optical coherence tomography (SD-OCT) after internal limiting membrane (ILM) peeling.

Methods: The average macular NFL areas were manually and automatically measured at baseline and 6 months postoperatively in patients who had undergone vitrectomy with ILM peeling for macular-on rhegmatogenous retinal detachment. In the manual evaluation, 2 examiners evaluated macular 5-line raster horizontal SD-OCT images using ImageJ, while delineating the macular NFL was done using OCT Explorer 3.8.0 program (IOWA institute for biomedical imaging) in the automatic evaluation.

Results: Based on the manual evaluation, there was no difference in average macular NFL area before and after ILM peeling (9921.8 ± 1020.1 and 9970.5 ± 1084.5 pixels, respectively) ($P = 0.822$) ($n = 16$). Furthermore, the automatic measurement did not show any difference in average macular NFL area between before and after ILM peeling (0.3647 ± 0.0534 and 0.3653 ± 0.1059 mm^3, respectively) ($P = 0.983$) ($n = 10$).

Conclusions: The quantitative change in the macular NFL after ILM peeling in macular-on retinal detachment was not evident. Mechanical damage to the NFL after ILM peeling could be negligible.

Dec 16, 2018 (Sun) 10:30 - 12:00

Venue: Ballroom 201

A Fully Implantable 44-Channel Suprachoroidal Retinal Prosthesis: Surgical Safety, Stability and Initial Functional Results

*First Author: Penelope **ALLEN***
*Co-Author(s): Nicholas **BARNES**, Robert **BRIGGS**, Matthew **PETOE**, Chris **WILLIAMS**, Jonathan **YEOH***

Purpose: The success of our prototype clinical trial of a suprachoroidal retinal prosthesis leads us to develop a 44-channel fully implantable device, with the aim of providing visual information to profoundly visually impaired patients and allowing them to utilize this device at home.

Methods: Two of 4 planned patients (P1 and P2) with end-stage rod-cone dystrophy (retinitis pigmentosa) and perception of light visual acuity were implanted with a 44-channel electrode array in the suprachoroidal space in February and March 2018. Two additional patients are planned for surgery in August 2018. After recovery they commenced stimulation of the device in the psychophysics laboratory. Postoperative follow-up included clinical examination, fundus photography and optical coherence tomography (OCT) to assess surgical recovery and impact of the surgery on the eye.

Results: The surgical procedures took 260 and 204 minutes and were uncomplicated. At the completion of surgery, impedance testing showed all electrodes were functional in P1 and P2. Postoperative recovery was uneventful. Fundus imaging and OCT imaging confirmed the position of the devices and the absence of retinal trauma. Psychophysical testing produced a phosphene map and lab-based testing was successful in preparation for orientation and mobility training so this was commenced.

Conclusions: A 44-channel retinal prosthesis can be safely implanted in the suprachoroidal space. Over 4 months of postoperative follow-up, clinical findings, fundus photography and OCT imaging confirm device stability. It is possible to produce a phosphene map for both patients, commence lab-based training and orientation and mobility activities.

Dec 16, 2018 (Sun) 10:30 - 12:00

Venue: Ballroom 201

Case Series of Subretinal Lenticular Material Following Cataract Surgery

*First Author: Christopher **GO***
*Co-Author(s): Samantha **BOBBA**, Jay **CHANDRA***

Purpose: To report a case series of subretinal lenticular material including a first reported case of subretinal intraocular lens (IOL).

Methods: Clinical history, documentation and outcomes were reviewed of 2 patients with subretinal lenticular material who presented to Westmead Hospital, Sydney for assessment and management.

Results: Case 1 was a 27-year-old male referred for query left subluxed IOL after cataract surgery. The operation was "difficult but uncomplicated" and lens repositioning day 1 postoperatively was performed. On examination, IOL was not identifiable with B scan demonstrating a retinal detachment. A subretinal IOL was found during planned vitrectomy and removed with intraocular forceps. Case 2 was a 74-year-old male referred following for dropped nucleus following a posterior capsule tear (PCT) during phacoemulsification. On examination, he had a 180-degree circumferential giant tear with radial extension to the optic disc, and RPE burn beneath the radial extension. There were several dislocated lens fragments, including one sub-retinally which was initially mistaken as a choroidal detachment. This was later removed in subsequent surgery.

Conclusions: Vigorous vitreous manipulation is considered the likely pathogenesis for subretinal nucleus, which is consistent with case 2. However, a PCT was not observed in case 1, and the mechanism is still unknown. It may be related to lens repositioning or an undetected preoperative giant retinal tear. This case series demonstrates how imperative it is to undergo an extensive dilated examination prior to

cataract surgery and be mindful of the risks of surgical revision.

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Venue: Ballroom 201

Comparative Study of Surgical Performance of Internal Limiting Membrane Peeling in Macular Hole Surgery Using Digitally Assisted Vitrectomy Surgery (DAVS) System Versus Conventional Vitrectomy Viewing System (CM)

First Author: Naresh ***KANNAN***
Co-Author(s): Piyush ***KOHLI****, Obuli* ***RAMACHANDRAN***

Purpose: To compare the surgical performance of internal limiting membrane (ILM) peeling in idiopathic macular hole using digitally assisted vitreoretinal system (DAVS) vis-à-vis conventional microscope (CM).

Methods: Patients with macular hole were operated on using CM (group A) and DAVS (group B). The data analyzed included surgical time required to complete ILM peeling; number of attempts to initiate ILM flap and to complete ILM peeling; and intra-operative complications.

Results: Each group included 20 patients. The mean surgical time for ILM peeling in group A and B was 123.05 ± 42.23 and 142.35 ± 31.49 seconds respectively (P = 0.109). The mean surgical attempts to initiate ILM flap were 1.05 ± 0.22 and 1.70 ± 1.22 respectively (P = 0.008). The mean surgical attempts to complete ILM peeling were 22.85 ± 9.95 and 27.20 ± 7.16 respectively (P = 0.121). Retinal touch occurred in 1 and 3 patients respectively.

Conclusions: DAVS provides similar surgical performance to CM, however initiating ILM flap is difficult with DAVS.

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Venue: Ballroom 201

Efficacy of Long-Acting Gas Endotamponade in Inferior Break Retinal Detachment with Proliferative Vitreo-Retinopathy Grade B and Selected Grade C Cases

First Author: Nishant Vijay ***RADKE***
Co-Author(s): Snehal ***RADKE***

Purpose: To study the efficacy and outcome of long-acting gas endotamponade in inferior break retinal detachments (RD) with proliferative vitreo-retinopathy (PVR) grade B and selected grade C cases without external buckle.

Methods: This was a retrospective case series of 11 cases with inferior break RD undergoing pars plana vitrectomy (PPV) without external buckle. Exclusion criteria were: traumatic RD, retinal dialysis or giant retinal tears, uveitic or combined RD, retinoschisis with RD, coloboma RD, recurrent RD presenting for the first time to us and PVR-C (posterior) with diffuse star folds or narrow/closed funnel configurations were excluded as well. A minimum of 6 months' follow-up after the last successful surgery was considered necessary. 23G or 25G PPV were done in all cases. 12-14% C3F8 gas was used as endotamponade.

Results: The mean age was 48.9 years. The average extent of clock hours of RD was 4.909. The average duration of RD based on history or records was 46.09 days. All cases had more than 1 break. Nine (81.81%) cases had a successful outcome in the primary surgery. Final success with rescue use of silicone oil in the 2 cases and subsequent SOR was 100%. P value for difference between BCVA pre-and post-operative was statistically significant. Four cases had 6 clock hours or more extent of RD out of which 2 had recurrence. Cataract developed in 4 out of 5 lens sparing vitrectomies.

Conclusions: Gas endotamponade showed promising outcomes in inferior break RD with advanced PVR and can be used with proper case selection.

Dec 16, 2018 (Sun) 10:30 - 12:00

Venue: Ballroom 201

Management of Posterior Segment Retained Intraocular Foreign Body by Pars Plana Vitrectomy

First Author: Pankaj ***ROY***
Co-Author(s): Ava ***HOSSAIN****, Banita* ***MISTRY****, Golam* ***MOSTOFA****, Dipak* ***NAG***

Purpose: To evaluate the structural and functional outcome of retained intraocular foreign body located in the posterior segment removal by pars plana vitrectomy.

Methods: This prospective purposive study was conducted from January 2014 to December 2017. A total of 64 consecutive eyes of 64 patients included in the study. The mean age was 26.34 ± 9.40 years (range, 16-41 years). Sixty male and 4 female patients underwent pars plana vitrectomy. Visual acuity, slit lamp biomicroscopy, intraocular pressure, posterior segment examination, B-scan and computed tomographic scan of eyes and orbits were routinely done.

Results: The size of removed metallic foreign body ranged from 2 to 16 mm. Preoperative visual acuity of the eyes were: no perception of light in 2 eyes, only perception of light in 4 eyes, perception of light and projection of rays in 16 eyes, counting fingers at half meter in 20 eyes, counting fingers at half meter to 1/60 in 16 eyes, 2/60 to 5/60 in 4 eyes, 6/60 in 2 eyes (P = 0.003). Anatomic success was obtained in 96.9% (n = 62) of eyes. The postoperative visual acuity improved 5.24 ± 3.4 letters in the Snellen visual acuity chart. Severe inflammation was noticed in 24 (37.5 %) eyes in early postoperative period. Intraocular pressure was elevated in 26 (40.63 %) eyes, 1 silicone oil-filled eye developed band keratopathy and 1 eye became phthisical.

Conclusions: Pars plana vitrectomy is an important, effective and essential surgical approach for maintaining ocular integrity and better functional outcome for managing retained posterior segment intraocular foreign body.

Dec 16, 2018 (Sun) 10:30 - 12:00

Venue: Ballroom 201

Multilayered Inverse Internal Limiting Membrane (ILM) Peeling: Is the ILM the Culprit or the Savior in Macular Hole (MH) and MH-Associated Retinal Detachments?

First Author: Srinivas ***JOSHI***
Co-Author(s): Guruprasad ***AYACHIT****, Apoorva* ***AYACHIT****, Puneeth* ***ISLOOR***

Purpose: To study the anatomic and visual outcomes of multilayered inverse ILM peeling in large macular holes (MHs) (>400 μ) and MH-associated retinal detachments (MH-RD).

Methods: This was a prospective study of 51 eyes of 50 patients. Preoperative minimum linear diameter (MLD) and basal diameter (BD) were noted. 25-gauge pars plana vitrectomy and posterior vitreous detachment (PVD) induction was done. ILM flaps were trimmed and placed one over the other on the MH (intra-op OCT guided) and under PFCL in MH-RD. Follow-up was done at 3 months after surgery. The best-corrected visual acuity (BCVA) and type of hole closure was noted.

Results: The mean age of the patients was 56.63 ± 15.69 years, with male:female ratio of 1:2. Of the 51 eyes, 10 had MH-RD. The mean preoperative BCVA was 1.363 ± 0.553 and at 3rd month 1.080 ± 1.080; mean MLD was 708.20 ± 374.12 μm, mean BD was 1347.20 ± 397.71 μm. Of the 51 eyes, 46 (90.2%) had type 1 hole closure whereas 4 (7.8%) had type 2 closure and 1 (2.0%) did not show closure. Three of 4 eyes with type 2 closure had improvement of vision. Eyes with type 1 closure showed a significant decrease in logMAR BCVA (improvement in vision) at 3 months ($P < 0.001$), while those with type 2 closure did not show a significant increase or decrease in logMAR BCVA.

Conclusions: Multilayered inverted ILM flap technique contributes to improved anatomic and visual outcomes in the treatment of MH and MH-RD and hence its benefit in vitreo-retinal surgery cannot be underestimated. It provides a promising method in preserving

the ILM flaps without causing unexpected flap dislodgment. Patients with type 1 closure showed a significant improvement in visual acuity and hence anatomic success must nevertheless be tried.

Dec 16, 2018 (Sun) 10:30 - 12:00

Venue: Ballroom 201

Risk Factors for Poor Visual Outcome Following Inverted Internal Limiting Membrane Flap Technique in Large Macular Holes

*First Author: Kshitiz **KUMAR***
*Co-Author(s): Amar **AGARWAL**, Santosh **BALASUBRAMANIAM***

Purpose: To assess risk factors for suboptimal postoperative visual recovery following inverted internal limiting membrane (ILM) flap procedure for large (>400 μm) full-thickness macular holes (FTMH).

Methods: This was a retrospective interventional study. Main outcome measure was to assess variables for suboptimal visual gain (<6/18 Snellen's best-corrected visual acuity, BCVA) following surgery using ILM flap technique on regression analysis.

Results: A total of 36 eyes with successful closure of FTMH with a mean follow-up duration of 7.55 months were assessed. The mean postoperative BCVA recovered to 0.69 ± 0.30 from 1.07 ± 0.39 logMAR preoperative BCVA ($P < 0.0001$). The mean central foveal thickness (CFT) recovered to 188 ± 46 μm. The duration of hole (2.59 ± 2.7 years, $P = 0.02$), height of hole (306 ± 59 μm, $P = 0.02$), length of inner segment-outer segment (IS-OS) disruption (2165 ± 643 μm, $P = 0.004$), MHI (0.28 ± 0.12, $P = 0.01$) along with normal ELM, ILM and RPE ($P = 0.000$) were independent variables. On multivariate analysis, duration of hole and length of IS-OS disruption were significant risk factors for poor visual outcome ($P = 0.19$).

Conclusions: Visual gain following surgery for large FTMH depends on chronicity of the hole and integrity of outer-retinal retinal layers. Anatomical success following ILM flap technique not necessarily translates into functional success.

Dec 16, 2018 (Sun) 10:30 - 12:00

Venue: Ballroom 201

Silicone Oil Tamponade might Assist Macular Hole Closure in Patients with Persistent Macular Hole after Primary Internal Limiting Membrane Peeling and Gas Tamponade

*First Author: I Chia **LIANG***
*Co-Author(s): Shuting **KAO**, Kwan-Rong **LIU***

Purpose: To report successful macular hole (MH) closure using silicone oil (SO) as intraocular tamponade for persistent MHs after primary intervention with pars plana vitrectomy (PPV), internal limiting membrane (ILM) peeling and C3F8 tamponade in 3 cases.

Methods: This was a retrospective review. Three eyes of 3 patients were included. Seven persistent MHs after 23-gauge or 25-gauge PPV combined with indocyanine green-assisted ILM peeling and C3F8 gas tamponade were noted in these 3 eyes. All 3 eyes received secondary PPV and SO tamponade. Best-corrected visual acuity (BCVA), slit-lamp examination, fundus examination and the size of MH measured by optical coherence tomography (OCT) were gathered pre-and post-operatively. The main outcome measures were anatomic closure of MHs and BCVA.

Results: All the MHs sealed from 10 days to 3 months after SO tamponade. The SO was removed after hole closure in 2 eyes (eye 1 and 2). Two eyes (eye 1 and 3) also received cataract surgery. Closure of MH was confirmed by OCT and maintained during long-term follow-up (range, 28-180 weeks). The BCVA of all eyes improved for at least 3 lines.

Conclusions: In our series, retreatment with SO tamponade was revealed to be effective for patients with failure of MH closure after gas tamponade.

Dec 16, 2018 (Sun) 10:30 - 12:00

Venue: Ballroom 201

Sub-Tenon's Urokinase Injection-Assisted Vitrectomy in the Early Treatment of Suprachoroidal Hemorrhage

*First Author: Fang **CHAI***

Purpose: To describe a novel surgical technique in which urokinase is used in the sub-Tenon's to target the organized clot of suprachoroidal hemorrhage prior to drainage.

Methods: A consecutive case series of 4 eyes with serous and hemorrhagic choroidal detachments secondary to cataract surgery or trauma was documented to evaluate the feasibility of using sub-Tenon's urokinase injection to assist the 23-gauge and 20-gauge incision to drain choroidal detachments.

Results: Four eyes of 4 patients (mean age, 61 years; range, 52–73 years) were studied. In 3 cases the occurrence of suprachoroidal hemorrhage was related to cataract surgery and occurred intra- or postoperatively. One patient developed suprachoroidal hemorrhage secondary to trauma. One patient had a history of hypertension; 2 patients had high myopia, and 1 patient had glaucoma. Postoperative follow-up of the patients ranged from 6 to 24 months (mean, 13 months). Sub-Tenon's urokinase injection assisted drainage of suprachoroidal hemorrhage was in all cases combined with pars plana vitrectomy, use of silicone oil tamponade in 3 patients and without heavy liquids in any patient. The mean time interval from hemorrhage to surgical intervention was 8.5 days (range, 5-12 days).

Conclusions: Sub-Tenon's urokinase injection assisted vitrectomy drainage of serous and hemorrhagic choroidal detachments seems to be a feasible and simple surgical option with minimal scleral and conjunctival damage. Using such technique, a slower and semiautomated controlled mechanism was obtained, with marked stability during the procedure, which is the primary advantage of this technique.

Dec 16, 2018 (Sun) 10:30 - 12:00

Venue: Ballroom 201

Time to Retinal Detachment Failure

*First Author: Rohan **ESSEX***
*Co-Author(s): Penelope **ALLEN**, Will **ATKINS**, Rachael **HEATH**-JEFFREY, Mali **OKADA**, Braden **YOUNG***

Purpose: To determine the median, 90th and 95th percentile of the time to failure of retinal detachment surgery using 2 different definitions of "time to failure".

Methods: Data from 2 centers participating in a large bi-national registry of retinal detachment surgery established by the Australian and New Zealand Society of Retinal Specialists (ANZSRS) were used. Primary and recurrent detachments were included. The date of surgery, date of failure (date failure first diagnosed) and date of oil removal (when applicable) were determined, and independently verified against the medical record. Time to failure was defined in 2 ways: method A used the duration (in days) from the date of surgery to the date of failure; method B used the duration (in days) from the date of surgery to the date of failure or from the date of oil removal to the to the date of failure if failure was diagnosed at or after oil removal.

Results: A total of 188 failures were identified from 1290 retinal detachment surgeries (14.6%). Using method A the median time to failure was 34 days (90th percentile 122 days, 95th percentile 182 days). Using Method B the median time to failure was 28 days (90th percentile 87 days, 95th percentile 109 days).

Conclusions: These results can be used to inform the design of clinical care pathways, studies and registries which must balance resourcing with accurate capture of delayed failure.

POSTERS

Eye Trauma, Emergencies & Infections

Poster No.: EX1-005
Panel No.: 005, Session: EX1
Clinical Characteristics and Prognosis of Endogenous Endophthalmitis in Western Gyeongsang nam-do

*First Author: Ji Sung **JUNG***
*Co-Author(s): In Young **CHUNG**, Min Ho **SHIN**, Woong-Sun **YOO***

Purpose: To investigate the clinical features and prognosis associated with endogenous endophthalmitis (EE) in western Gyeongsang nam-do over a 10-year period.

Methods: A retrospective medical records review of 24 patients presenting with EE at the Gyeongsang National University Hospital from 2009 to 2018 was performed.

Results: The mean age of onset was 63.2 years, and 58.3% were male. Bilateral involvement was observed in 9 cases (26.5%). Liver abscess (30.3%) and urinary tract infection (24.2%) were the most common extraocular sources of infection. Positive culture result was noted in 72.7%. The most common causative agents were Gram-negative organisms (45.8%) and the most commonly isolated microorganisms was *Klebsiella pneumoniae*. Vitreous tapping and intravitreal antibiotics injection were performed in all patients and pars plana vitrectomy with intravitreal antibiotics injection was performed in 12 eyes (36.4%). Eight eyes (24.2%) achieved a visual acuity of 20/200 or better and 25 eyes (75.8%) achieved a visual acuity worse than 20/200. Enucleation and evisceration were performed in 6 eyes (18.2%).

Conclusions: In our study, EE showed a poor visual prognosis irrespective of the treatment. Liver abscess and urinary tract infections are common extraocular sources of EE and *Klebsiella pneumoniae* is the most common causative organisms.

Poster No.: EX1-001
Panel No.: 001, Session: EX1
Electrical Shock Induced Purtscher-Like Retinopathy

*First Author: Reddy **Y C***
*Co-Author(s): Syed **ABDUL KADAR**, Anuj **SHARMA***

Purpose: To describe a case of Purtscher-like retinopathy following an electric shock and its manifestation on the OCT angiography.

Methods: An 18-year-old male, an electrician by profession, presented with mild diminished vision in the left eye following blunt trauma 2 days prior with a rubber ball. He additionally complained of grossly reduced vision in the right eye of 2 months following an electric shock. The point of contact was his right hand.

Results: The visual acuity was 3/60 in the right eye and 6/6 in the left eye. The right eye had a relative afferent pupillary defect while the left had mild anterior uveitis and 0.8 mm hyphema. The RE fundus showed macular ischemic degeneration, occluded vessels, cotton wool spots and hemorrhages. The left eye fundus appeared normal. OCT angiography showed presence of capillary drop-out in the parafoveal region which was more pronounced in the deep capillary plexus.

Conclusions: Electric shock injury can lead to a clinical picture simulating Purtscher's retinopathy. The electrical injury leads to a more extensive damage to the deep capillary plexus as compared to the superficial plexus.

Poster No.: EX1-003
Panel No.: 003, Session: EX1
Endophthalmitis: Relationship of Precipitating Event and Microbiology

*First Author: Andrew **HURLEY***
*Co-Author(s): Penelope **ALLEN**, Will **ATKINS-BROWN**, Rosie **DAWKINS***

Purpose: Different precipitating events causing endophthalmitis introduce different microorganisms into the eye. We aimed to

establish the leading microbial causes in Victoria, Australia for each precipitating event and measure outcomes.

Methods: Data were collected prospectively in the Victorian Endophthalmitis Registry from 1 January 2007 to 31 December 2017 at the Royal Victorian Eye and Ear Hospital (RVEEH), currently held as an online database created with REDCap. This captured all cases of endophthalmitis at the RVEEH with catchment throughout the state of Victoria. To ensure completeness, cross-checking against discharge diagnosis and data in-fill was undertaken.

Results: Cataract surgery associated endophthalmitis (n = 159) resulted in mostly Gram-positive organisms (51.0%), particularly coagulase-negative staphylococcus species (27.1%). Intravitreal injection associated endophthalmitis (n = 117) resulted in some coagulase-negative staphylococcus (29.9%), but also more streptococcal infections (17.1%) as compared to cataract surgery (11.9%). Glaucoma drainage surgery (n = 58) introduced a range of organisms, notably Gram-negative organisms (17.2%). Endogenous endophthalmitis (n = 76) was commonly caused by fungal infection (26.3%), particularly candida albicans, though unusual organisms were cultured. Corneal ulceration (n = 56) was the precipitating event with the worst outcomes with 32% of patients receiving enucleation.

Conclusions: Clinicians should be aware of likely microorganisms according to precipitating factor, so they can prescribe the appropriate empirical intravitreal antibiotics, and arrange early vitrectomy for more aggressive disease. Such data confirm that the empirical endophthalmitis protocol at the RVEEH remains appropriate for our clinical pattern of microbiology.

Poster No.: EX1-002
Panel No.: 002, Session: EX1
Innate Immunity in Endophthalmitis: The Role of Phagocytosis and the P2X7 Receptor

First Author: Andrew ***HURLEY***
Co-Author(s): Penelope ***ALLEN****, Rosie* ***DAWKINS****, Ben* ***GU****, Xin* ***HUANG***

Purpose: We hypothesize that innate phagocytic function is one determinant of the development of endophthalmitis. This pilot study compared the function of the P2X7 receptor and phagocytosis in patients with acute endophthalmitis with a population control group.

Methods: Patients presenting to the Royal Victorian Eye and Ear Hospital (RVEEH) emergency department with acute endophthalmitis were offered entry into the study. Informed consent was obtained, and peripheral blood taken. Quantitative measurement of P2X7 receptor function via uptake of ethidium and phagocytic function via uptake of fluorescent latex beads using a validated flow cytometric-method was undertaken at the Florey Institute. Patients will have repeat bloods taken 3 months from admission to observe phagocytic function through convalescence.

Results: The subjects (n = 8) all had reduced ethidium uptake and latex bead phagocytosis compared to controls. Additionally, phagocytic function was not improved with CPX which typically boosts phagocytic function significantly in healthy patients. This was true for all 3 subsets of CD14+ monocytes tested.

Conclusions: This pilot study shows reduced P2X7 receptor function and phagocytic function in acute endophthalmitis. We intend to recruit a larger cohort to elucidate this interesting finding. This may allow us to predict susceptibility or guide future therapeutics through enhancement of innate immune function.

Poster No.: EX1-004
Panel No.: 004, Session: EX1

Unusual Presentation of Postoperative Endophthalmitis Caused by *Streptococcus dysgalactiae subsp. equisimilis*: Case Series

First Author: Woong-Sun ***YOO***
Co-Author(s): In Young ***CHUNG****, Ji-Sung* ***JUNG****, Min Ho* ***SHIN***

Purpose: To report 2 cases of postoperative endophthalmitis caused by *Streptococcus dysgalactiae subspecies equisimilis* (SDSE), which showed unusual presentations as hyper-acute onset and panophthalmitis.

Methods: This was a retrospective case series of postoperative SDSE endophthalmitis.

Results: A 68-year-old man received cataract surgery and was evaluated the next day (less than 24 hours from the surgery) because of acute loss of vision. Visual acuity was light perception and the eye showed corneal edema, hypopyon, and vitreous opacity. He underwent pars plana vitrectomy, and removal of capsular bag and intraocular lens with intravitreal antibiotic injection. Culture of vitreous revealed SDSE. After operation, inflammation was regressed, though corneal edema showed progression. Cornea evolved to decompensate as bullous keratopathy and visual acuity was no light perception after 3months. An 87-year-old man who underwent cataract operation 2 days previously was hospitalized due to severe ocular pain and visual loss. Visual acuity was no light perception and the eye showed severe corneal edema, hypopyon, and thick vitreous opacity. The patient received only intravitreal injection of antibiotic due to severe corneal edema. Culture of aqueous humor showed SDSE. Four days after intravitreal injection, erythema and swelling of eyelid of affected eye was observed, and diagnosed as panophthalmitis. After using intravenous vancomycin and ceftazidime, cellulitis of eyelid was resolved. The eye progressed as phthisis after 3 months without recurrence.

Conclusions: Postoperative SDSE endophthalmitis showed aggressive and hyper-acute presentation resulted in blindness despite prompt treatment. SDSE is an emerging organism and should be considered a potential cause of postoperative endophthalmitis.

Intraocular Inflammation, Uveitis & Scleritis

Poster No.: EX1-008
Panel No.: 008, Session: EX1

A Case of Subretinal Cysticercosis Treated by Retinal Cryopexy in Nepal

First Author: Shanti ***GURUNG***
Co-Author(s): Sanyam ***BAJIMAYA***

Purpose: Intraocular cysticercosis can involve either the anterior or the posterior segment. While anterior segment cysticercosis is rarely seen, posterior segment involvement is common. Ocular cysticercosis is a preventable cause of blindness endemic in South East Asia. A case of subretinal cysticercosis which was presented with nongranulomatous panuveitis at the beginning was described. We report a rare case of subretinal cysticercosis treated with retinal cryopexy in a 45-year-old woman.

Methods: A 45-year-old Nepali female presented to a uvea clinic with a history of pain and redness in the right eye (RE) 14 days ago followed by diminution of vision RE 10 days ago. Ophthalmological examination revealed nongranulomatous panuveitis in the RE with presented visual acuity of 6/18 (RE) and 6/6 in the left eye. Initial treatment started with topical steroids and cycloplegics and follow up with baseline workup was within normal limit but revaluation revealed well-defined globular, translucent and white subretinal cyst with head/scolex (undulates in response to examining light) on inferotemporal retina on RE. Her CT brain scan and head and stool examination were normal.

Results: She was treated with oral albendazole 15 mg/kg BW in divided dose along with oral corticosteroid 1 mg/kg and underwent RE retinal cryopexy followed by delimiting laser beyond SRF (subretinal fluid) in outpatient department.

Conclusions: Our case highlights that subretinal

cysticercosis can present as panuveitis leading to diagnostic dilemma. Surgical intervention along with medical management is an acceptable approach with good results.

Poster No.: EX1-009
Panel No.: 009, Session: EX1

Bilateral Macular Infarction as an Initial Manifestation of Behcet's Disease

*First Author: Inyoung **CHUNG***
*Co-Author(s): Min Ho **SHIN**, Woong-Sun **YOO***

Purpose: To report a rare case of bilateral macular infarction as an initial presenting sign of Behcet's disease (BD).

Methods: A 51-year-old female visited our emergency clinic with blindness of both eyes for 3 days. Her best-corrected visual acuity (BCVA) was 4/200 in both eyes. Anterior segments were unremarkable. Posterior segment examination showed bilateral multiple and confluent patches of cotton-wool spots with attenuated smaller arterioles at the macula. Spectral-domain optical coherence tomography (SD-OCT) showed localized retina edema with subfoveal fluid in both eyes. Multiple small branches of macular arterioles were occluded in both eyes, with perivascular leakage of some macular arterioles at the late phase in the left eye by fluorescein angiography (FA).

Results: In collaboration with rheumatology, she was diagnosed with BD. She underwent posterior sub-Tenon's injections of triamcinolone acetonide in the left eye. Simultaneously she was given oral prednisolone and immunosuppressive agents. Her BCVA gradually improved to 20/200 in the right eye and 16/200 in the left eye after 10 weeks' treatment. There was obviously decreasing macular soft exudates in both eyes, with less perivascular leakage in the left eye from FA.

Conclusions: Bilateral macular infarction is an uncommon initial presenting sign of BD but most severe ocular complication. Early diagnosis and prompt proper treatment is mandatory to improve the vision of both eyes.

Poster No.: EX1-007
Panel No.: 007, Session: EX1

Clinical Profile and Prevalence of Panuveitis in Filipinos in a Tertiary Government Center: A 2-Year Retrospective Study

*First Author: Cristina **GARCIA***
*Co-Author(s): Egidio **FORTUNA**, Ulysses **YAP***

Purpose: We describe the profile and prevalence of panuveitis patients in a tertiary Government hospital in the Philippines.

Methods: This was a descriptive cross-sectional study.

Results: Over a 2-year period, a total of 34 patients were diagnosed with panuveitis. The distribution of patients was equal based on gender and the patients' age range was 1-80 years. Further consults and examination revealed the distribution of panuveitis diagnosis based on frequency was as follows: panuveitis not otherwise specified, Vogt-Koyanagi-Harada Syndrome (VKH), sympathetic ophthalmia, Adamantiades Behcet's disease, multifocal choroiditis with panuveitis.

Conclusions: Despite being a rare condition, the number of patients diagnosed with uveitis in our institution is steadily rising. Panuveitis is difficult to manage and the profile and prevalence of this condition is important in order to assess the outcomes of management in these patients.

Poster No.: EX1-006
Panel No.: 006, Session: EX1

Optical Coherence Tomography Angiography in Post-Fever Retinitis

*First Author: Komal **AGARWAL***
*Co-Author(s): Jay **CHHABLANI**, Rajeev **REDDY**, Mudit **TYAGI***

Purpose: To describe the features of post-fever retinitis on optical coherence tomography angiography (OCTA) including the layers involved and extent of involvement.

Methods: This was a retrospective study of patients diagnosed with post-fever retinitis. Patients presenting with retinitis with a history of fever less than 3 months before

were included. Other causes for retinitis and immunocompromised systemic status were excluded. Demographic details, duration of symptoms and duration between systemic and ocular symptoms were noted. OCT and OCTA features through the area of retinitis lesion were noted. Area of retinitis and the area of non-perfusion on OCTA were measured. The difference was tested for statistical significance.

Results: Thirteen eyes of 8 patients were included. OCT showed hyper-reflectivity with shadowing and disorganization of the retinal layers in all eyes. All eyes showed hyper-reflective dots in the posterior vitreous. OCTA showed non-perfusion of the superficial and deep capillary plexus in areas of active retinitis. Area of non-perfusion on OCTA was larger than the area of clinically perceived retinitis. Major vessels were spared in all eyes. Abnormal arborization of the capillary network at the level of superficial capillary plexus was noted in 3 eyes.

Conclusions: OCTA is a useful tool to identify the extent of involvement in post-fever retinitis. A correlation of both OCT and OCTA gives us an insight on the horizontal and the vertical extent of the retinitis. This tool can also be further used on follow-up and used to prognosticate the outcome of such cases.

Ocular Imaging

Poster No.: EX1-015
Panel No.: 015, Session: EX1

A Different Type of Atypical Epiretinal Proliferation: Clinical Presentation and Optical Coherence Tomographic Findings

*First Author: Tso-Ting **LAI***
*Co-Author(s): Chung-May **YANG***

Purpose: To describe the morphological pattern and the associated changes of the protruded epiretinal tissue other than lamellar hole-associated epiretinal proliferation (LHEP), based on optical coherence tomography (OCT) examinations.

Methods: This was a retrospective study of 28 cases showing a protruded epiretinal tissue on OCT. The serial OCT images and their visual acuity were reviewed, and the morphology of epiretinal tissue along with associated vitreomacular interface changes were recorded.

Results: Among 25 cases presenting with epiretinal membrane (ERM), 8 had the protruded tissue at the edge of ERM, while the other 17 eyes had the tissue located in the middle of ERM. A membrane-like structure was noted within the tissue in 6 cases that were located at the edge of ERM, all of them had ruptured internal limiting membrane (ILM) and/or ERM noted before or during the formation of epiretinal tissue on serial images; meanwhile, only 2 cases had membrane-like structure among those not at the edge. A connection between the protruded tissue and inner retinal was found in 15 eyes, and 3 of them were at the ERM edge. The optical density of the epiretinal tissue was similar to inner retina but brighter than LHEP. Five patients underwent vitrectomy for ERM removal or macular hole repair and all had vision improved after surgery.

Conclusions: The protruded epiretinal tissue had heterogeneous presentation and possible different pathogenesis. The origin of this tissue could result from proliferating retinal tissue through minor ILM break or a condensed ILM/ERM remnant as seen in those at the edge of ERM.

Poster No.: EX1-010
Panel No.: 010, Session: EX1

Average Choroidal Thickness Measurements Using Enhanced Depth Imaging Optical Coherence Tomography of Normal Patients and Those with Selected Retinal Pathologies among Patients Undergoing OCT of the Macula in an Eye Center from January to June 2017

*First Author: Melody Ana **TAN-DACLAN***
*Co-Author(s): Lyll Karen **ARRIOLA**, Jeffrey **LIM***

Purpose: This study aimed to provide baseline data on choroidal thickness in normal and pathological Filipino eyes.

Methods: An enhanced depth imaging–

optical coherence tomography (EDI-OCT) of the subfoveal region of the choroid was taken in all patients for macular OCT studies at 1 eye center from January 2017 to June 2017 using the Nidek OCT Machine. The choroidal thickness of each patient was taken from the posterior edge of the retinal pigment epithelium to the choroid/sclera junction at the subfoveal area. The images were stored and processed in the application software (Eyeground Image Lite.exe). Measurement was performed by one observer. Statistical analysis was done to correlate inter-observe findings, choroidal thickness and measurements with age and sex.

Results: The sample population included 161 patients. The mean age of patients examined using EDI OCT was 58.5031 ± 15.69 years. The age range was from 23 to 86 years. Males accounted for 60% of patients. Approximately 45% of the eyes included were normal. An analysis of variance (ANOVA) on the different choroidal thickness values yielded significant variation among conditions, $F(6, 154) = 27.568$, $P < 0.0005$.

Conclusions: There was no significant difference ($P = 0.451$) in the choroidal thickness between male and female. In correlating age with subfoveal choroidal thickness, there was a weak negative correlation ($r = –0.348$) between age and choroidal thickness. The normal mean choroidal thickness was 245.22 ± 35.94. Polypoid choroidal vasculopathy had the highest value of choroidal thickness followed by central serous chorioretinopathy both of which exceed 300 μm. Dry AMD had the lowest mean thickness values of 231.76 ± 25.56.

Poster No.: EX1-018
Panel No.: 018, Session: EX1

Choroidal Structural Changes in Diabetes Using Choroidal Vascularity Index

*First Author: Sumit **KUMAR***
*Co-Author(s): Manisha **AGARWAL**, Rupesh **AGRAWAL**, Neha **KHANDELWAL**, Dilys **LEE***

Purpose: To evaluate choroidal structural changes in patients with diabetes using choroidal vascularity index (CVI), through image binarization of enhanced depth imaging (EDI) optical coherence tomography (OCT) scans.

Methods: A prospective cross-sectional study was conducted in a single tertiary eye care center in North India. This included acquiring and binarization of EDI-OCT scans of 70 eyes of patients with diabetes and 88 eyes of healthy controls to compute CVI. CVI was defined as the ratio of luminal area to total choroidal area. The mean CVI was compared between the 2 groups using Student's *t*-test.

Results: There was a significant difference between the CVI of patients with diabetes and healthy controls. The mean CVI for patients with diabetes was lower (62.40 ± 0.92) compared with the mean CVI of healthy controls (66.75 ± 2.14) ($P < 0.0001$).

Conclusions: Eyes of patients with diabetes demonstrated reduced CVI. There is potential use of image binarization and CVI as a non-invasive tool for measuring choroidal structural changes and vascular status of the choroid in patients with diabetes.

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

Clinical Implication of Nonvascular Decorrelation Signal within Intraretinal Cyst in Diabetic Macular Edema Observed in Optical Coherence Tomography Angiography

*First Author: Jaemoon **AHN***
*Co-Author(s): Sangheon **HAN**, Seong-Woo **KIM***

Purpose: To investigate the characteristics and association with treatment response of the nonvascular decorrelation signal observed within intraretinal cyst in diabetic macular edema (DME) in optical coherence tomography angiography (OCTA) images.

Methods: Medical records of patients with DME treated, including optical coherence tomography (OCT) and OCTA, were reviewed. Images of OCT and OCTA were compared and their relationship with the treatment response was analyzed.

Results: A total of 41 eyes of 41 patients were included in this study. Of them, 22 were

treated with anti-vascular endothelial growth factor, and 19 were treated with steroid. A binary logistic regression model showed that optical density ratio (ODR) of intraretinal cyst was associated with the nonvascular decorrelation signal (P = 0.018). Kaplan-Meier survival analysis showed that median ODR was 6.395 (95% CI, 3.894-8.896). A multinomial logistic regression showed that the nonvascular decorrelation signal of intraretinal cyst, especially in superficial capillary plexus, was a predictor for differentiating treatment response. The nonvascular decorrelation signal was not correlated with visual acuity.

Conclusions: The nonvascular decorrelation signal is observed with higher ODR in intraretinal cyst. This is related to the poor structural response to treatment.

Poster No.: EX1-012
Panel No.: 012, Session: EX1
Collateral Vessels on Optical Coherence Tomography Angiography in Macular Edema Associated with Branch Retinal Vein Occlusion

*First Author: Norihiro **SUZUKI***
*Co-Author(s): Yoshio **HIRANO**, Yuichiro **OGURA**, Taneto **TOMIYASU**, Tsutomu **YASUKAWA**, Munenori **YOSHIDA***

Purpose: To evaluate collateral vessels (CVs) using optical coherence tomography angiography (OCTA) in eyes with macular edema (ME) secondary to branch retinal vein occlusion (BRVO).

Methods: Thirty eyes of 30 patients (8 men, 22 women; mean age 68 years) who underwent OCTA at baseline and were followed up for more than 6 months were enrolled. The presence of CVs, whether the CVs were leaky, whether the CVs were accompanied by microaneurysms (MAs), and the relationship with ME were evaluated by multimodal imaging technique including OCT, OCTA, and fluorescein angiography (FA).

Results: CVs around the macula were detected in 25 out of 30 eyes and were already formed at the initial visit. The ME was resolved in 16 out of 25 eyes with CVs and 2 out of 5 eyes without CVs, respectively. The mean duration of ME resolution was 13 months with CVs and 15 months without CVs, respectively, which was not significantly different. FA was performed in 22 eyes with CVs; the 8 eyes had leaky CVs and MAs were detected in all the eyes, whereas the other 14 eyes had nonleaky CVs and MAs were detected in 7 eyes.

Conclusions: These results suggest that CVs are formed at the acute phase in the eyes with BRVO. In addition, the presence of CVs might be associated with absorption of ME, but MAs formed in CVs sometimes can cause ME.

Poster No.: EX1-013
Panel No.: 013, Session: EX1
Comparison between Support Vector Machine and Deep Learning, Machine-Learning Technologies for Detecting Epiretinal Membrane Using 3D-OCT

*First Author: Tomoaki **SONOBE***
*Co-Author(s): Hiroki **MASUMOTO**, Daisuke **NAGASATO**, Hideharu **OHSUGI**, Hitoshi **TABUCHI***

Purpose: In this study, we compared deep learning (DL) with support vector machine (SVM), both of which use 3-dimensional optical coherence tomography (3D-OCT) images for detecting epiretinal membrane (ERM).

Methods: A total of 529 3D-OCT images from the Tsukazaki hospital ophthalmology database (184 non-ERM subjects and 205 ERM patients) were assessed; 80% of the images were divided for training and 20% for test as follows: 423 training images (non-ERM 245, ERM 178), 106 test images (non-ERM 59, ERM 47). Using the 423 training images, a model was created with Deep Convolutional Neural Network (DNN) and SVM, and the test data were evaluated.

Results: The DL model's sensitivity was 97.6% [95% confidence interval (CI), 87.7-99.9%] and specificity was 98.0% (95% CI, 89.7-99.9%), and the area under the curve (AUC) was 0.993 (95% CI, 0.993-0.994). In contrast, the SVM model's sensitivity was 97.6% (95% CI, 87.7-99.9%), specificity was 94.2% (95% CI, 84.0-98.7%) and AUC was 0.988 (95% CI, 0.987-0.988).

Conclusions: DL model is better than SVM model for detecting ERM by using 3D-OCT.

Poster No.: EX1-014
Panel No.: 014, Session: EX1

Comparison in Retinal Blood Flow Determined by Laser Speckle Flowgraphy between Left and Right Eyes, and Superior and Inferior in the Eyes of Normal Subjects

*First Author: Ryo **TOMITA***
*Co-Author(s): Kensuke **GOTO**, Takeshi **IWASE**, Hiroko **TERASAKI**, Yoshitaka **UENO***

Purpose: To compare in the retinal blood flow determined by laser speckle flowgraphy (LSFG) between left and right eyes, and superior and inferior in the eyes of normal subjects.

Methods: In this cross-sectional study, we examined 150 eyes from 75 healthy volunteers (mean age, 30.1 ± 9.2 years). We measured mean blur rate (MBR) which is an index of retinal blood flow velocity, vessel diameter, and retinal flow volume (RFV) which is an index of retinal blood flow in arteries and veins around the optic nerve head using LSFG, and compared those parameters between left and right eyes and the superior and the inferior sector.

Results: No significant difference was observed in the MBR, the vessel diameter, and total RFV between left and right eyes. The total RFV of arteries and veins in the superior retinal sector (1839.9 ± 383.0 AU) were significantly higher than that in the inferior retinal sector (1611.7 ± 325.6 AU) ($P < 0.001$). In addition, the vessel diameter ($P < 0.01$) and the MBR ($P < 0.001$) in the superior retinal sector were greater than that in the inferior retinal sector.

Conclusions: Our results showed no differences in the MBR, the vessel diameter, and the total RFV between left and right eyes, suggesting a possibility that the fellow eyes can be used as a control in the blood flow parameters determined by LSFG. On the other hand, attention has to be paid when comparing the blood flow parameters between the superior and inferior retinal sector.

Poster No.: EX1-016
Panel No.: 016, Session: EX1

Correlation between Posterior Staphyloma and Dome-Shaped Macula in High Myopic Eyes

*First Author: Fangfang **DAI***
*Co-Author(s): Jinfeng **HAN**, Xuemin **JIN**, Mengdi **LI**, Shuangshuang **LI***

Purpose: To investigate the relationship between posterior staphyloma and dome-shaped macula (DSM) in high myopic eyes.

Methods: The following clinical data were collected from patients with high myopia: diopter, best-corrected visual acuity, axial length, panoramic fundus photography, optical coherence tomography (OCT), and eye 3-dimensional magnetic resonance imaging (3D-MRI). The morphology of posterior staphyloma and DSM in high myopic eyes was described, and the number of posterior staphyloma was counted.

Results: A total of 123 eyes in 69 persons were investigated. According to 3D-MRI, posterior staphyloma could be classified according to their morphologies: basin shape (12 eyes, 9.75%), taper shape (30 eyes, 24.39%), doliform shape (42 eyes, 34.15%), and irregular shape (39 eyes, 31.71%). In total, 42 eyes of simple macular involvement occupied a ratio of 34.14%, 9 eyes of simple optic disc involvement a ratio of 7.32%, 53 eyes of extensive involvement a ratio of 43.09%, and 19 eyes with no obvious posterior staphyloma a ratio of 15.45%. DSM occurred in 22 eyes among 17 patients (17.89%). According to the scleral overall trend showed by OCT, the DSM could be classified based on shapes: arc shape (11 eyes, 50.00%), inclined shape (6 eyes, 27.27%), and sawtooth shape (5 eyes, 22.73%). Among them, there were 6 eyes with single staphyloma (27.27%), 4 eyes with dual staphyloma (18.18%), and 12 eyes with multiple staphyloma (54.55%). All patients with inclined shape had peripapillary staphyloma, while all patients with sawtooth shape had multiple staphyloma.

Conclusions: There is a close relationship

between posterior staphyloma and DSM in high myopic eyes.

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

Correlation between the Light Scattering of Optical Coherence Tomography and the Mitochondrial Content of the Neuroretinal Lamellae on Histology

*First Author: Jongshin **KIM***
*Co-Author(s): Hye Kyoung **HONG**, You-Jin **KO**, David **MCLEOD**, Kyu Hyung **PARK**, Se Joon **WOO***

Purpose: To investigate the relationship in the retina between the reflectivity profile of cross-sectional optical coherence tomography (OCT) and the fluorescence intensity of mitochondria captured with confocal microscopy.

Methods: High-resolution OCT images were acquired in vivo from mouse and human retina. Histological slides of mouse and human retina were stained with mitochondrial enzyme cyclooxygenase 4 (COX4) and ATP synthase inhibitory factor subunit 1 (ATPIF1) antibody. The optical intensities of each retinal layer in OCT images and the fluorescence intensities of the equivalent layers labeled with COX4 were measured using Image J software. The relationship between the OCT intensities and the COX4 and ATPIF1 fluorescence intensities was analyzed using Spearman correlation.

Results: The fluorescence intensities of COX4 and ATPIF1 were higher in axodendritic layers (nerve fiber layer, inner and outer plexiform layers) in comparison with cell body layers (ganglion cell layer, inner and outer nuclear layers) in both mouse and human retina. The COX4 fluorescence intensities were strongly correlated with the OCT intensities of each retinal layer in the mouse (r = 0.809, P = 0.024) and human (r = 0.943, P = 0.017). In addition, the ATPIF1 fluorescence intensities were also significantly correlated with the OCT intensities of each retinal layer in the mouse (r = 0.817, P = 0.031).

Conclusions: The distribution of mitochondria was well matched with the OCT reflectivity profile in the retina. These findings suggest that the optical properties and content of mitochondria largely account for the light scattering in OCT retinal imaging.

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

Dosage-Dependent Reduction of Macular Pigment Optical Density in Female Breast Cancer Patients Receiving Tamoxifen Adjuvant Therapy

*First Author: Visvaraja **SUBRAYAN***
*Co-Author(s): Lim I-**LIANG**, Kenneth **LEE***

Purpose: This study aimed to model variation in macular pigment optical density (MPOD) as a function of central macular thickness and tamoxifen dosage.

Methods: It was a cross-sectional study in which we compared MPOD and central macular thickness between breast cancer patients on tamoxifen adjuvant therapy and a control group.

Results: Multiple regression analysis indicated that MPOD decreased with increasing tamoxifen dosage, up to a threshold of about 20 g, after which the MPOD plateaued out. The mean MPOD in the treatment group (0.40) was significantly lower (P = 0.02) compared to the control group (0.47) for the left eye, as well as for the right eye (treatment mean = 0.39; control mean = 0.48; P = 0.009). No significant difference in the mean central macular thickness was found between the treatment and the control groups (P > 0.4). In the control group, MPOD and central macular thickness showed significant correlation (r ~ 0.30; P < 0.01) for both eyes. However, in the treatment group, loss of significant correlation was observed in the left eye (r = 0.21; P = 0.08).

Conclusions: Increased tamoxifen dosage appears to reduce MPOD in female breast cancer patients up to a threshold dosage. The observed loss of correlation between MPOD and central macular thickness in the left eye of the tamoxifen treatment group suggests that tamoxifen-induced depletion of macular pigment concentrations need not occur through induced retinal cell death.

Poster No.: EX1-021
Panel No.: 021, Session: EX1

Evaluation of Choroidal Structural Changes Using Choroidal Vascularity Index in Central Serous Chorioretinopathy

*First Author: Dilys **LEE***
*Co-Author(s): Manisha **AGARWAL**, Rupesh **AGRAWAL**, Jianbin **DING**, Neha **KHANDELWAL**, Sumit **KUMAR***

Purpose: To evaluate structural changes in choroid in patients with central serous chorioretinopathy (CSCR) using choroidal vascularity index (CVI), through image binarization of swept-source spectral-domain optical coherence tomography (SS-OCT) scans.

Methods: A prospective cohort study was conducted at a tertiary referral eye care center in North India, which included 53 eyes with CSCR and 44 healthy eyes. Choroidal images on SS-OCT were binarized into luminal area (LA) and stromal area (SA). CVI was calculated as the ratio of LA to total choroidal area (TCA). A paired comparison of CVI between eyes with CSCR and healthy eyes was done using Tukey's post-hoc test.

Results: The mean CVI of CSCR eyes (65.31 ± 2.16%) was significantly lower than healthy normal eyes (66.75 ± 1.97%) (P = 0.001) using 1-way ANOVA test. The paired comparison of CVI between the 2 groups showed that the effect of CVI in CSCR eyes was significantly lower (P = 0.0019).

Conclusions: Eyes with CSCR was associated with decreased choroidal vascularity as compared to eyes of healthy subjects. There is potential use of image binarization and CVI as a non-invasive tool for measuring structural choroidal changes and vascular status of the choroid in CSCR and other retinal diseases.

Poster No.: EX1-087
Panel No.: 087, Session: EX1

Foveal Avascular Zone Area and Vessel Density Changes Analyzed Using OCT Angiography after Aflibercept and Ranibizumab Therapy for Neovascular Age-Related Macular Degeneration

*First Author: Yong Seok **PARK***
*Co-Author(s): Jung Kee **MIN**, Je Moon **WOO***

Purpose: To investigate changes of foveal avascular zone (FAZ) area and vessel density in neovascular age related macular degeneration (N-AMD) patients receiving repeated intravitreal (IVT) ranibizumab and aflibercept treatment.

Methods: In this retrospective consecutive case series study, 60 eyes of 60 patients with treatment-naive N-AMD diagnosed were included. Thirty eyes were treated with IVT injections of aflibercept. Thirty eyes were treated with IVT injections of ranibizumab. The unaffected fellow eyes (60 eyes) were used as a control. The dosage was one injection per month for 3 consecutive months as an initial treatment. The patients were examined monthly for the following 6 months. Additional IVT injections were given reactively in an OCT-guided 'capped pro re nata (PRN)' protocol. Main outcome measures were changes of superficial capillary plexus (SCP) vessel density; deep capillary plexus (DCP) vessel density; choriocapillary plexus (CCP) vessel density in the Early Treatment Diabetic Retinopathy Study (ETDRS) subfields and FAZ area examined by swept-source optical coherence tomography angiography (SS-OCTA).

Results: There were no significant differences in superficial, deep, and choriocapillary foveal avascular zona area changes betwwen study groups (aflibercept vs ranibizumab). There were no significant differences in deep capillary plexus vessel density and choriocaillary plexus vessel density changes, but superficial capillary plexus vessel density change was significantly higher in aflibercept treatment group than in ranibizumab treatment group (P < 0.05).

Conclusions: Excessive long-term VEGF inhibition by anti-VEGF agent which is trapped

by neuronal and RPE cells could adversely affect the function of physiological VEGF and harm retinal cells and vessels.

Poster No.: EX1-084
Panel No.: 084, Session: EX1
Inner Retinal Thickness and Retinal Vessel Changes after Vitrectomy in Macula-Off Retinal Detachment Using Swept-Source Optical Coherence Tomography Angiography

First Author: Yong Un ***SHIN***
Co-Author(s): Hee Yoon ***CHO***

Purpose: To compare post-vitrectomy inner retinal layer thickness and retinal vessel density between eyes with macula-off and macula-on rhegmatogenous retinal detachment (RRD) using swept-source optical coherence tomography (SS-OCT) and OCT angiography (OCTA) and to identify OCTA factors associated with visual outcome.

Methods: We retrospectively reviewed 50 eyes that underwent pars plana vitrectomy with primary RRD. Eyes with macula-off and macula-on RRD were compared with healthy fellow eyes. Both OCT and OCTA were performed at 6 months after surgery and macula-off RRD group was divided into 2 subgroups according to the presence of outer retinal defect. The correlation between postoperative best-corrected visual acuity (BCVA) at 6 months and SS-OCT and OCTA measurements were analyzed.

Results: Twenty eyes with macula-off RRD and 10 eyes with macula-on RRD were included. In the macula-off group, the total retinal layer (TRL) thickness was significantly decreased compared to the fellow eyes (215.6 ± 21.7 μm vs 244.9 ± 30.9 μm, P = 0.004). Inner retinal thickness and superior retinal capillary plexus (SCP) VD did not show significant difference. In the outer retinal defect group, choroidal capillary plexus (CCP) VD was significantly decreased (P = 0.028). The postoperative BCVA at 6 months was significantly correlated with CCP VD ratio (RRD eye / fellow eye) in outer retina defect group (R = –0.535, P = 0.024).

Conclusions: The CCP VD may be related to anatomical restoration of the outer retinal layer in macula-off RD. CCP VD on OCTA may be one of OCTA markers to predict visual outcome after surgery of macular-off RD cases.

Poster No.: EX1-017
Panel No.: 017, Session: EX1
Retinal Sensitivity, Cone Photoreceptors, and Microcirculation in Patients with Diabetic Retinopathy

First Author: Tomoko ***RO-MASE***
Co-Author(s): Akihiro ***ISHIBAZAWA****, Satoshi* ***ISHIKO****, Tsuneaki* ***OMAE****, Akito* ***SHIMOUCHI****, Akitoshi* ***YOSHIDA***

Purpose: To study the relationship among retinal sensitivity, cone photoreceptors, and microcirculation in diabetic retinopathy (DR).

Methods: Fifteen eyes (10 patients) with DR (mean age ± standard deviation, 52.0 ± 14.2 years) were included. The retinal sensitivity was evaluated by microperimetry (MP), with 4 inner measurement points 1 mm in diameter (fovea) and 12 outer points 3 mm in diameter (parafovea) of the ETDRS sector. Cone images were observed using a flood-illuminated adaptive-optics retinal camera. Cone packing regularity, cone density, and cone spacing were analyzed in 4 areas 80×80 pixels from the center of the MP measurement. The vessel densities were evaluated by optical coherence tomography angiography obtained in 3x3-mm scan centered on the fovea. The superficial vessel density (SVD), deep vessel density (DVD), and choriocapillaris vessel density (CVD) were calculated in the area that included the MP measurement point.

Results: The foveal and parafoveal retinal sensitivities were correlated significantly (P < 0.01) with the cone indexes. At the fovea, the retinal sensitivity and CVD were correlated significantly (P < 0.01). At the parafovea, the retinal sensitivity was correlated significantly (P < 0.01 for all comparisons) with the cone indexes. The cone packing regularity was correlated significantly (P < 0.01 for both comparisons) with the DVD and CVD. The CVD at the parafovea decreased significantly (P < 0.05) compared with that at the fovea.

Conclusions: The retinal sensitivity was correlated with the cone photoreceptors and microcirculation. Capillary perfusion of the choriocapillaris at the fovea is maintained relative to that at the parafovea and might be related to the minimal cone damage.

Ocular Oncology & Pathology

Poster No.: EX1-025
Panel No.: 025, Session: EX1
A Case Report of a Retinal Hemangioblastoma in von Hippel-Lindau Syndrome

*First Author: Timothy **TANG LEE SAY***
*Co-Author(s): Rolando Enrique **DOMINGO**, Gary **MERCADO***

Purpose: To present a 28-year-old Filipino male with von Hippel-Lindau (VHL) syndrome.

Methods: Case report.

Results: VHL syndrome is a rare autosomal dominant inherited disorder characterized by the development of tumors notably involving the cerebellum, spinal cord, inner ear, retina, lungs, liver, pancreas, adrenals, kidneys and epididymis. This disease can have varied clinical features depending on which part of the spectrum is affected. We present a case of a 28-year-old Filipino male who initially presented with vertiginous dizziness accompanied by loss of balance and was assessed to have a cerebellar mass. The patient had no ophthalmologic complaints but on funduscopy there is an incidental finding of a peripheral retinal vascular lesion with exudation. A systemic work-up was done to rule out other tumors. Prophylactic barricade photocoagulation was done to prevent retinal detachment and further exudation to the posterior pole. However, due to delay in surgery of the cerebellar mass and eventual increase in intracranial pressure, the patient developed papilledema and eventually his vision became no light perception.

Conclusions: It is therefore important to have a high degree of suspicion for cases of VHL syndrome with surveillance for early detection and management of tumors which would lead to increased lifespan and better quality of life for these patients.

Poster No.: EX1-023
Panel No.: 023, Session: EX1
Granular Cell Tumor: A Case Report of Unusual Tumor of the Ciliary Body

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

Purpose: To report an unusual case of a ciliary body tumor.

Methods: A case report.

Results: A 35-year-old male first visited our clinic with intermittent blurred vision in his left eye. The slit examination showed a large, protruding brownish yellow mass behind the iris in his left eye. Tumor vascularization along with corneal neovascularization and indentation of the peripheral lens was present. Ultrasonographic examination showed polycystic nature of a tumor. The orbit MRI showed a 7.9 x 8.1 x 6.2 mm–sized nodular enhancing mass with lobulating contour mass. En block resection of tumor was performed with lamellar sclero-iridocyclectomy. Histological diagnosis of granular cell tumor was confirmed. The patient retained vision and no sign of recurrence was seen during 3 months after surgery.

Conclusions: Granular cell tumor is a rare soft tissue tumor. PubMed search showed only 2 cases of iris and/or ciliary body granular cell tumor, which were managed with partial removal of a large tumor or an excisional biopsy of a small tumor. The present case was managed with complete removal of the large tumor with retention of vision and eyeball. Granular cell tumor should be considered a differential diagnosis of ciliary body tumor.

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

Study of the Histopathological Characteristics of Ciliary Body from the Enucleated/ Eviscerated Human Eye and Comparison of Histopathological Features of Ciliary Body in Various Etiologies

*First Author: Hitesh **AGRAWAL***
*Co-Author(s): Anthony Vipin **DAS**, Subhadra **JALALI**, Dilip **MISHRA***

Purpose: To understand the histopathology of the ciliary body in enucleated/eviscerated human eyes due to absolute glaucoma, anterior segment diseases and painful blind eyes with excluding causes of infection and malignancy.

Methods: We collected a total of 20 eyes. We dissected the ciliary body tissue through the scleral pocket. All the specimens underwent histopathological evaluation with H&E stain. Detailed histopathology examination was done under microscope.

Results: Post trauma eyes (6): atrophy of ciliary processes, elongated villi like projection, hyperpigmented pigmented epithelium (PE), eosinophilic material deposit in non-pigmented epithelium (NPE) and hypertrophy or congested blood vessels in stroma. Atrophia bulbi (5): flattening/finger-like projections of ciliary processes, inward folding or eosinophilic material deposit in NPE. Absolute glaucoma eyes (3): flattening and folding of ciliary processes. Atrophy and eosinophilic material deposit in NPE. Inflammatory cells and congested blood vessels in stroma. Anterior staphyloma (2): flattening of ciliary processes. Eosinophilic material deposit in NPE exudative retinal detachment (1): atrophy of ciliary processes. Hypertrophy of PE. Pigment dispersion in NPE. Stroma showing thick hyalinized collagen and amorphous eosinophilic material. Coat's disease (1): fused ciliary processes. Eosinophilic material deposit in NPE. Stroma scanty. With Sturge Weber syndrome (1): flattening of ciliary processes. Hyperpigmentation of PE. Swelling of cells in NPE. Stroma edematous with muscle hypertrophy. Orbital cellulitis (1): focal hypertrophy of PE. Muscle hypertrophy in stroma.

Conclusions: Most of the specimens were showing flattening of ciliary processes. PE, NPE and stroma showing variable findings based on etiology. Further molecular analysis is needed to look for secretory activity of ciliary body.

Ophthalmic Epidemiology

Poster No.: EX1-026
Panel No.: 026, Session: EX1

Sleep Apnea is a Stronger Risk Factor for Proliferative Diabetic Retinopathy Than Metabolic Syndrome and the Number of Its Individual Components

*First Author: Tomoaki **SHIBA***
*Co-Author(s): Yuichi **HORI**, Tadashi **MATSUMOTO**, Mao **TAKAHASHI***

Purpose: To evaluate whether the features of sleep apnea are stronger independent factors for proliferative diabetic retinopathy (PDR) compared to the incidence of metabolic syndrome (MetS) and the number of its individual components.

Methods: We conducted a cross-sectional study of 132 patients with type 2 diabetes. Of them, 39 patients had non-proliferative diabetic retinopathy (NPDR) and 93 patients had PDR. Pulse oximetry was conducted, and the patients' mean oxygen saturation (mean SpO_2%) and 4% oxygen desaturation index (4% ODI times/hour) were evaluated. We compared the sleep apnea and MetS variables between the NPDR and PDR patients. A logistic regression analysis was used to determine the independent factors for the diagnosis of PDR.

Results: The MetS diagnosis was made significantly more often in the PDR group ($P = 0.04$). The number of individual MetS components was significantly greater in the PDR group compared to the NPDR group ($P = 0.01$). The mean SpO_2 of the NPDR group was not significantly different from that of the PDR group. The 4% ODI in the NPDR group was significantly lower than that in the PDR group

(P = 0.01). The logistic regression analysis using the prevalence of MetS and the number of MetS components revealed that younger age and high 4% ODI value were independent factors contributing to the diagnosis of PDR.

Conclusions: Our findings confirmed that compared to MetS and the number of its individual components, sleep apnea may be a factor contributing to the progression to PDR.

Other (General Ophthalmology)

Poster No.: EX1-028
Panel No.: 028, Session: EX1
Atypical Phenotype of Occult Macular Dystrophy Associated with *RP1L1* Mutation (p.P109Sfs*29)

*First Author: Wenjun **ZOU***
*Co-Author(s): Suqin **YU***

Purpose: To report an atypical case of occult macular dystrophy (OMD) with bilateral subfoveal subretinal fluid (SRF), vitelliform lesion (VL) and retinal pigment epithelium (RPE) rip.

Methods: A 68-year-old Chinese man underwent detailed ophthalmic clinical evaluations because of decreased visual acuity in both eyes. Genetic analysis was extracted from venous blood samples.

Results: At age 60, his best-corrected visual acuity (BCVA) was 6/6 in the right eye and 6/10 in the left eye. Fundus examination showed that pigmentary changes in both eyes and VL in the left foveal corresponding to patchy hypofluorescence in fundus fluorescein angiography (FA). At age 65, the patient complained of progressive loss of visual acuity in both eyes. Fundus examination showed increased pigmentary changes and VL in both eyes and RPE rip corresponding to the round hyperfluorescence in FA in the left eye. Spectral-domain optical coherence tomography (SD-OCT) showed soft drusen with VL in the right eye, SRF, RPE rip and VL in the left eye. He was given 1 administration of intravitreal ranibizumab (IVR; 0.5 mg) in the left eye but had poor response. At age 68, microperimetry revealed decreased central retinal sensitivity in both eyes and the right eye developed RPE rip confirmed by fundus autofluorescence (FAF) and OCT. An electrooculogram (EOG) and full-field electroretinography (ERG) were unremarkable. Genetic analysis revealed a novel heterozygous mutation (p.P109Sfs) in the retinitis pigmentosa 1-like 1 (*RP1L1*) gene.

Conclusions: We presented a case of bilateral subfoveal SRF, VL and RPE rip with atypical OMD carrying a novel heterozygous *RP1L1* mutation.

Poster No.: EX1-030
Panel No.: 030, Session: EX1
Bilateral Phthiriasis Palpebrarum: A Case Report

*First Author: Kristine **PORMIDA***
*Co-Author(s): Pia Regina **GALVANTE***

Purpose: To present a case of bilateral phthirus pubis eyelash infestation in an elderly male.

Methods: Case report.

Results: A 75-year-old man suffered from severe itchiness and irritation of both eyes for more than a year. On examination, multiple red pinpoint excretions were noted in the periorbital area, with multiple oval-shaped brown opalescent nits anchored on the upper eyelashes with blood crusts. Translucent lice were observed to be burrowing deep into the hair follicles and sucking blood from its host. The rest of the slit-lamp examination findings were essentially normal. Manual removal of nits and ectoparasites was done. A regimen of erythromycin ointment 3 times daily and pilocarpine 2% drops once daily at night was advised. The patient was subsequently referred to Dermatology and Urology services for further evaluation. On follow-up 2 weeks later, the patient was asymptomatic and lice or nits were no longer seen on the lashes.

Conclusions: Phthiriasis pubis infestation, a rare type of eyelash infestation, is commonly misdiagnosed and mistreated. Careful slit-lamp examination is necessary to visualize the translucent ectoparasites and nits. Poor hygiene

and sexual intercourse play a significant role in its transmission. Family members as well as sexual contacts should be examined and treated. Emphasis on proper hygiene is essential to prevent its spread.

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

IOL Opacification Years after Uncomplicated Cataract Surgery: An Upcoming Challenge

First Author: Remya ***PAULOSE***
Co-Author(s): Thomas Cherian ***CHERIAN****, Reesha* ***KARINGATTIL***

Purpose: (1) To investigate clinical features, initial diagnosis and surgical outcome in IOL opacification. (2) To propose a grading for IOL opacification. (3) To report histopathology results of the explanted IOL-capsule complex and vitreous and aqueous aspirate.

Methods: Patients with IOL opacification following uncomplicated phacoemulsification with foldable IOL were included in the study. Patients were graded into 3 groups with regard to severity of opacification, visual acuity and fundus view. Cases where fundus view was precluded, ultrasound was performed. All patients of group 1 and 2 were observed, while grade 3 cases were taken up for surgery. Aqueous and vitreous sample along with the IOL-capsule complex was sent for histopathological examination.

Results: Of 8 eyes of 8 patients with IOL opacification, 62.5% were women (mean age, 66.8 years). The mean interval from cataract surgery to onset of symptom was 22.5 months (range, 11-50 months). IOL opacification grade 1 and 2 included 3 patients each and 2 eyes were in grade 3. These 2 patients underwent IOL explantation. The IOL was fibrosed to the capsular bag in both cases and hence had to be removed en masse. Multiple epithelial cells were seen on the surface of the IOL optic and haptic region of HPE. No intralenticular opacification or calcification was found.

Conclusions: Although rare, IOL opacification is highly relevant because it is often misdiagnosed as posterior capsule opacity, vitreous hemorrhage or endophthalmitis. The study emphasizes the need for high index of suspicion in post-cataract surgery patients presenting with visual problems. A simple and practical grading system has been proposed which will aid in the optimum management of these cases.

Poster No.: EX1-029
Panel No.: 029, Session: EX1

Severe Bilateral Retrobulbar Optic Neuritis (RON) in an Elderly Patient

First Author: Amelia ***LIM***
Co-Author(s): Chon ***CHON CHEAN****, Nor Fariza* ***NGAH****, Shelina* ***OLI MOHAMED***

Purpose: To describe a rare presentation and management of bilateral RON in an elderly patient.

Methods: Case report.

Results: A 68-year-old Chinese man presented with drastic bilateral painless visual loss for 4 days, whereby it started off with the right eye, followed by the fellow eye within a day. He began to experienced bilateral complete darkness 2 days from the onset of symptom. On examination, bilateral pupils were dilated at 6-7 mm with sluggish pupillary reflexes. Vision was non-perception to light (NPL) OU. There were prominent bilateral superficial temporal artery, however they were not tender or hard in consistency. Otherwise, anterior and posterior segments examination did not show any significant abnormality. Giant cell arteritis was rule out. Additionally, a careful consideration was given to rule out vascular and infective causes as well, however all work-up were negative. CT scan orbit and paranasal sinuses revealed bilateral optic nerve enhancement and severe pansinusitis. Subsequently he received intravenous Augmentin and Flagyl for 2 weeks combined with expeditious drainage of sinuses collections. After being treated with 5 days of antibiotics, he was started on oral prednisolone 1 mg/kg OD with gradual tapering dose. He gained significant visual recovery from NPL to PL OD, Counting fingers (CF) OS at 1 week and CF OD, 6/15 OS at 1-month interval.

Conclusions: Bilateral RON secondary to pansinusitis with dramatic visual loss in elderly is a rare clinical entity. Hence, a meticulous work-up to rule out important cases is crucial.

Pediatric Retina

Poster No.: EX1-033
Panel No.: 033, Session: EX1
Anterior and Posterior Persistent Fetal Vasculature (PFV)

*First Author: Vera **SUMUAL***
*Co-Author(s): Calvin **NUGRAHA**, Herny **POLUAN***

Purpose: To report a case of PFV in Prof. Dr. R.D. Kandou General Hospital, Indonesia.

Methods: The clinical history and physical examination were obtained by an ophthalmologist.

Results: A 3-year-old boy presented with white pupillary reflex in the left eye since birth. He never experienced red eye and had no history of trauma or surgery. He was delivered per vaginam. His mother had no history of illness or consumption of any medication when pregnant. Microphthalmia, poor fixation reflex, and opacified lens with retrolental membrane in his left eye were found, thus blocking the view of the posterior segment. The lens of the right eye was clear. The intraocular pressure, corneal diameter, eye position, eyelid, conjunctiva, cornea, anterior chamber, iris, and pupil of both eyes were normal. B-scan ultrasound of the left eye revealed dense stalk arising from the optic nerve, attaching to the posterior lens. The only systemic abnormality found was pulmonary tuberculosis.

Conclusions: Based on clinical history, examination, and B-scan ultrasound, a diagnosis of anterior and posterior PFV was made. PFV should be differentiated from retinoblastoma which is usually not obvious at birth, more often bilateral, and almost never associated with microphthalmos or cataract. Systemic abnormalities that may be found at pediatric cataract such as intrauterine infection, metabolic diseases were not found. Cataract extraction and removal of the fibrovascular retrolental membrane were planned for this patient. Pulmonary tuberculosis will be treated by the Pediatric Department. Anatomic and visual outcomes depend on preoperative ocular anatomy, the timing of surgery, whether the lens was removed, and postoperative amblyopic therapy.

Poster No.: EX1-031
Panel No.: 031, Session: EX1
Bilateral Non-Traumatic Macular Hole in Posterior Microphthalmos

*First Author: Ritesh **SHAH***

Purpose: To report a very rare co-existence of bilateral macular hole in a 15-year-old girl with posterior microphthalmos.

Methods: Detailed ophthalmic examination and investigations including B scan ultrasonography and optical coherence tomography (OCT) were performed.

Results: Ophthalmic examination showed bilateral high hyperopia. The best-corrected visual acuity was 6/18 in each eye with correction of +12 D in the right eye and +10 D in the left eye. Ocular biometry measurements showed short total axial length (16.3 mm both eyes) with remarkable shortening of posterior segment (9.3 mm right eye; 9.28 mm left eye) but normal anterior segment parameters. Anterior chamber depth (2.96 mm right eye; 2.94 mm left eye), horizontal corneal diameter (10.5 mm both eyes) and keratometry readings were within normal range. Fundus evaluation revealed bilateral macular hole. Optical coherence tomography finding was compatible with bilateral lamellar macular hole in both eyes. B scan ultrasonography showed sclerochoroidal thickening with foreshortening of vitreous cavity.

Conclusions: A variety of posterior segment manifestations associated with posterior microphthalmos have been reported but macular hole is an extremely rare association. This finding is noteworthy and probably the second in literature.

Poster No.: EX1-089
Panel No.: 089, Session: EX1

Early Postnatal Weight Gain is a Predicting Factor for Severe Treatment-Needed Retinopathy of Prematurity (ROP)

*First Author: Haein **MOON***
*Co-Author(s): Jung Kee **MIN**, Je Moon **WOO***

Purpose: To analyze risk factors for treatment-needed ROP and compare a tendency of postnatal weight gain of premature baby between non-treatment ROP group and treatment ROP group.

Methods: This retrospective chart review study included premature babies with gestational age under 32 weeks or birth body weight under 1500 g from January 2013 to March 2018. A total of 95 babies were analyzed and categorized into 2 groups as per treatment. Postnatal weight gain ratio was calculated every week and analyzed after standardization.

Results: A mean standardized postnatal weight ratio of treatment ROP group from postmenstrual age 27 weeks to 43 weeks was higher than that of non-treatment ROP group. Low birth body weight, low birth gestational age, large postnatal weight gain ratio, multiple red blood cell transfusion, low Apgar score at 1 minute, bronchopulmonary dysplasia and long oxygen treatment duration were significant factors for treatment of ROP in univariate logistic regression analysis. In multivariate analysis, low birth body weight, low birth gestational age, and large standardized postnatal weight gain ratio were significant.

Conclusions: Low birth body weight, low birth gestational age, and large standardized postnatal weight gain ratio are predicting factors for treatment-needed ROP.

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

Optic Disc Contractility in Morning Glory Disc Anomaly: A Case Report

*First Author: Syed **KADAR***
*Co-Author(s): Reddy **Y C**, Sherin Haroon M **HAROON**, Samyuktha **SADASIVAN***

Purpose: To report a case of morning glory disc anomaly which contracted on consensual light exposure and B-scan documentation of the globe elongation in response to consensual light stimuli.

Methods: A 4-year-old girl presented with defective vision and squinting of her left eye. She had no other systemic complaints. She was evaluated with detailed clinical examination with relevant investigations.

Results: Her best-corrected visual acuity was 6/6 in the right eye and no PL in the left eye. Her ocular examination findings in the right eye were normal. Left eye examination revealed esotropia, enophthalmos, and afferent pupillary defect. No systemic or central nervous system anomalies were found. Fundus examination showed morning glory disc in the left eye. On examination under anesthesia with video indirect ophthalmoscope the anomalous disc showed a brisk contraction to light stimuli on the opposite eye and no contraction when light is thrown on the same eye. Ultrasound B-scan showed an increase in axial length in the left eye on consensual light exposure.

Conclusions: Contractility of disc in morning glory anomaly suggests the presence of contractile smooth muscles around the optic disc and in the adjacent posterior sclera which possibly explains the disc contractility along with conical posterior elongation of the globe demonstrable on ultrasound B-scan, on consensual light exposure.

Retina (Medical)

Poster No.: EX1-042
Panel No.: 042, Session: EX1

One-Year Result of Fixed-Dose Aflibercept Regimen for Polypoidal Choroidal Vasculopathy (PCV)

*First Author: Hun Gu **CHOO***

Purpose: To report the result of the fixed-dose aflibercept regimen in patients with polypoidal choroidal vasculopathy (PCV).

Methods: This was a prospective, single-arm, interventional case series study conducted on

a total of 25 patients: 12 pre-treated and 13 naïve. The patients were treated and monitored for 12 months. They were followed up every month for the first 3 months of fixed-dose aflibercept (2.0 mg) injection, which was a loading phase, and thereafter, every 2 months.

Results: After 12-month aflibercept treatment, in all the 25 patients, the mean BCVA statistically significantly increased from 65.48 letters at baseline to 69.91 letters at 12 months (P = 0.001), and CSMT significantly decreased from 406.92 μm at baseline to 276.12 μm at 12 months (P < 0.001). Additionally, 10 patients (40%) showed complete polyp regression. In the comparison of the naïve and pre-treated groups, the naïve group showed a statistically significant increase in BCVA from 66.58 letters at baseline to 76.36 letters at 12 months, and a significant decrease in CSMT, from 462 to 243 μm. In the pre-treated group, there was no change in BCVA (64.46 letters), and the decrease in CSMT from 356.08 to 303.69 μm was not statistically significant.

Conclusions: The fixed-dose aflibercept regimen is useful in patients with PCV, and is more effective in naïve patients than in pre-treated patients.

Poster No.: EX1-053
Panel No.: 053, Session: EX1

A Multi-Country Comparison of Real World Management and Outcomes of Polypoidal Choroidal Vasculopathy: Fight Retinal Blindness! Cohort

*First Author: Kelvin **TEO***
*Co-Author(s): Gemmy **CHEUNG**, Mark **GILLIES***

Purpose: Comparing the 12-month real-world visual and disease activity outcomes of eyes with polypoidal choroidal vasculopathy (PCV), treated with a combination of photodynamic therapy and anti-vascular endothelial growth factor (anti-VEGF) injections versus eyes treated with anti-VEGF monotherapy.

Methods: This was a registry comparative observational study. Eyes with PCV as graded in Fight Retinal Blindness! database from Australia, New Zealand, Singapore and Switzerland were included and divided into 2 groups. The primary outcome was the change in visual acuity in logMAR letters over 12 months between the 2 groups analyzed with intention-to-treat approach.

Results: There were 41 and 152 eyes that received combination therapy and anti-VEGF monotherapy respectively. The adjusted mean (CI) change in visual acuity was +16.9 (10.6-23.3) letters in the combination group and +8.2 (5.2-11.3) letters in the monotherapy group (P = 0.02). The proportion of inactive lesions and mean (CI) time to inactivity was 85.3% and 80.7 (62.8-98.5) days in the combination group compared to 76.8% and 150.4 (132.8-168.0) days in the monotherapy group (P = 0.01). The mean number of injections (CI) was 4.3 (3.6-5.2) in the combination group and 6.4 (5.9-6.9) in the monotherapy group (P = 0.01). Bevacizumab comprised 66.1% of injections administered.

Conclusions: The real-world outcomes for the treatment of PCV showed larger gains in vision, higher proportion of inactive lesions, quicker time to inactivity and fewer injections administered in the combination group versus the monotherapy group. These findings are consistent with current evidence reporting the advantages of combination therapy for PCV.

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

Cilioretinal Artery Occlusion Mimicker: A Case Report on a Proximal Superior Macular Branch Retinal Artery Occlusion

*First Author: Janice Marie **JORDAN-YU***
*Co-Author(s): Kent **WEE***

Purpose: Retinal arterial occlusions are rare vaso-occlusive events. The least common of retinal arterial occlusions involves that of a cilioretinal artery and or branch retinal artery. We report a rare case of an isolated unilateral proximal macular branch retinal artery occlusion in a 60-year-old Filipino Female that clinically mimicked a cilioretinal artery occlusion.

Methods: Case report.

Results: A 60-year-old Filipino female

presented with sudden painless unilateral blurring of vision of the right eye in the inferior hemi-field which persisted for a month. Funduscopic examination of the right eye revealed an area of hypopigmentation superior to the macula. In the same area, a long straight sclerotic vessel was noted seemingly originating temporal of the optic disc thus a diagnosis of cilioretinal artery occlusion of the right eye was made. Macular optical coherence tomography (OCT) showed a focal area of thinning at the superior macular quadrant in the right eye. However, further studies included ultrawide-field fundus angiography which revealed a proximal superior macular branch retinal artery occlusion with a visible greyish to whitish intra-arterial emboli at the point prior to vessel dropout. Ocular anti-hypertensive drops were prescribed and digital massage was attempted, however due to the late course of the disease visual loss was permanent. Currently, she is monitored for signs of neovascularization. The patient was also referred to internal medicine (cardiology) for systemic evaluation.

Conclusions: Branch retinal artery occlusion may mimic clinical features of a cilioretinal artery occlusion especially when involving a proximal supero-temporal branch retinal artery partially supplying the macula.

Poster No.: EX1-040
Panel No.: 040, Session: EX1

Comparison of Ranibizumab and Aflibercept for Neovascular Age-Related Macular Degeneration Using a Treat-and-Extend Regimen: Results of the 24-Month Secondary Efficacy Outcomes from the RIVAL Study, a Randomized Clinical Trial

*First Author: Mark **GILLIES***
*Co-Author(s): Jennifer **ARNOLD**, Robyn **GUYMER**, Alex **HUNYOR**, Ian **MCALLISTER**, Francois **PECHEUR***

Purpose: To report the 24-month secondary efficacy outcomes of RIVAL, a study designed to investigate the development of macular atrophy in patients receiving ranibizumab 0.5 mg (RBZ) or aflibercept 2.0 mg (AFL) for neovascular age-related macular degeneration (nAMD).

Methods: A 24-month, multicenter, phase IV study that randomized 281 patients (1:1) to receive RBZ or AFL following a treat-and-extend (T&E) regimen. The best-corrected visual acuity (BCVA) assessors and the reading center were masked.

Results: A total of 278 patients (RBZ, n = 141; AFL, n = 137) were included in the analysis. 225 (80%) patients [117 (82%) RBZ; 108 (78%) AFL] completed the study. Demographic and baseline characteristics were similar. The mean ± SD number of injections over 24 months was 17.7 ± 6.4 for RBZ and 17.0 ± 6.3 for AFL. From baseline to month 24 (M24), the mean ± SD BCVA increased from 65.3 ± 15.1 letters (n = 141) to 72.5 ± 16.4 letters (n = 117) for RBZ, and from 65.1 ± 12.5 letters (n = 137) to 70.3 ± 14.9 letters (n = 108) for AFL, while the mean ± SD central subfield foveal thickness (CSFT) decreased from 468 ± 151 µm (n = 141) to 306 ± 81 µm (n = 117), and from 484 ± 168 µm (n = 137) to 299 ± 78 µm (n = 108), respectively. Random effect mixed modelling found the mean (95% CI) changes in BCVA and in CSFT from baseline at M24 were +6.6 letters (4.7, 8.5) and −161 µm (−174, −147) for RBZ, compared to +4.6 letters (2.7, 6.6) and −173 µm (−186, −159) for AFL; the respective treatment effects (95%CI) were 2.0 letters (−0.7, 4.6) (P = 0.15) and 12 µm (−7, 31) (P = 0.23).

Conclusions: RBZ and AFL achieved similar visual acuity and retinal thickness improvements with similar injection loads over 24 months using a T&E regimen for nAMD.

Poster No.: EX1-045
Panel No.: 045, Session: EX1

Comparison of Treatment Outcomes among Subtypes of Polypoidal Choroidal Vasculopathy in a Multicenter Randomized Controlled Study (EVEREST Study)

*First Author: Colin **TAN***
*Co-Author(s): Louis **LIM**, Wei Kiong **NGO***

Purpose: To evaluate the frequency and characteristics of polypoidal choroidal vasculopathy (PCV) subtypes among patients from a multicenter randomized controlled trial,

and to determine the impact of the subtypes on clinical outcomes.

Methods: Sixty patients with macular PCV from the EVEREST study were analyzed. The diagnosis of PCV was confirmed by a Central Reading Center using standardized indocyanine green (ICGA) and fluorescein angiography (FA). Type A PCV had polyps with interconnecting channels, type B had polyps with branching vascular networks with no leakage on FA, and type C had polyps with branching vascular networks with significant leakage on FA. The visual acuity (VA) and central retinal thickness (CRT) of the PCV subtypes were evaluated.

Results: Of the 54 patients who were gradable for PCV subtype, 8 had type A PCV (14.8%), 27 had type B (50%) and 19 had type C (35.2%). Both VA and reduction in retinal thickness varied significantly with PCV subtype. At month 6, type A PCV had the best VA compared to types B and C (80.1 letters vs 67.2 vs 50.4 respectively, $P < 0.001$). Type A PCV gained 13 letters vs 8.5 (type B) and 6.9 (type C) ($P < 0.001$). The proportion of patients with VA ≥20/40 was highest for type A compared to types B and C (100% vs 51.9% vs 10.5%, $P < 0.001$). Post treatment, the CRT was thickest for type C PCV.

Conclusions: The PCV subtype affects visual outcomes following treatment. This PCV subtype classification is useful in prognosticating patients presenting with PCV.

Poster No.: EX1-046
Panel No.: 046, Session: EX1
Correlations between Multifocal Electroretinogram and Optical Coherence Tomography Angiography: A Pilot Study

*First Author: Hoon Dong **KIM***
*Co-Author(s): Jin Ah **KIM**, Sanjar **MADRAHIMOV**, Young Hoon **OHN***

Purpose: To assess morphological and functional macular changes in subjects with normal and abnormal fundus using optical coherence tomography angiography (OCT-A) and multifocal electroretinogram (mfERG).

Methods: OCT-A and mfERG recording were performed on 8 healthy controls (11 eyes) and 13 patients (20 eyes). Patient characteristics included diabetic retinopathy, age-related macular degeneration, epiretinal membrane, branched retinal vein occlusion, staphyloma, and fundus albipunctatus. Foveal avascular zone (FAZ) size, vessel density (VD), perfusion of superficial capillary plexus (SPC) on OCT-A, and amplitude and implicit time from the ring 1 of mfERG were analyzed.

Results: The FAZ size was 0.23 mm^2 in normal controls and 0.26 mm^2 in patients. VD was 8.4 mm^{-1} in normal controls and 7 mm^{-1} in patients with abnormal fundi. N1, P1, and N2 (ring 1) amplitudes were reduced significantly in the eyes with abnormal fundi compared to the normal controls ($P < 0.05$). There were correlations between central VD, perfusion of SPC, horizontal diameter of FAZ, and mfERG N1, P1, and N2 amplitude and N2 implicit time in ring 1 ($P < 0.05$).

Conclusions: FAZ size was increased and VD was decreased in eyes with abnormal fundi compared with normal controls. mfERG responses were decreased in patients with abnormal fundi. These results suggest that OCT-A and mfERG are useful tools to investigate the morphology and function of the fundus in patients with abnormal fundus.

Poster No.: EX1-043
Panel No.: 043, Session: EX1
Demographic and Risk Factors Analysis of Rhegmatogenous Retinal Detachment in a Tertiary Health Center in Jakarta, Indonesia

*First Author: Vincent **TAHIJA***
*Co-Author(s): Elvioza **ELVIOZA***

Purpose: Rhegmatogenous retinal detachment (RRD) occurs when fluid enter through a retinal break and dissect neurosensory retina and retinal pigment epithelium. This study aimed to evaluate patient characteristics and risk factors in patients with RRD in Kirana eye center.

Methods: This was a retrospective study. Patient data were gathered from medical records. New patients with diagnosis of RRD between January and December 2016 were

included in the study. A total of 191 patients were eligible, and the patient characteristics (gender and age) and risk factors (history of cataract extraction, trauma, family history, fellow eye and refractive error) were evaluated.

Results: In our center, new patients with RRD were 58% males; almost 60% patients aged less than 50 years with a mean age of 48.2 years. Consecutively, myopia, aging process, cataract extraction, trauma, fellow eye and family history identified as the most to least common risk factor. Almost 21% patients have at least 2 known risk factors, which are myopia and aging. Most of the patients (35.3%) were young patients with myopia, followed by 21.9% with aging as risk factor. Myopic risk factor is more common (14.1%) in young age compared to 3.7% in aged patients. 21.9% of the patients were identified without any risk factors.

Conclusions: Myopia and aging were 2 most commonly known major risk factors of RRD. In this study, it seems both risk factors can simultaneously or independently cause RRD. While 21.9% patients without known risk factors might have RRD from other risk factors which are still unknown to ophthalmologists.

Poster No.: EX1-055
Panel No.: 055, Session: EX1
Detection of Novel Variants in *ABCA4* Causing Stargardt Disease

*First Author: Ta-Ching **CHEN***
*Co-Author(s): Pei-Lung **CHEN**, Ding-Siang **HUANG**, Chao-Wen **LIN**, Chang-Hao **YANG**, Chung-May **YANG***

Purpose: The ABCA4 protein is active following phototransduction to remove potentially toxic substances N-retinylidene-PE from photoreceptor cells. Mutation of *ABCA4* gene is the main cause of Stargardt disease. Here, we tried to identify novel variants in *ABCA4* that would cause retinal degeneration.

Methods: The 2 reported cases were recruited in the TIP (Taiwan Inherited retinal diseases Project) program. The blood sample was collected and the genomic DNA was sequenced by panel-based next-generation sequencing (NGS) with 215 genes associated with inherited retinal degenerations. NGS data were processed and pathogenicity of retained variants was predicted by algorithm analysis such as SIFT, PolyPhen-2, and database such as GnomAD. The criteria of classifying pathogenic variants were based on the ACMG standard and guideline.

Results: In patient 1, a 29-year-old woman, compound heterozygous nonsense mutations c.6190G>A (p.Ala2064Thr) and a novel variant c.3287C>T (p.Ser1096Leu) were identified in *ABCA4* gene. In patient 2, a 25-year-old man, compound heterozygous nonsense mutations c.1804C>T (p.Arg602Trp) and another novel variant c.6113G>A (p.Arg2038Gln) were identified in *ABCA4* gene. Both patients showed typical phenotype of central macular degeneration and decreasing visual acuity from late teens, corresponding to Stargardt disease. The 2 novel variants were identified "likely pathogenic" based on the ACMG standard.

Conclusions: Here we report 2 novel variants c.3287C>T (p.Ser1096Leu) and c.6113G>A (p.Arg2038Gln) in *ABCA4* which are related to Stargardt disease. These findings broaden the spectrum of *ABCA4* mutations and might be useful for genetic consultation and diagnosis in the future.

Poster No.: EX1-035
Panel No.: 035, Session: EX1
Diabetic Optic Neuropathy and Its Risk Factors in Chinese Patients with Diabetic Retinopathy

*First Author: Rui **HUA***

Purpose: To investigate diabetic optic neuropathy (DON) prevalence and risk factors in Chinese diabetic retinopathy (DR) patients.

Methods: This retrospective study included 1067 eyes (550 patients), who underwent ocular imaging examinations.

Results: A total of 410 eyes with DON and 657 eyes without DON were included (38.4% DON prevalence). DON eyes were classified as having diabetic papillopathy (DP), optic disc neovascularization (NVD), anterior ischemic

optic neuropathy (AION), or optic atrophy (OA). Proliferative DR eyes had a higher DON incidence compared with non-proliferative DR eyes (P < 0.001). Diabetes duration, systolic blood pressure (SBP), and HbA1c were higher in DON patients than in non-DON patients (all P < 0.001). Additionally, high density lipoprotein was lower in patients with DON (0.74 ± 0.13 mmol/L) than in those without DON (1.00 ± 0.24 mmol/L, P < 0.001). HbA1c level was greater in AION patients [10.00 ± 1.53% (85.76 ± 16.71 mmol/mol)] than in DP patients [8.78 ± 1.97% (72.45 ± 21.55 mmol/mol), P = 0.017]; central foveal thickness (CFT) on optical coherence tomography significantly varied among groups (P < 0.001). Increased age, diabetic duration, SBP, CFT and DR severity were risk factors for DON; and increased HbA1c was a risk factor for NVD, AION, and OA (all P < 0.05).

Conclusions: Our study results strengthen the argument that increased age, diabetic duration, SBP, CFT, DR severity, and HbA1c are all risk factors for developing DON in patients with DR.

Poster No.: EX1-049
Panel No.: 049, Session: EX1

Efficacy and Safety of Anti–Vascular Endothelial Growth Factor Treatment Using a Short 34-Gauge Needle for Intravitreal Injections

*First Author: Hirofumi **SASAJIMA***
*Co-Author(s): Motohiro **KAMEI**, Kotaro **TSUBOI***

Purpose: We previously reported that the short 34-gauge needle significantly reduced patients' perceived pain during the intravitreal injections and the lower incidence of reflux after injections compared to a 30-gauge needle. In the current study, we evaluated the efficacy and preliminary safety of anti-vascular endothelial growth factor (VEGF) treatment using a short 34-gauge needle for intravitreal injections.

Methods: Medical records were reviewed in consecutive patients with age-related macular degeneration, diabetic macular edema, or macular edema associated with retinal vein occlusions who received intravitreal injections with a 34-gauge needle (8 mm long) between December 2016 and January 2018.

Results: A total of 698 injections (243 consecutive patients) were reviewed. The mean age was 74.0 years and the mean follow-up time was 30.2 ± 15.9 weeks. The mean number of intravitreal injections per eye was 2.7 ± 1.8 (range, 1-9 injections). The mean best-corrected visual acuity significantly (P < 0.0001) improved from 0.43 ± 0.4 logMAR at baseline to 0.36 ± 0.41 logMAR at the last visit. The mean central retinal thickness significantly (P < 0.0001) decreased from 426.9 ± 168.5 μm at baseline to 297.6 ± 121.1 μm at the last visit. A retinal tear occurred in 1 eye (0.14%). The mean intraocular pressure significantly (P < 0.0001) decreased from 13.3 ± 3.0 mm Hg at baseline to 12.9 ± 2.9 mm Hg at the last visit. A sustained rise of the intraocular pressure occurred in 9 eyes (1.29%).

Conclusions: Despite few complications, the short 34-gauge needle for the anti-VEGF treatment was efficacious and preliminarily safe for intravitreal injections.

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

Efficacy and Safety of Oral Eplerenone in Chronic CSCR and Its Impact on Serum Cortisol Level

*First Author: Remya **PAULOSE***

Purpose: (1) To evaluate the efficacy and safety of oral eplerenone in chronic central serous chorioretinopathy. (2) To analyze the impact of eplerenone on serum cortisol levels.

Methods: This was a prospective study done on chronic central serous chorioretinopathy (CSCR). OCT was performed, including manual measurements of the height and diameter size of subretinal fluid. All these patients underwent serum cortisol levels, serum potassium level in addition to RFT at baseline. All of them were started on eplerenone. Monthly monitoring of RFT and potassium was done for 3 months and thereafter every 3 monthly. The primary outcome measure was the reduction in subretinal fluid and change in visual acuity.

Results: A total of 21 eyes of 19 patients were enrolled. The mean follow-up time was 6.4 ± 4.3 months. Baseline BCVA was 0.54 ± 0.44 logMAR, which improved to 0.42 ± 0.43 logMAR at the final visit (P = 0.04). The mean CMT decreased from 282.69 ± 103.23 μm at baseline to 236.75 ± 90.10 μm at final visit (P = 0.11), and the mean of maximum SRF height decreased from 155.63 ± 95.27 μm at baseline to 77.19 ± 95.68 μm at the final visit (P = 0.04). SRF resolved completely in 18 eyes. However the reduction in serum cortisol level in these patients was not statistically significant.

Conclusions: In eyes with persistent SRF due to CSCR eplerenone therapy was associated with a significant decrease in maximum SRF height, as well as an improvement in BCVA. Hence oral eplerenone should be considered a low-cost alternative to the expensive treatments available.

Poster No.: EX1-054
Panel No.: 054, Session: EX1

Identification of a Novel Missense Mutation in Cep290 in Two Unrelated Families of Retinitis Pigmentosa

*First Author: Ta-Ching **CHEN***
*Co-Author(s): Pei-Lung **CHEN**, Ding-Siang **HUANG**, Chao-Wen **LIN**, Chang-Hao **YANG**, Chung-May **YANG***

Purpose: CEP290 plays an important role in photoreceptor and mutation of *CEP290* gene could lead to ciliopathies with associated retinal degeneration, such as Leber congenital amaurosis (LCA). Here, we tried to identify a novel missense mutation in *CEP290* in 2 unrelated families of autosomal recessive retinitis pigmentosa (arRP).

Methods: The reported cases were recruited in the TIP (Taiwan Inherited retinal diseases Project) program. The blood sample was collected and the genomic DNA was sequenced by panel-based next-generation sequencing (NGS) with 215 genes associated with inherited retinal degenerations. NGS data were processed and pathogenicity of retained variants was predicted by algorithm analysis such as SIFT, PolyPhen-2, and database such as GnomAD. The criteria of classifying pathogenic variants were based on the ACMG standard and guideline.

Results: In family 1, compound heterozygous nonsense mutations c.4897C>T (p.Gln1633Ter) and a novel variant c.6798G>A (p.Trp2266Ter) were identified in 2 sisters: 68-year-old and 54-year-old women. Both of them described typical symptoms of night blindness from their 30s. In family 2, the proband is a 24-year-old woman having compound heterozygous nonsense mutations c.3802C>T (p.Gln1268Ter) and the same novel variant c.6798G>A (p.Trp2266Ter). Her symptoms onset in her teens. The novel variant c.6798G>A (p.Trp2266Ter) was identified "pathogenic" based on the ACMG standard. All 3 cases showed typical phenotypes of RP in retinal examinations.

Conclusions: Here we report a novel variant c.6798G>A (p.Trp2266Ter) in *CEP290* which is related to arRP. The finding broadens the spectrum of *CEP290* mutations and would be useful for genetic consultation and diagnosis in the future.

Poster No.: EX1-056
Panel No.: 056, Session: EX1

Involution of Endophytic Optic Nerve Head Angioma with a Single Session of Photodynamic Therapy

*First Author: Pritam **BAWANKAR***

Purpose: We report a rare case of unilateral endophytic optic disc angioma with serous macular detachment and exudation who was successfully treated with photodynamic treatment (PDT).

Methods: A retrospective case report.

Results: A 17-year-old male was referred to us for evaluation and management of an unusual optic disc lesion in his right eye (RE). He had a gradual progressive diminution of vision in RE for 2 months. HIs best-corrected visual acuity was 20/200 in RE and 20/20 in the left eye. Anterior segment examination was unremarkable in both eyes. Fundus examination of RE revealed an elevated, reddish lesion on

the optic disc with hard exudate and subretinal fluid extending superonasally from the optic disc into the macula. Fluorescein angiography in RE showed progressive hyperfluorescence and late leakage from the lesion. Optical coherence tomography (OCT) of RE revealed serous macular detachment. The left fundus was normal. We decided to treat angioma with PDT. The tumor regressed during the first 4 months, but the plaques of hard exudate surrounding the optic disc impinged on fovea. At the last control visit, after 1 year, angioma further regressed in size with a resolution of hard exudates. OCT revealed normal foveal contour in RE. BCVA in RE improved to 20/80.

Conclusions: PDT over a hemangioma on the optic nerve head allowed preservation of some visual function; this strategy can be considered a therapeutic option for tumors in this location.

Poster No.: EX1-085
Panel No.: 085, Session: EX1

Lamina and Prelaminar Tissue Thicknesses in the Fellow Eyes of Patients with Unilateral Central Retinal Vein Occlusion

*First Author: Seungwoo **LEE***
*Co-Author(s): Jong Yeop **PARK***

Purpose: The association of central retinal vein occlusion (CRVO) with primary open-angle glaucoma (POAG) or ocular hypertension has been reported. Thinning of the lamina cribrosa thickness (LCT) and prelaminar tissue thickness (PTT) has been observed in patients with glaucoma. This study aimed to evaluate the thickness of LCT and PTT of unaffected eye in patients with unilateral CRVO to compare the thickness with those of age-matched healthy controls.

Methods: A total of 40 unaffected fellow eyes from 40 patients with CRVO and 30 eyes from 30 age- and gender-matched healthy individuals were included in this study. The LCT and PTT were measured using the enhanced depth imaging mode of spectral-domain optical coherence tomography.

Results: The mean LCT and PT in CRVO-unaffected eyes (207.3 ± 23.4 and 145.0 ± 71.9 μm, respectively) were significantly thinner than those in the normal control eyes (230.4 ± 43.2 and 181.7 ± 71.9 μm, respectively) ($P < 0.001$).

Conclusions: This study showed that the LCT and PTT in the fellow eyes of patients with unilateral CRVO were thinner than those in normal patients. The thin LCT, PTT, and CRVO are strongly associated in our study. They might be an independent risk factor for CRVO.

Poster No.: EX1-052
Panel No.: 052, Session: EX1

Leber's Miliary Aneurysms with Macular Edema: A Case Report with Ultrawide Field Angiography and Spectral-Domain Optical Coherence Tomography Findings

*First Author: Recivall **SALONGCAY***

Purpose: To report a case of Leber's miliary aneurysms with macular edema.

Methods: This was a case study. Diagnosis was based on ultrawide-field fluorescein angiography (UWF-FA) and spectral-domain optical coherence tomography (SD-OCT) findings.

Results: A 23-year-old male with no relevant ocular or medical history presented at the ophthalmology clinic with blurring of vision of the right eye for 10 days. Visual acuity was 20/150. Funduscopic evaluation revealed multiple aneurysms, vessel dilatation and intraretinal exudation. The macula appeared elevated. UWF-FA showed numerous hyperfluorescent spots with leakage and peripheral ischemia while SD-OCT confirmed macular edema. Based on these findings, a diagnosis of Leber's miliary aneurysms was made. He was treated with focal laser photocoagulation of the aneurysms, scatter laser of the periphery, and a single dose of intravitreal bevacizumab. After 7 months, the visual acuity has improved to 20/30. There was noted resolution of macular edema and repeat UWF-FA showed no new aneurysms.

Conclusions: Leber's miliary aneurysms is a rare, idiopathic retinal telangiectasia characterized by multiple aneurysms and intraretinal exudation.

It is usually asymptomatic until the macula gets involved. UWF-FA is helpful in visualizing the full extent of leaking aneurysms and peripheral nonperfusion. SD-OCT confirms and monitors the macular edema. Treatment is directed at thermal closure of the sites of leakage, reducing the oxygen demand of the retina by ablating the ischemic areas, and suppressing angiogenic and inflammatory stimuli to reduce permeability of the blood-retinal barrier. Despite adequate treatment, however, visual recovery may take several months.

Poster No.: EX1-050
Panel No.: 050, Session: EX1

Leucine-Rich Alpha-2-Glycoprotein Predicts Proliferative Diabetic Retinopathy in Type 2 Diabetes: A Nested Case-Control Study

*First Author: Neelam **KUMARI (BHASKAR)***
*Co-Author(s): Su Chi **LIM**, Sharon **PEK**, Tavintharan **SUBRAMANIAM**, Zhang **XIAO***

Purpose: To examine the association of plasma leucine-rich alpha-2-glycoprotein (LRG1) levels with diabetic retinopathy (DR) in a multi-ethnic Asian cohort with diabetes mellitus (DM).

Methods: We included type 2 DM patients who attended Diabetes Centre during 2011-2014 and were followed up for a median of 3.2 years. Plasma LRG1 levels were assessed using enzyme-linked immunosorbent assay. Color fundus photographs were assessed for the presence and severity of DR [categorized into non-proliferative DR (NPDR) and proliferative DR (PDR)]. Multivariable logistic regression was used to estimate odds ratio (OR) for DR after adjusting for confounding factors.

Results: Of the 1206 DM patients, DR was present in 396 (32.8%), including 270 NPDR and 107 PDR. DR patients have significantly higher LRG1 levels than patients without DR (19.5 ± 11.3 vs 16.9 ± 8.9 μg/mL, P < 0.001); however, this relationship was attenuated to non-significant levels after adjustment of confounders (OR = 1.2, 95% CI, 0.96-1.30, P = 0.16). In analysis stratified by DR severity, LRG1 level was significantly higher in patients with PDR (23.2 ± 15.4 μg/mL) than with NPDR (18.1 ± 8.9 μg/mL, P < 0.001) and without DR (P < 0.001). After adjustment, with 1-SD increase in LRG1, the relative risk of having NPDR and PDR was 0.99 (95% CI, 0.83-1.18, P = 0.91) and 1.42 (95% CI, 1.14-1.76, P = 0.002) (P trend = 0.01), respectively. Central arterial stiffness mediated 12.0% of the association between LRG1 and PDR (P = 0.03).

Conclusions: Plasma LRG1 levels were associated with PDR suggesting that it may be a promising biomarker for prediction of advanced proliferative stages of DR. The mediation result indicates the potential benefit of ameliorating central arterial stiffness to prevent PDR in type 2 DM.

Poster No.: EX1-057
Panel No.: 057, Session: EX1

Outcomes of Anti–Vascular Endothelial Growth Factor (anti-VEGF) for Diabetic Macular Edema (DME) by 5 Loading Doses Followed by As-Needed Regimen

*First Author: John **SHYONG***
*Co-Author(s): Shih Jen **CHEN**, Der-Chong **TSAI***

Purpose: To report anti-VEGF treatment outcomes for DME in Taiwan, and the associated prognostic factors.

Methods: We retrospectively evaluated DME patients who were treated with 5-monthly injection of anti-VEGF agents and then as needed with monthly follow-up. Best-corrected visual acuity (BCVA) and central fovea thickness (CFT) were measured and analyzed.

Results: There were 30 eyes treated with ranibizumab, and 15 eyes with aflibercept. The BCVA (logMAR) in eyes treated with ranibizumab and aflibercept improved from 0.642 ± 0.4 and 0.644 ± 0.28 at baseline to 0.367 ± 0.3 (P = 0.009) and 0.343 ± 0.25 (P = 0.016) at 6 months, 0.410 ± 0.2 (P = 0.023) and 0.39 ± 0.29 (P = 0.043) at 12 months. The CFT in eyes treated with ranibizumab and aflibercept reduced from 433.9 ± 104 μm and 416.9 ± 97 μm at baseline to 305.93 ± 115 μm (P < 0.001) and 284 ± 100 μm (P = 0.019) at 6 months, 333.21 ± 103 μm (P = 0.006) and 317.11 ± 99 μm at 12 months (P = 0.004). The mean injection number was 5.03 ± 1.33 in the

first year. There was no significant difference in injection numbers, CFT and VA from 6 to 12 months between anti-VEGF agents. Baseline BCVA and continuity of IS-OS was significantly correlated with a better visual improvement at 6 months ($P < 0.001$).

Conclusions: Our first-year data disclosed the treatment efficacy in improving BCVA and CFT by following our protocol. No difference in anatomical and functional outcome between the 2 anti-VEGF agents was noted.

Poster No.: EX1-041
Panel No.: 041, Session: EX1

Quantitative Analysis of Choroidal Vascular Area and Density in Central Serous Chorioretinopathy: UWF Indocyanine Green Angiography Study

*First Author: Min **SAGONG***
*Co-Author(s): Jano Van **HEMERT**, Junyeop **LEE**, Donggeun **PARK**, Gahyung **RYU***

Purpose: To evaluate the choroidal vascular area and density in eyes with central serous chorioretinopathy (CSC) using ultra-widefield (UWF) indocyanine green angiography (ICGA).

Methods: A total of 26 eyes with unilateral (12 patients) and bilateral (7 patients) CSC and 14 eyes of age-matched control (10 patients) were included and imaged using UWF fluorescein angiography (FA) and ICGA. All UWF images were stereographically projected and binarized for their quantification. Choroidal vascular area was calculated by subtracting retinal vascular area of FA image from that of ICGA image and converted to choroidal vascular density. The choroidal vascular density was compared in 4 different areas (<3 mm, macular; 3-10 mm, near-peripheral; 10-15 mm, mid-peripheral; >15 mm, far-peripheral) and correlated with clinical features.

Results: The CSC eyes had significantly higher choroidal vascular density than that of the control eyes ($P < 0.005$ in all concentric areas). In the patients with unilateral CSC, affected eyes showed higher choroidal vascular density in macular area, wider choroidal hyperpermeability area, and thicker choroidal thickness than unaffected eyes ($P < 0.05$ for all). In the multivariate analysis, the choroidal vascular density correlated with the choroidal hyperpermeability area ($P = 0.006$).

Conclusions: In this study, UWF ICGA showed that choroidal vascular density significantly increased in all concentric areas compared with control and in the macula compared with unaffected eyes. As the choroidal vascular density increased, the choroidal hyperpermeability area became wider. The choroidal vascular density may be a potential diagnostic and/or prognostic factor in the CSC.

Poster No.: EX1-047
Panel No.: 047, Session: EX1

Relationship between HbA1c and Retinopathy: A Study in Northeast India

*First Author: Hiranmoyee **DAS***

Purpose: To investigate the independent association between the severity of diabetic retinopathy and glycosylated hemoglobin (HbA1c) level.

Methods: This observational study was conducted at Diabetic Clinic in a tertiary health center, from January 2012 to December 2017. Screening for retinopathy (and grading according to diabetic retinopathy disease severity scale) and HbA1c level was done in each follow-up visit of every patient registered with diabetes. Data (HbA1c level and fundus finding) from the last examination of 2000 diabetic patients were analyzed cross-sectionally. Again prospective analysis was done on 300 diabetic patients free of retinopathy at their first diabetic examination at which HbA1c was measured.

Results: Patients were divided into 3 groups depending on HbA1c value: controlled (<7%), poorly controlled 7-9%), and uncontrolled (>9%). Depending on the presence of DR patients were again divided into 3 groups: (1) diabetes and no evidence of diabetic retinopathy (no-DR), (2) diabetes having NPDR as non–sight-threatening diabetic retinopathy (non-STDR), (3) diabetes with severe NPDR, PDR and CSME as sight-threatening diabetic

retinopathy (STDR). In the controlled group (<7%) retinopathy was not developed, or developed at a much slower rate than in uncontrolled group (>9%). The progression rate of retinopathy was remarkably less for each (1%) reduction in the HbA1c. In some cases retinopathy was developed despite good HbA1c control, as the control in previous years was poor.

Conclusions: The findings of our study reinforce the utility of monitoring the consistency in sugar control as it affects retinopathy development. This study probably have beneficial aspects in targeted diabetic retinopathy screening programs.

Poster No.: EX1-048
Panel No.: 048, Session: EX1

Relationship between Neutralizing Antibodies against Adeno-Associated Virus in the Vitreous and Serum: Effects on Retinal Gene Therapy

*First Author: Suhwan **LEE***
*Co-Author(s): Im Kyeung **KANG**, Joo Yong **LEE**, Heuiran **LEE***

Purpose: To determine the prevalence of neutralizing antibodies (NAbs) to adeno-associated virus (AAV) in the vitreous humor and serum of patients with various vitreoretinal diseases and investigate relationship between NAb titers in the vitreous humor and serum.

Methods: We analyzed NAbs to AAV serotypes 2, 5, 8, and 9 via in-vitro neutralization in the vitreous humor and serum from 32 patients requiring pars plana vitrectomy for vitreoretinal diseases. The blood-retinal barrier (BRB) was evaluated for integrity based on preoperative examinations, with vitreous hemorrhage on fundus examination or dye leakage on fluorescein angiography was observed indicating disruption.

Results: NAbs to AAV2 were observed most frequently, occurring at higher titers. NAb levels were much lower in the vitreous humor than in the serum regardless of the serotype. Patients with VH had higher levels of NAbs to serotypes 2 and 5 in the vitreous humor than those without VH. The NAb ratio (ratio between NAb titers in the serum and vitreous humor) was much lower in patients with epiretinal membrane with leakage than in those without leakage. A significantly lower NAb ratio was noticed in patients with BRB disruptions than in those without BRB disruptions.

Conclusions: The presence of NAbs in the serum was not a limiting factor in retinal gene therapy using AAV vectors especially in patients with an intact BRB. However, higher NAb levels were observed in the vitreous humor of patients whose BRB was disrupted, possibly high enough to negatively impact transgene expression.

Poster No.: EX1-051
Panel No.: 051, Session: EX1

Relationship between Retinal Blood Flow and Cytokines in Central Retinal Vein Occlusion

*First Author: Hidetaka **NOMA***
*Co-Author(s): Masahiko **SHIMURA**, Kanako **YASUDA***

Purpose: We evaluated the relationship between retinal blood flow and aqueous levels of cytokines in central retinal vein occlusion (CRVO) because laser speckle flowgraphy can measure blood flow distribution in the ocular fundus.

Methods: This study examined 64 eyes of 64 CRVO patients before treatment. Blood flow in large vessels around and at the optic disk were examined. Blood flow was evaluated as mean blur rate (MBR) by laser speckle flowgraphy. Aqueous humor samples were obtained from the CRVO patients during anti-vascular endothelial growth factor (VEGF) therapy. Aqueous humor levels of VEGF, soluble VEGF receptor (sVEGFR)-1, sVEGFR-2, placental growth factor (PlGF), soluble intercellular adhesion molecule (sICAM)-1, monocyte chemotactic protein (MCP)-1, platelet-derived growth factor (PDGF)-AA, interleukin (IL)-6, and IL-8 were measured by the suspension array method.

Results: The mean blur rate of the affected eye/MBR of the unaffected eye was significantly lower than the MBR of the fellow eyes (P <

0.05). MBR was significantly correlated to the aqueous levels of PlGF, sICAM-1, and IL-8 (P = 0.031, P = 0.019, and P = 0.033, respectively). On the other hand, MBR was not significantly correlated to the aqueous levels of sVEGFR-1, sVEGFR-2, VEGF, PDGF-AA, MCP-1, and IL-6.

Conclusions: These findings suggest that blood flow velocity might be influenced by the inflammatory-related factors and that aqueous levels of the inflammatory related factors might be an indicator for blood flow velocity.

Poster No.: EX1-044
Panel No.: 044, Session: EX1

Spectral-Domain Optical Coherence Tomography among Myopic Filipinos

*First Author: Camille Elaine **ZABALA***
*Co-Author(s): Jubaida **AQUINO**, Jose Maria **MARTINEZ**, John Mark **DE LEON***

Purpose: To provide mean macular and retinal nerve fiber layer (RNFL) thickness measurements of myopic Filipinos using spectral-domain optical coherence tomography (SD-OCT), and to evaluate the effects of age, gender, and the different degrees of myopia on these measurements.

Methods: This study was an observational cohort of myopic patients seen consecutively at an out-patient department of a government eye institution. Subjects were divided into 2 groups: low-moderate myopia (spherical equivalent –0.50D to –6.00D) and high-pathologic myopia (spherical equivalent less than –6.00D and axial length >26.5 mm). Macular and RNFL thickness were measured using a Spectralis SD-OCT and axial length was measured with non-contact biometry. Stepwise multiple regression analysis provided prediction equations of each macular and RNFL thickness measures considering effects of degrees of myopia, age and gender. Statistical significance was based on a P value ≤ 0.05.

Results: Of 156 eyes included in the study, the breakdown per degree of myopia were as follows: 55/156 (35%) as low, 33/156 (21%) as moderate, 27/156 (17%) as high; and 26/156 (26%) as pathologic. The mean age was 32 years. Multivariate analysis showed that degree of myopia and age significantly affect macular and RNFL thickness measures except for the following measures where only the degree of myopia was a significant factor: central foveal subfield, temporal parafoveal, nasal perifoveal , inferior and nasal RNFL thickness.

Conclusions: The central foveal subfield, temporal parafoveal, nasal perifoveal, inferior RNFL and nasal RNFL thicknesses may be better SD-OCT measurement parameters among myopic Filipino patients to monitor for disease since they may be less influenced by age.

Poster No.: EX1-039
Panel No.: 039, Session: EX1

Spectral-Domain Optical Coherence Tomography-Based Morphometric Response of Intravitreal Dexamethasone Implant for Diabetic Macular Edema

*First Author: Jay **SHETH***
*Co-Author(s): Giridhar **ANANTHARAMAN**, Paurnima **BODHANKAR**, Shruti **CHANDRA***

Purpose: The aim of our study was to evaluate efficacy of intravitreal dexamethasone (DEX) implant on visual acuity and micromorphic parameters on SD-OCT in eyes with diabetic macular edema (DME).

Methods: This was a retrospective analysis of 42 eyes undergoing intravitreal DEX implant who were evaluated at baseline and subsequently at 1, 3, and 6 months. All patients underwent SD-OCT and DFA at baseline and were followed up on SD-OCT at all subsequent visits. Changes in BCVA, central subfield thickness (CSFT), hard exudate resolution, largest cystoid area (LCA), serous macular detachment (SMD) height, ELM and ellipsoid zone (EZ) regeneration, disorganization of inner retinal layer (DRIL) resolution, and intraretinal hyperreflective dots were evaluated at all visits.

Results: Of 42 eyes, 11 were treatment-naïve while 31 were previously treated with anti-VEGF ± laser. Compared to baseline, significant improvement was noted in BCVA (logMAR: 0.61, P < 0.05), CSFT (545.71 μ), LCA (0.20

mm^2), at all visits, with peak effect at 1 month [BCVA: 0.53, (P = 0.002); CSFT: -186.82 μm; (P < 0.001); LCA: 0.06 mm^2; (P < 0.001)] and early recurrence at 3 months [BCVA: 0.56, (P = 0.2); CSFT: -144 μ; (P < 0.001); LCA: 0.08 mm^2; (P < 0.001)] and at 6 months [BCVA: 0.57; (P = 0.8); CSFT: -74 μ; (P < 0.001); LCA: 0.15 mm^2; (P = 0.014)] respectively. Dry macula was achieved in 33.3% of eyes at 1 and 3 months and 11% eyes at 6 months with recurrence seen in 81.8% of eyes at 6 months. At 6 months, ELM and EZ regeneration was seen in 33% and 18% of eyes respectively with resolution of SMD height in 70% of eyes. Improvement was also noted in HE resolution and IR hyperreflective dots. No eyes with DRIL showed any improvement.

Conclusions: Intravitreal DEX implant showed significant improvement in BCVA and promising anatomical outcomes of micromorphic parameters with reduction in LCA and outer retinal layers regeneration in eyes with DME.

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

The Association of Angiogenin and Telomerase with Age-Related Macular Degeneration

*First Author: Arpitha **PEREIRA***
*Co-Author(s): Anuprita **GHOSH**, Arkasubhra **GHOSH**, Santosh **GOPIKRISHNA GADDE**, Swaminathan **SETHU**, Ganesh **RAM SAHU***

Purpose: Age-related macular degeneration (AMD) is characterized by dysfunction of the retinal pigment epithelium (RPE) as well as neovascularization. The only targeted treatments for this advanced disease stage currently available are anti-VEGF therapies. However, in many patients, the disease progresses despite repeated anti-VEGF injections indicating that we need to understand the disease better and find new therapeutic targets. Telomerase (TERT) affects age-associated tissue health by maintaining telomere length and controlling key intracellular signaling pathways. Angiogenin (ANG) regulates proliferation, angiogenesis and extracellular matrix modulation. Hence, we investigated molecular inter-regulation of these factors in AMD.

Methods: ANG levels were measured in aqueous humor samples from 87 controls and 78 AMD subjects in the context of VEGF, TERT and 12 additional factors to elucidate underlying molecular signaling processes. Molecular pathways were studies in in-vitro models of RPE cells (ARPE19) under conditions of hypoxia (2% O_2 for 72 hours or $CoCl_2$) and inflammation (10 μg TNFa). Also, overexpression of TERT reduced ANG levels.

Results: ANG and VEGF were significantly higher in AMD (P < 0.05). Hypoxia and inflammation induced ANG and VEGF in RPE cells (P < 0.05). Akt activation and VEGF production was induced by recombinant ANG treatment and by hypoxia.

Conclusions: TERT over expression could inhibit ANG levels and chemical blockade of ANG reduced in vitro angiogenesis. ANG regulation can be critical for AMD pathogenesis. Thus, Telomerase activation or Angiogenin blockade present new targets for treatment of the disease.

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

Triamcinolone Acetonide Modulates Transforming Growth Factor-Þ2–Induced Epithelial Mesenchymal Transition of Cultured Retinal Pigment Epithelial Cells

*First Author: Tzu-En **KAO***
*Co-Author(s): Yo-Chen **CHANG**, Kuo-Jen **CHEN**, Wen-Chuan **WU***

Purpose: Transforming growth factor-þ2 (TGF-þ2) has been implicated in the pathogenesis of both proliferative vitreoretinopathy (PVR) and proliferative diabetic retinopathy (PDR) due to its bioactivity to stimulate overproduction of pro-angiogenetic factor, vascular endothelial growth factor (VEGF), in addition to transdifferentiate retinal pigment epithelial (RPE) cells into myofibroblasts. Intravitreal triamcinolone acetonide (TA) is clinically useful in PVR and PDR treatment. The purposes of this study were to investigate whether TA treatment alters the

TGF-þ2–driven biological effects on behaviors of cultured human RPE cells, and to determine which signaling pathway was affected by TA treatment.

Methods: TA-pretreated ARPE-19 cells were used for cell viability assay and western blot of several signaling kinases. TGF-þ2–pretreated ARPE-19 cells were then treated by TA for VEGF detection by ELISA.

Results: TA treatment exhibited no prominent cytotoxicity but dramatically antagonize TGF-þ2–induced RPE cell growth arrest. TA treatment significantly attenuated both PMA– and TGF-þ2–induced VEGF upregulation in cultured RPE cells, confirming its anti-angiogenic activity in vitro. TA treatment alone directly suppressed ERK1/2, p38 MAPK, but not Smad2 protein phosphorylation under both serum-starved and serum-supplemented conditions. Moreover, TA significantly attenuated TGF-þ2–elicited Smad2, ERK1/2, p38 MAPK phosphorylation. Pretreatment with kinase inhibitors effectively prevented TGF-þ2–upregulated VEGF production in RPE cells.

Conclusions: Our findings suggest that TA effectively interferes with TGF-þ2 signaling possibly through abrogating through Smad2, ERK1/2, and p38 MAPK signaling pathways and may constitute a useful therapeutic modality for preventing TGF-þ2–mediated intraocular tissue remodeling and angiogenesis.

Retina (Surgical)

Poster No.: EX1-076
Panel No.: 076, Session: EX1

27-Gauge Vitreous Traction Comparison: Dual-Cutting vs Single-Cutting Vitrectomy Probes

First Author: Dina Joy ***ABULON***
Co-Author(s): Helaine ***GARIEPY***

Purpose: To quantify and compare vitreous traction forces of 2 different high-speed dual-pneumatic probe types operating at maximum cut rate.

Methods: Traction measurements were performed in an ex-situ test set up using vitreous harvested from fresh porcine eyes. HyperVit 27+ and Advanced UltraVit 27+ vitrectomy probes were tested in 30 porcine eyes for each group. Peak traction forces were averaged from each test for all 3 duty cycle modes on the CONSTELLATION® Vision System (ie, Core, 50/50, Shave). Additionally, vitreous flow tests were used to identify vacuum settings needed to match vitreous flow rates of 20,000 cpm dual-cutting probes and the previous generation 10,000 cpm single-cutting probes.

Results: 27-gauge dual-cutting probes operating at maximum cut rate (20,000 cpm) at 450 mm Hg vacuum achieve similar vitreous flow rates of previous generation, 27-gauge single-cutting probes at 650 mm Hg vacuum and maximum cut rate (10,000 cpm), the dual-cutting probes generated significantly less peak traction in the Core, 50/50, and Shave duty cycle modes, respectively. At these settings for similar vitreous flow rates, the peak traction forces of dual-cutting 20,000 cpm probes was 25-41% lower than previous generation single-cutting 10,000 cpm probes.

Conclusions: 27-gauge dual-cutting probes at maximum cut rate (20,000 cpm) are matched to previous generation single-cutting probes operating at maximum cut rate (10,000 cpm), the 20,000 cpm dual-cutting probes may improve surgery by generating less vitreous traction forces than previous generation probes.

Poster No.: EX1-062
Panel No.: 062, Session: EX1

A Comparative Analysis of Scleral Fixation of IOL by a Novel Extraocular Needle-Guided Haptic Insertion Technique 'XNIT' with that of Conventional Handshake Technique

First Author: Girish ***VELIS***
Co-Author(s): Prabu ***BASKARAN****, Nagesha* ***CHOKKAHALLI****, V G* ***MADANAGOPALAN***

Purpose: To compare scleral fixation of IOL by extraocular needle guided haptic insertion technique (XNIT) with conventional handshake technique.

Methods: A total of 116 eyes (56 eyes in XNIT group and 60 eyes in handshake group) of 114 patients were retrospectively analyzed. The time required for surgery, mean final BCVA, intraoperative and postoperative complications were noted.

Results: The time required for surgery by XNIT was comparatively less than that with handshake. Intraoperative complications like haptic slippage and IOL drop were not encountered by XNIT. Visual rehabilitation was earlier by XNIT as complications like corneal edema, VH were less. No statistically significant difference was found in the mean final BCVA between the 2 techniques.

Conclusions: XNIT is a safe, easy, comparable, cost-effective and highly reproducible technique, especially for trainees and anterior segment surgeons.

Poster No.: EX1-058
Panel No.: 058, Session: EX1
Anatomical and Clinical Outcome of Silicone Oil Removal
*First Author: Ritesh **SHAH***

Purpose: To evaluate the anatomical and visual outcome after silicone oil removal in eyes with complicated retinal detachment.

Methods: We retrospectively analyzed 64 eyes of 64 consecutive patients of silicone oil removal (SOR) over a period of 12 months. All eyes had undergone standard 3 ports pars plana vitrectomy with silicone oil placement for complicated retinal detachment. Cases that completed at least 1-month follow-up period after SOR were included in the study.

Results: Anatomical success after SOR was achieved in 56 of 64 eyes (87.5%). Seven of 8 redetachments (87.5%) were seen in eyes with silicone oil tamponade duration of less than 6 months. Male gender and proliferative vitreoretinopathy were found to be the risk factors for redetachment. Visual acuity improved or was stabilized in 49 of 64 eyes (76.6%). Using paired T-test, it was found that there was no significant difference in pre- and post-SOR visual acuity. Postoperative ocular hypertension, corneal decompensation, band shaped keratopathy and hypotony was observed in 9.4%, 4.7%, 6.4% and 21.9% respectively.

Conclusions: Our result shows that although there may not be significant change in visual acuity, stable retina and vision can be achieved in most cases when silicone oil is removed after thorough evaluation of retina for its stability and anterior segment for any silicone oil-related complications.

Poster No.: EX1-065
Panel No.: 065, Session: EX1
Central Acute Middle Maculopathy Following Routine Vitrectomy Surgery for Epiretinal Membrane
*First Author: Joseph **PARK***

Purpose: To describe onset of a central acute middle maculopathy 1 day following routine right vitrectomy surgery for an epiretinal membrane with peribulbar anesthesia in a 71-year-old Caucasian male. Findings, clinical features and possible mechanism will be discussed.

Methods: Retrospective case report.

Results: A 71-year-old Caucasian male underwent routine right vitrectomy surgery for an epiretinal membrane under peribulbar anesthesia. One day following surgery, the patient complained of gray, central scotoma and right visual acuity was less than 20/200. Preoperative visual acuity was 20/30. Fundal examination revealed central macular pallor and normal retinal vasculature. The eye was quiet without vitritis. Spectral-domain macular OCT showed hyper-reflective inner retinal layer with preserved outer retinal layer and normal central subfield thickness. Fluorescein angiogram of the right fundus revealed normal retinal arteriole and venous transit times. 10-2 Computerized perimetry test revealed reduced sensitivity of the central macular in keeping with central maculopathy. At 6 months' follow-up, central scotoma was persisting, and visual acuity was 20/160. Spectral-domain macular

OCT showed thinning of both the retinal nerve fiber layer and preserved retinal pigment epithelium.

Conclusions: Central acute middle maculopathy is a rare but devastating complication that has been described following both intraocular and extraocular surgery. Previous cases have also been described as paracentral acute middle maculopathy, however, given the central location of the lesion, the author has described this case as central maculopathy. These conditions may represent a spectrum of vascular conditions affecting the central macular.

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

Challenging Diagnosis and Surgical Management of Fat Adherence Syndrome after Scleral Buckle Surgery: A Case Report

*First Author: Adisti **LUKMAN***

Purpose: To overview the diagnosis and surgical management of a severe strabismus after scleral buckle procedure caused by fat adherence syndrome.

Methods: A 26-year-old female came with severe esotropia of 105 prism diopter after a year of scleral buckle surgery of the left eye. At first, the patient was assessed with esotropia in high myopia and given refractive aids to fix the ocular deviation. After a few months of observation no improvement was found. The patient then underwent scleral band exploration with 6-mm medial rectus recession of the left eye. Restrictive strabismus was caused by fat adherence syndrome which was found intraoperatively. Orbital MRI showed slight displacement of superior and lateral rectus of both eyes resulting in deviation of bilateral ocular bulbar to the medial; the left ocular bulbar was lobulated and looks smaller than the right ocular bulbar, and thickening of left medial rectus muscle.

Results: After the first surgery, ocular deviation decreased to 70 prism diopter. Second surgery on the fellow eye (right eye) using a modified Yokoyama technique was performed a month later. Significant result was found after second surgery, while ocular deviation regressed to 30 prism diopter.

Conclusions: Restrictive strabismus caused by adhesion was proved to be very difficult to fix, hence, prevention of tenon's capsule rupture in scleral buckle surgery was very crucial. The management of fat adherence syndrome was complicated and might consist of more than one surgery that can involve the fellow eye.

Poster No.: EX1-066
Panel No.: 066, Session: EX1

Choroidal Folds that Develop after Surgery for Retinal Detachment

*First Author: Yoshihito **MOCHIZUKI***
*Co-Author(s): Hisashi **FUKUYAMA**, Fumi **GOMI**, Hisashi **IWAMI**, Naoki **KIMURA***

Purpose: To evaluate the characteristics of eyes with choroidal folds after vitrectomy for retinal detachment (RD).

Methods: Six eyes of 6 patients (6 males, mean age 54.6 ± 8.0 years) with choroidal folds after RD surgery were included in this retrospective study. All eyes were treated by vitrectomy at our hospital between July 2013 and May 2017. After the retina being reattached, choroidal folds became apparent. We evaluated characteristics associated with the choroidal folds.

Results: Before surgery, 1 eye showed RD with 1 retinal tear, 1 eye showed a macular hole with RD, and 4 eyes showed proliferative vitreoretinopathy with multiple retinal tears. The former 2 eyes showed high myopia and latter 4 showed normal-range axial length (AL). Onset of RD was estimated at 1 week to 5 years previously. The mean intraocular pressure (IOP) in the affected eyes was 5.6 ± 2.4 mm Hg. All eyes underwent 25-gauge vitrectomy with gas tamponade, and 5 eyes underwent combined cataract surgery. After surgery, we found choroidal folds involving the macula extending to vascular arcades. The mean IOP was 20.6 ± 5.0 mm Hg. During the follow-up period (range, 8-45 months), the choroidal folds gradually improved. The mean AL was 25.2 ± 2.1 mm

when choroidal folds were first detected, and 25.8 ± 2.1 mm at the patient's last visit. These AL values were smaller than those in fellow eyes (27.4 ± 2.5 mm), although the patients did not recognize the difference in spherical error before surgery.

Conclusions: Choroidal folds can occur in eyes with successful RD surgery with shortening of the AL.

Poster No.: EX1-083
Panel No.: 083, Session: EX1

Clinical Characteristics, Risk Factors, and Surgical Outcomes of a Secondary Macular Hole after Vitrectomy

*First Author: Min **KIM***
*Co-Author(s): Eunyoung **CHOI**, Hyun Goo **KANG***

Purpose: To identify the risk factors of secondary macular hole (MH) that develops after vitrectomy and assess treatment outcomes.

Methods: A retrospective review of patients with a secondary MH development after vitrectomy during a 10-year period.

Results: A total of 38 cases (mean age, 55.7 ± 14.1 years) were identified out of 6354 cases (incidence 0.6%), occurring after a mean of 1.2 surgeries and a duration of 15.5 months. The primary diagnoses for vitrectomy were retinal detachment (9 eyes, 5 macula-off), secondary epiretinal membrane (ERM) (6), vitreous hemorrhage from proliferative diabetic retinopathy (5), idiopathic ERM (4), and others (12). MH surgery was performed in 36 eyes, with mean onset visual acuity (VA, logMAR) 0.70 ± 0.6; closure was achieved in 34 eyes after a mean of 1.2 operations with a final VA of 0.38 ± 0.4.

Conclusions: Secondary MH occurs rarely after vitrectomy and can be successfully treated in most cases.

Poster No.: EX1-070
Panel No.: 070, Session: EX1

Correlation between Aniseikonia Values and Macular Microstructures before and after Removal of Idiopathic Epiretinal Membrane: A Long-Term Analysis

*First Author: Young Seong **YANG***
*Co-Author(s): Hy **CHUNG**, Byung Gil **MOON**, Joonhong **SOHN***

Purpose: To analyze the relationship between retinally induced aniseikonia values and macular microstructures on spectral-domain optical coherence tomography (SD-OCT) before and after removal of idiopathic epiretinal membrane (ERM).

Methods: A retrospective review of patients who underwent vitrectomy to treat unilateral idiopathic ERM and followed up for at least 12 months was performed. Macular microstructures were assessed with the SD-OCT to measure vertical and horizontal thicknesses from ganglion cell to inner plexiform layer (GC-IPL), inner nuclear layer (INL) and outer retinal layer (ORL). Aniseikonia values were evaluated with the new Aniseikonia test to measure vertical and horizontal aniseikonia values. We analyzed the relationship between vertical and horizontal thicknesses of each retinal layers and vertical and horizontal aniseikonia values before, and at 6 months and 12 months after surgery.

Results: A total of 32 ERM patients were included in this study. Compared with the preoperative examinations, there was a significant improvement in the best-corrected visual acuity, total macular volume, and GC-IPL thickness (vertical and horizontal) after surgery (all $P < 0.001$). Whereas, vertical and horizontal values of aniseikonia, INL thickness, and ORL thickness were not significantly changed before and after surgery. Multivariate regression analysis revealed that vertical and horizontal aniseikonia values were significantly correlated with vertical and horizontal INL thickness at preoperative, 6 months, and 12 months after surgery, respectively (all $P < 0.05$).

Conclusions: Aniseikonia values did not change after ERM surgery. Aniseikonia

values were consistently associated with INL thickness before and after surgery. Therefore, INL thickness in SD-OCT can be used as a predicting factor of the surgical prognosis of ERM patients.

Poster No.: EX1-074
Panel No.: 074, Session: EX1

Duty Cycle of 25-Gauge of Dual-Pneumatic 10,000 cpm Vitrectomy Probes

*First Author: Ishaq **MOHAMEDY***
*Co-Author(s): Dina Joy **ABULON***

Purpose: To examine the duty cycles of 25-gauge (Ga) 10,000 cuts per minute (cpm) vitrectomy probes and compare performance to previous generation 7500 cpm cutters.

Methods: Advanced UltraVit® and UltraVit® 25+®Ga cutters were evaluated at cut rates of 500-10,000 cpm at Core, 50/50, and Shave duty cycles on the CONSTELLATION® Vision System. A Keyence high speed camera with high magnification lens was focused on the vitrectomy probe port. The camera recorded the cutting motion during operation and videos were analyzed frame by frame to calculate the duty cycle 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 at maximum cut rate.

Results: Core duty cycle ranged from 60.56 to 83.88% as cut rate increased from 500 to 10,000 cpm while Shave duty cycle ranged from 19.64 to 60.20% with increasing cut rate. In the 50% mode, duty cycle ranged from 51.53 to 60.36%. When comparing 10,000 cpm probes to previous generation 7500 cpm probes at maximum cut rate, there was a 22-24% increase in the Core, 50%, and Shave duty cycles (all $P < 0.05$).

Conclusions: The 25-Ga dual-pneumatic probes operating at maximum cut rate (10,000 cpm) generated significantly higher duty cycles than previous generation probes operating at 7500 cpm. The performance of 25-Ga vitrectomy probes appears to be optimized at 10,000 cpm.

Poster No.: EX1-080
Panel No.: 080, Session: EX1

Effectiveness of Pars Plana Vitrectomy and Internal Limiting Membrane Peeling in Patients with Retinal Artery Macroaneurysm

*First Author: Sung Won **CHOI***
*Co-Author(s): Kwang Soo **KIM**, Yu Cheol **KIM***

Purpose: To evaluate the treatment efficacy of pars plana vitrectomy (PPV) with internal limiting membrane (ILM) peeling in retinal artery macroaneurysm (RAM).

Methods: In this retrospective study, 14 patients (14 eyes) were diagnosed with RAM with refractive macular edema (group A) or thick sub-ILM hemorrhage (group B) and underwent PPV with ILM peeling. All patients had a comprehensive ophthalmic examination at initial visit. Visual acuity and retinal images by OCT were compared chronologically for 3 months.

Results: In group A (5 patients), refractory macular edema sustained for 54.5 ± 19.05 days before surgery and any hemorrhage involving macula were not present. In group B (9 patients), duration from advent of symptom to operation was 24.67 ± 15.91 days, thick sub-ILM hemorrhage and subretinal hemorrhage involved the macula. Vitrectomy with 1 DD sized-sectal removal of ILM around RAM lesion sparing macular ILM was performed in group A. Vitrectomy with broad ILM peeling including macula was done in group B. BCVA was 1.28 ± 0.75, 0.70 ± 0.32, 0.56 ± 0.33 at initial visit, postoperative 1 month and final visit each ($P = 0.012$, 0.031 and 0.001). Group A showed improvement in visual acuity and retinal thickness after surgery ($P = 0.043$, 0.031). Disruption of photoreceptor was observed on OCT in 2 eyes (group A) after operation.

Conclusions: PPV and ILM peeling was effective in improvement of visual acuity when subretinal hemorrhage and subILM hemorrhage involving macula was observed in patients with RAM. PPV and sectoral ILM peeling can be

considered when persistent macular edema for several months to protect further damage of photoreceptor.

Poster No.: EX1-075
Panel No.: 075, Session: EX1

Efficacy of the Inverted Internal Limiting Membrane Flap Technique with Perfluorocarbon Liquid-Mediated Selective Dyeing for Large Macular Hole Repair

*First Author: Ho **RA***
*Co-Author(s): Won Ki **LEE***

Purpose: The aim of the present study was to compare the efficacies of 2 internal limiting membrane (ILM) flap techniques for large macular hole (MH) closure. One technique involved the use of a PFCL bubble for the selective prevention of indocyanine green (ICG) dyeing of the parts of the inverted flap in contact with the RPE, while the other technique involved the use of conventional ICG dyeing methods.

Methods: This retrospective, interventional, comparative study included 26 patients with idiopathic large MHs (minimum diameter, >400 μm) who underwent vitrectomy using the inverted ILM flap technique with conventional ICG dyeing (n = 14, group 1) or PFCL-mediated selective ICG dyeing (n = 12, group 2). The hole closure rate, BCVA, and OCT findings were analyzed at baseline and 1, 3, and 6 months after surgery in both groups.

Results: Hole closure was achieved in all the eyes. The BCVA significantly improved after surgery in both groups, although group 2 exhibited significantly better values at 3 and 6 months after surgery (P = 0.008 and 0.001 at 3 and 6 months, respectively). The IS/OS line width significantly decreased after surgery in both groups, and it was significantly smaller in group 2 than in group 1 at 3 (P = 0.006) and 6 (P = 0.001) months after surgery.

Conclusions: The findings of this study suggest that recovery of the photoreceptor layers and, consequently, the postoperative VA are better with the inverted ILM flap technique employing PFCL-mediated selective ICG dyeing than with the technique employing conventional ICG dyeing methods for patients with large MHs.

Poster No.: EX1-073
Panel No.: 073, Session: EX1

Improved 27-Gauge Flow Performance of Dual-Pneumatic 10,000 cpm Cutters

*First Author: Ishaq **MOHAMEDY***
*Co-Author(s): Dina Joy **ABULON**, Helaine **GARIEPY***

Purpose: To (1) measure the flow of buffered saline solution (BSS) of 27-gauge (Ga) dual-pneumatic 10,000 cuts per minute (cpm) vitrectomy probes at various vitrectomy system settings and (2) compare flow performance at maximum cut rate: 10,000 cpm dual-pneumatic vitrectomy probes versus existing 7500 cpm dual-pneumatic vitrectomy probes.

Methods: During 27-Ga Advanced UltraVit and UltraVit vitrectomy probe aspiration of BSS, using a precision scale, the LabVIEW VI program calculated the volumetric flow rate using the change in weight, duration of aspiration, and BSS density. Three duty cycle modes were tested: Core, 50/50, and Shave at the cut rates of 500, 2500, 5000, 7500, and 10,000 cpm. For each vitrectomy parameter combination, flow was measured at least 3 times and averaged. For each duty cycle and cut rate combination, average flow rates and standard deviations were reported.

Results: BSS flow was highest in the Core mode and ranged from 5.10 ± 0.19 to 7.41 ± 0.24 cc/min. BSS flow was lowest in the Shave duty cycle and ranged from 2.88 ± 0.22 to 5.13 ± 0.13 cc/min. In the 50% duty cycle mode, BSS flow was 5.16 ± 0.20 to 5.29 ± 0.27 cc/min. Statistical comparisons at maximum cut rate demonstrated that 10,000 cpm probes generated 21-24% higher BSS flow than previous generation 7500 cpm probes in the Core, 50%, and Shave duty cycle modes.

Conclusions: At a maximum cut rate of 10,000 cpm, 27-Ga dual-pneumatic probes generated significantly greater BSS aspiration flow than previous generation probes at maximum cut rate (7500 cpm). When operating at 10,000 cpm, dual pneumatic probes offer more

effective aspiration than previous generation probes and may optimize surgical efficiency.

Poster No.: EX1-059
Panel No.: 059, Session: EX1
Incidence and Associated Factors of Secondary Glaucoma Following Silicone Oil Injection Ramathibodi, Thailand

First Author: Lindara ***PO***
Co-Author(s): Prut ***HANUTSAHA****, Kitikul* ***LEELAWONG***

Purpose: To determine the incidence and the associated factors of secondary glaucoma following pars plana vitrectomy with silicone oil injection in Ramathibodi, Bangkok, Thailand.

Methods: Patients who underwent pars plana vitrectomy with silicone oil injection were reviewed retrospectively. The outcome of the patients who underwent silicone oil removal and/or glaucoma management was also observed.

Results: The incidence was 16.5% (31 of 190 eyes) were sustained raised IOP >24 mm Hg or >10 mm Hg from the baseline IOP. Age (56.87 ± 17.57 years, $P < 0.005$), type of injected silicone oil ($P < 0.028$) and surgeon ($P < 0.001$) were relevant factors for development of glaucoma. The combined procedure with the scleral buckle was increased risk of elevated IOP postoperatively of more than 4 times (OR: 4.25, $P < 0.001$) while the risk is up to 23 folds (OR: 23.41, $P < 0.001$) if combined with AC washout. All of the cases were treated effectively with the antiglaucoma medicine.

Conclusions: The incidence of secondary glaucoma after silicone oil injection was relatively common among patients who were implanted the silicone oil as endotamponade, while there were several factors suggested the glaucoma development. Therefore, the treatment option should be directed to each individual balancing risk of the intervention with the expected benefit.

Poster No.: EX1-064
Panel No.: 064, Session: EX1
Incidence of Intraocular Pressure Elevation after Silicone Oil Removal Using 25-Gauge Vitrectomy Systems

First Author: Katsuya ***SUZUKI***
Co-Author(s): Hiroshi ***MORITA****, Miho* ***NOZAKI****, Yuichiro* ***OGURA****, Munenori* ***YOSHIDA***

Purpose: We previously reported that the intraocular pressure (IOP) elevation after removing silicone oil (SO) was found in 21.7% using 20-25–gauge vitrectomy systems. The purpose of this study was to determine the incidence of IOP elevation after SO removal using only 25-gauge systems.

Methods: Medical records of 61 eyes which underwent SO removal between May 2013 and February 2018 at Nagoya City University Hospital were reviewed retrospectively. Patients with a history of glaucoma, rubeosis iridis were excluded. The mean age was 53 ± 16 years (range, 12-82 years), and the mean period of SO tamponade was 131 ± 145 days (range, 5-707 days). IOP elevation was defined as IOP elevation greater than 21 mm Hg requiring medication.

Results: IOP elevation was found in 6 eyes (9.8%). The period of SO tamponade was significantly longer in elevated IOP group than normal IOP group (288 ± 269 days vs 114 ± 112 days, $P = 0.002$). Among elevated IOP group, the 4 of 6 eyes had the migration of SO in anterior chamber. The ratio of medicated patients for IOP elevation under SO tamponade was significant higher in elevated IOP group than in normal group (83% vs 22%, $P = 0.001$). There were no patients undertook glaucoma surgery.

Conclusions: In the current study, the IOP elevation was found in 9.8%. Elevated IOP group had longer period of SO tamponade and the migration of SO in anterior chamber. The elevation of IOP in SO tamponade was potential risk of IOP elevation after SO removal.

Poster No.: EX1-088
Panel No.: 088, Session: EX1

Intravitreal Ranibizumab Versus Laser Photocoagulation for Retinopathy of Prematurity: Efficacy, Anatomical Outcomes, and Safety

First Author: Min ***KIM***
Co-Author(s): Eunyoung ***CHOI****, Hyun Goo* ***KANG***

Purpose: To compare the efficacy, anatomical outcomes, and complications of intravitreal ranibizumab with those of laser photocoagulation for retinopathy of prematurity (ROP).

Methods: This was a retrospective case series of 315 eyes from 165 infants diagnosed with type I ROP and treated with either laser photocoagulation (162 eyes) or intravitreal ranibizumab (0.25 mg/0.025 mL) injection (153 eyes) between January 2006 and December 2016 in a tertiary referral-based hospital. The main outcome was the rate of recurrence requiring additional treatment. Secondary outcomes included the incidence of major complications and final refractive error.

Results: The mean follow-up was 36.2 ± 31.9 months. Recurrences requiring further intervention were noted in 22 (13.6%) laser-treated and 15 (9.8%) ranibizumab-treated eyes (P = 0.194). Retinal detachment (8 vs 1, P = 0.022) and macular dragging (7 vs 1, P = 0.040) were observed in the laser- and injection-treated group, respectively, but no systemic or neurodevelopmental adverse events were reported. In the ranibizumab group, 95.6% showed fully vascularized retinas. Multivariate analyses revealed that birthweight (odds ratio [OR] = 0.994, P = 0.023) and higher ROP stage (OR = 11.222, P = 0.008) influenced the incidence of major complications.

Conclusions: Intravitreal ranibizumab for ROP appears to achieve more favorable outcomes with fewer complications than did laser photocoagulation.

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

Inverted ILM Flap Technique for Myopic Macular Hole with Retinal Detachment: A Case Report

First Author: Adisti ***LUKMAN***

Purpose: Myopic macular hole (MMH) with retinal detachment (RD) is one of the most vision-threatening complications to high myopia. Inverted internal limiting membrane (ILM) flap was proven to be highly effective to treat MMH, however this particular technique has not been widely used in our daily practice. The purpose of this study was to showcase the efficacy of inverted ILM flap technique as a treatment for severe MMH with RD.

Methods: A 40-year-old female complained of sudden blurry vision of her right eye (RE) 2 weeks before admission. She had a history of high myopia since childhood. Her best-corrected visual acuity (BCVA) was 1/60 in the RE and 6/9 in the left eye (LE). Axial lengths were 28.57 mm in RE and 27.89 mm in LE. Funduscopy showed MMH with RD in RE, and grade II macular hole in LE. Brilliant blue guided inverted ILM flap technique combined with temporary use of heavy fluid were able to successfully close the macular hole and reattached the retinal layer.

Results: One week after surgery the macular hole was entirely closed in a "V-Shaped" manner. No subretinal fluid nor redetachment was found. A month later macular hole closure progressed to a "U-Shaped" manner and BCVA improved to 6/60. After 3 months of surgery BCVA improved to 6/30.

Conclusions: MMH with RD is a challenging case that requires prompt and proper management. The selection of surgical technique plays an important role in anatomical and functional success. Inverted ILM flap technique was proven to give excellent result for this condition.

Poster No.: EX1-067
Panel No.: 067, Session: EX1

Late-Onset Retinal Detachment from a Retinal Tear Associated with Laser Indirect Ophthalmoscopy for Retinopathy of Prematurity: A Case Report

*First Author: Ronnie **MANAYSAY***
*Co-Author(s): Jocelyn **SY***

Purpose: To describe a case of late-onset retinal detachment from a retinal tear associated with laser indirect ophthalmoscopy in a patient born with retinopathy of prematurity and was managed by scleral buckling with pars plana vitrectomy.

Methods: Descriptive clinical case report.

Results: A 12-year-old child who was born premature at 24-week age of gestation with a birth weight of 1200 g and was diagnosed to have retinopathy of prematurity in both eyes and subsequently underwent laser indirect ophthalmoscopy which regressed the retinopathy. He presented 12 years after with sudden-onset blurring of vision in his left eye. Fundus examination showed retinal tears on the superior border of the normal retina and lasered periphery in both eyes. The right eye has an attached retina, however, the left eye had total retinal detachment. The right eye underwent focal laser therapy immediately, which prevented detachment of the retina. The left eye then underwent scleral buckling with a 240 encircling band, pars plana vitrectomy, endolaser, and injection of 1000 centistoke silicone oil. Retina was attached postoperatively and visual acuity was 20/32 from counting fingers.

Conclusions: Late-onset retinal detachment is a sight-threatening sequela in children who had retinopathy of prematurity and treated with laser indirect ophthalmoscopy. Scleral buckling with pars plana vitrectomy, endolaser, and light silicone oil is a viable option to attach these retinas. Long-term follow-up, possibly lifelong, is warranted to prevent visual impairment from retinal complications and initiate treatment as early as possible.

Poster No.: EX1-086
Panel No.: 086, Session: EX1

Lidocaine Blocks the Proliferation, Migration, and Epithelial-Mesenchymal Transition of Human Retinal Epithelial Cells

*First Author: Yoon Hyung **KWON***
*Co-Author(s): Yeon A **KIM**, Min Seok **WOO***

Purpose: Proliferative vitreoretinopathy (PVR) is a major cause of failure in surgery of rhegmatogenous retinal detachment (RRD). The strategy for precautions or resolving the PVR is very limited. Lidocaine is well known and a widely used local anesthetics. We evaluated the effects of lidocaine on epithelial-mesenchymal transition (EMT) and migration in retinal pigment epithelial cells, which is major cell type involved in the development of PVR, and its mechanism.

Methods: Adult retinal pigmented epithelial 19 (ARPE 19) cell line was used and MTT (3-(4,5-Dimethylthiazol-2-yl)-2,5-Diphenyltetrazolium Bromide) assay was performed with various concentrations of lidocaine. We induced ARPE to EMT by TGFβ-1 and it was demonstrated with western blot of α-SMA (smooth muscle actin), vimentin, E-cadherin, and collagen I. The inhibitory effects of lidocaine in TGFβ-1 signaling were also evaluated with western blot of ERK (extracellular signal regulated kinase), PI3K (Phosphoinositide 3-kinase), Akt (Protein kinase B), and smad. The change of motile activity by TGFβ-1 and lidocaine was demonstrated with migration assay.

Results: Lidocaine inhibited the proliferation of ARPE cells in a concentration-dependent manner after treatment of lidocaine, 24 hours and 48 hours, respectively. Migration activities of ARPE cells were inhibited by lidocaine and the migration of ARPE cells undergoing EMT by TGFβ-1 was also inhibited significantly. Lidocaine prevented EMT by decreasing the activations of ERK, PI3K, Akt and smad, result in decreasing the expression of α-SMA, vimentin, and collagen I synthesis and increasing the expression of E-cadherin.

Conclusions: Lidocaine blocks the proliferation,

migration, and EMT of ARPE cells by inhibition of TGFβ-1 signaling pathway.

Poster No.: EX1-079
Panel No.: 079, Session: EX1

Macular Hole Surgery with Modified Inverted Internal Limiting Membrane Flap Technique

*First Author: Sung Il **KANG***
*Co-Author(s): Kwang Soo **KIM**, Yu Cheol **KIM***

Purpose: To describe an inverted internal limiting membrane (ILM) flap technique and to evaluate the surgical outcomes.

Methods: Medical records of patients who received the modified ILM flap technique were retrospectively studied and patients were included in the analyses. Best-corrected visual acuity (BCVA) before and 3 months after surgery, preoperative hole size, vertical size, and hole closure after surgery were checked using spectral-domain optical coherence tomography. Pars plana vitrectomy was performed and the ILM was stained using indocyanine green and peeled away with reserving the base part attached to the superior hole margin. The ILM flap was inverted over the macular hole and stabilized with help of viscoelastic substance and then SF6 gas tamponade was performed. All patients were asked to keep prone position for at least 2 days.

Results: The mean age of 7 patients was 65.71 ± 4.56 years. The mean BCVA (logMAR) was 0.81 ± 0.22. The mean hole size was 497.9 ± 137.2 μm, the mean vertical size was 410.0 ± 114.3 μm. Five macular holes were closed within 2 days after surgery, but 2 macular holes were not closed. The postoperative mean BCVA (logMAR) improved to 0.57 ± 0.28. Five eyes with macular hole closed showed visual improvement while 2 eyes without hole close did not show visual improvement after macular hole surgery.

Conclusions: The macular hole closure and the visual recovery may be hastened with the modified inverted ILM flap technique.

Poster No.: EX1-071
Panel No.: 071, Session: EX1

Performance Evaluation of 25-Gauge 20,000 cpm Vitrectomy Probes: Vitreous Flow Rates

*First Author: Helaine **GARIEPY***
*Co-Author(s): Dina Joy **ABULON***

Purpose: To measure vitreous flow rates of 25-gauge dual-cutting, 20,000 cuts per minute (cpm) vitrectomy probes under various cut rates.

Methods: Seven 25+® gauge HyperVit® vitrectomy probes were tested using the CONSTELLATION® Vision System (Alcon Laboratories, Inc.). Probes were evaluated in the Core (port biased open) duty cycle mode at various cut rates ranging from 2500 to 20,000 cpm. Cadaveric porcine vitreous was harvested within 24 hours and extracted immediately before testing. During cutter aspiration at specified test parameters, an electronic balance (Mettler Toledo MS 2014S) measured the volume of aspirated vitreous for a duration of 1 minute. The mean vitreous flow rates were calculated from the density of vitreous, change in weight, and duration of aspiration then compared to flow rates of previous generation probes.

Results: In the Core duty cycle mode, 25-gauge vitreous flow rates of dual-cutting probes increased from 2.64 ± 0.25 to 4.06 ± 0.36 cc/min as cut rate increased from 2500 cpm to 20,000 cpm. The greatest aspiration flow was observed at 20,000 cpm. Comparison of dual-cutting probes at maximum cut rate (20,000 cpm) to previous generation, single-cutting probes at maximum cut rate (10,000 cpm) demonstrated that the dual-cutting probes generated 47% significantly higher vitreous flow than single-cutting probes (+1.30 cc/min increase, $P < 0.05$).

Conclusions: In vitreous, the dual-cutting probes operating at maximum cut rates optimize vitreous aspiration better than previous generation probes.

Poster No.: EX1-081
Panel No.: 081, Session: EX1

Pneumatic Vitreolysis for the Management of Vitreo-Macular Traction and Stage-2 Macular Holes in Nepal

*First Author: Sanyam **BAJIMAYA***
*Co-Author(s): Govinda **PAUDYAL**, Sanjita **SHARMA***

Purpose: To assess the anatomical and functional outcome of pneumatic vitreolysis (PVL) in a patient with symptomatic vitreo-macular traction and stage 2 macular holes (MHs).

Methods: PVL is the intravitreal injection of a small quantity of expansile gas with the purpose of releasing focal vitreomacular traction (VMT) in cases with symptomatic VMT, or inducing VMT release and closure of the macular defect for eyes with a small stage-2 MH. With the advent of optical coherence tomography (OCT) allowing detailed observation of vitreomacular interface changes, there has been increasing interest in PVL, a low-cost procedure for managing symptomatic VMT in developing countries as well. We reviewed retrospective consecutive series who underwent PVL (0.3 mL of C3F8 gas). Macular OCT was done using Topcon 3D Meastro at post injection 1 week and 1 month.

Results: Of 10 eyes, 2 underwent PVL combined with phacoemulsification and IOL implantation at the same sitting. Four eyes had posterior vitreous detachment at 1 week. At 1-month follow-up, 8 eyes including combined cataract cases had complete release of VMT with normal anatomical configuration of fovea at OCT. There was 1 case that had intra-ocular pressure more than 25 mm Hg at 1-week follow-up, and was managed with topical anti-glaucoma medications. Two eyes which had persistent full-thickness macular hole underwent pars plana vitrectomy (PPV) with ILM peeling and C3F8 gas tamponed.

Conclusions: PVL is an encouraging, low-cost therapeutic option, with the potential for managing symptomatic focal VMT in developing countries.

Poster No.: EX1-068
Panel No.: 068, Session: EX1

Spontaneous Suprachoroidal Hemorrhage in a High Myopia Patient with Rhegmatogenous Retinal Detachment: A Case Report and Literature Review

*First Author: Xiquan **ZHAO***

Purpose: To report a case of spontaneous suprachoroidal hemorrhage (SSCH) in a high myopia patient with rhegmatogenous retinal detachment (RRD) and successful treatment.

Methods: We present the clinical course, management, and final outcome of a case of SSCH that occurred in a 73-year-old Chinese woman with high myopia with RRD. In addition to our case study, we discuss the results of a systematic review of the literature and reference lists of retrieved studies published from December 1999 to March 2017.

Results: Undergo surgical treatment, retinal detachment and choroidal detachment were reduction. Among a total of 36 patients (37 eyes), acute secondary glaucoma was a complication in 70.3% (26 eyes) of the cases, and over half of the cases (24 eyes, 64.9%) were treated with surgery. Eighteen cases (50%) were characterized by hypertension, which was followed by cardiovascular or cerebrovascular disease (17 cases, 47.2%). Twenty-one cases (58.3%) had abnormal hemostasis. Age-related macular degeneration (ARMD) was the most common (12 eyes, 32.4%) ocular disease and was followed by glaucoma (7 cases, 18.9%).

Conclusions: Advanced age, systemic anticoagulation, and hypertension are strong risk factors. ARMD patients should be informed of the risk of intraocular hemorrhage. RRD associated with massive SSCH is an extremely rare event. The most common risk factor is a long axial length. Vitrectomy and choroidal blood drainage can effectively remove suprachoroidal hemorrhage and promote retinal reattachment in these eyes. However, the final visual prognosis usually remains poor.

Poster No.: EX1-069
Panel No.: 069, Session: EX1

Subfoveal Pigment Epithelial Detachment and Visual Outcome of Subretinal Hemorrhage due to Age-Related Macular Degeneration

*First Author: Takahiko **IZUMI***
*Co-Author(s): Tomohiro **IIDA**, Taizo **KAWANO**, Ichiro **MARUKO**, Mizue **SUGIYAMA***

Purpose: To evaluate optical coherence tomography (OCT) finding in eyes with subretinal hemorrhage (SRH) due to age-related macular degeneration (AMD).

Methods: Consecutive 22 eyes of 21 patients (13 men 8 women, mean age 76.4 years) with SRH including the fovea due to AMD were examined using swept-source OCT (Topcon Japan). Pneumatic displacement by SF6 gas with anti-VEGF injection was performed in all eyes. Age, duration of subjective symptom, logMAR visual acuity (VA) before and after treatment, the detection of ellipsoid zone (EZ) and external limiting membrane (ELM) at the fovea, and subfoveal pigment epithelial detachment (PED) were also studied.

Results: The mean follow-up period was 27 ± 22 months. The mean logMAR VA before treatment was 0.48 and final VA was 0.31, which did not reach statistical significance (P = 0.347). Final VA did not correlate with age and symptom duration, while correlated with VA before treatment (R = 0.683, P < 0.001). Neither EZ or ELM detection were recognized in 18 eyes respectively, however the detection was not associated with the final VA (EZ, P = 0.638; ELM, P = 0.417). Final VA in 4 eyes with subfoveal PED was significantly better than without subfoveal PED (final logMAR VA: 0.0 with PED vs 0.90 without PED, P < 0.02).

Conclusions: Final VA of subretinal hemorrhage in AMD treated with pneumatic displacement was associated with baseline VA and subfoveal PED before treatment. In particular, subfoveal PED can be thought as a good prognostic factor.

Poster No.: EX1-063
Panel No.: 063, Session: EX1

The Correlation between Intraretinal Cyst and Pre- or Post-Operative Characteristics of Idiopathic Macular Hole

*First Author: Kensuke **GOTO***
*Co-Author(s): Takeshi **IWASE**, Hiroko **TERASAKI**, Ryo **TOMITA**, Yoshitaka **UENO***

Purpose: The intraretinal hyporeflective spaces are often observed on optical coherence tomography (OCT) images in eyes with preoperative idiopathic macular hole (MH). The purpose of this study was to investigate the relationship between the intraretinal cyst and preoperative or postoperative characteristics in eyes with MH.

Methods: We included 111 eyes of 111 patients with MH, who underwent successful MH surgery. The intraretinal cyst area on the B scan image of spectral-domain OCT was measured with ImageJ software. The relationship between the intraretinal cyst area and the MH characteristics was evaluated.

Results: The intraretinal cyst area was 64,981 ± 46,596 μm^2 preoperatively, whereas no intraretinal cyst was observed in all cases postoperatively. The intraretinal cyst area was significantly correlated with basal MH size (r = 0.452, P < 0.001), external limiting membrane (ELM)–retinal pigment epithelium (RPE) distance (r = 0.741, P < 0.001), and retinal thickness (r = 0.776, P < 0.001). Although there was significant correlation between the intraretinal cyst area and preoperative best-corrected visual acuity (BCVA) (logMAR) (P < 0.001), no correlation was observed between the area and postoperative BCVA. In grading of MH stages, the intraretinal cyst area was stage 2: 51,141 ± 39,458 μm^2, stage 3: 96,135 ± 47,482 μm^2, and stage 4: 55,920 ± 41,638 μm^2, showing a significant difference among the 3 stages (P < 0.001).

Conclusions: The intraretinal cyst area is correlated with the MH morphological features and the MH stages, suggesting that the intraretinal cyst is caused by vitreomacular traction in the process of MH formation.

Poster No.: EX1-078
Panel No.: 078, Session: EX1

The Efficacy and Safety of Posterior Scleral Reinforcement with Silicon Band for Macular Foveoschisis due to Pathological Myopia

*First Author: Jinfeng **HAN***
*Co-Author(s): Fangfang **DAI**, Xuemin **JIN**, Mengdi **LI**, Shuangshuang **LI**, Yanting **WANG***

Purpose: To investigate the surgical outcomes of posterior scleral reinforcement (PSR) using silicon band with allogeneic sclera to treat macular foveoschisis (MFS) caused by pathological myopia.

Methods: A total of 36 consecutive patients with MFS (36 eyes) were treated with PSR and followed up at least 6 months after surgery. All patients were reviewed and best-corrected visual acuity (BCVA), axial length (AL), optical coherence tomography (OCT) and complications were examined postoperatively.

Results: Six months after surgery, OCT showed complete resolution of MFS in 36 eyes (29/36, 80.6%) or partial resolution in 4 eyes (4/36, 11.1%). The foveal thickness was significantly reduced to 202.33 ± 42.78 μm postoperatively from 450.19 ± 42.78 μm preoperatively ($P < 0.01$). Vitreous hemorrhage was observed postoperatively in 2 eyes (2/36, 5.6%) and disappeared 1 month after surgery.

Conclusions: PSR is a safe and effective procedure for MFS due to pathological myopia. However, PSR still failed in a portion of MFS caused by pathological myopia. Therefore, novel equipment, standard procedure and multicenter clinical trial may provide basis for the generalization and application of PSR.

Poster No.: EX1-082
Panel No.: 082, Session: EX1

Vitrectomy with Subretinal Injection of Tissue Plasminogen Activator for Massive Subretinal Hemorrhage

*First Author: Shoko **UCHIDA***
*Co-Author(s): Makoto **INOUE**, Takashi **KOTO***

Purpose: To evaluate the surgical outcome of vitrectomy for massive subretinal hemorrhage associated with polypoidal choroidopathy (PCV).

Methods: The medical records of 11 eyes of 11 patients (7 men and 4 women) with massive subretinal hemorrhage defined by more than 10 disc areas were reviewed. The patients treated with vitrectomy with subretinal injection of tissue plasminogen activator (t-PA) following gas tamponade were reviewed.

Results: An association of vitreous hemorrhage was found in 4 eyes. Polypoidal lesion was detected postoperatively in all eyes and massive subretinal hemorrhage was diagnosed to develop due to PCV. The mean age was 74.5 ± 9.6 years. The mean baseline visual acuity in the logMAR units was 2.01 ± 0.42 which ranged from non-light perception to 0.04 in the decimal units. The retinal reattachment was achieved in all eyes. However, the reoperations were needed in 5 eyes (45%) due to recurrent massive subretinal hemorrhage. The postoperative vision at 3 months significantly improved to 1.32 ± 0.65 ($P = 0.0047$), ranged from 0.01 to 1.2 in decimal units. Intravitreal injection of anti-vascular endothelial growth factor (VEGF) agents were used in 4 eyes and 3 eyes were followed with intravitreal injection of ant-VEGF agents.

Conclusions: Vitrectomy with subretinal injection of t-PA was effective for eyes with massive subretinal hemorrhage associated with PCV.

Poster No.: EX1-077
Panel No.: 077, Session: EX1

Vitreous Flow Rates of 27-Gauge Dual-Cutting 20,000 cpm Vitrectomy Probes

*First Author: Dina Joy **ABULON***
*Co-Author(s): Helaine **GARIEPY***

Purpose: The purpose of this study was to assess the vitreous flow rates of minimally invasive 27-gauge (Ga) dual-cutting vitrectomy probes operating at various cut rates so surgeons may optimize intraoperative surgical parameters.

Methods: 27+ Ga HyperVit dual-cutting 20,000 cpm vitrectomy probes were tested using the

CONSTELLATION Vision System in the Core (port biased open) duty cycle mode at various cut rates ranging from 2500 to 20,000 cpm. An electronic balance measured the volume of aspirated porcine cadaver vitreous for a duration of 1 minute. Flow rates were calculated from the density of vitreous, change in weight, and duration of aspiration. Average vitreous flow and standard deviations were reported for each cut rate. Results of maximum cut rate in core mode were compared to vitreous flow rates of previous generation probes at the equivalent settings.

Results: Vitreous flow rates increased with increasing cut rates. For cut rates of 2500 to 20,000 cpm, the vitreous flow rates of 27-Ga dual-cutting probes ranged from 1.54 ± 0.18 to 2.15 ± 0.13 cc/min. The greatest flow rates were observed at the maximum cut rate of 20,000 cpm. When comparing dual-cutting probes at maximum cut rate (20,000 cpm) and previous generation, single-cutting probes at maximum cut rate (10,000 cpm), the dual-cutting probes generated significantly higher vitreous flow.

Conclusions: When compared to previous generation probes, the high speed cut rates (20,000 cpm) of the dual-cutting vitrectomy probes optimize vitreous aspiration.

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Vitreous Traction Comparison of 27-Gauge High-Speed Dual-Pneumatic Vitrectomy Probes

*First Author: Helaine **GARIEPY***

Purpose: To quantify and compare vitreous traction forces between maximum cut rates of high-speed dual-pneumatic vitrectomy probes (10,000 cuts per minute (cpm) and maximum cut rates of previous generation vitrectomy probes (7500 cpm) in an ex-situ porcine eye model.

Methods: A mechanical force measurement system was developed to quantify traction forces applied to the vitreous by a vitrectomy cutter. Traction measurements were performed in an ex-situ test set up using vitreous harvested from fresh porcine eyes. Advanced UltraVit® 27+® gauge (Ga) and UltraVit® vitrectomy probes were tested in 35 porcine eyes for each group. Peak traction forces were averaged from each test for all 3 duty cycle modes on the CONSTELLATION® Vision System (ie, Core, 50/50, Shave). Significant differences in traction forces between both groups at maximum cut rate and various duty cycle modes were determined using an unpaired *t*-test with Welch's correction. A statistical significance level of $P < 0.05$ was used.

Results: The 10,000 cpm cut rate created significantly less peak traction forces than the 7500 cpm cut rate of previous generation probes for Core, 50/50, and Shave duty cycle modes, respectively (-0.11 mN, $P < 0.0001$; -0.17 mN, $P < 0.0001$; -0.05 mN, $P < 0.0001$). When comparing the relative reduction in force for all duty cycle modes, the peak force of 10,000 cpm was 9-17% lower than 7500 cpm previous generation probes.

Conclusions: When operating at the maximum cut rate, new 27-Ga high-speed 10,000 cpm dual-pneumatic probes may improve surgery by generating less vitreous traction than previous generation 7500 cpm probes.

E-POSTERS

Eye Trauma, Emergencies & Infections

An Interesting Case of Secondary CNVM Following Traumatic Choroidal Rupture

First Author: Ritu ***SHAH***
Co-Author(s): Chaitali ***BHAVSAR****, Chinmay* ***NAKHWA****, Sundaram* ***NATARAJAN***

Purpose: This study aimed to report the development of secondary choroidal neovascular membrane (CNVM) following choroidal rupture after blunt trauma with a cricket ball.

Methods: A 16-year-old boy presented to us with dimness of vision in the right eye following trauma with a cricket ball. His best-corrected visual acuity was counting fingers at 1 meter in the right eye. On examination, he had Berlin's edema with choroidal rupture at the macula with a breakthrough vitreous hemorrhage. He was treated with oral steroids on tapering dose. His vision improved to 6/18 in that eye after 1 month of treatment. After 10 months post injury, his vision dropped to 6/36 in the right eye and on examination, he was noted as developing a CNVM. He was treated with intravitreal anti-VEGF 2 times.

Results: The patient is doing well after the intravitreal anti-VEGF injections. The vision is stable at 6/24, and he is on regular follow-up.

Conclusions: Choroidal rupture is a serious complication of nonpenetrating ocular trauma with a poor prognosis for returning to preinjury visual acuity. It can also lead to secondary CNVM which can be successfully managed with intravitreal anti-VEGFs.

Intravitreal Bevacizumab in the Management of Purtscher's Retinopathy

First Author: Kanwaljeet H ***MADAN***

Purpose: To present a case of Purtscher's retinopathy treated with intravitreal injections of bevacizumab.

Methods: A 35-year-old male complained of a sudden decrease of vision in both eyes. He gave a history of a roadside accident 48 hours ago in which he had multiple fractures of clavicle. His best-corrected visual acuity on presentation was 6/60 in the right eye and counting fingers at 1 meter in the left eye. He was diagnosed to have Purtscher's retinopathy in both eyes secondary to trauma. Optical coherence tomography showed the presence of thickening of inner retinal layers accompanied by subfoveal serous detachment and cystoid macular edema. Fundus fluorescein angiography confirmed the presence of Purtscher's retinopathy. Three intravitreal injections of bevacizumab (1.25 mg) were given at monthly intervals in both eyes.

Results: After 3 months of follow-up, his best-corrected visual activity improved from 6/60 to 6/6 in the right eye and from counting fingers only to 6/9 in the left eye. The fundus pictures showed a decreased number of cotton wool spots. Central foveal thickness improved from 396 μm to 243 μm in the right eye and from 451 μm to 255 μm in the left eye. There was complete resolution of subretinal fluid at the last follow-up.

Conclusions: Bevacizumab may be useful in the treatment of Purtscher's retinopathy.

Klebsiella Endogenous Endophthalmitis: A Changing Spectrum?

First Author: Adrian ***FUNG***
Co-Author(s): Jay ***CHANDRA****, Jane* ***FOO****, Jessica* ***TONG***

Purpose: To describe cases of Klebsiella endogenous endophthalmitis from a large tertiary referral hospital in western Sydney, Australia.

Methods: This was a retrospective chart review. Cases of endophthalmitis with systemic *Klebsiella pneumoniae* infection were identified by at Westmead Hospital, Sydney, Australia between 2000 and 2017.

Results: Three cases of presumed Klebsiella endogenous endophthalmitis were identified, ranging in age from 58 years to 81 years. All had *Klebsiella pneumoniae* liver abscesses requiring drainage. In 2 cases the pathogen was resistant to ampicillin. Presenting vision ranged from hand movements to light perception, and symptoms included ocular pain, redness, fever, rigors, syncope and abdominal pain. Two patients had diabetes mellitus, and none described recent travel history. All patients underwent vitreous tap and intravitreal antibiotics with vancomycin 1 mg/0.1 mL and ceftazidime 2.25 mg/0.1 mL. All cases had negative vitreous biopsies. Two patients underwent early small-gauge pars plana vitrectomy, but despite this one progressed to inoperable total retinal detachment after 1 month and the other to no light perception within 4 days. The third patient had extramacular retinitis and vitritis. After 3 intravitreal injections of vancomycin and ceftazidime, the infection was controlled without the need for vitrectomy and vision recovered to 6/18 after 3 months.

Conclusions: *Klebsiella pneumoniae* endogenous endophthalmitis is becoming increasingly prevalent in Australia. Diabetes is a significant risk factor and predicts poor visual outcome. Early recognition and treatment with intravitreal antibiotics is the mainstay of treatment, but despite this patient outcomes are often poor. Early vitrectomy is usually associated with better visual outcomes, but some patients can do well without surgery.

Multimodal Imaging Analysis of Two Cases with Traumatic Maculopathy and Its Visual Prognosis

First Author: Hae Min ***KANG***

Purpose: To report findings of the multimodal imaging analysis and its visual prognosis in 2 cases with traumatic maculopathy.

Methods: Comprehensive ophthalmologic evaluations including best-corrected visual acuity (BCVA), fluorescein angiography (FA), spectral domain optical coherence tomography (SD-OCT; Spectralis), and autofluorescence (AF) images were done.

Results: Case 1 was a 37-year-old male patient who visited the ophthalmology clinic after contusion by a soccer ball. The BCVA in the left eye was 0.2. Yellow-gray color retinal change with edema was noted, which was shown as decreased autofluorescence in AF. SD-OCT showed subretinal fluid with diffuse photoreceptor ellipsoid zone disruption. On FA, edematous retinal lesion showed hypofluorescence in early phase, and stippled hyperfluorescence spots appeared with profuse leakage within the hypofluorescence lesion in late phase. At 4 months, BCVA was improved to 1.0 in the left eye and SD-OCT showed recovered photoreceptor ellipsoid zone with focal disruption. Case 2 was a 47-year-male patient who visited the ophthalmology clinic after eyeball contusion by a baseball. His BCVA was counting fingers in the left eye with foveal depigmentation. On AF image, increased autofluorescence was noted, and foveal detachment with diffuse photoreceptor ellipsoid zone disruption by SD-OCT was noted. On FA, foveal dye pooling was shown throughout phase. After 2 months, BCVA improved to 0.4 in the left eye. On AF image, SD-OCT showed focal recovery of photoreceptor ellipsoid zone in the left eye.

Conclusions: We experienced 2 cases with traumatic maculopathy, and multimodal imaging studies can be helpful to differentiate the types of traumatic maculopathy and predict visual prognosis in these patients.

Traumatic Globe Avulsion and Complete Optic Nerve Transection

First Author: Nalan ***AYDIN***

Purpose: The purpose of this study was to document clinical findings and management of a patient with unilateral globe avulsion and complete nerve transection.

Methods: A 20-year-old male patient was admitted to the emergency department with unilateral traumatic globe avulsion following a motor vehicle accident.

Results: On ophthalmology visit, he was conscious (Glasgow Coma Scale score = 14). Severe facial soft tissue injury with Le Fort II maxillofacial fracture was noted. The left globe was protruding out of the orbit and globe integrity was normal. The left extraocular muscles and optic nerve were cut. Orbital computed tomography (CT) showed extensive facial and orbital fractures. The brain CT was normal. The left orbit was explored and the remaining conjunctiva was repaired. Systemic antibiotics and corticosteroid were given postoperatively. Two weeks later the tarsorrhaphy was opened.

Conclusions: We present a case of traumatic globe avulsion and optic nerve transection. Complete protrusion of the eyeball from the orbital condition called globe avulsion or globe luxation is a clinical rarity. In fact, it is so rare that an ophthalmologist may encounter such a situation once in his lifetime. The patient was successfully treated using a multidisciplinary approach. The challenges that the surgeons may encounter in such a case are discussed.

Intraocular Inflammation, Uveitis & Scleritis

A Difficult Journey: Combined Anterior and Posterior Scleritis in a 16-Year-Old Female

*First Author: Cristina **GARCIA***
*Co-Author(s): Egidio **FORTUNA***

Purpose: To present a case of a young female with features of combined anterior and posterior scleritis.

Methods: Case report.

Results: A 16-year-old female presented with a 1-month history of redness and dull pain in the right eye. Examination revealed dilation of the episcleral vasculature initially limited to a focal segment of the eye. On subsequent consultations the inflammation progressed and she was managed with oral prednisone, eventually augmented with methotrexate and intravenous cyclophosphamide. Scleral inflammation progressed including the posterior sclera, with note of formation of multiple nodules in the posterior sclera. The patient was managed by multiple subspecialties but eventually lost vision in the affected eye.

Conclusions: Scleritis is a rare ocular inflammation that has sight-threatening complications and therefore requires early diagnosis and treatment.

A Rare Case of Subacute Inflammation due to Intravitreal Copper Wire Reporting 10 Years after Injury

*First Author: Pooja **LAL***
*Co-Author(s): Anuj **SONI***

Purpose: To report a case of subacute inflammation due to intraocular copper wire foreign body resulting in sunflower cataract and chorioretinitis after 10 years of injury.

Methods: An interventional case report.

Results: The patient had best-corrected vision of 6/6 after phacoemulsification and posterior chamber intraocular lens implantation and vitrectomy followed by copper wire foreign body removal.

Conclusions: Copper can cause low-grade intraocular inflammation in case of insulated copper wires and alloys of copper with copper content of 65%.

A Rare Case of Sympathetic Ophthalmia Following Trabeculectomy

*First Author: Cristina **GARCIA***
*Co-Author(s): Emilio Serafin **ADRIANO**, Egidio **FORTUNA***

Purpose: To present a rare case of sympathetic ophthalmia (SO) following uncomplicated glaucoma surgery (trabeculectomy).

Methods: This is a case report of a 50-year-old female who underwent uncomplicated glaucoma surgery (trabeculectomy) for increased intraocular pressure (IOP) refractory to medical management. Diagnosis of SO was made clinically based on known ophthalmologic findings consistent with the said condition. Adjunct diagnostics were also performed including visual field perimetry, fundus photography, ocular coherence tomography,

and fluorescein angiography to support the clinical findings. Diagnosis was confirmed by a Uveitis Specialist. Treatment of SO was initiated including oral and topical medications and intravenous infusion of corticosteroids.

Results: Our patient is a 50-year-old female, a known case of primary angle closure, who underwent trabeculectomy due to uncontrollable IOP despite maximal medical management. Two months later, the patient developed blurring of vision in both eyes, eye redness, and photophobia. Findings on physical examination were consistent with the diagnosis of SO and the patient was managed with a combination of oral, topical, and intravenous medications to control intraocular inflammation and IOP.

Conclusions: Although SO is a rare condition, it has debilitating visual outcomes and is thus a feared ocular complication of penetrating ocular trauma or intraocular surgery. As such, despite its rarity it is an important clinical condition and one that is very difficult to manage. To our knowledge, this is the first local report of SO following uncomplicated trabeculectomy in a previously healthy 50-year-old female.

A Rare Case of Sympathetic Ophthalmia with Severe Annular Choroidal Detachment

*First Author: Jin Young **KIM***
*Co-Author(s): Mirinae **JANG***

Purpose: We describe a rare case involving a 67-year-old man with sympathetic ophthalmia (SO) accompanied by atypical annular choroidal detachment.

Methods: A 67-year-old man presented with decreased vision in the right eye 3 days ago. He underwent trabeculectomy of the left eye 27 years ago. The visual acuity in his right eye was 20/200, with no light perception in the left eye. The intraocular pressure was 13/11 mm Hg in both eyes. Mild inflammation was observed in the anterior chamber and anterior vitreous of both eyes. Fundoscopy revealed macular edema and annular choroidal detachment in both eyes, with a "kissing choroid" appearance in the left eye. Optical coherence tomography (OCT) revealed septated cavitary submacular fluid with irregularity of the retinal pigment epithelium (RPE) in both eyes. Fluorescein angiography showed multiple pinpoint leakages at the level of the RPE in the early phase and dye pooling in the late phase.

Results: We diagnosed the patient with SO and immediately initiated treatment with 60 mg of oral prednisolone once a day and 100 mg of oral cyclosporine twice a day. One week later, his visual acuity in the right eye was 20/60, and 3 weeks later, fundoscopy showed reduced choroidal detachment, while OCT revealed a marked decrease in subretinal fluid.

Conclusions: This is the first report of SO accompanied by severe annular choroidal detachment. Clinicians should be aware that SO can show atypical features associated with chronic inflammation and that timely diagnosis and management with intensive immunosuppressive treatment are crucial.

Clinicoaetiological Presentation of Posterior Uveitis in a Tertiary Center in Bangladesh

*First Author: Pankaj **ROY***
*Co-Author(s): Ava **HOSSAIN**, Banita **MISTRY**, Dipak **NAG**, Rinku **PAUL***

Purpose: This study aimed to find out the cause of unexplained vision loss in patients attended the Uvea, Retina clinic and to arouse interest for the causation of posterior uveitis by mycobacterium tuberculosis (MT).

Methods: The study was a prospective purposive case-control study conducted during July 2013 to December 2017. A total of 98 patients with posterior uveitis of unknown etiology were included in this study. Sixty MT-positive (>15 mm) patients who received anti-TB drugs and with no recurrences during the follow-up period were regarded as the study group, and 38 MT-negative patients as the control group.

Results: A total of 84 eyes of 60 patients were affected. Vasculitis with or without retinal hemorrhage was found in 20 eyes (24%), multifocal choroiditis in 18 eyes (21%),

disseminated choroiditis in 17 eyes (20%), vitreous hemorrhage in 8 eyes (10%), single focal choroiditis in 6 eyes (7%), vasculitis with branch retinal vein occlusion (BRVO) in 5 eyes (6%), serpiginous choroiditis in 4 eyes (5%), vasculitis with tractional retinal detachment in 3 eyes (4%), exudative detachment due to choroiditis in 3 eyes (4%).

Conclusions: In this study, 60 (61%) of 98 patients with chronic posterior uveitis had tuberculosis. Posterior uveitis present as focal, multifocal or diffuse areas of retinitis or choroiditis, with varying degrees of vitreous cellular activity and/or involvement of the retinal vasculature. Early diagnosis and treatment is needed to reduce visual morbidity and mortality due to posterior uveitis resulting from MT.

Ocular Angiostrongyliasis in Thailand: A Retrospective Analysis Over 2 Decades

*First Author: Thawinee **TRISAKUL***
*Co-Author(s): Stephanie **CHOI**, Wipada **LAOVIROJJANAKUL**, Michael **MORLEY**, Supat **SINAWAT**, Suthasinee **SINAWAT***

Purpose: To elucidate the clinical features, management, and visual outcomes of patients with ocular angiostrongyliasis.

Methods: This was a single-center retrospective study of patients with ocular angiostrongyliasis presenting between 1995 and 2017 at Srinagarind Hospital, Khon Kaen, Thailand. A total of 17 patients were diagnosed through clinical identification of the intraocular parasite. Medical records and fundus photography were reviewed.

Results: There were 17 patients (9 males, 8 females) with a mean age of 40.4 ± 14.6 years; all with a history of raw food ingestion such as snails, fish and shrimp. The majority of cases presented with blurred vision and best-corrected visual acuity (BCVA) of 1/60 or worse, resulting from optic neuropathy or macular damage. Three patients had a history of meningitis preceding visual impairment. Angiostrongylus cantonensis parasites were identified in the subtenon, intracameral, intravitreous, and subretinal space. Multiple types of treatment modalities were used including focal laser, surgical removal and medical management. Primary laser ablation was typically applied to the pigmented gut followed by parasitic removal. Surgical removal was performed in 9 out of 17 cases. Various routes of corticosteroids were administered depending on site and severity of intraocular inflammation. Over half of patients were prescribed antihelminthic drugs.

Conclusions: Surgical removal is recommended to eliminate intracameral and intravitreal angiostrongyliasis; however, focal laser to the living parasite should be done before surgery to immobilize the worm. Pulse methylprednisolone therapy may be beneficial in cases of acute optic neuritis. Antihelminthic drugs should be considered for all patients given their history of raw food intake.

Secondary Dengue Retinitis: A Case Report with Review of Literature

*First Author: Vikram **KOUNDANYA***
*Co-Author(s): Sumit **KUMAR***

Purpose: To report the clinical features and management of a rare case of retinitis following secondary dengue.

Methods: A 42-year-old female patient presented with diminution of vision in the right eye for the last 5 days along with myalgia and headache. She had a history of dengue fever 7 years back. She also gave a history of 2 family members suffering from dengue fever for the last 3 weeks. On examination the best-corrected visual acuity (BCVA) was 6/24,N18 in the right eye and 6/6,N6 in the left eye. Slit lamp examination showed a normal anterior segment in both eyes. Fundus examination of the right eye showed a clear vitreous and dilated and tortuous superotemporal vein with multiple intra-retinal hemorrhages and a patch of retinitis measuring approximately 2 disc diameter along the superotemporal arcade along with serous detachment of the macula.

Results: All the blood investigations were within normal except for a positive serology

for dengue IgG. Dengue IgG:IgM ratio was 1.8, suggestive of secondary dengue infection. A clinical diagnosis of dengue retinitis was made and the patient was started on oral corticosteroids (1 mg/kg). At 4-week follow-up the BCVA in the right eye was 6/6,N6. Fundus examination of the right eye showed resolving retinal hemorrhages and retinitis patch.

Conclusions: This case highlights the fact that absence of fever in a patient may be misleading to the treating doctor and the patient may be suffering from secondary dengue infection which may manifest as retinitis with signs of microvascular occlusions in the retina.

Surgical Management of a Case of Uveal Effusion Syndrome in a Hypermetropic Eye

*First Author: Shah-Noor **HASSAN***

Purpose: To report a case of surgical management of uveal effusion syndrome in a hypermetropic eye.

Methods: A 35-year-old male presented with decreased vision in the right eye. Fundus examination revealed 360-degree choroidal detachment with shallow exudative retinal detachment in the right eye. The axial length was 21 mm in both eyes. He was initially treated with systemic steroid but showed deterioration of vision over time in the right eye. Then 4-quadrant partial thickness sclerectomy with sclerostomy and SF6 gas implant was done in the right eye as an initial surgical procedure. Full-thickness sclerectomy in single quadrant with C3F8 gas implant was done in subsequent procedure.

Results: Visual acuity showed minimal improvement in partial-thickness sclerectomy with sclerostomy. Visual acuity markedly improved with anatomical improvement of fundus picture in full-thickness sclerectomy.

Conclusions: Surgical intervention is the choice of treatment in uveal effusion syndrome with hypermetropia. Full-thickness sclerectomy might achieve the final outcome when partial-thickness sclerectomy with sclerostomy fails.

Sympathetic Ophthalmia — An Ever Present Threat: A Retrospective Case Series

*First Author: Diva **MISRA***
*Co-Author(s): Pritam **BAWANKAR**, Harsha **BHATTACHARJEE**, Dipankar **DAS**, Pushkar **DHIR***

Purpose: To investigate the demographic profile, common causes, and final visual outcome of patients diagnosed with sympathetic ophthalmia (SO) in a tertiary eye care center of North East India.

Methods: Patients with sympathetic ophthalmia were identified from the uveitis database for the period between August 2013 and August 2015. The diagnosis of SO was made on the basis of a history of ocular trauma or surgery and subsequent development of bilateral uveitis consistent with SO, or histopathological evidence of SO in the enucleated eye.

Results: Of a total of 552 patients presenting to the uveitis clinic within the study period, 15 patients were diagnosed with SO (2.7%); 9 (60%) were male and 6 (40%) were female. The mean age of the patients was 46.20 ± 18.63 years (range, 8-70 years). Trauma (penetrating/blunt) was the most common cause of SO in the present case series (n = 9; 60%) followed by intraocular surgery (n = 6; 40%). The mean interval between the inciting event and onset of symptoms was 7 months (range, 1 month to 10 years). Intravenous methylprednisolone for 3 days followed by oral prednisolone in tapering doses formed the mainstay of treatment (n = 9; 60%). Oral prednisolone plus topical steroids were given in 4 cases. Oral immunosuppressives were required in 2 cases.

Conclusions: Sympathetic ophthalmia is a potentially devastating ophthalmic condition which is associated with significant visual morbidity. The present series, although small, implicates ocular trauma as the most common cause of sympathetic ophthalmia in the North East Indian population. Early diagnosis and prompt intervention leads to favorable visual outcome.

Neuroscience, Stem Cells & Regenerative Medicine

Effect of Intravitreal Triamcinolone Acetonide Injection in Optic Nerve Disease

*First Author: Kyungmin **LEE***
*Co-Author(s): Chul Woo **KIM**, Mingui **KONG**, Byung Gil **MOON**, Youngsook **PARK**, Joonhong **SOHN***

Purpose: To evaluate the clinical effect of intravitreal triamcinolone acetonide injection (IVTA) in optic nerve diseases.

Methods: This was a case series of 7 patients who have optic nerve swelling due to nonarteritic anterior ischemic optic neuropathy (NAION) or optic neuritis that were treated with 4 mg of IVTA.

Results: Six eyes of 6 patients had NAION and 1 patient had optic neuritis. All patients completed at least 3 months of follow-up. Optic disc swelling had markedly decreased within first postinjection month as 96.7 ± 75.8 μm. The visual acuity was also improved within 1 month after injection in most cases. After IVTA, 1 patient showed progression of cataract, and 1 patient had increased intraocular pressure, which was controlled with anti-glaucoma eyedrops.

Conclusions: In this study, IVTA provided relatively improved recovery of visual acuity and relatively rapid resolution of optic disc swelling in a small sample of patients with optic nerve diseases. It did not provide visual field improvement.

Ocular Imaging

Accuracy of Deep Learning, a Machine-Learning Technology, for Detecting Branch Retinal Vein Occlusion Using Ultra-Widefield Fundus Ophthalmoscopy

*First Author: Daisuke **NAGASATO***
*Co-Author(s): Hiroki **MASUMOTO**, Yoshinori **MITAMURA**, Masanori **NIKI**, Hideharu **OHSUGI**, Hitoshi **TABUCHI***

Purpose: We aimed to assess 2 machine-learning technologies with deep learning (DL) and support vector machine (SVM) algorithms for detecting branch retinal vein occlusion (BRVO) using ultra-widefield fundus images and investigated their performance.

Methods: A total of 237 images from 236 BRVO patients and 229 images from 176 non-BRVO normal subjects were used in this study. Sensitivity and specificity were calculated for the DL and SVM models. Furthermore, a receiver operating characteristic curve was constructed, and the area under the curve (AUC) was calculated.

Results: The sensitivity of the DL model for the diagnosis of BRVO was 94.0% [95% confidence interval (CI), 93.8-98.8%], the specificity was 97.0% (95% CI, 89.7-96.4%), and the AUC was 0.976 (95% CI, 0.960-0.993). In contrast, the sensitivity of the SVM model was 80.5% (95% CI, 77.8-87.9%), the specificity was 84.3% (95% CI, 75.8-86.1%), and the AUC was 0.857 (95% CI, 0.811-0.903). The DL model outperformed the SVM model with all indicators ($P < 0.001$).

Conclusions: Early diagnosis of BRVO can contribute to maintenance of better visual function. The proposed DL-based model can be used with ultra-widefield fundus ophthalmoscopy to diagnose BRVO in patients living in remote areas where it is difficult to reach an ophthalmic medical center.

Accuracy of Ultra-WideField Fundus Ophthalmoscopy-Assisted Deep Learning, a Machine-Learning Technology, for Detecting Treatment-Naïve Proliferative Diabetic Retinopathy

*First Author: Yuki **YOSHIZUMI***
*Co-Author(s): Hiroki **MASUMOTO**, Toshihiko **NAGASAWA**, Zaigen **OHARA**, Hideharu **OHSUGI**, Hitoshi **TABUCHI***

Purpose: The aim of the present study was to investigate the detection of treatment-naïve proliferative diabetic retinopathy (PDR) using ultra-widefield fundus images with a deep convolutional neural network (DCNN), which is a machine-learning technology.

Methods: A total of 378 photographic images

(132 PDR images and 246 non-PDR images) were amplified, and the area under the curve (AUC), sensitivity and specificity were examined.

Results: We conducted training with DCNN using the images and constructed a deep-learning model, which demonstrated a high sensitivity of 94.7% and a high specificity of 97.2%, with an AUC of 0.969.

Conclusions: Our findings suggest that PDR could be diagnosed using an approach that involves wide-angle camera images and deep learning.

Analysis of Choroidal Structural and Vascularity Indices with Image Binarization of Swept-Source Optical Coherence Tomography Scans: A Prospective Study of 460 Eyes

*First Author: Pukhraj **RISHI***
*Co-Author(s): Ashutosh **AGARWAL**, Rupesh **AGRAWAL**, Zeeshan **AKHTAR**, Ekta Anand **RISHI***

Purpose: To evaluate choroidal vascularity index (CVI) amongst normal subjects using image binarization of swept-source optical coherence tomography (SS-OCT).

Methods: A total of 460 eyes of 230 normal subjects were included. The total circumscribed choroidal area, luminal area, stromal area, and CVI were derived from SS-OCT scans using an open source software (ImageJ) with the modified Niblack method. Both CVI and subfoveal choroidal thickness (SFCT) were correlated with age, refractive error, intraocular pressure and mean ocular perfusion pressure (MOPP) using mixed linear model analysis. Pearson's correlation coefficient was used to determine the relationship between age and each dependent factor. Analyses were performed using SPSS version 20.0 (IBM Corp., Armonk USA) and statistical significance was tested at 5%.

Results: The mean age of the patients was 42.1 ± 17.6 years. The mean SFCT was 307 ± 79 μm and the mean CVI was 66.80 ± 3.8%. There was statistically significant positive correlation between CVI and increasing age (r = 0.259, P < 0.0001) and statistically significant negative correlation between SFCT and age (r = –0.361, P < 0.0001). There was positive linear correlation between refractive error and CVI (r = 0.220, P < 0.0001), and negative correlation between SFCT and refractive error. There was no significant effect of MOPP on both CVI (P = 0.07) and SFCT (P = 0.7).

Conclusions: In this study, CVI and SFCT are significantly correlated with age and refractive error.

Assessment of Response to Anti-VEGF Therapy on Choroidal Neovascularization Secondary to Pathological Myopia Using OCT Angiography

*First Author: Chui-Lien **TSEN***

Purpose: To assess the morphology of choroidal neovascularization (CNV) secondary to pathological myopia by optical coherence tomography angiography (OCTA) and determine the therapeutic effects of intravitreal antivascular endothelial growth factor (anti-VEGF).

Methods: We report a case of myopic CNV which was followed closely with OCTA over 2 cycles of anti-VEGF therapy. The central retinal thickness (CRT), selected CNV area, flow area and flow density on OCTA were measured sequentially.

Results: Quantitative measurements of CRT, selected CNV area, flow area and flow density were carried out. OCTA showed rapid shutdown of flow area after each dose of anti-VEGF therapy. The CRT apparently decreased after initial injection and remained stable during the whole course.

Conclusions: Optical coherence tomography angiography may be a useful tool for monitoring and quantifying the response of anti-VEGF treatment on CNV secondary to myopia. However, it may not be entirely consistent with patient's visual acuity and change of CRT. Further studies using OCTA in short intervals between antiangiogenic treatments are needed.

Correlations of Baseline Optical Coherence Tomography Angiography Biomarkers with Visual Improvement after Ranibizumab Treatment for Diabetic Macular Edema

*First Author: Yi-Ting **HSIEH***
*Co-Author(s): Minhaj Nur **ALAM**, Xincheng **YAO***

Purpose: To correlate the quantitative optical coherence tomography angiography (OCTA) biomarkers with clinical features, and to predict the extent of visual improvement after ranibizumab treatment for diabetic macular edema (DME) with OCTA biomarkers.

Methods: A total of 38 eyes from 38 patients who received ranibizumab treatment for DME were enrolled as the study group, and 30 patients with single-eye idiopathic epiretinal membrane had their fellow eyes enrolled as the control group. Five OCTA biomarkers, including blood vessel density (BVD), blood vessel tortuosity (BVT), blood vessel caliber (BVC), foveal avascular zone (FAZ) area (FAZ-A), and contour irregularity of FAZ (FAZ-CI) were comprehensively analyzed and compared between 2 groups. Their correlations to best-corrected visual acuity and central retinal thickness (CRT) at baseline and the changes after loading 3-monthly injections of ranibizumab were analyzed with linear regression models.

Results: Eyes with DME had larger BVT, BVC, FAZ-A and FAZ-CI and a lower BVD than eyes in the control group ($P < 0.05$ for all). After the loading ranibizumab treatment, these OCTA biomarkers improved but did not return to normal. Eyes with a lower parafoveal BVD or a smaller BVT at baseline tended to have poorer visual improvement after treatment ($P < 0.05$ for both). As for anatomical improvement, no baseline OCTA biomarkers were found to be significantly correlated.

Conclusions: For eyes with DME, poorer parafoveal vessel density and less tortuosity of macular vessels at baseline would predict poorer visual improvement irrespective of CRT after the loading ranibizumab treatment.

Influence of the Incidence of Tigroid Fundus on the Deep Learning Identification of Diabetic Retinopathy

*First Author: Hitoshi **TABUCHI***
*Co-Author(s): Hiroki **MASUMOTO**, Toshihiko **NAGASAWA**, Zaigen **OHARA**, Hitomi **SUMINO**, Yoshizumi **YUKI***

Purpose: In identifying diabetic retinopathy in fundus images using deep learning, we examined the influence of matching the incidence of tigroid fundus on the identification accuracy.

Methods: Ultra-widefield fundus photographs registered in the database of the Department of Ophthalmology in Tsukazaki Hospital were analyzed. The incidences of non-pathological tigroid fundus (leopard pattern fundus) were calculated in 132 eyes in the diabetic retinopathy group and 1060 eyes in the normal group. Of these, 226 eyes in the normal group with matched incidence of tigroid fundus in the diabetic retinopathy group (tigroid fundus incidence-adjusted group), and 196 eyes in the normal group with matched incidence of tigroid fundus in the normal group (unadjusted normal group) were prepared. With 16 layers of deep learning (with transfer learning), the identification of diabetic retinopathy and tigroid fundus incidence-adjusted group (adjusted identification) and the identification of diabetic retinopathy and unadjusted normal group (unadjusted identification) were performed using the k-fold cross validation ($k = 8$).

Results: The incidences of tigroid fundus were 13.6% in diabetic retinopathy eyes and 41.6% in the normal group, demonstrating significant difference ($P < 0.0001$ by Fisher's exact test). For adjusted identification, area under the curve (AUC), sensitivity, and specificity were 0.97, 0.95 and 0.97 respectively; for unadjusted identification, AUC, sensitivity, and specificity were 0.94, 0.92 and 0.93 respectively.

Conclusions: In the image identification using deep learning, the incidence of tigroid fundus influences the identification accuracy.

Intraretinal Cyst Simulating Intraocular Tumor in Chronic Rhegmatogenous Retinal Detachment

*First Author: Jian-Sheng **WU***
*Co-Author(s): San-Ni **CHEN***

Purpose: To report on a patient with chronic rhegmatogenous retinal detachment who presented with intraretinal cyst simulating intraocular tumor.

Methods: Case report.

Results: A 45-year-old male patient presented with blurred vision OD for 1 year. Ocular examinations revealed decreased visual acuity (20/600) OD. Slit lamp examination of the anterior segment was unremarkable. Indirect ophthalmoscopy showed an almost total shallow retinal detachment. Demarcation lines at upper and temporal upper aspects and a yellowish mass lesion in the inferior temporal area were also noted. Ultrasonography disclosed medium internal reflectivity of the mass lesion. FA showed angioma-like changes of the retinal vessels with profuse leakage overlying the mass. Orbital magnetic resonance imaging with contrast showed an enhanced ovoid lesion with hyperintensity on T2-weighted and T1-weighted images. Intraocular tumor with exudative retinal detachment was suspected, thus vitrectomy and biopsy of the intraocular mass were performed. During the vitrectomy, an intraretinal cyst with serosanguinous fluid and abundant yellowish, shining crystal were noted after puncture of the intraretinal cyst. One inferior retinal tuft with tiny break was noted. Cryotherapy of the retinal break, drainage of the cyst, repeated cryo and thaw of the retinal cyst, air-fluid exchange and silicone oil tamponade were performed. His condition was smooth without recurrence of retinal cyst 6 months after the operation.

Conclusions: With the advance of image studies, rhegmatogenous retinal detachment can be detected in the early stage and intraretinal cysts are rare clinically. Diagnostic biopsy is still required to confirm the diagnosis when an intraretinal cyst simulates an intraocular tumor.

Longitudinal Evaluation of Retinal Structure in Epiretinal Membrane Using Optical Coherence Tomography

*First Author: Jaehoon **LEE***
*Co-Author(s): Mee Yon **LEE***

Purpose: To evaluate the change of visual acuity (VA), central foveal thickness (CFT), disruption of external limiting membrane (ELM), disruption of inner/outer segment junction (IS/OS junction), growth of ectopic inner retinal tissue for idiopathic epiretinal membrane (iERM) without surgery.

Methods: We tracked 49 patients (49 eyes) with iERM without surgical treatment retrospectively for over 6 months from January 2016 to May 2018. Visual acuity, CFT, disruption of ELM, disruption of IS/OS junction, growth of ectopic inner retinal were reviewed.

Results: The mean follow-up duration was 14 months (range, 6-24 months). From first visit to final visit, VA (logMAR) changed from 0.22 ± 0.04 to 0.23 ± 0.46, CFT changed from 331.22 μm to 334.22 μm without showing clinically significant changes (P = 0.383, P = 0.607). Disruption of ELM and growth of ectopic inner retinal tissue did not show clinically significant changes (P = 0.063, P = 0.157). Disruption of IS/OS junction showed significant difference at follow-up period (P = 0.001).

Conclusions: A clinically significant change of the disruption of IS/OS junction was observed during the mean follow-up duration of 14 months. It is known that damage of inner retina is a more sensitive indicator than outer retina to surgical results. However, due to the change of outer retina during an average of 14 months, early surgical approaches would be recommended for relatively good prognosis.

Papillary Venous Loop in Adolescence: A Rare Cause of Branch Retinal Vein Occlusion

*First Author: Mingshan **HE***

Purpose: We aimed to report a rare etiology of branch retinal vein occlusion (BRVO) in adolescence.

Methods: To review the medical records of an adolescent patient with BRVO cased by papillary venous loop.

Results: A 22-year-old college boy without systemic diseases presented to our clinic with complaints of seeing light spots over right lower half of the visual field for 5 days. Ophthalmic examination revealed a flame-shaped hemorrhage over temporal upper retina in the right eye (OD), other ophthalmic examinations were non-remarkable. Vital signs were checked with a stable blood pressure and heart rate within normal limits. Laboratory studies showed a normal range of complete blood count, random-glucose, lipid profiles, coagulation profiles, autoimmune indicators, and inflammatory index. The fluorescein angiography revealed a delayed return of temporal upper venous circulation with an underlying ischemic zone at 22 seconds, and a small venous loop was visible and continuously enhanced since 42 seconds OD. A final diagnosis of papillary venous loop results in BRVO OD was made.

Conclusions: Branch retinal vein occlusion is a rare ophthalmic disease in young patients. In this population, a different differential diagnosis would be listed compared with the elderly. Papillary venous loop is one of the rare causes of BRVO in youth, which should be borne in mind during clinical approaching.

The Prevalence of the Lamina Cribrosa Disinsertion in the Eyes with Pachychoroid Spectrum Diseases in the Absence of Peripapillary Retinoschisis

*First Author: Hae Min **KANG***

Purpose: To investigate the prevalence of disinsertion of the lamina cribrosa (LC) in patients with pachychoroid spectrum diseases in the absence of peripapillary retinoschisis.

Methods: This retrospective, cross-sectional study included 95 patients with pachychoroid spectrum diseases. The medical records were reviewed including optic nerve head evaluations using spectral domain optical coherence tomography with an enhanced depth imaging.

Results: The primary diagnosis was central serous chorioretinopathy in 28 patients (29.5%), polypoidal choroidal vasculopathy in 33 patients (34.7%), pachychoroidal neovasculopathy in 22 patients (23.2%), and pachychoroid pigment epitheliopathy in 12 patients (12.6%). A total of 5 patients (5.3%) showed disinsertion of the LC, and all were unilateral. Three eyes were the affected eyes by polypoidal choroidal vasculopathy, 1 eye was the contralateral eye of polypoidal choroidal vasculopathy, and 1 eye was the affected eye with pachychoroidal neovasculopathy (P = 0.142).

Conclusions: The LC disinsertion was present in the patients with pachychoroid spectrum diseases without peripapillary retinoschisis. The LC disinsertion was present in both the disease-affected and the non–disease-affected fellow eyes.

Ocular Oncology & Pathology

Effect of Age at Diagnosis on the Clinical Features and Long-Term Prognosis of Retinoblastoma

*First Author: Hyun-Ah **KIM***

Purpose: To study the clinical characteristics and long-term prognosis of retinoblastoma according to the age at diagnosis.

Methods: A retrospective chart review of patients newly diagnosed with retinoblastoma from January 2007 to February 2018 who were followed up for at least 6 months were evaluated. Staging was done according to the International Intraocular Retinoblastoma Classification (IIRC).

Results: A total of 20 patients were studied, including 11 patients diagnosed at age younger than 1 year, and 9 patients diagnosed at age 1 year or older. None of the patients had a family history of retinoblastoma. Patients diagnosed at age younger than 1 year had significantly higher proportion of bilateral retinoblastoma when

compared with those diagnosed at an older age (72.7% vs 11.1%; P = 0.010). Four (80.0%) out of 5 patients with detected RB1 germline mutations were diagnosed as retinoblastoma at age 3 months or younger. Eyes of patients diagnosed at age 1 year or older were classified as significantly higher IIRC stage compared to those diagnosed at a younger age (P for trend = 0.010). The proportion of eyes with optic nerve invasion, and the proportion which had undergone enucleation were significantly higher in patients diagnosed at age 1 year or older (P = 0.033 and P = 0.046, respectively). Survival was not different according to the age at diagnosis (P = 0.450).

Conclusions: Laterality, germline RB1 mutation status, and severity of disease differed according to age at diagnosis in retinoblastoma patients, whereas survival was not affected by the age at diagnosis.

Ophthalmic Epidemiology

Current Status of Late and Recurrent Intraocular Lens Dislocation: Analysis of Real-World Data in Japan

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Purpose: To describe relevant patient demographic characteristics and investigate the influence of known risk factors for late intraocular lens (IOL) dislocation, and to explore the associations between those risk factors and the incidence of recurrent IOL dislocation.

Methods: This was a retrospective cohort study using Nationwide Diagnostic Procedure Combination data and insurance claims data in Japan from April 1, 2008 through July 31, 2016. Descriptive statistics for late and recurrent IOL dislocation, incidence rates, and risk factors for recurrent IOL dislocation were analyzed.

Results: A total of 678 of 287,499 eyes that had undergone cataract surgery were included in the analysis. Most of the patients with late IOL dislocation were male (72%, 488/678). The female patients were older than their male counterparts (mean age 74.5 years vs 65.2 years, respectively). The incidence rate of recurrent IOL dislocation was 5.1 per 100 person-years. All 20 cases of recurrent IOL dislocation were observed within the year following surgery. There were no significant associations between potential risk factors and recurrent IOL dislocation (P = 0.53 for diabetes mellitus and P = 0.96 for atopic dermatitis; no recurrences occurred in patients with pseudoexfoliation syndrome, retinitis pigmentosa, or connective tissue disease).

Conclusions: Late IOL dislocation occurs more frequently in men than in women. We found that recurrent IOL dislocation was rare during long-term follow-up, and potential risk factors observed in late IOL dislocation were not statistically significant regarding recurrent IOL dislocation. Further studies are needed to clarify the sex-related difference in the risk for IOL dislocation.

Other (General Ophthalmology)

The Effect of a Clinical Practice Guideline on the Treatment of Diabetic Macular Edema in the Middle East

*First Author: Eui Seok **HAN***
*Co-Author(s): Moon Jung **KIM***

Purpose: To evaluate the effectiveness of a clinical practice guideline (CPG) on the improvement of patient's vision fluctuation in Northern parts of United Arab Emirates.

Methods: Clinical practice guideline for the treatment of diabetic macular edema (DME) was developed to support the physician's and patient's decision in 2017. We reviewed all medical records of DME patients treated in an out-patient department. The time period of 3 months before CPG application was defined as pre-quarter, 3 months after CPG application as 1st quarter and from 6 to 9 months after application as 3rd quarter. Inclusion criteria were the eyes with diabetic retinopathy with

clinically significant macular edema and at least followed up twice for 3 months. Eyes with surgery during quarter and corrected visual acuity less than 20/200 were excluded. Vision fluctuation was defined as discrepancy of 2 Snellen lines or more between every visit during quarter.

Results: A total of 52 eligible eyes were identified (12 eyes of 10 patients for pre-quarter, 13 eyes of 9 patients for 1st quarter and 20 eyes of 15 patients for 3rd quarter). Gender and mean age were not significantly different between each group. Visual acuity fluctuation was found in 3 (25%) of 12 eyes during pre-quarter, 2 (15%) of 13 during 1st quarter and 2 (10%) of 20 during 3rd quarter, which showed the tendency of improvement of visual acuity fluctuation after introduction of CPG on DME.

Conclusions: Introduction and application of CPG on the management of DME can improve the patient's vision fluctuation.

Unusual Presentation of Ocular Myasthenia Gravis

*First Author: Amelia **LIM***
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Purpose: To describe an unusual presentation of ocular myasthenia gravis (MG).

Methods: Case report.

Results: A 20-year-old man presented in the evening with right eye ptosis for 5 days. It was associated with mild blurring of vision and unable to focus during near reading. Otherwise, there were no recent head trauma, ocular surgery, symptoms of increased intracranial pressure or limb weakness. At initial presentation, he appeared confused and uttered answers in single word or short phrases. Examination showed an obvious ptosis over his right eye with marginal reflex distance (MRD) of 0 mm whereas the left eye upper lid was in normal position at MRD of 2 mm. There was significant pupillary dilatation of 5-6 mm with sluggish reflexes in both eyes. Both eye visual acuities were good at 6/6 while his extra-ocular movements were full. He was then listed for urgent computed tomography of the brain to rule out intracranial pathology, but the report was unremarkable. On the following morning, we observed that the right eye ptosis was less marked, with MRD of 1 mm. In addition, he was able to speak appropriately in long sentences. Therefore, fatigability test and ice pack test were performed and turned out to be positive. His pupil size were 4 mm with brisk reflexes. He responded well to pyridostigmine.

Conclusions: Pupillary involvement is a rare presentation of ocular MG and was not mentioned in the Osserman classification. Ophthalmologist should keep a high index of suspicion towards MG as a diagnosis in the case of ptosis with pupillary involvement to prevent life-threatening event.

Pediatric Retina

Familial Exudative Vitreoretinopathy (FEVR)-Related Genes in Malay Premature Babies with Retinopathy of Prematurity

*First Author: Zunaina **EMBONG***
*Co-Author(s): Abdul Salim **ISMAIL**, Abdul-Aziz **MOHAMED-YUSOFF**, Siti-Zulaikha **MOHD KHAIR***

Purpose: Familial exudative vitreoretinopathy (FEVR)–related genes are suggested as the most commonly mutated genes in retinopathy of prematurity (ROP). The aim of this study was to determine the variant in FEVR-related genes in Malay premature babies with ROP.

Methods: A comparative cross-sectional study was conducted between September 2012 and December 2014 among Malay premature babies with and without ROP. Mutation analyses in FEVR-causing genes (*FZD4*, *LRP5* and *TSPAN12*) were performed using premature baby deoxyribonucleic acid (DNA) by polymerase chain reaction (PCR) and direct sequencing. Sequencing results were confirmed with PCR-Restriction Fragment Length Polymorphism (RFLP).

Results: A total of 86 Malay premature babies were recruited with birth weight ≤ 2000 g and

gestational age ≤ 36 weeks (ROP = 41 and non-ROP = 45). Gene variants were detected in *FZD4*, *LRP5* and *TSPAN12*. One patient from each group showed a non-synonymous *FZD4* change, c.502C>T (p.P168S). A synonymous variant of *LRP5* [c.3357G>A (p.V1119V)] was discovered in 30 ROP and 28 non-ROP premature babies. Two variants of *TSPAN12* c.765G>T (p.P255P) and c.*39C>T (3'-UTR) were also recorded (29 and 21 in ROP, 33 and 26 in non-ROP respectively). There was no significant difference of FEVR-gene variants among Malay premature babies with and without ROP.

Conclusions: Four different known single nucleotide polymorphisms were discovered in Malay premature babies. These variants of FEVR-gene need to be further clarified in future whether they are common polymorphisms in Malay ethnic group of premature babies and the risk of ROP susceptibility.

Juvenile Association of Nephronophthisis with Retinitis Pigmentosa: "It Takes Two to Tango"

First Author: Sherine ***BRAGANZA***
Co-Author(s): Thirumalesh M B, Sushil ***PATIL,***
Bhujang ***SHETTY***

Purpose: We report a 12-year-old female who was diagnosed juvenile nephronophthisis and also had association with retinitis pigmentosa.

Methods: The patient did not present with complaints of decreased vision, but on prompt referral from treating nephrologist these features were revealed on ocular examination. Complete ophthalmic examination was done including squint assessment, visual acuity, refraction, dilated funds examination with swept-source optical coherence tomography. Right eye 30 degrees exotropia with both eyes with nystagmus of low amplitude moderate frequency variable beating nature with best-corrected visual acuity of 20/40p in the right eye and 20/70 in the left eye, fundus examination in both eyes revealed pale disc with tapetal reflex with normal disc ratio with arteriolar attenuation with pigmentary changes at fovea with no sign of mid-periphery classical peri-vascular bony spicules. Optical coherence tomography of both eyes showed normal foveal contour with preserved central island of outer nuclear layer which decreased in thickness eccentrically around fovea, which is a classical sign in retinitis pigmentosa. Fundus auto-fluorescence of both eyes had alternating hypoautofluorescence and hyperautofluorescence.

Results: Positive association of diagnosed nephronophthisis with tapeto-retinal degeneration was revealed in this examination. There was associated RPE changes at macula with arteriolar attenuation, pallor of optic disc.

Conclusions: In children with renal, cardiac and liver impairment, an association of retinitis pigmentosa known as Senior-Loken syndrome should be assessed for a diagnosis.

Morphometric Features of the Macular Area in Children with Regressive Retinopathy of Prematurity

First Author: Maxim ***PSHENICHNOV***
Co-Author(s): Oleg ***KOLENKO***

Purpose: To evaluate the morphometric features of macular area in children with regressive retinopathy of prematurity (ROP) after retina laser coagulation in threshold stages of ROP.

Methods: Ten years ago retina laser coagulation was performed in threshold stages of ROP in 18 children. Selection criterion was the absence of retinal detachment after laser coagulation, the second degree of regressive ROP. Spectral optical coherence tomography of macular zone ("Cirrus HD 5000" Carl Zeiss meditec, protocol "Macular cube 512×128") was carried out. The thickness of retina was measured in the sectors of ETDRS macular map using the "Macular Thickness Analysis" protocol. Seventeen children (34 eyes) of comparable age and sex without pathology of the organ of vision were the control group.

Results: Significant difference was found in reduction of retinal thickness in all sectors of macular map in the group with regressive retinopathy in comparison with healthy children: in the internal temporal (282.2 ± 36.1

vs 312.1 ± 11.5 µm) and the upper sectors (301.1 ± 18.9 vs 321.5 ± 11.6 µm) (P ≤ 0.01), in other sectors the thickness reduction was not reliable. In fovea sector, there was a significant increase in the retina thickness compared with the control group (279.5 ± 17.9 vs 239.2 ± 9.2 µm, respectively, P ≤ 0.01), foveal fossa smoothing, without epiretinal membranes and compression in internal border membrane in macular interface. Photoreceptor layer thickness was comparable to that of the control group.

Conclusions: Retina morphometric features in children with regressive ROP grade 2, after retinal laser coagulation are: increased retina thickness in fovea, as well as a uniform decrease in its thickness in other sectors of macular map.

Safety and Efficacy of Green Laser Photocoagulation for Treatment of Severe Retinopathy of Prematurity

*First Author: Simar Rajan **SINGH***
*Co-Author(s): Mangat **DOGRA**, Mohit **DOGRA**, Sabia **HANDA**, Savleen **KAUR**, Deeksha **KATOCH***

Purpose: To evaluate the safety and efficacy of green laser (532 nm) for the treatment of severe retinopathy of prematurity (ROP).

Methods: This was a retrospective chart review of all ROP eyes treated with green laser between January 2012 and March 2017 for presenting features, treatment outcomes and complications, if any.

Results: During the study period, 430 eyes of 224 premature infants were treated for ROP with laser. Of the 347 eyes which received treatment with green laser, stage disease was present in 135 eyes, aggressive posterior ROP in 147 and hybrid ROP in 65. Tunica vasculosa lentis was present in 141 eyes. Earliest treatment was done at 17 days of life and supplemental laser was required in 38 eyes. The mean follow-up period was 8.7 months. Of the 322 eyes with a minimum follow-up of 3 months, 92.6% had a favorable structural outcome. Only laser-related complication noted was anterior segment ischemia in 2 eyes.

Conclusions: Green laser photocoagulation is safe and effective in the treatment of severe ROP.

The Efficacy of the Screening Algorithm WINROP® in a Filipino Population of Preterm Infants in a Tertiary Hospital's Neonatal Intensive Care Unit

*First Author: Grace Celine **BAUTISTA***
*Co-Author(s): Ricardo **VENTURA***

Purpose: To determine the accuracy of the online screening tool WINROP® in detecting high-risk, treatment-requiring retinopathy of prematurity (ROP) among preterm infants admitted in a tertiary hospital's Neonatal Intensive Care Unit (NICU).

Methods: This study validated WINROP® by reviewing complete charts of consecutive preterm infants previously admitted to the NICU from January 2013 to April 2017, seen and screened by the pediatric ophthalmology section for ROP. Birth date, gestational age, birth weight and weekly post-natal weight measurements were entered into WINROP® to determine the preterm infant's risk for developing high-risk, treatment-requiring ROP. Alarm signals were noted for infants tagged by WINROP® as high risk for developing sight-threatening ROP. WINROP® results were then compared with the actual ROP screening results.

Results: A total of 138 preterm infants screened for retinopathy using WINROP® were included in the study. The median gestational age was 31 weeks (26-32 weeks). The median birth weight was 1285 grams (800-1935 g). Alarm was signaled in 55.8% (77/138) of all preterm infants. WINROP® had a specificity of 63.5% (95% CI, 51.5%-74.2%) and a sensitivity of 78.1% (95% CI, 65.7%-87.1%) in detecting infants who would develop any form of ROP. In identifying high-risk, treatment-requiring ROP, WINROP® had a specificity of 46.4% (95% CI, 37.5%-55.5%) and a sensitivity of 76.9% (95% CI, 45.9%-93.8%). The mean time from alarm to development of high-risk, treatment-requiring ROP was 5 weeks.

Conclusions: WINROP® provides a good sensitivity in identifying preterm infants at risk

for developing high-risk, treatment-requiring ROP.

The Morning Glory Blooms: Morning Glory Syndrome with Contractile Optic Disc (a Rare Entity)

First Author: Kanwaljeet H. ***MADAN***
Co-Author(s): Sangeet Mittal ***MITTAL***

Purpose: To present 3 cases of morning glory syndrome with contractile optic disc.

Methods: Morning glory syndrome results from an abnormal closure of embryonic ocular fissure allowing herniation of retinal and optic nerve head tissue leading to excavation of optic disc. It consists of funnel-shaped excavated optic nerve head with an annulus of chorioretinal pigmentary disturbances. Multiple, narrow and straightened retinal vessels are seen emerging from the optic nerve head in a spoke like manner. Rarely the optic disc in morning glory syndrome exhibits contractile movements during which the change in size of the disc is seen. It is due to presence of smooth muscle cells in the coloboma and anomalous communication between the subretinal and subarachnoid spaces.

Results: In case 1, a 38-year-old male presented with decrease of vision in the right eye associated with outward deviation of the right eye. His best-corrected visual acuity was 20/60 in the right eye. On fundus examination, he was found to have a colobomatous disc. The optic disc was seen to change its size during the examination. In case 2, a 9-year-old girl presented with decreased vision in both eyes. On examination she was found to have optic disc coloboma. The optic disc showed contractile movements. In case 3, a 5-year-old girl presented with decreased vision in the right eye. On examination, she was found to have colobomatous disc with contractile movements.

Conclusions: We present 3 cases of morning glory syndrome with contractile optic disc which is a rare entity.

Retina (Medical)

A Case of Systemic Lupus Erythematosus Retinochoroidopathy in a 37-Year-Old Female

First Author: Maria Angelica ***VILLANO***
Co-Author(s): Harvey ***UY***

Purpose: Although the pathophysiologic mechanism of microangiopathy is similar in both systemic lupus erythematosus (SLE) retinopathy and choroidopathy, current literature is lacking for both in patients with active SLE. In fact, simultaneous occurrence of choroidopathy and retinopathy has only been reported in one study in 1977. We present a case of concurrent retinopathy and choroidopathy in a 37-year-old female diagnosed with SLE.

Methods: A 37-year-old female, diagnosed with SLE, presented with blurring of vision in both eyes. She was diagnosed 4 years ago, initially presenting with photosensitivity, rashes, arthritis and nephritis for which she has secondary hypertension. She is maintained on hydroxychloroquine, losartan, amlodipine and started on oral prednisone 2 weeks prior to the visit. She had sudden blurring of vision in both eyes, described as an appearance of a dark spot in the central field of vision.

Results: Fundus photo (OU) showed tortuosity of the retinal vessels and attenuation of the arteries, multiple cotton wool spots, few flame hemorrhages, and hard exudates in the macula. Fluorescein angiography (OU) showed numerous areas of deep retinal hypoperfusion in early shots, with areas of intense leakage adjacent to the cotton wool spots in later shots. Optical coherence tomography (OCT) (OU) showed neurosensory retinal detachment of the macula. Optical coherence tomography angiography (OU) showed disruption of the deep retinal vasculature and focal subfoveal choriocapillaris hypoperfusion.

Conclusions: This is a case of SLE retinopathy with occult choroidopathy, with the latter presenting as subfoveal exudative RD on OCT. Both SLE retinopathy and choroidopathy are suggestive of active disease.

An Unusual Appearance of Large Choroidal Mass with Retinoschisis

*First Author: Amelya **SARI***
*Co-Author(s): Mutmainah **MAHYUDDIN**, Anggun **YUDANTHA***

Purpose: To demonstrate an unusual case of large choroidal mass with retinoschisis.

Methods: A 62-year-old male presented with painless blurry vision of the right eye 2 years ago and worsened visual acuity in 2 months. There was no history of trauma or prior systemic known malignancy. The visual acuity was hand movement. Funduscopic examination showed a clear vitreous and choroidal mass in superotemporal site with orange-color pigmentation and subretinal fluid surrounding the mass. Ocular ultrasonography showed high internal reflectivity, positive sound attenuation with ultrasound hollow, acoustic solidity mass size 9.7 x 10.9 x 5.0 mm. Optical coherence tomography on macula demonstrates dome shape elevated with splitting of the neurosensory retina. Abdomen ultrasonography, chest x-ray and laboratory examination have been performed to rule out other systemic cancer. There was an enlargement of prostate suggestive of benign nature. Laboratory examination showed normal result tumor marker for prostate. No malignancy was confirmed by urologist.

Results: Benign choroidal mass with retinoschisis was suspected in this patient with suggested condition of hemangioma and nevus. Series ocular ultrasonography was performed with monthly interval and the result showed no significant progression. The patient will be observed for 3 to 6 months and ocular ultrasonography will be performed.

Conclusions: Choroidal mass can lead to retinoschisis. The pathophysiology of retinoschisis that caused by choroidal mass has never been reported. Large choroidal mass with retinoschisis is very rare, therefore ophthalmologist should be aware of this condition. Clinical diagnosis and ancillary test to find out the cause is most important.

Bilateral Exudative Retinal Detachment due to Hypertensive Retinopathy and Choroidopathy in a Young Patient with Chronic Kidney Disease

*First Author: Indha **KARTIKASARI***
*Co-Author(s): Nadia **DEWI**, Mirza **METITA***

Purpose: To report a rare case of bilateral hypertensive retinopathy and choroidopathy with bullous exudative retinal detachment in a young patient with chronic kidney disease.

Methods: A 26-year-old man with underlying chronic kidney disease (CKD) gr-V underwent bilateral bullous exudative retinal detachments. Retinal arteriolar narrowing, vascular tortuosity, arteriovenous nicking, optic disc swelling, retinal hemorrhage, Elschnig spot, Siegrist streak were identified in both eyes. His blood pressure was 200/140 mm Hg with visual acuity of 0.5/60 OU. The patient was diagnosed with bilateral hypertensive retinopathy and choroidopathy with bullous exudative retinal detachments and managed with antihypertensive treatment with internal medicine.

Results: After antihypertension treatment, his visual acuity improved to 1/60 and exudative retinal detachment and other conditions were reduced. A patient with those findings should be considered to have hypertensive retinopathy and choroidopathy and treated as soon as possible because of the poor prognostic.

Conclusions: Hypertensive choroidopathy is a rare finding associated with acute increases in blood pressure. When the choroid is involved, the hypertensive event is often more acute and associated with increased morbidity. It is necessary to obtain fundus examination in any patient with elevated blood pressure and concomitant vision complaints. Therefore screening hypertensive patients involves close collaboration of internists with ophthalmologists.

Bilateral Simultaneous Central Retinal Artery Occlusion (CRAO) in a Patient with Systemic Lupus Erythematosus

*First Author: Kiran **CHANDRAN***
*Co-Author(s): Yogish S **KAMATH**, Namitha **MATHEW**, Shailaja **SHENOY***

Purpose: To report a rare case of bilateral central retinal artery occlusion (CRAO) in a patient with systemic lupus erythematosus (SLE).

Methods: A 22-year-old South Indian female, with no premorbidities being treated for SLE, presented with sudden, painless, simultaneous diminution of vision in both eyes for the last 3 weeks. A general examination showed hypotension with tachycardia, malar rash and multiple oral ulcers. Systemic examination was within normal limits. On ocular examination, visual acuity was counting fingers at 1 meter in both eyes. Pupillary reaction was sluggish, but the rest of anterior segment was normal. Fundus in both eyes showed pallor of optic disc with multiple peripapillary cotton wool spots, severe arteriolar attenuation with box-carring of arteries and veins, few scattered dot and blot hemorrhages, diffuse retinal whitening with cherry red spot at macula, suggestive of bilateral CRAO. Serology showed anti-nuclear antibody with positive renal biopsy of diffuse mesangial proliferative glomerulonephritis clinching a diagnosis of SLE. Magnetic resonance (MR) imaging with MR angiogram of brain showed bilateral atrophy with features suggestive of central nervous system vasculitis.

Results: Immunosuppressives and intravenous steroids were given in view of the renal condition. Within 3 weeks, her systemic condition improved. On follow-up 2 weeks later, the vision was status quo and fundus fluorescein angiography was done. In view of extensive capillary non-perfusion areas, Pan retinal photocoagulation was done for both eyes. She was discharged and lost to follow-up.

Conclusions: Although uncommon, bilateral CRAO can be seen in patients with systemic vasculitis. Hence in patients with bilateral CRAO, this possibility should be kept in mind.

Branch Retinal Arterial Occlusion Presenting with Papilledema

*First Author: Shih-Hao **TZENG***

Purpose: To report a case of branch retinal arterial occlusion presenting with papilledema.

Methods: Case report.

Results: A 66-year-old woman with a history of hypertension complained of central scotoma of the left eye about 2 weeks ago. She described intermittent episodes of headache accompanied with blurred vision during this time. On examination, visual acuity was 20/20 in the right eye and 2/20 in the left eye. There was also equivocal relative afferent pupillary defect (RAPD) sign. Fundus examination revealed tortuosity and obscured cilioretinal vessels with flame-shaped hemorrhage over temporal disc area and blurry disc margin with mild disc pallor at temporal side was noted. Visual field examination showed inferonasal scotoma of the left eye, and optical coherence tomography of disc demonstrated swelling of superotemporal disc area. Under impression of optic neuritis suspect anterior ischemic optic neuropathy, steroid pulse therapy was administered. Brain magnetic resonance imaging excluded compressive lesions or optic nerve abnormalities. After pulse therapy treatment, the patient noted slight improvement of scotoma; however, her visual acuity remained static at discharge.

Conclusions: Cilioretinal arteries are anatomical variants originating from the short posterior ciliary arteries. Anterior ischemic optic neuropathy is known to be caused by occlusion of the short posterior ciliary arteries, resulting in partial or total infarction of the optic nerve head. Thus, occlusion of the short posterior ciliary arteries may cause concomitant occlusion of the cilioretinal artery. Our case reported a patient with only a history of hypertension, but presented with both of these conditions.

Choroidal Neovascularization Secondary to Intense Pulsed Light Injury

*First Author: Chih-Yao **CHANG***
*Co-Author(s): Shwu-Jiuan **SHEU***

Purpose: To present a case with choroidal neovascularization (CNV) as a complication of intense pulsed light injury.

Methods: A case report.

Results: We report on a 26-year-old medical device saleswoman who developed CNV after injury by intense pulsed light (IPL) with detection and monitoring by optical coherence tomography angiography. Intravitreal injection of ranibizumab effectively diminished the CNV, but recurrence occurred and repeated treatments were required.

Conclusions: This is the first IPL-related CNV case, which reminds us the importance of using appropriate eye protection throughout the course of treatment for all individuals present in the therapy room.

Choroidal Remodeling in Polypoidal Choroidal Vasculopathy after Treatment with Photodynamic Therapy

*First Author: Jay **SHETH***
*Co-Author(s): Giridhar **ANANTHARAMAN**, Shruti **CHANDRA**, Jay **CHHABLANI***

Purpose: The aim of our study was to evaluate retinal and choroidal morphological changes after treatment with photodynamic therapy (PDT) in polypoidal choroidal vasculopathy (PCV).

Methods: This was a retrospective analysis of 8 eyes with PCV undergoing full-fluence PDT+3 intravitreal ranibizumab, followed by PRN regimen. All eyes underwent multimodal imaging including EDI-OCT, DFA and ICGA (Spectralis). Changes in BCVA, subfoveal choroidal thickness (SFCT), CT at pachyvessel (CTPv), choroidal vascularity index (CVI), choroidal area (CA), intraretinal fluid (IRF), subretinal fluid (SRF), along with dimensions of PED (height, base-diameter, area) and shallow irregular PED (double-layer sign; DLS) were analyzed at baseline and 6 months.

Results: Compared with baseline, significant reduction was seen in SFCT (baseline: 298.50 ± 78.18 μm; 6 months: 248.25 ± 65.6 μm; P = 0.002) and CTPv (baseline: 276.12 ± 33.88 μm; 6 months: 233.12 ± 41.28 μm; P = 0.001) at 6 months. Of the 8 eyes, 3 showed resolution of pachyvessels. Complete resolution of PED was noted in 3/7 eyes while the DLS resolved in 2/7 eyes. Statistically significant reduction was also noted in PED area (P = 0.03) and height of PED (P = 0.002), SRF (P = 0.005) and DLS (P = 0.04). 66.33% and 62.5% of eyes had complete resolution of IRF and SRF respectively. The mean BCVA improved from 0.49 logMAR at baseline to 0.42 at 6 months, although not significantly (P = 0.4). Similarly CVI also reduced 6 months following the combination therapy, but not significantly (P =0.14). Likewise, improvement was noted in the width of DLS (P = 0.6) and PED (P = 0.3), although not significantly.

Conclusions: Photodynamic therapy is associated with an improvement in retinal and choroidal morphology with stabilization of choroidal vascularity in eyes with PCV at 6 months. Additionally, it is associated with promising anatomical outcomes on morphometry of choroid and PED, besides achieving a dry macula, maintaining stable visual acuity with an acceptable safety profile.

Combined Central Retinal Artery and Vein Occlusion as the Presenting Manifestation of Systemic Lupus Erythematosus: An Uncommon Entity

*First Author: Pritam **BAWANKAR***

Purpose: To report a rare case of combined occlusion of the central retinal artery (CRAO) and central retinal vein (CRVO) presenting as the first manifestation of systemic lupus erythematosus (SLE) in a 14-year-old girl.

Methods: A retrospective case report.

Results: A 14-year-old girl presented with sudden loss of vision in her left eye (LE) for 1 day. Best-corrected visual acuity in the right eye (RE) was 20/20 and there was no light perception in the LE. The LE had relative

afferent pupillary defect. Fundus examination of the LE revealed a mild swollen optic disc, pale and edematous retina, engorged and tortuous retinal veins, scattered intraretinal hemorrhages in all quadrants and a cherry-red macular spot, establishing the diagnosis of a combined CRAO and CRVO. Anterior and posterior segment findings were unremarkable in the RE. Despite ocular paracentesis and supplementation with anticoagulants, there was no improvement in the visual acuity of LE and amaurosis eventually developed. She had raised anti-nuclear antibody, double-stranded DNA, and slightly decreased complement-3. Lupus anticoagulant, anticardiolipin antibodies were negative. She developed all characteristic manifestations of SLE including maculopapular rashes, polyarthritis, lupus nephritis, broncho-alveolar hemorrhages and ultimately died of terminal cardiorespiratory arrest due to bilateral aspiration pneumonitis on the 9th day of presentation.

Conclusions: The combined occlusion presented as a catastrophic form of disease flare in the absence of raised anti-phospholipid antibodies suggesting inflammatory etiology, leading to severe visual loss, despite aggressive treatment. This case reminds us that SLE must be considered in the rare instance in which the patient presents with combined CRAO and CRVO.

Comparison of Retinal Changes after Intracameral Moxifloxacin or Levofloxacin among Eyes Undergoing Cataract Surgery

*First Author: Harvey **UY***

Purpose: To compare retinal changes associated with intracameral moxifloxacin or levofloxacin among eyes undergoing phacoemulsification (PHACO) cataract surgery.

Methods: This was a randomized, double-masked, clinical trial of 114 eyes that underwent PE and were assigned to receive either intracameral unpreserved moxifloxacin 0.5 mg in 0.1 mL (n = 58) or levofloxacin, 0.5 mg in 0.1 mL (n = 56). Slit lamp cataract grading, PHACO parameters, and preoperative and postoperative spectral domain optical coherence tomography (6 x 6) scans were obtained. Main outcome measures were central retinal thickness (CRT) and macular volume (MV).

Results: The baseline characteristics and PHACO parameters were similar. At visits on pre- and post-operative day 1, week 1 and month 1, the mean CRT (SD) in the moxifloxacin group were 243.5 (32.6), 246.9 (22.0), 251.4 (22.0) and 261.4 (24.6), respectively, whereas that of the levofloxacin group were 241.3 (34.5), 244.6 (24.7), 250.9 (27.4) and 262.2 (35.8), respectively (P = 0.840). At visits on pre- and post-operative day 1, week 1 and month 1, the mean MV (SD) among eyes receiving moxifloxacin, were 9.4 (0.8), 9.4 (0.6), 9.7 (0.6) and 10.0 (0.6), respectively, whereas that of the levofloxacin group were 9.2 (0.9), 9.3 (0.7), 9.5 (0.8) and 9.8 (0.7), respectively (P = 0.012). Changes in CRT were not statistically significant. The MV increase appears lower among eyes receiving intracameral levofloxacin. No retinal adverse events were observed.

Conclusions: Among eyes undergoing PE, intracameral moxifloxacin and levofloxacin result in minimal changes in CRT and MV after PHACO. The CRT and MV gradually increase after PHACO surgery until 1-month period. Intracameral levofloxacin appears to result in less increase in MV. In terms of retinal outcomes, both antibiotics appear equally safe as prophylactic antibiotics.

Efficacy of Intravitreal Aflibercept as Primary Treatment in Exudative Age-Related Macular Degeneration Associated with Retinal Pigment Epithelial Detachment

*First Author: Kanwaljeet H **MADAN***

Purpose: Exudative age-related macular degeneration (AMD) associated with retinal pigment epithelial detachment (RPED) is difficult to treat with standard treatment and it responds poorly to intravitreal injections of bevacizumab/ranibizumab. The aim of this study was to assess the efficacy of intravitreal aflibercept in exudative AMD associated with

RPED when given as primary treatment.

Methods: Seven eyes of 7 patients with exudative AMD associated with RPED were treated with a single dose of intravitreal aflibercept (2 mg) followed by monthly intravitreal bevacizumab (1.25 mg) for 2 months. Diagnosis was confirmed with fundus fluorescein angiography, indocyanine green angiography and optical coherence tomography (OCT) whenever required. Patients were followed at 1 week, 1 month, 2 months, 3 months and 6 months. Best-corrected visual acuity (BCVA), intraocular pressure, clinical examination, OCT and fundus photo were done on every visit.

Results: The mean BCVA before treatment was 6/36. The mean height of RPED was 539.4 µm. Three eyes had associated subretinal hemorrhage. The mean BCVA improved to 6/12 post treatment at 6-month follow-up. The mean height of RPED decreased to 245.6 µm. There was complete resolution of subretinal hemorrhage. All patients showed complete resolution of subretinal fluid.

Conclusions: Primary treatment with intravitreal aflibercept followed by monthly doses of intravitreal bevacizumab is efficacious in the treatment of exudative AMD associated with RPED. However randomized controlled trials with longer follow-up are required to corroborate it.

Evaluation of Choroidal Neovascularization before and after Anti-VEGF Therapy Using OCT Angiography

*First Author: Bhuvan **CHANANA***
*Co-Author(s): Rajvardhan **AZAD**, Sudhank **BHARTI***

Purpose: To analyze choroidal neovascularization (CNV) using optical coherence tomography (OCT) angiography, and to study structural features of CNV sequentially after anti–vascular endothelial growth factor (anti-VEGF) therapy.

Methods: Macular OCT angiography images were acquired using the RTVue XR Avanti with AngioVue. Distinct morphologic patterns and quantifiable features of neovascular membranes were studied at baseline and follow-up.

Results: Twenty-one eyes of 21 patients were included: 15 eyes (71%) were identified as type I CNV, 5 eyes as type 2 CNV, and 1 eye as type 3 CNV. In 17 eyes, a highly organized vascular complex could be identified. A large main central vessel trunk/feeder vessel could be seen in 76% (13 eyes) of these eyes, with vessels radiating in a branching pattern either in all directions from the center of the lesion ("medusa" pattern), or from one side of the lesion ("seafan" pattern). 19% (4 eyes) had an "indistinct" vascular pattern. Of the 15 eyes with follow-up OCT angiography, the lesion area changed marginally, but vessel density decreased after anti-VEGF therapy, indicating a more mature longstanding neovascular complex resistant to anti-VEGF therapy.

Conclusions: OCT angiography is a noninvasive imaging modality which provides a unique opportunity to study the morphology of neovascular membranes and allows precise structural and vascular assessment. We identified a large mature neovascular complex in approximately 81% of eyes. OCT angiography may help to define a correlation between a particular vascular pattern and response to treatment, and may contribute to the development of improved therapies.

Evaluation of Retinal Nerve Fiber Layer Thickness, Ganglion Cell Layer-Inner Plexiform Layer Thickness and Macular Thickness in Patients with Diabetes Mellitus with or without Signs of Early Diabetic Retinopathy

*First Author: Patricia **TACATA***

Purpose: This study aimed to evaluate early structural retinal changes prior to vascular signs in patients diagnosed with diabetes mellitus type 2 with no or minimal retinal findings using spectral-domain optical coherence tomography..

Methods: A prospective, observational, cohort, single-center study was performed in patients with diabetes mellitus type II with no or minimal retinal findings. All patients enrolled

in the study underwent full ophthalmologic examination. Analysis of the retinal nerve fiber layer (RNFL), ganglion cell layer-inner plexiform layer (GCL-IPL) and macular thickness were measured on both eyes using the spectral-domain optical coherence tomography..

Results: A total of 14 patients were included in this study, of whom 8 (57%) had no diabetic retinopathy (DR) and 6 (43%) had mild non-proliferative diabetic retinopathy (NPDR). There was no significant thinning detected at the RNFL, GCL-IPL and macula. However, it is relevant to mention that minute structural changes were observed at the superior, temporal and inferior RNFL quadrants between the no DR and mild NPDR group, however it was not significant. The nasal RNFL quadrant showed no change.

Conclusions: The findings in the current study indicate minute and negligible retinal thickness changes, however it did not have a significant reduction in thickness of GCL-IPL, RNFL and macula in patients with diabetes mellitus with or without signs of early DR. Although larger studies are needed, the theory of diabetes as neurodegenerative disease remains stimulating and possibly links retinal neuropathy to other diabetic neuropathies.

Micropulse Laser Treatment for Atypical Central Serous Chorioretinopathy: A Case Report

*First Author: Hee Weon **KIM***
*Co-Author(s): Si Yeol **KIM**, Oh Woong **KWON**, Hansang **PARK***

Purpose: To report a case of chronic central serous chorioretinopathy (CSCR) with hyporeflective lucency, which was treated with micropulse laser, showing the deterioration of the lesion.

Methods: A 52-year-old man visited our clinic with the chronic CSCR in his left eye, repeating the improvement and deterioration for 1 year. On OCT examination, round hyporeflective lucency with surrounding hyperreflective material was observed, which was correlated with the leakage on FAG. Two intravitreal injections of bevacizumab in the left eye were performed, but the response to the injection was insufficient. Therefore, the micropulse laser was irradiated with a small intensity (350 mW).

Results: Five weeks after laser treatment, aggravation of the lesion with massive subretinal deposits occurred, and his visual acuity decreased. Over the next 5 months, continuous intravitreal injections of bevacizumab resulted in the disappearance of subretinal lesions, but the visual acuity was not restored due to the damage to the outer retinal layer.

Conclusions: Micropulse laser treatment is known to have advantages, such as not causing retinal thermal damage. However, in the case of CSCR with exudative deposits, it may be necessary to pay attention to the treatment decision because it may lead to rapid deterioration of the lesion after treatment.

Multimodal Imaging of Focal Choroidal Excavation Complicated by Choroidal Neovascularization in a Patient

*First Author: Xuhui **YU***

Purpose: To describe a case of focal choroidal excavation (FCE) complicated with 2 type 2 choroidal neovascularization (CNV) in a patient before and after treatment with conbercept.

Methods: Fundus photography, fundus autofluorescence, fluorescein angiography, indocyanine green angiography, spectral-domain optical coherence tomography (SD-OCT) were performed in a 38-year-old man with bilateral FCE. Spectral-domain OCT images were taken before and after 2-monthly intravitreal injections of conbercept.

Results: Multimodal imaging revealed bilateral FCE and CNV. Spectral-domain OCT diagnosed bilateral FCE and type-2 CNV in the right eye, which were observed on fluorescein and on indocyanine green angiography. The patient presented good anatomical and functional response to intravitreal injections of conbercept.

Conclusions: Focal choroidal excavation is a

rare condition detected mainly by SD-OCT, which may be associated with CNV. Multimodal imaging is important for diagnosis and follow-up of such patients, even in the absence of signs of CNV, and anatomical and functional response to anti–vascular endothelial growth factor therapy is encouraging.

Multimodality Imaging in a Series of Torpedo Maculopathy

*First Author: Purva **PATWARI***
*Co-Author(s): Ashish **AHUJA***

Purpose: Torpedo maculopathy is a congenital benign non-progressive, flat, pigmentary lesion seen temporal to the fovea with no gender predilection. We describe a case series with multimodality imaging along with optical coherence tomography (OCT) angiographic features in torpedo maculopathy.

Methods: Three cases are described. Case 1 was a 12-year-old male, with best-corrected visual acuity 20/20. Fundus examination of the LE showed an oval hyperpigmented lesion of 1.5 dd horizontal and 0.5 dd vertical which was temporal to the fovea. Case 2 was a 16-year-old female with hypopigmented torpedo-shaped lesion temporal to the fovea in the left eye. Case 3 was a 33-year-old male with torpedo maculopathy lesion in the right eye.

Results: Several theories have been proposed for the pathogenesis so far, including the developmental theory, which suggested that the fetal retinal pigment epithelial (RPE) bulge corresponds to the site of torpedo maculopathy. The vascular theory explains that there is modification of the sclera to allow the long posterior ciliary nerves and artery to pass an effect on the development of the choroid and RPE, accounting for this torpedo-shaped lesion. The pigment theory suggested lack of melanin or production of an orange pigment that causes abnormal interaction between the RPE and the outer segments.

Conclusions: In our case series, OCT angiography demonstrated absence of capillary in the area of the torpedo maculopathy lesion in the region of the outer retina and was associated with attenuation of the ellipsoid layer and RPE layer on the OCT.

Novel Panoramic OCT Angiography: The Non-Invasive Imaging Tool for Central Serous Chorioretinopathy

*First Author: Rakesh **JUNEJA***
*Co-Author(s): Ahmed **ELTAYIB**, Navneet **MEHROTRA**, Manish **NAGPAL**, Aparajita **RAIHAN**, Shachi **WACHASUNDAR***

Purpose: To describe optical coherence tomography angiography (OCTA) findings in central serous chorioretinopathy (CSCR) by novel panoramic OCTA imaging (P-OCTA) and to compare these findings with fluorescein angiography (FA) and indocyanine green angiography (ICGA) features.

Methods: A total of 18 eyes with CSCR (10 acute and 8 chronic; 10 pre-treatment and 4 post-treatment) were included in this prospective cross-sectional study. The study duration was 6 months. All eyes underwent OCT, FA, ICGA and P-OCTA (covering 12 x 9 mm, 40 x 30–degree field of view centered from fovea). The morphological features were compared between P-OCTA, FA and ICGA to assess the accuracy of P-OCTA in detecting leakage point, lesion area in CSCR non-invasively.

Results: The areas showing abnormalities in P-OCTA were 'congruent' in terms of location and appearance with leaking areas in FA or areas with hyper-permeability in ICGA in all eyes. In P-OCTA, acute cases pre-treatment, the choriocapillaris appeared 'dilated'. Whereas, in chronic cases and in post-treatment cases with focal laser, the choriocapillaris typically appeared 'flat'.

Conclusions: With the advent of imaging superficial choriocapillaris and generating high-resolution images coupled with correlation of anatomical landmarks details, the novel P-OCTA can be an invaluable noninvasive alternative tool to FA and ICGA for the diagnosis of CSCR.

Outcomes of Ranibizumab Biosimilar in a Case Series of CNVM Associated with Parafoveal Telangiectasia Type IIA

*First Author: Ashish **AHUJA***

Purpose: Parafoveal telangiectasia type IIA (PFT IIA) is characterized by abnormal retinal capillaries, graying of parafoveal retina, and right-angled venule configuration. It can be complicated by growth of choroidal neovascular membrane (CNVM), exudation, and hemorrhage. Intravitreal ranibizumab has been used successfully to treat PFT-associated subretinal fluid in the past but we report the use of Razumab (biosimilar ranibizumab) in treating CNVM associated with PFT IIA.

Methods: Three patients were enrolled in the study who were diagnosed to have PFT IIA-associated CNVM with a mean visual acuity of 20/200 at presentation. All patients received 3 injections of Razumab at monthly interval. Patients were followed up for a minimum period of 6 months.

Results: Visual acuity improvement was noted in all patients and the improvement in vision noted was 2 lines at the end of follow-up. Also the OCT showed resolution of subretinal fluid and also there was a decrease in metamorphopsia at the end of the follow-up period.

Conclusions: Razumab is noted to have good efficacy in cases of PFT IIA-associated CNVM and is also lower in cost.

PLANET Study: Treat-and-Extend Intravitreal Aflibercept Use in Patients with Polypoidal Choroidal Vasculopathy at 2 Years

*First Author: Shih Jen **CHEN***
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Purpose: To evaluate the 96-week outcomes in patients with polypoidal choroidal vasculopathy (PCV) utilizing a treat-and-extend (T&E) intravitreal aflibercept (IVT-AFL) regimen in the PLANET study.

Methods: From weeks 52 to 96, patients not requiring rescue photodynamic therapy (PDT) could have their treatment intervals extended by 1- to 2-week increments at each visit at investigator's discretion. Patients were randomized at week 12 to IVT-AFL plus sham PDT (IVT-AFL monotherapy) or IVT-AFL plus rescue PDT.

Results: In IVT-AFL monotherapy and IVT-AFL plus rescue PDT groups, 57.9% and 51.9% reached treatment intervals extending to ≥10 weeks respectively; and 41.2% and 37.0% reached intervals of ≥12 weeks respectively. The mean best-corrected visual acuity (BCVA) changed from baseline to week 96 was +11.1 and +11.0 Early Treatment Diabetic Retinopathy Study (ETDRS) letters (≥10-week group) and +10.5 and +11.5 ETDRS letters (≥12-week group). The mean number of injections from week 52 to 96 was 4.1 and 4.4 (≥10-week group) and 3.9 and 4.2 (≥12-week group), respectively. Over 96 weeks, 15.9% patients in IVT-AFL monotherapy and 18.0% in IVT-AFL plus rescue PDT groups met the rescue criteria and gained +10.7 and +9.1 letters, respectively. The most frequent ocular adverse events were conjunctival hemorrhage (6.4%) in IVT-AFL monotherapy group and dry eye (6.8%) in IVT-AFL plus rescue PDT group.

Conclusions: At 2 years, patients receiving IVT-AFL monotherapy in a T&E regimen had considerable improvements in visual and anatomical outcomes, similar to those with fixed dosing in year 1, but with fewer injections. Furthermore, IVT-AFL was noninferior to IVT-AFL plus rescue PDT in patients with PCV.

Relationship of Retinal Hemorrhage Absorbing Velocity with Long-Term Clinical Aspect in Branch Retinal Vein Occlusion

*First Author: Young Seung **SEO***
*Co-Author(s): Moo-Hwan **CHANG**, Chan Ho **LEE***

Purpose: To announce that the relation of retinal hemorrhage absorbing velocity with long-term clinical aspects associated with branch retinal vein occlusion (BRVO).

Methods: This study compared fundus photos when BRVO was diagnosed in patients with others that was taken after 6 months, and

calculated retinal hemorrhage absorbing velocity (RHAV) by measuring amount of retinal hemorrhage which was measured by using grid that was quantitative measurement unit. We checked relation of best-corrected visual acuity (BCVA) with RHAV, relation of central macular thickness (CMT) with RHAV and relation of other long-term clinical aspects with RHAV.

Results: RHAV in BRVO patients group was measured 16.46 ± 21.48 [∑grid/time (months)]. Improvement of the logarithm of the minimal angle of resolution (logMAR) of BCVA was 0.28 ± 0.28, regression of CMT was 189.55 ± 142.88 μm during total observation and these factors had statistical significance with RHAV ($P < 0.001$, $P < 0.001$). Improvement of BCVA (logMAR) was 0.16 ± 0.23 in slow RHAV group, 0.38 ± 0.28 in fast RHAV group with statistical significance ($P = 0.01$). Regression of CMT was 133.1 ± 142.9 μm in slow RHAV group, 236.6 ± 131.5 μm in fast RHAV group with statistical significance ($P = 0.004$).

Conclusions: The faster the RHAV, the better improvement of BCVA and regression of CMT was seen for long-term observation with statistical significance. By these result, RHAV could be thought as prognostic factor when regular follow-up was performed in BRVO patients.

Response to Photodynamic Therapy in Polypoidal Choroidal Vasculopathy Refractory to Anti-Vascular Endothelial Growth Factor Treatment

*First Author: Na Kyung **RYOO***
*Co-Author(s): Kyu Hyung **PARK**, Se Joon **WOO***

Purpose: To evaluate the response to photodynamic therapy (PDT) in polypoidal choroidal vasculopathy (PCV) patients refractory to anti-vascular endothelial growth factor (VEGF) injections.

Methods: This retrospective, interventional study included 261 PCV patients who underwent 3 or more intravitreal anti-VEGF injections. A total of 66 patients who were non-responsive to the initial anti-VEGF injections underwent PDT with or without anti-VEGF treatments. Anatomic and functional features after PDT were analyzed in these PCV patients who were initially non-responsive to anti-VEGF treatments.

Results: In this study, 25% of the PCV patients were non-responsive to anti-VEGF treatment. After PDT, 66% of the patients' best-corrected visual acuity had improved or maintained at 12 months post-treatment. Central foveal thickness (CFT) significantly decreased from 374 ± 155 μm at baseline to 283 ± 132 μm at 12 months. Anatomically, effective treatment response to PDT — such as a decrease in CFT, subretinal fluid, intraretinal fluid (IRF) and/or pigment epithelial detachments — appeared in 85% of the patients 1 month post-treatment and remained effective in 74% of the eyes up to 1 year. Among the optical coherence tomography features, those with extensive IRF were most resistant to PDT.

Conclusions: In PCV patients refractory to anti-VEGF treatments, PDT may be an effective alternative treatment option.

Risk Factors for Nonarteritic Anterior Ischemic Optic Neuropathy in an Indian Population

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Purpose: Nonarteritic anterior ischemic optic neuropathy (NAION) is the most common cause of sudden optic nerve-related vision loss in patients over the age of 50. This study was done to form a profile of patients with NAION and assess its risk factors.

Methods: This was a retrospective study assessing all NAION patients presenting to a tertiary institute over a 1-year period.

Results: Thirty cases were studied with the following recorded: (1) Profiling on the basis of age-group, eye involved, sudden or gradual onset, duration of symptoms, visual acuity at presentation, color vision, optic disc assessment for crowding and visual field defects. (2) Association with comorbidities like diabetes, hypertension, dyslipidemia, parkinsonism,

other medications. (3) Correlation with blood parameters like ESR, CRP, platelets, and response to treatment.

Conclusions: This study is one of its kind profiling patients with NAION at a tertiary eye care institute and establishing the correlation with various risk factors in the Indian scenario.

Safety and Efficacy of Biosimilar Ranibizumab: Preliminary Data from 300 Eyes

*First Author: Sriram **GOPAL***

Purpose: Diabetic macular edema (DME), neovascular age-related macular degeneration (nAMD) and retinal vein occlusion (RVO) are among the most common ocular diseases causing visual loss. Vascular endothelial growth factor (VEGF) inhibitors have become the standard of care for these diseases. The US FDA-approved drugs are quite expensive and not affordable to all patients in many countries such as India. Only a less expensive off-label alternative (bevacizumab, Avastin) is the most commonly used drug. So biosimilars of US FDA-approved drugs at a much lesser cost may be more appropriate.

Methods: Exclusion criteria included previous vitrectomy, a history of recent cerebrovascular accident or myocardial infarction. The patients were divided into 3 groups according to their etiology — group 1: DME, group 2: nAMD, and group 3: RVO. The primary outcome measures evaluated drug safety which included local toxicity such as anterior segment reaction, progression of cataract, vitritis, retinal hemorrhages, retinal vasculitis, retinal necrosis or detachment or systemic adverse effects (thromboembolic events) reported.

Results: The mean best-corrected visual acuity of all the groups improved by 1.62 lines (Snellen visual acuity chart) from baseline to day 30: group 1: 1.28 lines, group 2: 1.9 lines, and group 3: 1.28 lines. The mean central macular thickness (CMT) improved from 430.13 µm to 320.4 µm in group 1, from 393.51 µm to 271.16 µm in group 2, and from 399.37 µm to 290.16 µm in group 3.

Conclusions: Biosimilar intravitreal ranibizumab matched with the reference product in both safety and efficacy. The initial data show good initial clinical response.

Spironolactone as an Adjuvant Treatment in Neovascular Age-Related Macular Degeneration

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Purpose: To report the use of oral spironolactone (SPRL) treatment in a patient with non-resolving large pigment epithelial detachment (PED) and exudation of neovascular age-related macular degeneration (AMD).

Methods: Case report.

Results: A 63-year-old woman presented with decreased visual acuity in the left eye. Neovascular AMD was notified on ophthalmic examination. After 3 times of intravitreal ranibizumab injection, retinal lesions were completely resolved. However, 1 month later, she had a recurrence of subretinal fluid with large PED, which did not resolve despite consecutive high-dose intravitreal aflibercept injections. After 9 intravitreal injections of aflibercept, the patient was prescribed 25 mg of SPRL daily along with serum potassium monitoring. One month later, the large PED was almost resolved and hard exudation was decreased.

Conclusions: The current case suggests that oral SPRL may serve as an adjuvant treatment in neovascular AMD with PED and hard exudate.

Spontaneously Resolving Optic Disc Pit Maculopathy: To Treat or Observe?

*First Author: King **KURNIA***
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Purpose: To demonstrate the decision making process in managing a case of spontaneously resolving optic disc pit maculopathy.

Methods: A 21-year-old female presented with a complaint of blurry vision in the right eye over the last 6 months. Her best-corrected visual

acuity was 6/30. On funduscopy we observed a pit appearance on the superotemporal optic nerve head and a teardrop-shaped elevation on the macula. Fluorescein angiography showed dye pooling and window defect in the area of macular detachment. Optical coherence tomography of the macula and optic nerve head demonstrated area of macular detachment and retinoschisis, which continued to the optic disc pit sac. She was diagnosed with optic disc pit maculopathy.

Results: The patient was observed monthly for 3 months before deciding to undergo surgery. Optical coherence tomography demonstrated resolution of serous macular detachment, with increased visual acuity to 6/18 at the third follow-up. However because retinoschisis persisted, surgery was planned, consisting of vitrectomy, internal limiting membrane peeling, and internal gas tamponade. The patient eventually declined to undergo surgery. She was followed every 3 months to monitor for disease progression.

Conclusions: The common approach for optic disc pit maculopathy with persistent retinoschisis is surgery. Some cases may resolve spontaneously, as demonstrated in this case. In such cases, the patient should be monitored periodically, and surgery should be considered for persisting or recurring macular detachment and retinoschisis.

Swept-Source OCT Characterized Clinical Features of Central Serous Choroidal Retinopathy

*First Author: Bingjie **QIU***
*Co-Author(s): Kaiyue **WANG**, Xinyuan **ZHANG***

Purpose: To investigate the characteristic of central serous chorioretinopathy (CSC) in affected and uninvolved fellow eyes by Swept-Source optical coherence tomography (SS-OCT) to provide theoretical basis for the pathogenesis of CSC.

Methods: This was a prospective, controlled case study. All patients received best-corrected visual acuity testing, digital photography, fundus fluorescein angiography, indocyanine green angiography and SS-OCT B-scan and OCT angiography examinations. Age- and sex-matched subjects were enrolled as the control. Topcon Advanced Boundary Segmentation (TABS) software was used to measure the subfoveal choroidal thickness (SCT). Age was categorized into 8 groups, each of which was stratified by age per 10 years. SAS 9.4 covariance analysis and logistics regression were used to analyze the test data.

Results: A total of 51 eyes (43 patients) with CSC were enrolled in this study, and 138 eyes (93 patients) were enrolled as the control. In the control group, the SCT (260.6 ± 78.7 μm) is thinner accordingly with the age. The mean age was 47.0 ± 9.5 years (32-69 years) in the CSC patients and 47.8 ± 21.9 years (12-92 years) in the control group. The mean SCT of the CSC group in the affected eyes was 396.2 ± 107.6 μm, which was thicker than the age- and sex-matched normal group (P = 0.002). In the follow eyes of CSC (407.8 ± 113.5 μm), the SCT is much thicker than the control (P = 0.002).

Conclusions: This study shows that the SCT in CSC was thicker in both affected and fellow eyes compared with the control, supporting the findings that CSC belongs to the pachychoroidal spectrum diseases. The contralateral eyes are also needed to be followed up, and SS-OCT is a useful examination for the measurement of SCT and could contribute to further understanding of the disease pathogenesis.

Vascular Endothelial Growth Factor Level in Tears and Serum among Diabetic Patients

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*Co-Author(s): Siti Azrin **AB HAMID**, Wen Jeat **ANG**, Mahaneem **MOHAMED**, Julieana **MUHAMMED***

Purpose: Vascular endothelial growth factor (VEGF) has been postulated to play a role in the pathogenesis and progression of diabetic retinopathy (DR). The aim of this study was to evaluate the level of VEGF in tears and serum amongst patients with type 2 diabetes mellitus (T2DM).

Methods: A cross-sectional study was

conducted between August 2016 and May 2018 involving T2DM patients. Tear and blood samples were collected, and VEGF level in tears and serum were measured by enzyme-linked immunosorbent assay.

Results: A total of 88 T2DM patients [non-proliferative DR (NPDR): 28 patients, proliferative DR (PDR): 30 patients, and non-DR: 30 patients] were included into the study. The mean tears VEGF were significantly higher in NPDR and PDR groups [114.4 (52.50) pg/mL and 150.8 (49.66) pg/mL, respectively] as compared to non-DR group [40.4 (26.46) pg/mL, $P < 0.001$]. There was no significant difference of mean serum VEGF between the 3 groups [NPDR: 299.1 (179.12) pg/mL, PDR: 374.1 (193.82) pg/mL and non-DR: 265.6 (139.80) pg/mL, $P = 0.052$]. There was a significant but weak correlation between serum and tears VEGF ($P = 0.015$, $r = 0.263$).

Conclusions: In this study, VEGF level in tears was significantly related to the severity of DR. There was also a weak but significant correlation between serum and tears VEGF among T2DM patients.

Vitreoretinal Surgery for Late Complications of Branch Retinal Vein Occlusion

*First Author: Faika **DEDDY***
*Co-Author(s): Ramzi **AMIN***

Purpose: To report the visual outcome of vitreoretinal surgery for late complications of branch retinal vein occlusion (BRVO).

Methods: We report on a 59-year-old woman who presented with vitreous hemorrhage (VH) secondary to BRVO with neovascularization elsewhere. Once the blood clears after vitrectomy, sectoral photocoagulation is applied to the areas of neovascularization. Visual outcome was measured 7 days after surgery.

Results: Vitrectomy involves removal of VH and release of the hyaloid from fronds of retinal neovascularization ingrowth. The goal of photocoagulation was to destroy ischemic retina and increase oxygen tension in the eye. Visual acuity was improved from hand movement to 0.3 logMAR.

Conclusions: Neovascularization in BRVO usually develops 6 to 12 months after onset of the disease, and VH 2-3 years later. Vitreous hemorrhage is the most common vision-threatening complications of retinal disease. Vitrectomy is indicated when VH fails to resolve spontaneously and laser treatment is considered for regression of the neovascularization. Vitrectomy combined with laser photocoagulation is safe and effective for intravascular reperfusion and had significantly better visual acuity.

Would I be Able to See my Child? Bilateral Exudative Retinal Detachment in Impending Eclampsia

*First Author: Dian **ABU TALIB***
*Co-Author(s): Jemaima **CHE HAMZAH**, Norshamsiah **MD DIN**, Ainal **NAFFI**, Rona Asnida **NASARUDDIN***

Purpose: To report an uncommon case of bilateral exudative retinal detachment (RD) in impending eclampsia.

Methods: Case report.

Results: Exudative RD is an uncommon complication of pre-eclampsia, which has only been reported in 1-2% of pre-eclampsia cases. We report a case of a 36-year-old gravida 3 para 2 woman with essential hypertension diagnosed at 11th week of period of amenorrhea (POA) during antenatal check-up. At 31st week POA she was started on methyldopa to optimize her blood pressure (BP). She was admitted at 34th week POA for impending eclampsia, where her BP was 170/110 mm Hg and urinalysis showed proteinuria. She experienced headache and generalized blurring of vision bilaterally, but no photopsia, floaters or visual field defect. Biochemistry markers did not suggest HELLP syndrome. She was given intravenous magnesium sulphate and labetalol for impending eclampsia and underwent an emergency caesarean section on the same day. Postnatally, her BP was better controlled but her visual acuity (VA) worsened with OD = hand movement and OS = counting finger at 1 feet. Relative afferent pupillary defect (RAPD) was absent. Anterior segment examination was normal. Fundus examination revealed bilateral

bullous exudative RD inferiorly involving macula with widespread choroidopathy. Shifting fluid test was positive, otherwise there was no evidence of rhegmatogenous RD. With medical optimization of BP, her VA gradually improved and serial fundus examination showed resorption of subretinal fluid.

Conclusions: Most exudative RD secondary to hypertensive retinopathy resolves spontaneously after a few weeks and vision prognosis is good unless in cases of severe pre-eclampsia causing irreversible ischemia of RPE.

Retina (Surgical)

A Case of Bilateral Giant Retinal Tear

*First Author: Lanin **CHEN***
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Purpose: To report a case of spontaneous bilateral giant retinal tear.

Methods: We report a case of a 57-year-old man who presented to us with complaints of black shadow in the nasal field in both eyes for the last 5 months. On examination of the posterior segment, he has giant retinal tears in both eyes with retinal detachment in the right eye.

Results: The patient underwent pars plana vitrectomy with meticulous base dissection, excision of the anterior flaps and silicone oil injection in both eyes, with the right eye followed by the left eye. Both eyes recovered with good vision and maintained 6/6 vision.

Conclusions: Our case highlights the possibility of bilateral spontaneous giant retinal tears in emmetropic patients without any systemic or ocular predisposing conditions. This is the only case reported where the giant retinal tear did not have detachment involving macula.

A Case of Milky Opacification of the Capsular Bag: Secondary Cataract or Infection in Disguise?

*First Author: Annuar **AZMI***
*Co-Author(s): Mae Lynn **BASTION**, Jemaima **CHE HAMZAH**, Rona Asnida **NASARUDDIN***

Purpose: To report the result of pars plana posterior capsulotomy in dealing with late-onset milky emulsion posterior to the implanted intraocular lens.

Methods: Retrospective case report.

Results: An 80-year-old woman with bilateral pseudophakia presented in January 2018 with a history of blurring of vision in the left eye for 6 months and was referred to vitreo-retinal team for further evaluation with provisional diagnosis of intraocular lens opacification. Examination showed left-eye capsular bag milky fluid emulsion with remnant of cortical matter or crystals were seen inferiorly posterior to the intraocular lens and anterior chamber cells of 1+. Left-eye phacoemulsification with intraocular lens implantation was done in 2012. Prior to this symptom, her best-corrected visual acuity (BCVA) was 6/9. Left-eye best-corrected vision was 6/60 prior to the operation. Following informed consent, uneventful pars plana capsulotomy was done with the vitreous cutter followed by aspiration of the milky fluid. Vitreous samplings followed by broad-spectrum intravitreal antibiotics were given in case of infection. Examination at 1 week after surgery showed left-eye BCVA returned to 6/9. Vitreous sampling for culture and sensitivity was negative.

Conclusions: Postoperative capsular opacification is a common physiological complication following cataract surgery. However late-onset emulsification of retained cortical matter sequestered in the bag is rare. A pars plana capsulotomy with vitrectomy and aspiration of fluid is an effective and safe method of removing this material without risk of chronic vitreous inflammation or infection that may occur with laser capsulotomy.

Clinical Benefits of 27-Gauge High-Speed Dual-Pneumatic Vitrectomy: A Prospective, Multicenter Randomized Controlled Trial

First Author: Dina Joy ***ABULON***
Co-Author(s): Maria ***BERROCAL****, Steve* ***CHARLES****, Pravin* ***DUGEL****, Allen* ***HO****, Chris* ***RIEMANN***

Purpose: To compare 27- and 23-Ga vitrectomy outcomes and increase surgeons' understanding of the differences between surgical outcomes.

Methods: This was a multicenter, prospective, randomized, subject-masked study. Subjects requiring vitrectomy (n = 136) were randomized to either 27- or 23-Ga vitrectomy groups. Comparisons between the groups included: mean change between immediate postoperative and immediate preoperative intraocular pressure (IOP) on treatment day, mean conjunctival edema grade on postoperative week 1, and mean pain grade on postoperative day 1. Vitrectomy outcomes related to wound closure were also assessed.

Results: The 27-Ga group demonstrated a significantly smaller mean change in IOP on treatment day (P = 0.0131) compared to the 23-Ga group. A significantly lower mean conjunctival edema grade was observed with the 27-Ga group compared to 23-Ga group (P = 0.0044). Postoperative pain ratings did not significantly differ between groups at day 1 (P = 0.8691). The 27-Ga group had a lower number of leaking sclerotomies on postoperative day 1 compared to the 23-Ga group. The 27-Ga group did not require any sclerotomy sutures, while 4 subjects in the 23-Ga group required all 3 sclerotomies to be sutured.

Conclusions: A significantly smaller mean change in immediate IOP and significantly less conjunctival edema was observed with 27-Ga high-speed, dual-pneumatic vitrectomy instrumentation compared to the 23-Ga group. There was no statistically significant difference in the mean pain grade between groups. Less wound leakage and a lower suture rate was observed with the 27-Ga group.

Comparison of Spectral-Domain Optical Coherence Tomography Findings between Eyes Undergoing Pars Plana Vitrectomy with Gas Versus Vitrectomy with Silicone Oil Tamponade for Primary Non-Complex Rhegmatogenous Retinal Detachment

First Author: Mohit ***DOGRA***
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Purpose: To compare the foveal anatomy between eyes receiving gas or silicone oil tamponade along with pars plana vitrectomy (PPV) for non-complex retinal detachment repair on spectral-domain optical coherence tomography (SD-OCT).

Methods: This was a retrospective interventional case series. High-definition SD-OCT was performed in these patients at 1 and 3 months. Patients with a history of trauma, previous retinal surgery/laser, giant retinal tears, choroidal detachment, choroidal colobomas, proliferative vitreoretinopathy greater than C2, follow-up of less than 3 months were excluded.

Results: A total of 40 eyes of 40 patients (14 females and 26 males) were included. Their mean age was 54.69 years. Of the patients, 24 underwent PPV with gas and 16 underwent PPV with silicone oil. Of the 16 who had PPV with silicone oil, 8 eyes (50%) had foveal atrophy on SD-OCT at 3 months, 2 eyes (12.5%) had an epiretinal membrane and the remaining 6 eyes (37.5%) had normal foveal contour. Of the 24 patients who had PPV with gas, only 2 eyes (8.3%) had foveal atrophy on SD-OCT, 21 eyes (87.5%) had normal foveal contour and 1 eye (4.2%) had an epiretinal membrane with lamellar macular hole.

Conclusions: When used as a tamponade agent, silicone oil causes greater damage to the photoreceptors, foveal atrophy and poorer recovery of vision as compared to gas. Its use should be reserved for repair of complex retinal detachments.

Double Decentered Lens in an Eye with Marfan Syndrome

*First Author: Mingshan **HE***
*Co-Author(s): Wei-Shan **TSAI***

Purpose: To present a decision making of intervention in a patient with Marfan syndrome with subluxated lens and anterior chamber intraocular lens (ACIOL).

Methods: Case report.

Results: A 43-year-old women with Marfan syndrome presented with a 2-year history of right eye monocular diplopia after receiving bilateral ACIOL implantation. Her visual acuity was 20/100 OD and 20/60 OS. Examination showed bilateral native lens subluxation and decentering of the right ACIOL. A dense cataract was also noted in the left eye. We corrected her visual problems with pars plana lensectomy and replacing the ACIOL with an artisan iris-claw device, specifically used to overcome the unusual anterior chamber anatomy. Postoperatively, her right eye visual acuity improved to 20/30 OD. At 3-month follow-up, the patient noted progressive visual blurring in her left eye (VA 20/100) due to centripetal movement of the cataract obscuring the visual axis. A similar procedure was performed in the left eye, again using an Artisan iris-claw device. Her visual acuity improved to 20/25 bilaterally at 6 months.

Conclusions: In Marfan syndrome, ectopia lentis was found to be the most common ocular complications. In addition, typical ACIOL implants in a patient with Marfan syndrome are also at a greater risk of decentering due to the unusually deep and large anterior chamber anatomy. Diplopia occurs when the light was bisected simultaneously by the subluxed native lens and decentered ACIOL. Therefore ACIOL implantation alone without removal of the subluxed native lens may not be sufficient for treatment of Marfan patients.

Fluid Flow Performance of 25-Gauge Dual-Pneumatic 10,000 cpm Cutters

*First Author: Ishaq **MOHAMEDY***
*Co-Author(s): Dina Joy **ABULON***

Purpose: To measure fluid flow of 25-gauge (Ga) dual-pneumatic 10,000 cuts per minute (cpm) cutters and compare flow performance to existing 7500 cpm dual-pneumatic cutters.

Methods: A precision balance (Mettler Toledo, Greifensee, Switzerland) reported the mass of Balanced Salt Solution (BSS®) in an open beaker. During 25+® Ga Advanced UltraVit® and UltraVit® vitrectomy aspiration of BSS®, a LabVIEW VI program calculated the volumetric flow rate using the change in weight, duration of aspiration, and BSS density. Testing was evaluated at cut rates of 500-10,000 cpm and Core, 50/50, and Shave duty cycles. For each test, flow was measured 3 times and averaged. A Welch's statistical T-Test compared Advanced UltraVit® BSS® flow at maximum cut rate (10,000 cpm) to previous generation UltraVit® BSS flow at maximum cut rate (7500 cpm). A statistical significance level of $P < 0.05$ was used.

Results: Fluid flow of the 10,000 cpm probes was highest in the Core mode and ranged 9.33-13.30 cc/min. Fluid flow was lowest in the Shave duty cycle and ranged 5.08-9.54 cc/min. In the 50% duty cycle mode, fluid flow was 8.33-9.58 cc/min. Statistical comparisons at maximum cut rate demonstrated that 10,000 cpm probes generated 19-23% higher fluid flow than previous generation 7500 cpm probes in the Core, 50%, and Shave duty cycle modes (all $P < 0.05$).

Conclusions: At a maximum cut rate of 10,000 cpm, 25-Ga dual-pneumatic probes generated significantly greater fluid flow than previous generation probes at maximum cut rate (7500 cpm). When operating at 10,000 cpm, dual-pneumatic probes offer more effective fluid aspiration than previous generation probes and may optimize surgical efficiency.

ILM Free-Flap Transposition with Tuck Technique in Chronic Full-Thickness Macula Holes after Previously Failed Vitrectomy

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*Co-Author(s): Wai-Ching **LAM**, Kwan Ho, Anthony **MAK***

Purpose: To review the effect of internal limiting membrane (ILM) free-flap transposition with tuck technique in chronic full-thickness macula holes after previously failed vitrectomy.

Methods: Consecutive patients with full-thickness macular hole (MH) for at least 1 year and at least 1 previous vitrectomy with ILM peeling were recruited. A 25-gauge vitrectomy with ILM free-flap transposition was done without secondary assistance of PFCL, viscoelastic or autologous blood. The ILM was manually tucked into the MH and a gas fluid exchange was performed with 20% SF6 then postured prone for 2 weeks. Preoperative visual acuity (VA), MH duration, previous surgeries, optical coherence tomography (OCT) appearance and hole size were recorded. Postoperative 3 months' VA, hole closure rate, and OCT appearance were also documented.

Results: A total of 6 consecutive patients were included from May 2016 to February 2018: 66% were in the right eye, 66% were female, and the mean age was 65 years. Transposition surgery was performed with a mean of 953 days after diagnosis of MH. The mean size of MH was 0.838 mm (SD 0.5), preoperative VA was logMAR 1.09 (SD 0.15), postoperative VA was logMAR 0.76 (SD 0.29) with 1.4 lines gained and a significant improvement of logMAR 0.33 (P = 0.0138). Hole closure was seen in 5 (83.3%) out of 6 eyes. The OCT with failed closure showed ILM flap within a flat hole, however no neurosensory layers were seen and the duration from diagnosis to surgery was 2349 days.

Conclusions: Free-flap ILM transposition tuck is an effective technique in treating chronic MH with previously failed traditional MH surgeries.

Incidence and Cause of Iatrogenic Retinal Breaks 20G Versus 25G Vitrectomy in the Idiopathic Macular Hole

*First Author: Fumihiko **YAGI***
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Purpose: To evaluate the incidence and cause of iatrogenic retinal breaks (RBs) and postoperative retinal detachment (RD) in 20-gauge (20G) and 25-gauge (25G) vitrectomy in cases of the idiopathic macular hole.

Methods: This was a retrospective nonrandomized consecutive observational case study of 185 vitrectomy procedures (130 eyes of 129 patients: 20G and 55 eyes of 54 patients: 25G). We analyzed the relationship between the incidence of RBs and postoperative RD and the frequency of posterior vitreous detachment (PVD) and lattice degeneration (LD).

Results: The incidence of RBs related to the operation was 36.9% (48/130) in the 20G group and 12.7% (7/55) in the 25G group. The frequency of PVD and LD did not differ between the 2 groups; however, in the 20G group, the incidence of RBs related to the operation was high in the eyes without LD (29.7%: 20G and 7.8%: 25G). The frequency of RBs did not differ between the 2 groups in the eye with LD (78.9%: 20G and 75.0%: 25G) and 4 cases of postoperative RD were reported in the both groups (3.1%: 20G and 7.3%: 25G).

Conclusions: In the 20G group, the incidence of RBs related to the operation was higher than that in the 25G group, especially in the eyes without LD.

Long-Term Financial, Anatomic and Visual Outcomes for Traditional and Nontraditional Primary Pneumatic Retinopexy for Rhegmatogenous Retinal Detachment

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Purpose: To determine factors predictive of financial, anatomic and visual outcomes after traditional primary pneumatic retinopexy (TPR) and nontraditional primary pneumatic

retinopexy (NTPR) for rhegmatogenous retinal detachment (RD).

Methods: A total of 178 eyes (156 patients) with pneumatic retinopexy (PR)–repaired primary RD by a single surgeon from January 2001 to December 2013 and followed for 1 year or more were retrospectively studied. NTPR was defined as: multiple tears >1 clock hour apart, tears in flat or detached retina in the inferior 4 clock hours, and/or vitreous hemorrhage. Cost analysis including a *t*-test comparison of subgroups based on CMS reimbursement CPT codes and potential cost savings comparing PR to scleral buckle (SB) and vitrectomy was performed. Characteristics associated with best-corrected visual acuity (BCVA) and anatomic outcomes were evaluated by Fisher exact test, *t*-test and regression analyses.

Results: Of 178 eyes, 131 (73.6%, 93 male), mean age 55.7 (range, 14-87) years, were successfully treated at 1 year (POY1): 72.8% (75/103) in TPR and 74.6% (56/75) in NTPR. The mean follow-up was 57.5 months (range, 12-307 months). Macula-off detachment (-0.44 logMAR, $P < 0.001$) and clock hours of RD (-0.84, $P < 0.001$) were associated with improved POY1 BCVA, whereas pseudophakia (0.26, $P = 0.002$) and inferior retinal tears (0.62, $P = 0.009$) were associated with worsening BCVA. Pseudophakic eyes (coefficient: -0.15, $P = 0.03$), inferior quadrant RD (-0.27, $P < 0.001$) and proliferative vitreoretinopathy (-0.68, $P < 0.001$) were associated with POY1 anatomic failure. The average cost for all surgeries performed was $1248.37 ± 882.11 (for TPR) and $1471.91 ± 942.84 (NTPR), $P = 0.10$. Pneumatic retinopexy had a potential cost savings of 62% and 60.8% when compared to SB and vitrectomy, respectively.

Conclusions: Pneumatic retinopexy results in successful anatomic and visual outcomes in both TPR and NTPR repair of primary RD. Pseudophakia is associated with worse visual outcomes and less anatomic success. Initial PR demonstrates significant potential cost savings.

Macular Hole Formation and Spontaneous Closure after Scleral Fixation Surgery

*First Author: Minkyu **SHIN***
*Co-Author(s): Jiwon **JUNG**, Sekwang **PARK***

Purpose: To report a case of macular hole formation and spontaneous closure after scleral fixation surgery.

Methods: An 81-year-old man suffered from decreased vision of the left eye. His intraocular lens (IOL) was dislocated to the inferonasal side of the pupil into the vitreous. The patient used 2 anti-glaucoma eye drops. He underwent IOL removal, pars plana vitrectomy, and IOL scleral fixation surgery without internal limiting membrane (ILM) peeling.

Results: Macular hole was developed 3 days after operation. During the surgery, posterior vitreous detachment was developed spontaneously but ILM peeling was not done intentionally. Macular hole was small and there was no cystoid edema at the margin of macular hole. Two weeks later the macular hole was closed spontaneously.

Conclusions: There were some cases of delayed closure of macular hole after macular hole surgery with ILM peeling. Spontaneous closure was observed after decrease of edema at the margin of macular hole with various ocular conditions. But in this case, there was no intentional ILM peeling or cystoid edema. This was the first case of macular hole formation and spontaneous closure after scleral fixation surgery.

Macular Internal Limiting Membrane Imbrication Technique for Foveal Detachment in Myopic Traction Maculopathy: A Case Report

*First Author: Joon Hyung **YEO***
*Co-Author(s): June-Gone **KIM***

Purpose: The purpose of this study was to introduce a new technique of internal limiting membrane (ILM) peeling for foveal detachment in myopic traction maculopathy (MTM), which we called macular ILM imbrication technique.

Methods: The clinical course of a case was

retrospectively evaluated according to a chart review.

Results: A 62-year-old woman with pathologic myopia was referred to our clinic because of blurring of vision and metamorphopsia of the left eye that had persisted for 2 months. On examination, her decimal best-corrected visual acuity (BCVA) was 0.3 in the left eye and counting fingers at 20 cm in the right eye. Slit-lamp examination of the anterior segment was unremarkable. Fundus examination demonstrated tessellated fundus and posterior staphyloma in both eyes and chorioretinal atrophy in the right eye. The spectral domain optical coherence tomography revealed a foveal detachment with retinoschisis and without detectable full-thickness macular hole (FTMH). Surgery with a macular ILM imbrication technique was performed. One month after surgery, the foveal detachment was flattened, although still present, and the retinoschisis was decreased. During the next 3 months, BCVA improved to 0.4 and the foveal detachment, retinoschisis were further reduced and a postoperative FTMH was not developed until her last follow-up.

Conclusions: Our case suggests that pars plana vitrectomy with macular ILM imbrication technique may be successful in the management for foveal detachment in MTM. Longer-term follow-up study with large population will be necessary to clarify the usefulness and safety of macular ILM imbrication technique.

New Instrument of Lens Holder in PPV

*First Author: Kim **CHANG RYONG***

Purpose: To report a new lens holder that fixes a lens for vitrectomy.

Methods: We designed the lens holder using a 3D printer. The lens holder widened the contact with the eyeball by slicing the face contacting the eyeball. Multiple spikes were made on the slope of the lens holder to prevent it from slipping.

Results: Lens movement was less when using this lens holder than using a conventional lens ring for macular surgery.

Conclusions: The new lens holder is useful when performing macular surgery.

Nightmare of Every Vitreoretinal Surgeon: Posterior Proliferative Vitreoretinopathy Following Repair of Traumatic Retinal Detachment in a Child

*First Author: Cheng **TECK CHEE***
*Co-Author(s): Mae Lynn **BASTION**, Jemaima **CHE HAMZAH***

Purpose: To discuss the management of proliferative vitreoretinopathy (PVR) in a child complicated by subretinal heavy liquid migration intraoperatively.

Methods: A retrospective case report.

Results: An 8-year-old boy was the unfortunate victim of blunt trauma to his left eye from a bicycle handle while strolling in a park. He sustained traumatic mydriasis, traumatic cataract with lens dislocation, hyphema and sclopetaria with rhegmatogenous retinal detachment. This was repaired with lens aspiration, scleral tunnel fixated intraocular lens, 360-degree scleral buckle and vitrectomy with silicone oil injection. One month later he was noted to have posterior PVR with fibrous proliferation causing traction detachment on the retina. Revision vitrectomy was performed to release the posterior traction, remove remaining membranes and flatten the retina. Intraoperatively he was also noted to have anterior proliferation and annular subretinal band. Heavy liquid migrating subretinally during the operation was an added challenge. This was detected when intraoperative laser photocoagulation failed. A broad retinectomy was done in order to release the subretinal fibrosis and to remove the subretinal heavy liquid followed by endolaser and then silicone oil injection. Postoperatively, his posterior pole appeared flat with resolved retinal starfold.

Conclusions: Posterior PVR complicating repaired pediatric traumatic retinal detachment requires removal of posterior membranes. Retinectomy is helpful in removing subretinal

heavy liquid which has migrated during surgery.

Outcome of Primary Rhegmatogenous Retinal Detachment Surgery in a Tertiary Eye Referral Center in the Philippines from 2016 to 2017

*First Author: Aimee **NG TSAI-CHUA***

Purpose: This study was designed to report the outcome of primary rhegmatogenous retinal detachment (RRD) surgery in a tertiary eye referral center in the Philippines. This paper describes the clinical profile of patients operated for RRD and determines the anatomical and functional outcomes of primary RRD surgery.

Methods: This was a retrospective audit involving patients seen and managed for primary RRD in a single center from 2016-2017. Patients' demographics, anatomical and functional outcomes with subgroup analysis were performed.

Results: A total of 58 cases were included with a mean age of 48.36 ± 15.64 years. Primary and final anatomical success rates were 89.65% and 93.1% respectively. Mean visual acuity improved from 1.76 to 0.92 logMAR at least 3 months after the surgery. Presence of complications significantly affected the anatomical and functional success. There was also significant difference in the final visual acuity in relation to baseline macular status, duration of retinal detachment, and the type of procedure performed.

Conclusions: Overall, the anatomical and functional success rates of this audit were comparable to the results of the international studies. Early consultation and timely repair of RRD might yield better outcomes.

Outcomes of Retinal Detachment Surgery in Eyes with Chorioretinal Coloboma

*First Author: Nazmun **NAHAR***
*Co-Author(s): Mohammad **MALEK***

Purpose: To study the anatomical and functional outcomes of surgery for retinal detachment associated with chorioretinal colobomas.

Methods: This was a retrospective study. We evaluated medical records of 31 patients who had undergone surgery for retinal detachment associated with chorioretinal colobomas between January 2013 and July 2017. All surgeries were done in Ispahani Islamia Eye Institute and Hospital, a tertiary eye care center in Bangladesh by different surgeons. All eyes underwent pars plana vitrectomy with internal tamponade using silicone oil. The main outcome measures were retinal reattachment and visual recovery.

Results: The mean age of the patients was 27.32 years. After a mean follow-up of 17.4 months, 90.4% of eyes had attached retina. The mean preoperative visual acuity was 2.54 ± 0.58 (range, 1.30-3) logMAR which improved to 1.32 ± 0.52 (range, 0.5-4) logMAR postoperatively. In 51.61% of cases, lensectomy was done during vitrectomy. Raised intraocular pressure occurred in 29.03% of vitrectomized eyes and was controlled with medications in all cases.

Conclusions: Retinal detachment secondary to coloboma of choroid is treated best by pars plana vitrectomy along with silicone oil tamponade. The anatomical success was highly satisfactory and there was visual improvement after surgery. Final functional outcomes reflected the complexity of the condition and amblyopia.

Pneumatic Displacement of Non-Traumatic Acute Submacular Hemorrhage: A Case Series and Systematic Review of Treatment Options

*First Author: Jennifer Joy **SANTOS-RAYOS***

Purpose: To evaluate the immediate outcomes of pneumatic displacement (PD) of acute submacular hemorrhage (SMH) due to neovascular age-related macular degeneration, polypoidal choroidal vasculopathy, and retinal artery macroaneurysm using pure perfluoropropane gas (C3F8), and other adjunct treatments using recombinant tissue plasminogen activator (rtPA) and intravitreal anti-vascular endothelial growth factor (anti-

VEGF).

Methods: This was a case series of 21 eyes from 21 patients in a multispecialty referral ophthalmology center seen from 2015 to 2017. Two groups were identified: group 1 (PD plus anti-VEGF injection), and group 2 (PD plus rtPA and anti-VEGF). Patients' data for up to 3 months were recorded. A systematic review of the literature on the current management of SMH was also performed.

Results: Complete displacement was achieved in all patients from both groups at 3 months. For group 1, the mean best-corrected visual acuity (BCVA) at baseline of 1.92 logMAR improved to mean BCVA of 0.2 logMAR. For group 2, the mean BCVA at baseline of 1.70 logMAR improved to 0.4 logMAR. However, 25% of patients in group 2 retained vision worse than logMAR 0.8 due to vitreous hemorrhage and recurrence of SMH. For group 1, 100% had improved visual status. For group 2, the visual status were improved in 75% and stable in 25%.

Conclusions: PD of acute massive SMH utilizing simultaneous intravitreal injection of C3F8 and anti-VEGF appears to be a safe and effective technique to provide earliest visual recovery. Sustaining this visual improvement depended on continuous monthly injection of anti-VEGF. Use of rtPA may contribute to post-injection vitreous hemorrhage.

Predictive Factors for Penetrating Eye Injuries Caused by Intraocular Foreign Bodies

*First Author: Jane **FOO***
*Co-Author(s): Jay **CHANDRA**, Adrian **FUNG***

Purpose: To describe the factors predicting the outcome of patients with intraocular foreign bodies (IOFB) from a tertiary referral center in Australia from 2007 to 2017.

Methods: Retrospective case series.

Results: A total of 18 patients presented with IOFB. Most patients were male (16/18, 89%). The mean age was 46 years (range, 20-61 years). Thirteen (72%) cases were work-related injuries, of which only 2 used protective eyewear. The mechanism of injuries was related to hammering, grinding and wiring. The majority (10/18, 56%) of IOFB were metallic, whereas the rest varied from rocks to eyelashes. All had entrance sites via the cornea except one was transscleral entry, lens capsule was breached in 8 (44%) patients, and one developed endophthalmitis. There were 4 (22%) cases of IOFB in the posterior segment. The mean duration from trauma to IOFB removal was 2.7 days (range, 1-18 days). The mean best-corrected visual acuity (BCVA) on presentation was logMAR +1.5 (range, 0-4), whereas the mean BCVA on final follow-up was logMAR +0.9 (range, 0-4). Of the 4 cases which required vitrectomy for IOFB removal, 2 had retinal complications requiring further surgery. The patient with endophthalmitis had a foreign body in the lens, which was removed 4 days after injury.

Conclusions: In our study, poor visual outcome (BCVA worse than 6/60) was associated with delayed IOFB removal (>24 hours), poor presenting visual acuity, lens injury and posterior segment IOFB.

Retinal Detachment in a Case with Associated Maculopathy with Unilateral Morning Glory Optic Syndrome and Peripapillary Choroidal Cavitation

*First Author: Xuhui **YU***

Purpose: Morning glory syndrome (MGS) and peripapillary choroidal cavitation (PCC) are all belonging to congenital cavitary optic disc anomalies (CODA). Some cases of congenital CODA can develop associated maculopathy or even retinal detachment.

Methods: We present a case of retinal detachment in which associated maculopathy with MGS accompanied PCC was diagnosed and treated surgically.

Results: A 43-year-old man with features of retinal detachment presented to the Clinic of Ophthalmology. The fundus examination revealed findings compatible with associated maculopathy unilateral MGS and PCC in the right eye. The patient underwent pars plana

vitrectomy combined with juxtapapillary laser photocoagulation and perfluoropropane tamponade. Retinal reattachment was acquired and BCVA was improved.

Conclusions: To our knowledge, this is the first case of retinal detachment in associated maculopathy with MGS and PCC. Pars plana vitrectomy combined with juxtapapillary laser photocoagulation and perfluoropropane tamponade is effective in the treatment of this case.

Traumatic Retinal Detachment — Combined Retinal Dialysis and Giant Retinal Tear: A Case Report

*First Author: Po-Chen **TSENG***

Purpose: To present a rare and interesting case with combined retinal dialysis and giant retinal tear (GRT) secondary to blunt trauma in a 25-year-old, high myopic male.

Methods: A 25-year-old, high myopic (-11.75D) male was struck in the left eye while playing basketball. At presentation, his best-corrected visual acuity (BCVA) was 20/20 (OD), 20/25 (OS) with normal intraocular pressure. Dilated fundus examination revealed draped vitreous opacity with clumps of pigment in upper quadrant without obvious retinal break in the left eye. Five days later, during outpatient department follow-up, through dilated fundus examination with scleral indentation, superotemporal retinal dialysis with vitreous base avulsion and localized retinal detachment without macula involvement (OS) were diagnosed. The patient was thus scheduled for scleral buckling. Next day on admission, indirect ophthalmoscopy revealed a GRT from 10 to 2 o'clock with bullous retinal detachment (OS). The surgical plan was then changed to encircling scleral buckling with pars plana vitrectomy and gas tamponade. During operation, we observed a GRT with avulsion of the pars plana epithelium from the vitreous base, which was seen as an irregular ribbon within the vitreous cavity. Perfluorocarbon liquid was used intraoperatively to prevent slippage of the GRT flap.

Results: The visual acuity in his left eye returned to 20/20 after cataract extraction 6 months later and the retina remained attached with break in bed 1 year after surgery.

Conclusions: This case illustrates the importance of careful preoperative assessment and the recognition of these conditions to provide the patient with optimal management.

Vitrectomy for Macular Hemorrhage Secondary to Acute Lymphoblastic Leukemia

*First Author: Jian-Sheng **WU***
*Co-Author(s): San-Ni **CHEN***

Purpose: To report on a patient of macular submembrane hemorrhage secondary to acute lymphoblastic leukemia which was treated successfully with pars plana vitrectomy and membrane peeling.

Methods: Case report.

Results: A previously healthy 18-year-old female patient presented with a sudden onset of blurred vision OS. The initial visual acuity were 20/20 OD and 20/400 OS. Ocular examination revealed retinal hemorrhage, mild tortuous retinal vessels, mild blurred disc margin OU, and macular submembrane hemorrhage OS. Systemic examination revealed pancytopenia and acute lymphoblastic leukemia was diagnosed. Pars plana vitrectomy with internal limiting membrane peeling OS was performed. Mild macular edema was noted and improved after sub-tenon triamcinolone acetonide injection. The visual acuity was improved to 20/20 OS 2 weeks later. The retinal hemorrhage, tortuous retinal vessels and papilledema improved after induction chemotherapy. Unfortunately she died from sepsis during chemotherapy 1 month later.

Conclusions: Pars plana vitrectomy appears to be safe and effective in treating massive macular submembrane hemorrhage caused by acute lymphoblastic leukemia.

Vitrectomy with Silicone Oil Tamponade Without ILM Peeling for Myopic Foveoschisis

*First Author: Yi-Ju **LIN***

Purpose: To report the clinical and anatomical

outcomes of pars plana vitrectomy and silicone oil (SO) tamponade without internal limiting membrane (ILM) in symptomatic patients caused by myopic foveoschisis.

Methods: Patients with visual loss or central metamorphopsia caused by myopic foveoschisis were included. All patients were older than 50 years old, with original myopia of more than −6.0 D and axial length (AL) more than 27 mm. All patients underwent standard 25G 3-port pars plana vitrectomy (PPV), ILM scrapping without peeling. Fluid/air exchange was then performed followed by injection SO. Patients were encouraged to maintain sitting posture postoperatively. Outcome measurements were based on BCVA, CRT (central retinal thickness, the height of foveal detachment and resolution in myopic foveoschisis as demonstrated by OCT) and SE change (D).

Results: Foveoschisis resolution after SO tamponade. We thought SO have long-term remolding force than gas, and the patient had better compliance in a sitting position than a prone position after gas tamponade. Foveoschisis sealed over time and without macular hole formation under SO.

Conclusions: 25G PPV with SO tamponade without ILM peeling was a relative safe and fast surgical intervention in treating foveoschisis. It provides a long-term healing procedure to retina adhesion, and can also decrease high myopic degree.

Vitreous Traction Comparison of 25-Gauge High-Speed Dual-Pneumatic Vitrectomy Probes: 20,000 cpm Versus 10,000 cpm

*First Author: Helaine **GARIEPY***
*Co-Author(s): Dina Joy **ABULON***

Purpose: To quantify and compare vitreous traction forces between maximum cut rates of high-speed dual-pneumatic vitrectomy probes (20,000 cuts per minute (cpm) and maximum cut rates of previous generation vitrectomy probes (10,000 cpm) in an in-situ porcine eye model.

Methods: Traction measurements were performed in an ex-situ test set up using vitreous harvested from fresh porcine eyes. HyperVit® 25+® gauge (Ga) and Advanced UltraVit® vitrectomy probes were tested in 30 porcine eyes for each group. For each group, peak traction forces were averaged from each test for all 3 duty cycle modes on the CONSTELLATION® Vision System (ie, Core, 50/50, Shave) and the vacuum was set to 380 mm Hg. Moreover, vitreous flow tests was used to adjust the vacuum settings to achieve vitreous flow rates similar to previous generation probes at common intraoperative settings (650 mm Hg vacuum and maximum cut rate of 100,000 cpm). Significant differences in peak traction forces between both groups at maximum cut rate and various duty cycle modes were determined using an unpaired Welch's *t*-test, and a statistical significance level of $P < 0.05$ was used.

Results: Our results demonstrated that the 25 dual-cutting probe operating at the maximum cut rate of 20,000 cpm generated significantly less peak traction forces than previous generation, single-cutting 10,000 cpm probes for Core, 50/50, and Shave duty cycle modes, respectively (-0.1828 mN, $P < 0.05$; -0.1386 mN, $P < 0.05$; -0.1218 mN, $P < 0.05$). The dual-cutting probe traction force was approximately 19-28% lower than single-cutting probe traction forces for all duty cycle modes.

Conclusions: The dual-cutting probes generated less vitreous traction forces than previous generation probes.

VIDEOS

Eye Trauma, Emergencies & Infections

A Case Report on Removal of a Large Intraocular Foreign Body (Part of Spoon) from Posterior Segment

*First Author: Md Arif **PATHAN***

Purpose: To describe a case of repair of an eye with removal of large 15-mm intraocular foreign body from the posterior segment.

Methods: Case report.

Results: A 50-year-old male presented with painful loss of vision during hammering a teaspoon when a part of the bowl broke and struck his eye. On examination, his vision was perception of light. A 10-mm sclerocorneal lacerated injury was found temporally. Anterior chamber was shallow, there was iridodialysis from 1-2.30 o'clock. Posterior synechiae with a cyclitic membrane over the anterior lens capsule was noted. The lens was cataractous and vitreous hemorrhage precluded the view of the retina. Cornea was repaired with nylon 10-0 and the sclera, with vicryl 7-0. A peritomy was done at 12 o'clock and a scleral tunnel was made and lens was removed through the scleral tunnel. Pars plana vitrectomy was started and a large semi-circular metallic foreign body was found. After complete vitrectomy, foreign body was removed through the scleral tunnel with forceps and endolaser was done around the identified retinal breaks and 360-degree barrage laser was done following which silicone oil was given. The foreign body extracted was 15-mm long and 8-mm wide and was anterior part of tea spoon. The vision had improved to counting fingers at 2 meters during the last follow-up.

Conclusions: This case shows that globe integrity and vision can be preserved with prompt surgical action, injured with large foreign body, greater than corneal diameter.

Different Ways of Metal Rods Foreign Body Removal from Eye

*First Author: Dayawansa **KEEMBIYAGE***
*Co-Author(s): Mangala **DHANAPALA**, Sushrutha **DISSANAYAKE***

Purpose: This aims to show different approaches to removal of metal rod foreign bodies from the eye.

Methods: The first case was with a metal rod foreign body from motorized wire brush hit from anterior to posterior side of the globe with only one entry wound with distal end lied just above the optic nerve was just pulled out after evaluation with X ray and B scan. The second case was completely opposite, similar type of foreign body lied horizontally in the globe with globe perforation which needed to extrude one end of foreign body out of scleral entry wound and pulled from a side while doing vitrectomy.

Results: Both procedures went uneventfully with removal of foreign body and saving the globe.

Conclusions: This video will illustrate the importance of history taking, careful examination and deciding appropriate investigations before performing metal rod foreign bodies from the eye which demonstrate different approaches of removal.

From the Repertoire of an Adrenaline Junkie: A Video Series of Intraocular Foreign Bodies

*First Author: Guruprasad **AYACHIT***
*Co-Author(s): Apoorva **AYACHIT**, Srinivas **JOSHI***

Purpose: To demonstrate a variety of intraocular foreign body (IOFB) cases and innovative methods of removal.

Methods: Thirteen cases of varied complexity were chosen by a retrospective chart review. The cases ranged from small to very large IOFB. There were metallic, glass, wooden and stone foreign bodies, some of which were extremely large and of peculiar shapes which

made removal difficult. Some of the videos in the series show the use of an intraocular magnet with a "magnet-to magnet pass", use of extrusion cannula for a non-metallic, non-magnetic IOFB; dealing with IOFB on the fovea and dealing with large, flat stones and dagger-shaped foreign bodies coursing throughout the length of the eye. This video series demonstrates techniques of removal, some of which were innovative and the others were interesting because of the sheer size of the IOFB.

Results: All IOFBs were successfully removed. The highlight of this video is the intra-operative IOFB removal aspect only.

Conclusions: IOFB can be extremely challenging and require tactful, surgical skill and out-of-the-box thinking on table to remove successfully.

Surgical Management of Massive Suprachoroidal Hemorrhage: Don't Play It Blind!

*First Author: Jay **SHETH***
*Co-Author(s): Giridhar **ANANTHARAMAN**, Shruti **CHANDRA**, Mekhla **NAIK***

Purpose: Expulsive suprachoroidal hemorrhage (SCH) is a catastrophic complication of intraocular surgery. Current management includes SCH drainage through external sclerotomies and intermittent fundus evaluation by IO. We describe a novel surgical technique, utilizing chandelier-assisted wide-angled visualization of various steps of SCH drainage in 62/M.

Methods: PCIOL explantation was performed initially with AC maintainer being used for infusion, followed by 360° peritomy. A 25G chandelier was inserted inferiorly and a sclerotomy was done in superonasal quadrant 7 mm behind the limbus. Using the wide-angles viewing system and 23G extrusion cannula through the sclerotomy, active drainage of suprachoroidal hemorrhage was performed under visualization. Beautiful separation of the kissing choroids could be illustrated with gradual unmasking of the macula and disc underneath. Similar sclerotomy was also performed in superotemporal quadrant for complete drainage of SCH under endoillumination. Subsequently, a 23G PPV was performed with silicone oil injection.

Results: Immediate after surgery, the retina was attached and the eye was successfully salvaged by timely surgical intervention using the novel technique. Three weeks post primary surgery, the patient had resolved choroidals with early inferior retinal detachment. Subsequently, he underwent a successful retinal reattachment surgery. One month post-secondary surgery, the patient's retina was attached and BCVA improved to CF 3 m.

Conclusions: Our educational video demonstrates that chandelier-assisted controlled drainage of suprachoroidal hemorrhage using active extrusion and under continuous visualization is an easy technique to achieve excellent anatomical and visual outcomes with better safety profile. It can be instrumental in training residents and fellows who can simultaneously visualize surgical steps along with surgeon.

Ocular Imaging

Evaluation of Foveal Avascular Zone Using Optical Coherence Tomography Angiography

*First Author: Colin **TAN***
*Co-Author(s): Isaac **CHAY**, Kai Xiong **CHEONG**, Louis **LIM**, Srinivas **SADDA**, Shoun **TAN***

Purpose: Optical coherence tomography angiography (OCTA) is a new, non-invasive imaging modality which allows for imaging and evaluation of the superficial and deep retinal vasculature. In this video, we demonstrate OCTA images of the superficial and deep retinal plexuses, and a novel technique to evaluate the size and characteristics of the foveal avascular zone (FAZ). Factors affecting FAZ sizes were also analyzed.

Methods: In a prospective study, we performed OCTA scans on 117 participants. Using Image J, the FAZ was outlined and measured.

Ocular and demographic factors, including central retinal thickness, axial length, spherical equivalent and choroidal thickness, which may influence FAZ size were evaluated using univariate and multivariate regression analyses.

Results: The mean superficial FAZ area was 0.24 mm^2 (0.04-0.48 mm^2), and the deep FAZ area was 0.38 mm^2 (0.10-0.70 mm^2). The superficial and deep FAZ areas varied significantly with gender, central retinal thickness and spherical equivalent. In high myopes, the FAZ size was also significantly smaller in both superficial and deep layers.

Conclusions: OCTA is a novel imaging technique to visualize the retinal vasculature in detail. This video examines the influence of ocular and demographic factors on retinal vasculature and FAZ size.

Ocular Oncology & Pathology

Retinoblastoma: They Live and See

*First Author: Pukhraj **RISHI***

Purpose: Retinoblastoma is the most common intraocular malignancy of the childhood. According to estimates, each year, nearly 5000 new cases of retinoblastoma are reported from India and China. Retinoblastoma continues to be a health concern in the developing world.

Methods: This educational video puts forth information about the diagnosis, inheritance, investigations, and treatment of retinoblastoma – in the words of a doting father, and compassionate health care providers, in simple understandable language.

Results: The important goals of treatment, need for timely recognition and referral to a tertiary care hospital with comprehensive in-house facilities are emphasized.

Conclusions: Patient education forms a critical component in raising awareness about this potentially fatal disease.

Other (General Ophthalmology)

Low-Cost Electronic Video Magnifier: Low Visual Aid

*First Author: Ashish **AHUJA***

Purpose: Various products are available to magnify reading fonts, which include optical (telescopes and magnifiers) and electronic devices. But the cost of digital video magnifier is usually high. We suggest the use of a novel device which may be used as a low-cost alternative to the traditional video magnifiers which include CCTV.

Methods: We present a low-cost alternate to the traditional electronic video magnifiers. It is called a digital microscope which is available on most of the e-commerce websites. It costs about 1500-2000 rupees price range. It is easily connected to the laptops via a USB cable and we use a software AMCAP to display the content of this device to the screen. Its configuration include an Image Sensor of 0.3M HD CMOS Sensor (Digital 2M) and a Controller of High Speed DSP. It has a focus range from 0-40 mm and a video capture resolution of 640 x 480, still image capture resolution of 1600 x 1200 (2M Pixel), 1280 x 960 (1.3M Pixel), 800 x 600, 640 x 480. Frame rate: Max. 30f/s under 600 Lux brightness.

Results: Magnification is adjustable from 50X to 500X. It has an 8 White Light LED (with adjust controller on USB cable). Its weight is 168 g and dimensions are 20*10*5. Images captured or the video may be directly stored to the computer if required.

Conclusions: These devices provide a very low-cost alternative for near vision requirements. We should create an awareness and help our patients improve their quality of life with these reasonable alternatives.

Retina (Surgical)

A Surgical Approach to a Case of Failed Retinal Detachment Surgery with Subretinal Silicone Oil Resulting from Severe Retinal Shortening due to Advanced Eales Disease

*First Author: Paul **SIOPONGCO***

Purpose: To describe the surgical approach to a failed retinal detachment surgery case resulting from advanced Eales disease.

Methods: This was a case of a 24-year-old male, a known case of Eales disease with bilateral total retinal detachment with advanced proliferative vitreoretinopathy. He underwent phacoemulsification with IOL implantation and retinal detachment surgery which included scleral buckling, pars plana vitrectomy, membrane peeling and segmentation, a 2-clock hour superior retinectomy and 5000cs silicone oil injection in the left eye. On the first postoperative day, a bullous retinal detachment was noted with subretinal oil that resulted from retinal shortening. The patient underwent repeat surgery which included removal of the subretinal silicone oil, injection of perfluorocarbon liquid, a 330-degree retinectomy, repeat injection of 5000cs silicone oil, and argon laser retinopexy.

Results: On the first postoperative day from the second surgery and up to the present time, the patient's retina is well attached.

Conclusions: As shown in this case, an aggressive surgical approach must always be kept in mind in dealing with retinal detachment resulting from Eales disease and those with advanced stages of proliferative vitreoretinopathy. Retinal re-attachment is still possible even in cases with retinal shortening.

Charming the Snake Out of Its Hiding: A Video Series of Subretinal Gliosis Management

*First Author: Guruprasad **AYACHIT***
*Co-Author(s): Apoorva **AYACHIT**, Srinivas **JOSHI***

Purpose: To demonstrate different types of subretinal gliotic (SRG) bands and the surgical techniques of removing them.

Methods: We present 7 cases of retinal detachment with proliferative vitreoretinopathy with associated SRG. Case 1 had total rhegmatogenous retinal detachment (RRD) with thin peripheral bands. Case 2 was a case of RRD with an interconnected network of SRG bands. Case 3 had thick preretinal and subretinal membranes along with a napkin ring around the disc. Anterior PVR also complicated this case. Case 4 was a paramacular SRG which could have been left alone since it caused macula to get pulled off. In case 5, 360-degree giant retinal tear was associated with SRG. Herein, the retina had to be overturned to remove the SRG and reattach the retina. In case 6, intraoperative OCT was used to demonstrate SRG removal and flattening of the retina. In case 7, a massive coil of SRG band around the disc was removed.

Results: SRG bands were successfully removed in all cases with retinal re-attachment under oil.

Conclusions: Subretinal gliosis poses a unique challenge during surgery for proliferative vitreoretinopathy. Tackling membranes under the retina needs expertise, both in recognition of these bands and their removal with minimum complications. Often, subretinal gliosis is the only factor preventing retinal re-attachment. It is important to have the tact in recognizing these bands, possess the surgical know-how of removing them, even if it involves making large retinotomies or overturning the retina.

Complex Diabetic Vitrectomies: Tips and Tricks to Improve Outcome

*First Author: Rajiv **GANDHI***

Purpose: To demonstrate few tips and tricks during vitrectomy for complex diabetic membranes which will help improve the surgical outcome.

Methods: Patients with complex diabetic tractional retinal detachments who underwent vitrectomy for the last 2 years were recorded after due consent from the patient. Each step was performed meticulously and was edited

for the video presentation. Patients were given preoperative intravitreal anti-VEGF 2-3 days prior to surgery in most of the cases.

Results: Proper preoperative evaluation and anti-VEGF injection helped intraoperatively a lot as it reduced the vascularity and thus intraoperative bleeding. Induction of PVD , finding right dissecting plane of membrane, ILM peeling, achieving hemostasis etc., each step can help improve surgical outcome when performed meticulously.

Conclusions: With microincision era and improved technology tackling complex diabetic membranes has become easier with vitrectomy cutter alone and thus helped reducing the tedious bimanual work required in most of the cases. With these techniques the surgical outcomes have improved even in very complex diabetic cases and thus improving the patient satisfaction.

Diabetic Vitrectomy: Combined Retinal Detachment

*First Author: Rinku **PAUL***

Purpose: Diabetic vitrectomy is often challenging particularly when it is a combination of both tractional and rhegmatogenous retinal detachment. We would like to show various techniques to way out efficiently from such situation.

Methods: Bimanual technique, Chandelier light, small gaze instrumentations, valve cannula, proportional reflex, use of IVTA, endo diathermy.

Results: Membrane dissection, separation of posterior hyaloid, complete vitrectomy can be efficiently done in combined retinal detachment.

Conclusions: Modern technology and appropriate techniques can lead the way forward in advanced diabetic eye disease.

Extreme PVR: Navigating the Narrow Funnels in Pediatric Cases

*First Author: Simar Rajan **SINGH***
*Co-Author(s): Mangat **DOGRA**, Mohit **DOGRA**, Deeksha **KATOCH***

Purpose: Pediatric retinal detachments (RD) with extensive proliferative vitreoretinopathy (PVR) can pose a management challenge. We describe the surgical nuances and tricks for the treatment of such cases to obtain a successful outcome.

Methods: We describe the tricks for management of pediatric RD with extensive PVR using few descriptive cases. The use of various modalities including scleral buckles, pars plana vitrectomy, lensectomy, epiretinal and subretinal membrane dissection, perfluorocarbon liquids, relaxing retinectomy and silicone oil were demonstrated.

Results: The cases had a good anatomical outcome with variable functional outcome postoperatively. This highlights the need for good preoperative counseling and meticulous surgical technique in the management of these challenging cases.

Conclusions: Pediatric RD present various inherent management challenges. The presence of PVR requires complex vitreoretinal techniques for the treatment. But the challenges can be overcome by a patient and meticulous surgical technique.

Keep Calm and Rescue On

*First Author: Rakesh **JUNEJA***
*Co-Author(s): Jayesh **KHANDELWAL**, Manish **NAGPAL***

Purpose: To describe the management of a sudden disaster in the form of globe perforation that occurred while giving local anesthesia for an epiretinal membrane (ERM) removal surgery.

Methods: A routine case of ERM peeling was scheduled for surgery. As soon as we placed the standard 3-port, 25-gauge cannulas and inserted the light pipe to get a view of the fundus, there was spattered blood all over the retinal surface and under it. At that moment

we realized that there has probably been an inadvertent globe perforation during the peribulbar block injection.

Results: The sub-retinal blood was carefully and gradually removed after PVD induction along with removal of pre-retinal blood. The globe perforation site was identified and was lasered. ERM peeling was completed.

Conclusions: This video highlights how we managed a sudden disaster by thoroughly assessing the damage, clearing the blood, peeling the ERM and lasering the site of the entry and exit wounds of the needle perforation to salvage the situation.

Management of Giant Retinal Tear with Sub-Macular Hemorrhage: A Novel Technique

*First Author: Bhuvan **CHANANA***
*Co-Author(s): Sudhank **BHARTI***

Purpose: To describe a novel technique for management of giant retinal tear (GRT) with sub-macular hemorrhage.

Methods: A 43-year-old female presented with an inferior 180-degree GRT associated with a large dense sub-macular bleed following blunt trauma with a cricket ball. The drainage of thick sub-macular bleed by an innovative technique is being described in the video clip. Two small retinotomies were made near the lower and upper edge of the hemorrhage, and saline was flushed from upper retinotomy pushing the sub-macular hemorrhage out of the lower retinotomy. This was followed by flattening of the GRT and insertion of silicone oil.

Results: The patient was successfully managed. A choroidal rupture was noted adjacent to the disc intra-operatively. At postoperative 1 week, the patient gained a vision of 20/120 with a clear macula and attached retina. At 1 month, the vision was maintained and the retina was stable.

Conclusions: A novel technique for drainage of sub-macular dense hemorrhage in attached retina is being described in this video. The present case also had an inferior 180-degree GRT which was successfully managed.

Management of Inadvertent Intralenticular Ozurdex Implant

*First Author: Naresh **KANNAN***
*Co-Author(s): Piyush **KOHLI***

Purpose: To report a vitreo-retinal approach for the management of inadvertent intralenticular ozurdex implant in a patient with non-responding cystoid macular edema (CME) due to branch retinal venous occlusion (BRVO).

Methods: A 60-year-old hypertensive male with non-responding CME due to BRVO was advised ozurdex. Accidentally the implant got injected into crystalline lens causing an intumescent cataract. The implant, along with cortex and a small piece of epi-nucleus, was pushed into the vitreous cavity through the pre-existing PCR. 25-gauge pars plana vitrectomy was done to separate the implant from the cortex and epi-nucleus. Finally, posterior vitreous detachment (PVD) was induced and a 3-piece intraocular lens (IOL) was placed in the sulcus.

Results: Postoperative examination at 1 month showed that the IOL was stable with no anterior segment reaction and the implant was intact in the vitreous cavity. Ocular coherence tomography showed complete resolution of macular edema.

Conclusions: Separating the implant from the lens cortex in the capsular bag can lead to its accidental aspiration or zonular dialysis. The implant along with surrounding cortex can be pushed in the vitreous, followed by vitrectomy. A vitreo-retinal approach not only prevents the accidental aspiration of the implant, vitrectomy can also help in better resolution of edema.

Management of Retinal Detachment with Choroidal Detachment

*First Author: Rinku **PAUL***

Purpose: Managing combined retinal and choroidal detachment is often challenging. We would like to show various techniques to way out from such a situation.

Methods: Efficiently placing of infusion cannula, supra-choroidal drainage under 360-degree

scleral band, IVTA-guided vitrectomy, endo drainage of SRF, endo-laser, silicone oil injection.

Results: Retina attached postoperatively.

Conclusions: Correct placing of infusion cannula and supra-choroidal drainage is the key to attach the combined retinal and choroidal detachment.

Management of Traumatic Dropped Nucleus with Retinal Detachment

*First Author: Dipak **NAG***
*Co-Author(s): Rinku **PAUL**, Pankaj **ROY***

Purpose: Using fragmatome in traumatic dropped nucleus with retinal detachment (RD) is technically difficult and can cause iatrogenic retinal break. In this presentation we would like to show 2 surgical techniques of nucleus delivery in 2 unusual traumatic dropped nucleus with RD.

Methods: We used endo diathermy to remove the intravitreal dropped nucleus (grade IV) and PFCL to express the sub-retinal dropped nucleus where nucleus has gone subretinally through the dialysis.

Results: Endo diathermy is used to hold the nucleus and delivered through the limbal incision successfully. PFCL on the other hand, is used to shift the sub-retinal dropped nucleus and removed subsequently. Retina is done settled in the same procedure.

Conclusions: Endo diathermy and PFCL can be used instead of fragmatome in traumatic dropped nucleus with RD safely.

Management of a Young Patient with Advanced PDR with Combined Retinal Detachment Already Underwent Glaucoma Valve Implant

*First Author: Sanyam **BAJIMAYA***

Purpose: To assess the anatomical and functional outcome after phaco-vitrectomy in a patient with advanced PDR with combined retinal detachment.

Methods: A 47-year-old woman with a history of type 1 diabetes mellitus for 22 years was presented. She was under anti-hypertensive for 5 years and on thyroid medications for 1 year. She presented with best-corrected visual acuity of 6/12 in the right eye (RE) and perception of light in the left eye (LE) in October 2017. She gave the history of glaucoma valve surgery in her LE 8 months ago. She underwent LE phacoemulsification combined with 23-G pars plana vitrectomy (PPV) with extensive membrane peeling, endo-laser and silicone oil tamponed under topical anesthesia.

Results: At 2-month follow-up, her visual acuity in LE was 6/24 with +11.00 DS. Macular OCT revealed central DME with cystoid macular edema (CME). At 3 months from primary vitrectomy, she underwent LE silicone oil removal with secondary foldable IOL implantation with intra-vitreal injection of dexamethasone 0.7 mg implant. At 9-month follow-up, her BCVA was 6/24 in LE with resolved CME with intraocular pressure of 12 mm Hg.

Conclusions: Meticulous membrane peeling during diabetic vitrectomy and use of intra-vitreal dexamethasone implant help good anatomical and functional outcome for young advanced PDR cases.

Managing Vitreo-Retinal Interface in Diabetic Vitrectomy

*First Author: Bhuvan **CHANANA***

Purpose: To demonstrate management of vitreo-retinal interface in proliferative diabetic retinopathy (PDR).

Methods: The posterior hyaloid phase in PDR is usually thick, taut and firmly adherent to the underlying retina at multiple sites. Induction of posterior vitreous detachment (PVD) is often difficult due to strong attachments at the disc and areas of neovascularization, and frequent presence of vitreoschisis. Advances in vitreous surgery like micro incision vitrectomy systems, better viewing devices, and careful dissection techniques have made it possible to manage such difficult cases.

Results: Video clips demonstrating successful PVD induction in difficult situation, management of dense subhyaloid hemorrhage in PDR, dissection of thick and firmly adherent fibrovascular fronds in advanced end-stage PDR, and use of perfluorocarbon liquids (PFCL) during diabetic vitrectomy will be presented.

Conclusions: The posterior hyaloid phase in PDR is usually thick and firmly adherent to the underlying retina at multiple sites. However, with micro incision vitrectomy system, advanced instrumentation and careful dissection techniques, most of the cases can be managed successfully.

Pars Plana Cyst Versus Scolex: "Biting the Bullet"

*First Author: Sherine **BRAGANZA***
*Co-Author(s): Thirumalesh **M B**, Sushil **PATIL**, Bhujang **SHETTY***

Purpose: We report on a 21-year-old male patient with high-grade myopia in both eyes with uniocular multiple pars plana cysts which were differentiated from ocular cysticercosis.

Methods: Complete ophthalmologic examination revealed the best-corrected visual acuity 6/6p in both eyes. Fundus examination revealed left eye temporal hollow clustered pars plana cysts at 1 o'clock, 3 o'clock and 4 o'clock hours, white without pressure areas and normal posterior pole. B-scan left eye showed high-intensity echos corresponding to cyst wall with anechoic center. MRI brain and stool examination ruled out systemic cysticercosis association. Hemogram parameters were normal. The patient underwent examination under local anesthesia with left eye 23G pars plana vitrectomy (Constellation system, Alcon) + peripheral cryopexy (single freeze-thaw cycle) + 360-degree prophylactic endolaser + air-fluid exchange + 20% SF6 gas injection with uneventful surgery.

Results: After surgery, the left eye retina was attached with 20% SF6 gas-filled eye with stable intraocular pressure within normal level with best-corrected visual acuity of 6/6p, no sign of intraocular inflammation. At 6 months postoperatively the retina was stable.

Conclusions: Unusual association of pars plana cysts in patients is a differential for ocular cysticercosis.

Suprachoroidal Buckling in Rhegmatogenous Retinal Detachment: A Step-by-Step Illustration

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Purpose: To demonstrate suprachoroidal buckling (SCB) as an effective alternative procedure in the management of rhegmatogenous retinal detachment by an educational video.

Methods: Suprachoroidal buckling involves using specially designed devices i.e. catheter or cannula (bent cannula used in this video) to be guided in the suprachoroidal space to reach the target site. Suprachoroidal filler (Healon viscoelastic substance) is then injected to indent the choroid creating a suprachoroidal buckle. This in turn causes closure of retinal tears and supports the retina, 2 surgeries done over the past 1 year were recorded and reviewed. All surgeries were recorded on a 3-chip camera (PMW-10MD, Sony, Japan). The videos were edited using the Edius Pro 8 software (Grass Valley, Montreal, Canada) and the key steps were highlighted.

Results: Retinal layer restoration was achieved in both cases after SCB with resolution of retinal detachment. There was no recurrence of retinal detachment over 1-month follow-up period.

Conclusions: Suprachoroidal buckling is a novel promising alternative approach to the treatment of selected cases of rhegmatogenous retinal detachment with minimum complications.

Surgical Approaches in Myopic Traction Maculopathy (MTM)

*First Author: Deven **DHURANDHAR***
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Purpose: To discuss the various surgical modalities of treatment at different stages of

MTM through this video.

Methods: MTM encompasses a collection of pathological changes associated with highly myopic eyes which include myopic retinoschisis, neurosensory detachment (NSD) and macular hole (MH) with or without retinal detachment (RD). With the help of optical coherence tomography, high-resolution cross-sectional images of the posterior retinal anatomy assisted us in grading the type of MTM. Our video demonstrates the surgical approaches at different stages of this spectrum of changes associated with MTM. We demonstrated the use of dye-assisted vitrectomy with internal limiting membrane (ILM) peeling for myopic retinoschisis with NSD, the use of dye diffusion technique in high myopic eyes with difficulty in localization of breaks and role of macular buckle in MH RD associated with posterior staphyloma.

Results: Vitrectomy with ILM peeling gave a good anatomical outcome over a period of time in myopic retinoschisis with NSD, dye diffusion method helped in easy localization of breaks in myopic RD and the macular buckle effectively combats the posterior traction caused by posterior staphyloma in myopic MH RD.

Conclusions: Dye-assisted vitrectomy with ILM peeling resolves the anterior and tangential components in myopic retinoschisis with NSD, the dye diffusion technique assists in localization of the break in high myopic eyes with RD and use of macular buckle provides adequate posterior tamponade in eyes with myopic MH RD complicated by posterior staphyloma. These surgical techniques provide a good anatomical outcome in eyes with MTM and helps us to tackle this complex spectrum of diseases.

Surgical Treatment Approach for a Pediatric Patient with Combined Retinal and Choroidal Detachment

*First Author: Camille Elaine **ZABALA***
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Purpose: To present a video detailing a surgical technique in a pediatric patient with a combined retinal and choroidal detachment.

Methods: This was a case presentation of a 14-year-old Filipino male who consulted our institution due to a 2-week history of sudden blurring of vision. He denies any history of trauma and eye redness. His medical history was likewise unremarkable. On physical examination, vision in the left eye was hand movement with a hypnotic globe. Anterior segment examination was unremarkable, with no signs of inflammation. There was note of a very high retinal detachment, that is visualized just behind the crystalline lens. On b-scan ultrasound, there was note of choroidal detachment as well. Ancillary laboratory examinations were also unremarkable. For this case, scleral encerclage with 240 buckle was done followed by lensectomy. Afterwards, pars plana vitrectomy using a gauge 23 system was done with meticulous peeling of peripheral proliferative membranes. There was note of a small retinal tear superiorly. Perfluoron was used to flatten the retina and complete the peeling. Afterwards, direct perfluoron-silicone oil exchange was done, followed by endolaser.

Results: Postoperatively, the retina was attached with good laser marks. Additional laser was done with gradual resolution of remaining choroidal effusion. The best-corrected vision was 20/200 at 3 weeks post-operation.

Conclusions: Prompt surgical treatment of combined retinal and choroidal detachment may prevent proliferation of vitreo-retinal membranes and lead to improved surgical success in pediatric patients.

Tackling Chronic Hypotony due to Uveitis by Its Roots: Cyclitic Membrane Removal

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Purpose: To propose a step-wise approach to evaluate and surgically manage hypotonous eyes secondary to uveitis.

Methods: Eyes of uveitic patients with intraocular pressure (IOP) of ≤6 mm Hg were included. Complete ocular examination and

ultrasound biomicroscopy (UBM) were done. Causes of hypotony were noted: cyclitic membrane (CM), ciliary body (CB) atrophy or ciliochoroidal effusion. Hybrid 3-port pars plana lensectomy (PPL) with vitrectomy (PPV), posterior hyaloid removal, CM dissection and 5000 centistoke (Cs) silicone oil tamponade (SOT) were done.

Results: Hypotonous uveitic eyes due to CM with CB atrophy needed long-term SOT along with CM removal. In contrast, eyes with normal CB along with CM needed only CM removal for visual rehabilitation and IOP to build up.

Conclusions: "Pre-phthisical" uveitic eyes need to be managed cautiously. Excellent control of ocular inflammation followed by 360-degree UBM examination to look for CM and CB status should be done. 5000 Cs SOT needs to be done along with PPL, PPV and CM removal for eyes with CB atrophy. Thus, judicious planning and meticulous surgery can help salvage these eyes and give gratifying functional outcomes.

The Two Faces of the Internal Limiting Membrane (ILM): The Culprit and the Unsung Hero

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Purpose: ILM is a thin acellular membrane which is the culprit in a variety of vitreo-retinal pathologies. ILM peeling is being done in epiretinal membrane removal, macular pucker, diabetic macular edema. On the other hand, ILM transplantation is being done for large-sized macular holes (MHs), persistent MH and in optic disc pit maculopathy. The purpose of this video was to present a surgical potpourri of cases to enlighten on the multiple facets of the ILM and its importance in vitreo-retinal surgery.

Methods: A prospective study of 51 eyes of 50 patients with large (>400 μ) MHs and MH-associated retinal detachments (MH-RD) was conducted. 25-gauge pars plana vitrectomy was done. ILM flaps were trimmed and placed one over the other on the MH (intraoperative OCT guided) and under PFCL in MH-RDs. In cases of persistent MH, dispersive visco-elastic was injected in the hole. ILM was harvested from adjacent area and stuffed into the MH. In optic disc pit maculopathy, the ILM was harvested similarly and stuffed into the disc pit.

Results: In this study, 46/51 eyes (90.1%) had type 1 hole closure while 4/51 (7.8%) had type 2 closure and 1/51 (2.1%) did not show closure. Nine cases of persistent MH of which 8 showed type 1 closure. Six cases of optic disc pit maculopathy which showed complete resolution of sub-retinal fluid after ILM transplant.

Conclusions: Though ILM causes tangential traction and has been implicated as a culprit in retinal pathologies, it bridges tissue defects in retinal surgeries and is the real unsung hero.

Tips for Managing Plethora of Intra-Ocular Foreign Bodies

*First Author: Vikram **KOUNDANYA***
*Co-Author(s): Sumit **KUMAR***

Purpose: To provide tips for removal of various intraocular foreign bodies like glass, pellet, metal, stone etc.

Methods: Review of various cases operated on by a single surgeon at a tertiary eye hospital.

Results: All foreign bodies were removed successfully.

Conclusions: Intraocular foreign body removal often presents with challenging situation. Proper planning can vastly improve surgical outcomes.

To Pull or Not to Pull? Steps of Tackling Diabetic Tractional Retinal Detachment

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Purpose: Diabetic tractional retinal detachment (TRD) is a potentially sight-threatening insidious disease entity which occurs as a result of strong mechanical pull on the inner retinal layers causing them to detach from the retinal pigment epithelium. Though the primary

goal is to eliminate the traction on the retinal layers through pars plana vitrectomy, surgical management still remains a challenge for even the most skillful vitreoretinal surgeons. Through this video, we intended to demonstrate a number of technically challenging cases of TRD managed successfully.

Methods: Multiple cases of diabetic TRDs presenting with varied clinical picture who came to the vitreoretinal services department of a tertiary eye care center, underwent thorough anterior and posterior segment examination. This was followed by appropriate planning and preoperative work up after which the patients were managed surgically by pars plana vitrectomy and adjunctive procedures. The surgical techniques were modified according to the clinical presentation of TRD.

Results: Through this video we comprehend that rigorous preoperative planning and sound knowledge of vitrectomy technique can help us tackle technically demanding cases of TRD.

Conclusions: TRD repair is one the most challenging intraocular surgeries to perform. By utilizing the techniques exhibited in the array of surgical cases shown in the video, one will be better able to tackle complex TRD cases with relative ease and finesse.

Vitrectomy + ILM Peeling: The Final Destination of Retinal Artery Macroaneurysm (RAM)

*First Author: Neha **KHANNA***

Purpose: To present preliminary effect of vitrectomy with internal limiting membrane (ILM) peeling in ruptured RAM which was non-responsive to other conventional mode of treatments.

Methods: A 70-year-old male complained of diminished vision in the right eye (RE) for 5 days. His best-corrected visual acuity (BCVA) was 6/12,N6 in RE and 6/9,N6 in the left eye (LE). Fundus examination revealed tributary vein occlusion with cystoid macular edema (CME) in RE and normal fundus in LE. SD-OCT showed CME with subretinal fluid (SRF) for which he was given Inj Ranibizumab intravitreally. At 1-month follow-up, we saw drop in vision to 6/18P in RE. OCT showed increase in CME with traction at fovea and SRF in RE. Second dose of injection was given and reviewed 1 month later when we noted persistent traction and sub ILM bleed clinically which was confirmed on OCT with same vision. On fluorescein angiography we saw the presence of RAM and hence focal laser was done. Three weeks later unfortunately further drop in vision to 6/24p,N12 was noted, thus the patient was advised RE vitrectomy with ILM peeling with C3F8 gas injection.

Results: One month after surgery, OCT showed restoration of normal foveal contour with improved BCVA from 6/24p, N12 to 6/12,N8.

Conclusions: This case had ruptured RAM with sub ILM blood and traction at fovea, thus ILM peeling was done, which to our knowledge has never been reported before. This case highlights the role of ILM peeling in ruptured RAM with traction at fovea, when focal laser and anti-VEGF showed no response.

Vitrectomy in Case of Rhegmatogenous Retinal Detachment and CNVM

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Purpose: To report management of a case of rhegmatogenous retinal detachment and CNVM due to wet age-related macular degeneration.

Methods: A 72-year-old male patient presented with sudden loss of vision in his left eye and was diagnosed to have a subtotal rhegmatogenous retinal detachment with a macular scar. Surgical intervention was advised and he underwent belt buckle with vitrectomy with endolaser with subretinal CNVM removal with silicone oil infusion in the left eye.

Results: Postoperatively, retina was attached. Visual acuity improved from hand movements close to face to counting fingers at 3 meters.

Conclusions: Subretinal scar tissue removal may not be advised in cases of CNVM alone, but it can be attempted in such case with retinal detachment and CNVM.