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## 2017 COS Annual Meeting Abstract Booklet – Poster Presentations

### OCULOPLASTIC & RECONSTRUCTIVE SURGERY

#### Poster 1

**Title:** A Potentially Life Threatening Complication of Conjunctivodacryocystorhinostomy: A Case Report

**Authors:** Kaisra Esmail, Stephanie Chan, Steven Gilberg

#### **Abstract Body:**

**Purpose:** A conjunctivodacryocystorhinostomy (CDCR) with Jones tube is used to manage epiphora resulting from canalicular obstruction. Previously reported complications include tube extrusion, malpositioning, local inflammation or infection, obstruction, discomfort, and diplopia. We present, to the best of our knowledge, the first report of a life-threatening complication from a Jones tube insertion.

**Study Design:** Case Report.

**Methods:** The patient's clinical and surgical charts were reviewed including patient history, clinical examinations, and investigations. A thorough review of the literature was also performed.

**Results:** A 40 year old female with a history of obstructive sleep apnea presented with chronic left epiphora secondary to canalicular obstruction. She underwent an uneventful endoscopic dacryocystorhinostomy with Jones tube insertion. Two hours after discharge from the hospital she developed orbital emphysema that had spread to the soft tissues of her face, neck, and chest. She experienced dyspnea and subsequently sought urgent medical attention. CT scanning demonstrated diffuse cervicofacial subcutaneous emphysema, pneumomediastinum, pneumopericardium and prevertebral air. She was admitted to the Intensive Care Unit for monitoring of potential cardiovascular and respiratory compromise for three days before being discharged home.

**Conclusions:** According to our knowledge, this is the first documented case in the literature of pneumomediastinum post CDCR surgery. Patients undergoing this procedure should avoid behaviours that increase positive airway pressure, including nose-blowing, coughing, sneezing, straining, and use of a CPAP machine immediately after surgery. The development of post-operative subcutaneous emphysema should prompt urgent assessment and close monitoring post-operatively for potential cardiorespiratory complications.

## Poster 2

**Title:** Squamous cell carcinoma of the canaliculus associated to HPV infection

**Authors:** Evangelina Esposito, Pablo Zoroquiain, Bryan Arthurs, Miguel Burnier

### **Abstract Body:**

**Purpose:** Human papillomavirus (HPV) infections occur in the skin and mucosa and may play a significant role in the neoplastic transformation of cells. At least half of all the epithelial tumours of the ocular surface and the lacrimal drainage system have been shown to be HPV associated. The prevalence of tumors affecting the lacrimal drainage system is low, thus generating a risk of late diagnosis and treatment in clinical practice. However, these tumors can be potentially life-threatening, which emphasizes the importance of early diagnosis and treatment. It has also been described that in oropharyngeal squamous cell carcinoma (SCC), the presence of transcriptionally active HPV is generally associated with better overall survival compared with HPV-negative tumors. Herein, we present a case of SCC of the left canaliculus associated with HPV infection.

**Study Design:** Case report

**Methods:** A 55-year-old man with past medical history of rheumatoid arthritis and asthma presented with a large exophytic mass growing from the left lower canaliculus and exiting the punctum with extension to the lacrimal sac. An excisional biopsy was performed. During gross examination, a polypoid tumor with deeply infiltrative margins measuring 7mm x 6mm was noted, consistent with the clinical diagnosis. Histopathological examination showed conjunctival intraepithelial neoplasia (CIN) with severe dysplasia (type III) and the presence of koilocytic cells. Immunohistochemistry with Ki67 and P16 supported the diagnosis of SCC in situ related to HPV infection.

**Conclusions:** Due to the rarity of SCC of the lacrimal drainage system, it is important to report the distinct features of all cases. A high proportion of carcinomas arising in the lacrimal sac are associated with HPV and this has lately being associated with better prognosis. In the current case, the lesion was associated with HPV infection, and was positive for Ki67 and P16. Close follow up of lacrimal duct pathologies is highly recommended and early diagnosis and prompt excision is mandatory in order to ensure the best possible outcome.

### Poster 3

**Title:** Bilateral traumatic subgaleal orbital hemorrhage: case presentation and literature review

**Authors:** Michelle Khan, Ahsen Hussain, Simon Fung, Dan DeAngelis, Kamiar Mireskandri

#### **Abstract Body:**

**Purpose:** We report the unique case of a patient with an underlying coagulopathy who suffered bilateral subgaleal hemorrhages leading to multiple complications.

**Study Design:** Case-report and literature review.

**Results:** An eight-year old male with Hemophilia B sustained head injuries after a bicycle accident. He was initially treated locally and then transferred to our unit five days post-trauma. At presentation, he had poor bilateral visual acuity, pain, significant eyelid edema and ecchymosis, proptosis, chemosis, lagophthalmos, exposure keratopathy and microbial keratitis and almost complete ophthalmoplegia. These along with a right sided RAPD were concerning for orbital compartment syndrome. He required immediate correction of his coagulopathy status by Hematology followed by emergent bilateral lateral canthotomy and cantholysis resulting in intraoperative reduction in intraocular pressure. Magnetic resonance imaging confirmed large subgaleal scalp hematomas extending into the intraorbital subperiosteum bilaterally. Image-guided drainage of the scalp hematomas was performed. Central tarsorrhaphies were required bilaterally two-days post canthotomy/cantholysis due to severe corneal thinning despite successful treatment of corneal ulcer with hourly moxifloxacin. Eventual improvement in fundal view determined right optic nerve atrophy, cilio-retinal artery occlusion and likely retinal stasis vasculopathy. Best uncorrected visual acuity was count fingers OD and 20/40 OS upon last review.

**Conclusions:** Subgaleal hemorrhages post-trauma are rare and can cause severe orbital and ocular complications. Initial management including scalp hematoma drainage were critical. We discuss the importance of early multi-disciplinary management and a literature review of similar cases.

#### Poster 4

**Title:** Management of dysfunctional epiphora: Comparing the surgical outcome of non-endoscopic endonasal dacryocystorhinostomy, transcanalicular diode laser assisted dacryocystorhinostomy and external dacryocystorhinostomy

**Authors:** Can Ozturker, Bayasgalan Purevdorj, Gamze Ozturk Karabulut, Gamal Seif, Korhan Fazil, Yasser Anwar Khan, Pelin Kaynak

#### **Abstract Body:**

**Purpose:** To compare the outcome of non-endoscopic endonasal dacryocystorhinostomy (NEED), transcanalicular diode laser assisted dacryocystorhinostomy (TDL-DCR) and external dacryocystorhinostomy (Ext-DCR) as the first choice of treatment for dysfunctional epiphora.

**Study Design:** Retrospective chart review

**Methods:** The postsurgical success rates of the 3 groups were compared retrospectively from data charts.

**Results:** Data of 138 eyes of 119 patients in demographically similar groups were analysed. Functional success rates were 71.0% in NEED, 66.7% in TDL-DCR and 82.1% in Ext-DCR groups at the 43.5, 18.8 and 57.4 months, respectively.

**Conclusions:** Ext-DCR group yielded a higher success rate than the other groups for the treatment of dysfunctional epiphora, but as a minimally invasive procedure avoiding skin incision NEED seems to be a better option than TDL-DCR. The higher incidence of canalicular problems after TDL-DCR may be a reason for the lower success rate compared to the other groups.

#### Poster 5

**Title:** A case of orbital dumbbell dermoid cyst located at the frontozygomatic suture with a secondary extension through the orbital roof in the intracranial space

**Authors:** Can Ozturker, Bayasgalan Purevdorj, Gamal Seif, Yasser Anwar Khan

#### **Abstract Body:**

**Purpose:** To discuss the clinical features and the complications experienced in the management of an orbital dermoid cyst with an intracranial extension.

**Study Design:** Case report

**Methods:** A 41 years old male with proptosis and hypoglobus on the left eye for the last two months was diagnosed with a large superolateral orbital dermoid cyst extending posteriorly to the orbital apex and superiorly to the intracranial space based on MRI scan. At the time of the surgery the dermoid cyst was ruptured despite a careful dissection. Cyst walls were removed completely and the violated duramater was repaired meticulously. A CSF leakage was noticed 5 days after the surgery and the postoperative CT and MRI scan revealed a large area of infarct on the left frontal lobe.

**Results:** The patient was treated for CSF leakage by the neurosurgery and is still being followed up without any ophthalmological or neurological morbidities. The long term result will be updated.

**Conclusions:** Orbital dermoids located posteriorly may be undiagnosed until adulthood and treatment can be difficult and complicated. This case is presented as an example to emphasize the importance of imaging for the preoperative surgical plan and the postoperative follow up.

## Poster 6

**Title:** Use of dermis fat graft for cosmetical volume augmentation in the lower eyelid

**Authors:** Bayasgalan Purevdorj, Can Ozturker, Gamal Seif, Yasser Anwar Khan

### **Abstract Body:**

**Purpose:** To discuss the long term outcome of dermis fat graft in the lower eyelids for cosmetical volume augmentation by presenting two cases.

**Study Design:** Case report

**Methods:** The procedure was performed on two cases with hollowness on the lower eyelids. The first case is a 26 years old male with a history of left orbital floor fracture repair and the second case is 66 years old female with a history of lower blepharoplasty.

**Results:** Both of the cases had a resorption of dermis fat graft as expected and ended up with a good volume replacement and a smooth lower eyelid - cheek contour after 1 year.

**Conclusions:** To our knowledge, there are only few publications about the use of dermis fat graft on the lower eyelids and it can be a good alternative to fillers, fat injections and more invasive midface lifting techniques in selected cases.

## Poster 7

**Title:** Mucinous adenocarcinoma of the eyelid: a case-series

**Authors:** Debra-Meghan Sanft, Pablo Zoroquiain, Bryan Arthurs, Miguel Burnier

### **Abstract Body:**

**Purpose:** Primary mucinous adenocarcinomas (PMAs) of the eyelid are rare clinical entities typically arising from the peri-orbital area. The purpose of this case-series is to report 3 cases of PMA as well as to discuss the pathological and immunohistochemical features of these tumors.

**Study Design:** Retrospective case series

**Methods:** Three cases of PMA of the eyelid were identified from 2 tertiary ophthalmology referral centers. Clinical and histopathological features of the cases were reviewed. Immunohistochemistry was performed for cytokeratin (CK) 7, CK20 and p63.

**Results:** PMA of the eyelid was identified in the three patients. The patients' ages ranged from 63-73 years old. All patients were male. All PMAs were on the right peri-orbital area. Two of the three eyelid lesions were located on the lower eyelid and one was located on the upper lid. Immunohistochemistry demonstrated positive staining for CK7 and GCDP-15 and were negative for CK20. One of the 3 cases was stained for p63, and it was found to be positive.

**Conclusions:** Due to the difficult clinical diagnosis of this often benign appearing lesion, it is imperative that physicians send all specimens for histopathological and immunohistochemical correlation. Advances in IHC including CK7 and CK20 as well as p63 are important for the diagnosis of this rare eyelid tumor, though are not yet totally definitive in their ability to distinguish PMA from other lesions with similar profiles.

## Poster 8

**Title:** Does mitomycin C improve the success of endoscopic DCR in Asian patients improve the success of endoscopic DCR in Asian patients?

**Authors:** Chee-Chew Yip

### **Abstract Body:**

**Purpose:** To compare the success rates of endoscopic dacryocystorhinostomy with lacrimal stenting (EDCR-LS) in Asian patients with and without mitomycin C (MMC).

**Study Design:** A retrospective, audit of consecutive cases of EDCR-LS.

**Methods:** Fifty-four patients (60 sides: 21 right, 28 left) with naso-lacrimal duct obstruction underwent EDCR-LS. All sides had epiphora/ discharge, increased tear meniscus, delayed dye disappearance test and resistance on lacrimal irrigation. Evaluation parameters included patients' demographics, anatomical success (AS) and functional success (FS) rates. AS was defined as visualization of the common canalicular opening on nasal endoscopy, with patency confirmed on probing or irrigation. FS was defined as symptomatic relief of epiphora or discharge.

**Results:** Thirty-nine EDCR-LS sides (65%) received intra-operative MMC 0.4mg/ml for 5 minutes (Group 1) and 21 sides (35%) did not (Group 2). The 2 groups were comparable in terms of age ( $p=0.776$ ), gender ( $p=0.775$ ) race ( $p=0.775$ ), incidence of septoplasty ( $p=0.928$ ) and follow-up duration ( $p=0.084$ ). The AS rate of group 1 (94.9%) was comparable to group 2 (81%) ( $p=0.086$ ); but the FS rate was significantly higher in Group 1 (94.9% versus 76.2%,  $p=0.032$ ).

**Conclusions:** EDCR-LS with lacrimal stenting have a good success rate. The use of MMC seems to improve the success rate. Further studies with larger sample sizes are needed to validate the study findings.

## RETINA

### Poster 9

**Title:** Endoscopy Assisted Vitrectomy in Proliferative Vitreoretinopathy Associated Retinal Detachment

**Authors:** Radwan Ajjan, Jordan Isenberg, Flavio Rezende

#### **Abstract Body:**

**Purpose:** To investigate outcome of proliferative vitreoretinopathy (PVR) associated retinal detachment repair between patients using conventional pars-plana vitrectomy (PPV) alone and using endoscopy assisted PPV.

**Study Design:** A retrospective cohort analysis.

**Methods:** Medical records of patients who had proliferative vitreoretinopathy associated retinal detachment repair since 2009 were reviewed. Inclusion criteria include previous retinal detachment with PVR. Exclusion criteria include scleral buckling, no PVR, and non-compliance with postoperative follow up. Data collection included type of surgery (PPV alone, and endoscopy assisted PPV), PVR location (anterior or posterior to equators), number of previous retina surgeries, macula status on presentation (attached or detached), number of retinectomy quadrants, and anatomical outcome at 1 year.

**Results:** Sixty nine patients met the inclusion criteria. Forty three patients had conventional PPV, and 26 patients received endoscopy assisted PPV. In the PPV only group, 25 patients remained attached at one year follow up (success rate 58.2%). In the endoscopy assisted group, 17 patients remained attached at one year (success rate 65.4%), there was no statistical significant difference between both groups outcome at 1 year (p value=0.55). Logistic regression analysis of all patients showed an odd ratio of 2.8 (p-value= 0.025) with number of previous ppv, and an odd ratio of 0.3 (p-value= 0.026) with lens status on presentation. Subgroup analysis showed a correlation trend in the endoscopy group with the number of previous retina surgeries (OR=9.4, p-value=0.073) and lens status (OR=0.05, p-value=0.086), but with no statistical significance.

**Conclusions:** Endoscopy assisted pars-plana vitrectomy may have technical surgical advantages and facilitate treating hard to visualize anteriorly located PVR lesions. In this retrospective study, there was no significant difference in the one year surgical outcome between both groups. Number of previous retina surgeries and lens status seem to have an impact on the odds of anatomical success at the one year endpoint. Larger prospective studies a warranted to further analyze impact of endoscopy in treating PVR associated retinal detachments.

## Poster 10

**Title:** A standardized approach to correlating OCT images to histopathology using paraffin embedded specimens: clarification of the Ellipsoid Zone and new opportunities

**Authors:** Sabrina Bergeron, Carlos A. Moreira Neto, Pablo Zoroquiain, Jacqueline Coblentz, Miguel N. Burnier

### **Abstract Body:**

**Purpose:** The aim of this project is to develop a new standardized and cost-efficient method to compare OCT scans to their corresponding paraffin embedded histopathology sections in post-mortem eyes. This correlation will clarify the interpretation of OCT images, and it will also enable direct immunohistochemical characterization of features observed on OCT.

**Study Design:** Donor eyes were obtained from two separate eye banks. In order to minimize post-mortem change like retinal detachment and vitreous opacification, the eyes were fixed in a previously tested fixative solution. Time between death and fixation has been kept under 6 hours.

**Methods:** Using a customized imaging device, nine post-mortem eyes were imaged with a SD-OCT machine. Subsequently, an 8mm trephine was used to isolate a portion of the posterior pole including the macular area and the optic nerve head for histopathological analysis. Paraffin embedded cross-sections of the retina were obtained and visually compared to each OCT image (b-scans).

**Results:** To facilitate the correlation of OCT images to their histopathological sections, three principle aspects were controlled during tissue processing: rotation, tilt and location. Using markings as well as anatomical landmarks, serial histopathological sections in an orientation comparable to OCT b-scans were obtained, thereby facilitating image pairing.

**Conclusions:** Compared to other well established methods using resin and electron microscopy, our standardized methodology allowed us to successfully compare OCT b-scans to serial retinal cross-sections of a wider macular area at a lower cost. Our novel approach allows us to translate features observed on OCT images into well-established histopathological images, providing the clinician with additional tools to obtain difficult diagnoses with more confidence.



## Poster 11

**Title:** Machine Learning-assisted Automated Quantification of Foveal Avascular Zone Parameters and Perifoveal Capillary Density of Prototype and Commercial Optical Coherence Tomography Angiography (OCT-A) Platforms in Healthy and Diabetic Eyes

**Authors:** Forson Chan, Zaid Mammo, Morgan Heisler, Chandrakumar Balaratnasingam, Pavle Pavle, Gavin Docherty, Sanjeeva Rajapakse, Sven Loncaric, Andrew Merkur, Andrew Kirker, David Albiani, Mirza F. Beg, Marinko V. Sarunic, Eduardo Navajas

### **Abstract Body:**

**Purpose:** To demonstrate the utility of an automated quantification method in quantifying foveal avascular zone (FAZ) parameters and perifoveal capillary density of OCT-A images in healthy and diabetic eyes.

**Study Design:** Observational imaging study.

**Methods:** 74 OCT-A images of the foveal region were acquired using two OCT-A systems: one 1060nm Swept-Source (SS)-OCT prototype and the commercially available RTVue XR Avanti (Optovue, Inc). From the prototype system 21 eyes from 12 healthy subjects and 9 eyes from 5 diabetic subjects were imaged, and with the commercial system 32 eyes from 18 healthy subjects and 12 eyes from 7 diabetic subjects were imaged. The microvasculature in the enface angiograms was then manually segmented by two blinded, trained raters and automated segmentation was performed by classifying each pixel into vessel or non-vessel class using deep neural networks (DNNs). FAZ morphometric parameters (area, minimum/largest diameter, and eccentricity) and perifoveal capillary density were used as outcome measures for the image processing pipeline.

**Results:** The accuracy (healthy: 0.796, diabetic: 0.831), sensitivity (healthy: 0.763, diabetic: 0.758) and specificity (healthy: 0.869, diabetic: 0.913) of the algorithm on the commercial system was comparable to the accuracy (healthy: 0.797, diabetic: 0.823), sensitivity (healthy: 0.806, diabetic: 0.720) and specificity (healthy: 0.790, diabetic: 0.868) of the algorithm on prototype images. Comparing manual and automated segmentations, no statistically significant difference existed between the means for any of the FAZ morphometric parameters or perifoveal capillary density in either system. Correlation of these clinical measures between automated and manual segmentations was strong for the commercial system ( $r > 0.7$ ,  $p < 0.01$ ) but poorer for the prototype system. Eyes with diabetic retinopathy had significantly lower perifoveal capillary density ( $p < 0.01$ ), greater maximum diameter (commercial  $p = 0.031$ , prototype  $p < 0.01$ ), and greater eccentricity ( $p < 0.01$ ) compared to healthy normals, but there was no difference in FAZ area in this dataset.

**Conclusions:** The DNN based automated segmentation of OCT-A may be suitable for both commercial and research purposes for better characterization of the FAZ and quantification of the retinal capillary density in healthy subjects and in subjects with retinal vascular disease.

## Poster 12

**Title:** Small-gauge Endoscopy-guided Pneumatic Anterior Hyaloid Detachment: a new surgical technique for combined pars plana vitrectomy and pars plana glaucoma drainage implant

**Authors:** Ali Dirani, Marina Ciongoli, Mark Lesk, Flavio Rezende

### **Abstract Body:**

**Purpose:** To describe a new surgical technique to induce pneumatic anterior hyaloid detachment in eyes with glaucoma drainage implants (GDI)

**Study Design:** description of surgical technique and report of cases

**Methods:** Description of the surgical technique and report of cases that underwent surgery using the new surgical technique.

**Results:** The first patient had secondary Ahmed valve obstruction secondary to anterior vitreous entrapment. The second patient had neovascular glaucoma secondary to proliferative diabetic retinopathy and underwent pars plana GDI implantation. The surgery went uneventfully for both patients. Anterior hyaloid was completely removed.

**Conclusions:** Endoscopy assisted anterior hyaloid detachment allows complete removal of anterior hyaloid, and decreases the risk of secondary implant obstruction.

## Poster 13

**Title:** Strip-based registration of serially acquired optical coherence tomography angiography

**Authors:** Gavin Docherty, Morgan Heisler, Sieun Lee, Zaid Mammo, Yifan Jian, Myeong Jin Ju, Andrew Merkur, Eduardo Navajas, Chandrakumar Balaratnasingam, Mirza Faisal, Marinko Sarunic

### **Abstract Body:**

**Purpose:** To demonstrate a novel automated technique for registration and averaging of serially acquired Optical Coherence Tomography Angiography (OCTA) images resulting in enhanced visualization of the foveal microvasculature.

**Study Design:** Prospective observational imaging study.

**Methods:** Ten normal human eyes from 6 healthy subjects (4 male, 2 female) were imaged with our prototype 1060nm swept source 100kHz OCT system. Average age (Standard deviation) of the sample was 36.8 (9.3) years. Ten OCT-A volumes centered at the foveal avascular zone (FAZ) for each eye were acquired using our imaging protocol. The scan area was sampled in a 300x300 grid with ~2x2mm field of view in 3.15 seconds. The axial resolution was ~6  $\mu\text{m}$  in tissue. The resulting average images were presented in the whole retina, as well as in the superficial and deep plexus layers separately. The volumes were divided into microsaccade-free enface angiogram strips, which were affine-registered using Scale Invariant Feature Transform (SIFT) keypoints, followed by nonrigid registration by pixel-wise local neighborhood matching. The performance of the algorithm was evaluated with qualitative observation and quantitative measures of the contrast to noise ratio (CNR), signal to noise ratio (SNR), and structural similarity index (SSIM).

**Results:** Qualitatively, our strip-based registration averaging algorithm enhanced visualization of the superficial and deep foveal microvasculature. Quantitatively, we were able to demonstrate increased SNR (Average $\pm$ Standard deviation) from  $0.52 \pm 0.22$  using a single image to  $0.77 \pm 0.25$  with the mean images. Additionally, the CNR (Average $\pm$ Standard deviation) was increased from  $19.58 \pm 4.04$  using template images to  $25.05 \pm 4.73$  with mean images. The SSIM values for the superficial, deep and combined layers increased after the registration and application of each strip to the template image.

**Conclusions:** Averaging multiple registered sequentially acquired OCT-A images allows better qualitative and quantitative visualization of the foveal microvasculature networks. The improved visualization of the foveal capillaries could allow robust quantification and detection of early microvascular changes in diseased states.

## Poster 14



**Title:** Distinguishing central serous chorioretinopathy and neovascular age related macular degeneration using enhanced depth imaging – A prospective study

**Authors:** Parampal Grewal, Steven Lapere, Christopher Rudnisky, Rizwan Somani, Matthew Tennant

### **Abstract Body:**

**Purpose:** Central serous chorioretinopathy (CSCR) and choroidal neovascularization (CNV) secondary to age related macular degeneration (AMD) are commonly encountered conditions with overlapping clinical presentations. They share common presenting symptoms and clinical findings, however they are distinct entities with different etiologies, prognosis and treatment. Our study aimed to identify distinguishing features to aid clinicians in making an accurate diagnosis to provide the most appropriate therapy for patients.

**Study Design:** Prospective observational study.

**Methods:** Patients with a new diagnosis CSCR, CNV or an indeterminate presentation of CSCR or CNV were prospectively enrolled. All patients underwent a comprehensive clinical assessment complimented with measurement of axial length, enhanced depth imaging ocular coherence tomography (EDI-OCT) and intravenous fluorescein angiography (IVFA). A consensus diagnosis was made reviewing all clinical information, with specific focus on the results of angiography. Subsequently, clinical findings, EDI-OCT features and IVFA characteristics were compared between the groups.

**Results:** A total of fifty-six patients (sixty eyes) were enrolled. Thirty-four patients had CSCR (thirty-six eyes) and twenty-two patients (twenty-four eyes) had neovascular AMD. The mean age of the CSCR group was 50.4 years with 29.4% female patients, while the AMD group had a mean age of 74.4 years with 50.0% female patients. Drusen and macular hemorrhage were noted in 67% and 13% of the AMD eyes respectively, whereas neither were noted in the CSCR group. EDI-OCT features were compared and the subfoveal choroid was significantly thicker in eyes with CSCR ( $418 \pm 158\mu\text{m}$ ) in comparison to eyes with AMD ( $214 \pm 89\mu\text{m}$ ;  $p < 0.0001$ ). The most common pattern of leakage on IVFA in the CSCR group was single or multiple expansile dots (89%), whereas for AMD was occult CNV (46%).

**Conclusions:** Demographic, clinical and EDI-OCT features can help distinguish CSCR and neovascular AMD. Specifically, choroidal thickness determined by EDI-OCT is increased in CSCR.

## Poster 15



**Title:** Metformin inhibits survival, migration, and vascular endothelial growth factor production in uveal melanoma cells

**Authors:** Jade M. Lasiste, Bruna Duarte, Denise Miyamoto, Pablo Zoroquiain, Miguel N. Burnier, Jr.

### **Abstract Body:**

**Purpose:** Uveal melanoma is the most common intraocular malignancy in adults. Despite advances in treatment and effective control of the primary tumor, 50% of patients develop metastasis, 90% of which succumb to their disease.

Metformin, a biguanide drug used primarily for the treatment of diabetes, has an excellent safety profile. Metformin has also been shown to reduce proliferation, metastasis and angiogenesis in a variety of tumor cells, including cutaneous melanoma. However, it has not yet been tested on uveal melanoma. The objective of this study is to determine the effect of metformin on: (1) survival, (2) migration and (3) production of the angiogenesis precursor vascular endothelial growth factor (VEGF) in the uveal melanoma cell line OCM-1.

**Study Design:** This study employs multiple assays to test the efficiency of metformin against human uveal melanoma *in vitro*.

**Methods:** Metformin treatment concentrations ranged from 0-100 mM were used. The cell counting kit-8 (CCK-8) viability assay was utilized to test the cytotoxicity of metformin. The scratch assay, with subsequent ImageJ analysis, was performed to assess the effect of metformin on migration. To promote angiogenesis and test the effect of metformin on VEGF production, cells were grown in a hypoxic (1% oxygen) chamber. Secreted VEGF was quantitated using a sandwich enzyme-linked immunosorbent assay (ELISA). Western blot was done to test for the presence of SLC22A1, the cellular uptake receptor for metformin. Statistical analysis was done using Kruskal-Wallis with Dunn's multiple comparison test for data on cytotoxicity and angiogenesis, while analysis of variance (ANOVA) with Tukey post-hoc test was used for data on migration.

**Results:** Metformin was lethal to half and all of the cells at 30 mM and 70 mM (LC<sub>50</sub> and LC<sub>100</sub>, respectively). There was a significant decrease in survival ( $P < 0.05$ ) at 30 mM. To avoid bias due to cytotoxicity, all subsequent experiments were performed with 0-20mM metformin. Metformin significantly inhibited cell migration at 5mM metformin ( $P < 0.05$ ). VEGF production also decreased with the lowest dose of metformin (0.1 mM) and significantly at 5 mM ( $P < 0.05$ ). Lastly, SLC22A1 was observed to be strongly expressed in the OCM-1 cell line.

**Conclusions:** Metformin inhibits survival, migration and production of VEGF in human uveal melanoma cells. As it limits key events in metastasis, metformin therefore has potential as an adjunct to therapy. Studies on its mechanism of action and toxicity to proximal eye tissues should be performed. Effectiveness in *in vivo* models must be tested to determine the ideal dose, route and timing of administration.

## Poster 16

**Title:** Blowouts of the Retinal Pigment Epithelium

**Authors:** Mikel Mikhail, **Nour Nofal**, Mikael Sebag

### **Abstract Body:**

**Purpose:** To describe the natural course, clinical outcomes and morphological changes of blowout lesions of the retinal pigment epithelium (RPE) identified on spectral-domain optical coherence tomography (SD-OCT).

**Study Design:** Retrospective cohort study of 30 eyes of 21 patients with SD-OCT evidence of an RPE blowout consisting of a hyperreflective focus of the RPE associated with intraretinal hyperreflective foci.

**Methods:** Clinical and demographic information were obtained. The dimensions of the hyperreflective focus in the RPE, subfoveal choroidal thickness and central subfield thickness (CSF) were recorded. The location of those lesions relative to the fovea, as well as the retinal layers in which intraretinal hyperreflective foci were identified and morphologic abnormalities of the ellipsoid zone and external limiting membrane were identified. These lesions were followed temporally for up to 3.5 years.

**Results:** The mean follow-up period was 56 months +/- 25.3. The mean horizontal and vertical dimensions of these lesions on first identification was 235.2 +/- 108.5 um and 104.8 +/-23.6 um respectively. All lesions were associated with areas of choroidal hyporeflexivity on en-face OCT images. Intraretinal hyperreflective foci were found extending up to the ONL in 39/39 (100%) of cases. The ellipsoid zone (EZ) was found to be continuous in 11/39 (28.2%) lesions. EZ abnormalities were found in 28/39 (71.7%) lesions. On follow-up, only 4/39 lesions had resolution of these EZ abnormalities. These lesions often preceded subretinal fluid formation or choroidal neovascularization.

**Conclusions:** Blowout lesions of the RPE are an ubiquitous finding on SD-OCT and can be found in patients with a variety of macular disease. These lesions are often self-limited, but may be precursors to important pathology.

## Poster 17

**Title:** Efficacy of Tele-ophthalmology Initiative on Patient Satisfaction and Compliance to Follow-up

**Authors:** Prima Moinul, Joshua Barbosa, Mei Lin Chan, Varun Chaudhary

### **Abstract Body:**

**Purpose:** To determine if a diabetic retinopathy education program increases patients' compliance to routine vision screening and to characterize their overall satisfaction with the tele-medicine screening program.

**Study Design:** A Prospective Cohort Study

**Methods:** This study screened and followed 63 adult patients with diabetes (aged 29-89 years) across 9 sub-urban Ontario sites over 1 year. Patients with narrow-angle glaucoma were excluded. Patient demographics, highest education level, and HbA1c status before and after screening, were gathered. Visual acuity, fundus imaging and retinal OCT images were gathered at the screening sites and a 10-15 minute education session was conducted. Two surveys, before and after teaching, were administered to assess the patient's understanding of diabetic retinopathy. A retinal specialist remotely assessed the OCT and fundus images on the modified Walsh scale to determine the need for an ophthalmology consultation. Compliance to follow-up was self-reported over telephone. All statistical analyses were performed on SPSS software (IBM Ver 23.0).

**Results:** Sixty-three patients were enrolled in the study (30.2% were female and 69.8% were male). The average baseline visual acuity was 69-72 letters (approximate Snellen equivalent 20/40). After the education session, 92.5% of patients acknowledged that they were more likely to follow-up as recommended; however, 34.0% were compliant, 41.5% were not, and 24.5% were unknown ( $p=0.32$ ; CI: 0.13-0.32). The average recommended time to follow-up post-screening was 4.1 months (SD 1.4). Most patients (83.0%) were referred back to community optometrists and the ophthalmologist examined 9.4% of patients for further workup and treatment. There were no significant differences in patients' pre to post-screening HbA1c levels ( $p=0.49$ ; CI:0.00-0.01). Overall, 96.3% of patients were satisfied with the tele-ophthalmology initiative and 86.6% agreed that it was important to have the screening close to home.

**Conclusions:** The tele-ophthalmology screening and education initiatives increased compliance in this high-risk group from 0 to 34% over 1 year. However, pre- to post-screening HbA1c levels remain unchanged. It was important for patients to be screened close to home and they were very satisfied with the overall process. Ongoing education initiatives are encouraged to increase patients' compliance to diabetic retinopathy screening and follow-up.

## Poster 18

**Title:** Optical coherence tomography examination of vitelliform lesions and the retinal pigment epithelium in patients with Best vitelliform macular dystrophy

**Authors:** Cynthia Qian, Dionisio Charran, Cameron R. Strong, Timothy J. Steffens, Thiran Jayasundera, John R. Heckenlively

### **Abstract Body:**

**Purpose:** To describe the anatomical changes and natural history of vitelliform lesions in Best vitelliform macular dystrophy (BVMD) using spectral-domain optical coherence tomography (SD-OCT).

**Study Design:** Prospective comparative case series

**Methods:** Forty eyes of twenty patients with molecular confirmation of mutation in the *BEST1* gene and forty eyes of twenty age-matched controls were included. Color fundus photographs, fundus autofluorescence and SD-OCT were obtained and were compared between the two groups. Main outcome measures include evolution of visual acuity and clinical stage of BVMD correlated to OCT measurement parameters including RPE thickness, central macular thickness and integrity of the ellipsoid zone.

**Results:** BVMD patients demonstrated progressive disorganization and thinning of the submacular RPE on OCT when compared to normal controls. Concurrent with the appearance of “egg yolk lesions”, the OCT showed a cleft in the outer retina, creating an apical and basal separation of retinal layers. Eventually, the apical complex of the vitelliform lesion degenerated and flattened. Patients with such lesions nevertheless maintained reasonable visual acuity into the advanced vitelliform stages despite the disruption of normal anatomical changes.

**Conclusions:** Our study suggests that in BVMD, subretinal vitelliform material accumulation leads to a clear separation of the outer retinal layers. The level at which this cleft forms is a topic of discussion and interest, with the most likely levels of least resistance being the interdigitation zone or between the RPE and Bruch’s membrane. The RPE may continue to form a preserved photoreceptor-RPE complex which provides essential nutrients to the photoreceptors and in turn helps patients maintain better than expected visual acuity for years.



## Poster 19

**Title:** Evaluation of the RETeval 30Hz Flicker ERG in the Assessment of Diabetic Patients

**Authors:** Nadia Sayed, Stuart Coupland, vanja Popovic, Merem Faris, **Lynca Kantungane**

### **Abstract Body:**

**Purpose:** The RETeval 30 Hz Flicker ERG Device (LKC Technologies) is a diagnostic tool that has the potential to play a critical role in the early detection of diabetic retinopathy (DR), due to its great ability to detect retinal ischemic disease. As a result, the purpose of this study is to (1) evaluate the use of the RETeval device on diabetic subjects with varying stages of diabetic retinopathy, (2) to observe whether the device identifies any abnormalities in the retina before structural changes become evident and lastly, (3) to correlate the RETeval ERG results to other screening methods used to diagnose DR in order to assess its reliability and utility as a tool in the early detection of sight-threatening DR.

**Study Design:** The recruitment of diabetic subjects was done at the University of Ottawa Eye Institute of the Ottawa Hospital and Riverside Eye Care Centre, where fifty research participants were prospectively studied from 2014 to date.

**Methods:** Recordings were obtained by the use of a skin sensor strip electrode, which is comprised of the active, reference and ground electrode. The device measured the time delay and amplitude of the retina's electrical response. Based on normative data, patients with diabetic retinopathy have a diabetic retinopathy assessment score above 20. Analysis of variance (ANOVA) was used to determine significance between each condition.

**Results:** To date, of the fifty research participants, it was found that majority of diabetic subjects had non-proliferative diabetic retinopathy. Our subject characteristics involve an average age of 59, a blood sugar level of 7.7 mmol/L and 19.5 years as the average time patients having diabetes. As the stage of retinopathy progressed, the implicit time and amplitude increased and decreased, respectively. This finding supports the decline in visual acuity found in patients with worsening diabetic retinopathy. The diabetic retinopathy assessment score was found to be higher in patients with diabetic macular edema, as seen by Optical Coherence Tomography (OCT) findings. As a result, the diabetic retinopathy assessment score directly correlated to the stage of diabetic retinopathy. Lastly, the RETeval score correlated to intravenous fluorescein angiography findings (IVFA) (subjects who were shown to have an absence or presence of vitreous hemorrhages) where subjects were found to have a higher score; however, the results were non-statistically significant. Thus, an increased implicit time (latency) indicates that inner-layer retinal cells have become damaged, thereby delaying their response. Also, dampened amplitude indicates a reduction attenuation of the electrical input produced by retinal cells.

**Conclusions:** Therefore, our results support how valuable the RETeval device can be in screening for diabetic retinopathy. It has potential to improve earlier detection of diabetic retinopathy, before structural changes are visible. It can be also be used as a valuable screening device for diabetic retinopathy. It can be used in community and mobile clinics in third world countries. Lastly, it allows for any health care provider to refer at risk diabetics to ophthalmologists that manage diabetic retinopathy for earlier treatment and prevention of disease progression.

## Poster 20

**Title:** Anterior chamber paracentesis for central retinal artery occlusion: a promising alternative technique

**Authors:** Fatma Zaguia, Mikel Mikhail, Michael Kapusta

### **Abstract Body:**

**Purpose:** Central retinal artery occlusion (CRAO) is a visually devastating ophthalmological emergency with a narrow therapeutic timeframe. Many of the traditional conservative approaches revolve around the principle of lowering/varying the intraocular pressure in hopes of increasing retinal perfusion and dislodging any embolus. These therapies include digital massage, administration of systemic vasodilators and diuretics, and anterior chamber (AC) paracentesis. Various techniques for performing AC paracentesis have been described, including the use of different gauge needles with or without an attached syringe, plunger or bulb pipette. The objective of this study was to present a case of CRAO treated with a unique alternative technique for performing AC paracentesis, with evidence of promising retinal reperfusion.

**Study Design:** We are presenting a technique case report. Patient is a 69 year-old female who was referred with history of same day acute painless vision loss OD, with prior standard AC paracentesis done by an outside ophthalmologist. Visual acuity was hand motion OD. Diagnosis of CRAO was made based on classic fundus appearance of retinal pallor and cherry-red macula.

**Methods:** Modified paracentesis was performed at the slit lamp, using topical anesthesia and two-hand technique. 25-gauge needle attached to tuberculin syringe with plunger was used to enter the AC at the limbus. Controlled aspiration of approximately 100ul aqueous fluid was done, with subsequent reinjection of fluid back into the AC. 6 cycles of careful aspiration/reinjection were done, with final aspiration of 100ul of aqueous before exiting AC. Serial fundus photographs were taken pre-procedure, 1 hour post-procedure and at 1 week follow up.

**Results:** Fundus photograph upon presentation showed classical CRAO changes, with several retinal artery ghost vessels and clear filling defects. No complications were noted during or post modified paracentesis procedure. IOP was 9 1-hour post paracentesis, and AC was noted to be formed and devoid of any air bubbles. Fundus photograph at 1-hour post procedure shows clear reperfusion of retinal arterial circulation. Changes were consistently seen on fundus photograph at 1-week follow up. Visual acuity remained unchanged at 1-week follow-up.

**Conclusions:** We are presenting a case of CRAO treated with a unique alternative technique for AC paracentesis, which consists of varying intraocular pressure through aspiration/reinjection of aqueous fluid. We were able to show evidence of arterial reperfusion on serial fundus photographs. . Failure of visual acuity improvement is likely due to delayed presentation, hence irreversible retinal damage at presentation despite revascularisation. This technique could represent a novel method to the acute treatment of CRAO.

## CORNEA, EXTERNAL DISEASE AND REFRACTIVE SURGERY

### Poster 21

**Title:** Meibomian gland dysfunction and pseudohypoaldosteronism - case report

**Authors:** Tahra AlMahmoud, Anu Varghese

#### **Abstract Body:**

**Purpose:** There are various salt wasting diseases in infancy such as endocrine abnormalities, cystic fibrosis, renal disease and severe diarrhea. None of these are associated with eye abnormality. To our knowledge one case of pseudohypoaldosteronism associated with Meibomian Gland dysfunction has been reported in the literature.

**Study Design:** Case report

**Methods:** Case report and review of literature

**Results:** A full term 5 days old female, presented with poor sucking and hypoactivity. The patient was found to have hyperkalemia (10.2. mEq/L), hyponatremia (129 mEq/L), high renin activity (more than 116.73mcg/l/h) and serum hyperaldosteronism (78350 nmol/l) with Paradoxical urinary sodium excretion. Cortisol and 17alpha hydroxyprogesterone level were normal. Physical examination was normal apart from dry skin on the face and white finger like projections of toothpaste like material on the margins of upper and lower eyelids extending to the lumina of the meibomian glands. Another sibling had this finding at birth and the child died after 2 weeks of birth. Our patient was discharged from the hospital with breast feeding restriction and dietary restrictions.

**Conclusions:** We report an eye lid abnormality which added clue to the diagnosis of fatal systemic disease such as this case of pseudohypoaldosteronism.

## Poster 22

**Title:** Iatrogenic Keratectasia following Photorefractive Keratectomy

**Authors:** Ricarda J. Bentham, David Edmison, Pablo Morales, Yelin Yang, Kashif Baig.

### **Abstract Body:**

**Purpose:** To examine the uncommon complication of corneal ectasia following Photorefractive Keratectomy (PRK).

**Study Design:** Retrospective Cohort Study

**Methods:** Patients under the care of one Ophthalmologist from 1995 to 2015 who developed keratectasia following PRK were reviewed.

**Results:** 34,000 patients underwent PRK by the same Ophthalmologist from 1996-2015 and 10 eyes among 10 patients were diagnosed with postoperative ectasia. All 10 were males; mean age was 31.6 years (23-44). Ectasia developed on average 64.8 (10-180) months post-operative. Preoperative spherical average was -5.00 (-11.00-2.5). One patient was considered to be a Keratoconus suspect preoperatively. The Treatments for the ectasia included retreatment PRK +/-mitomycin, collagen crosslinking and transplant.

**Conclusions:** Keratectasia is a rare complication following PRK in comparison to laser-assisted in situ keratomileusis. Many of the risks factors for post-PRK ectasia are similar to post-LASIK and despite iatrogenic ectasia following PRK being rare, it is a possible and important complication for PRK surgeons to consider.

## Poster 23

**Title:** Patient-reported visual function after Boston keratoprosthesis type I implantation

**Authors:** Cristina Bostan, Marwan Elfekhfakh, Mona Harissi-Dagher

### **Abstract Body:**

**Purpose:** To determine patient-reported visual function following Boston keratoprosthesis type I (BKPro) implantation using the French National Eye Institute Visual Function Questionnaire-25 (NEIVFQ-25), and its association with postoperative best-corrected visual acuity (BCVA).

**Study Design:** Cross-sectional study.

**Methods:** Consecutive patients implanted with BKPro between 2008 and 2015 were assessed for eligibility. Were excluded unreachable patients, deceased, unable to consent, non-French speakers, and those with explanted BKPro. One interviewer administered the questionnaire by phone to consenting patients between February and June 2015. Clinical charts were retrospectively reviewed for demographics, indications for BKPro, baseline and postoperative (at time of interview) BCVA. Means  $\pm$  standard deviations and frequencies are reported. For patients operated unilaterally, stratification of NEIVFQ-25 scores based on BCVA in the non-operated eye was performed. Multivariate linear regression was also carried, using NEIVFQ-25 scores as dependent variables, and demographics and postoperative BCVA in both eyes as covariates. For patients operated bilaterally, no stratification was possible (small sample size), and only univariate (Spearman) correlation between NEIVFQ-25 scores and BCVA could be performed. Student t tests were used for comparisons.  $P < 0.05$  indicated statistical significance.

**Results:** Sixty-four patients, aged  $59 \pm 13$  years, 52% male, with a follow-up of  $54 \pm 19$  months, were included. Baseline characteristics of excluded (41%) patients did not differ significantly. Postoperative BCVA increased compared to baseline in all operated eyes ( $p = 0.000$ ). In patients with unilateral BKPro ( $n = 52$ ), logMAR BCVA was  $1.41 \pm 1.00$  in the operated eye, and  $0.80 \pm 0.97$  in the non-operated eye ( $p = 0.002$ ). Their NEIVFQ-25 overall score was  $70.7 \pm 25.1$ . Scores on all vision-related subscales were greater when BCVA in the non-operated eye was  $>20/200$  compared to  $\leq 20/200$  ( $p = 0.000$ ). In multivariate analysis, BCVA in the non-operated eye was associated with all vision-related subscales ( $p < 0.01$ ). Postoperative logMAR BCVA in patients with bilateral BKPro ( $n = 12$ ) was  $1.31 \pm 1.00$ , and their NEIVFQ-25 overall score was  $63.0 \pm 18.7$ . BCVA in the best eye positively correlated with Near/Distance activities, and Social functioning subscales ( $p < 0.05$ ). There was no significant difference between NEIVFQ-25 scores of patients operated unilaterally vs. bilaterally.

**Conclusions:** We describe patient-reported visual function more than 4 years after BKPro implantation. Compared to data at 1 year previously reported, our results suggest that, as vision deteriorates progressively in the operated eye, patients increasingly rely on their non-operated eye. Subjective visual function after bilateral BKPro is assessed for the first time in this study, and appears comparable to that after unilateral surgery. Larger, prospective, long-term studies, with assessment at baseline, are warranted to understand the effect of BKPro implantation.

## Poster 24

**Title:** DMEK shapes: easing the tapping

**Authors:** Johanna Choremis, Mathieu Mercier, Michele Mabon, Isabelle Brunette, Julia Talajic

### **Abstract Body:**

**Purpose:** The purpose of this study is to determine whether different shapes of DMEK tissue had a tendency to scroll less tightly than a conventional circular graft.

**Study Design:** Prospective laboratory-based study .Ethics approval was obtained from Hopital Maisonneuve Rosemont's ethics committee.

**Methods:** The local eye bank, operated by Hema Quebec, supplied pre-stripped corneas unfit for transplantation. Each pre-stripped cornea was trephinated with an 8 mm size round punch. It was stained with vision blue for 3 minutes then floated in BSS to observe its scrolling pattern. A photo was taken with iphone6. The graft was then unfolded on the stromal bed and a new shape was cut using a crescent or a 2 mm derm punch. The graft was then replaced in the BSS fluid to observe and photograph its scrolling pattern once more. Each tissue was used as its own control in this way.

**Results:** Certain shapes seemed to stay more open than others. The shape that least scrolled was that of a Maltese cross. Photos of results will be shown.

**Conclusions:** Certain shapes may lead to less scrolling of the DMEK graft in a BSS bath. These may in turn be easier to unfold intraoperatively. In the future, perhaps special punches could be developed to ease the unscrolling of DMEK tissue which seems to be the most dreaded step for surgeons hesitant to learn the procedure.

## Poster 25

**Title:** Kaposi's sarcoma of the conjunctiva and orbit

**Authors:** Jacqueline Coblentz, Sabrina Cohen, Gerardo Discepola, Rubens Belfort Neto, Bryan Arthurs, Miguel Burnier Jr.

### **Abstract Body:**

**Purpose:** To report two cases with rare manifestations of Kaposi's sarcoma.

**Study Design:** Two case reports.

**Methods: Case report 1:** A 93-year-old caucasian male presented with a nodule in his left eye. His past clinical history reported a gastrointestinal stromal tumor treated with imatinib mesylate (Gleevec®). All laboratory tests were negative, including tests for HIV. There was no history of acquired or iatrogenic immunosuppression. Best corrected visual acuity was 20/25 in both eyes. Ophthalmic examination was normal except for biomicroscopy in the left eye, which revealed conjunctival hyperemia with a nodule in the left inferior fornix. The patient underwent computed tomography of both orbits, which confirmed the conjunctival nodule and also showed lateral invasion to the orbit. Total excision of the nodule was performed and the specimen was sent for histopathological analysis. At low magnification, a fragment of conjunctiva with a subepithelial tumor was seen. The tumor was composed of dilated blood vessels with numerous spindle cells interspersed between them. There were also extensive areas of hemorrhage. At high magnification, the intervascular tissue was composed of atypical spindle cells with spindle and hyperchromatic nuclei. Several extravasated red blood cells were observed. Immunohistochemistry against Human Herpes Virus 8 was positive, with nuclear expression, which confirmed the diagnosis of Kaposi's sarcoma.

**Results: Case report 2:** A 50-year-old woman presented with hyperemia and itching in both eyes. She was previously treated for leprosy. Visual acuity was 20/20 in both eyes, intraocular pressure was 18mmHg in the right eye and 16mmHg in the left eye, and fundoscopy was normal. Biomicroscopy revealed intense hyperemia with inferior conjunctival nodules in both eyes, which was larger in the right eye. She also had lesions on her tongue and palate. Serology was performed and was positive for HIV (CD4+ 60 cells/ $\mu$ L). She started systemic treatment and surgical excision of the nodules was performed. Histopathological and immunohistochemistry analysis confirmed the diagnosis of Kaposi's sarcoma.

**Conclusions:** Although Kaposi's sarcoma is more common in HIV-positive males, these case reports are a reminder that elderly HIV-negative men can be affected, as well as HIV-positive women. Despite the conjunctiva being the most affected ocular structure, it is always important to rule out orbital invasion.

## Poster 26

**Title:** Applications for 3D printing technology in the field of ophthalmology

**Authors:** Cornelis de Jager, Chris Adams, Davin Johnson

### **Abstract Body:**

**Purpose:** To describe potential uses of 3D printing technology in the field of Ophthalmology including design and production of microsurgical instruments and a novel sutureless keratoprosthesis prototype.

**Study Design:** Computer design and proof of concept study.

**Methods:** Designs for surgical instruments and a sutureless keratoprosthesis were created in AutoCAD software (Autodesk, San Francisco, USA), and printed with the commercially available Form 1+ 3D printer (Formlabs Inc, Somerville, USA) using plastic resin. Our prototypes underwent a series of modifications to create functional microsurgical instruments suitable for ophthalmic use, as well as a sutureless keratoprosthesis able to quickly and securely attach to a trephined cadaver cornea.

**Results:** We successfully designed and 3D-printed a variety of microsurgical instruments using hard plastic resin followed by UV curing. These included both simple instruments such as a muscle hook, and more complex instruments such as forceps and clamps. Individual cost of instruments ranged from \$0.14 to \$0.56 per unit. Through a series of prototypes, we also successfully designed a “sutureless keratoprosthesis” that easily fit onto a trephined cornea to withstand intraocular pressures greater than 120mmHg. The design consisted of a clear central optic with surrounding threads and a posterior plate which fit behind the trephined cornea. An annular ring is then attached and tightened to sandwich the trephined cornea between the posterior plate and ring.

**Conclusions:** Applications for 3D printing technology in the field of medicine are rapidly expanding. Within the field of Ophthalmology, potential uses of 3D printing include low-cost and “on demand” printing of custom microsurgical instruments and other surgical devices. We created a “sutureless keratoprosthesis” that could be used as an educational tool for operating on cadaver eyes, or as an emergency method of closing an eye in the event of a suprachoroidal hemorrhage during penetrating keratoplasty.



## Poster 27

**Title:** Etiology and management of ocular surface keratinization: a case report and literature review

**Authors:** Ahsen Hussain, Michael Sidiropoulos, Navdeep Nijhawan

### **Abstract Body:**

**Purpose:** The human conjunctiva has the potential for developing keratin fibrils comparable to those normally found in skin epithelium. Ocular involvement affecting the conjunctiva, cornea, lens and retina has been described in many dyskeratotic disorders with variable multiorgan involvement. We present a patient diagnosed with dyskeratosis congenita (DKC) affecting the eyelids and ocular surface, and discuss the pathophysiology of this condition and potential treatment options.

**Study Design:** Case report and literature review

**Methods:** A 40 year-old patient with DKC presented with bilateral epiphora and quad-punctal stenosis. There were no initial ocular surface findings. 12 months later the patient presented with keratinization of the medial part of the upper and lower eyelid fornix. Conservative management included bandage contact lens use. Continued progression over two years necessitated complete excision of keratinized tissue, amniotic membrane grafting and fornix reconstruction. This was followed by a repeat of the same procedure and superficial keratectomy performed two years later. He has remained stable on Restasis® and Vitamin A ointment allowing tolerance of bandage contact lens wear.

**Results:** There are a variety of mainly acquired causes resulting in the production of keratinized cells in the conjunctival epithelium. Etiology can be differentiated on the basis of whether there is true metaplasia of the epithelial layer or whether there is simply drying of the normal cells through exposure. The latter is commonly seen in conditions such as lagophthalmos and eyelid ectropion. True metaplasia can occur in vitamin A deficiency, Stevens-Johnson Syndrome, burn injury, trachoma and eyelid irradiation. The genodermatosis DKC is a rare cause of chronic keratoconjunctivitis and keratinization. Treatment of the underlying cause if feasible, mucous membrane grafting and cryotherapy are potential treatment options.

**Conclusions:** Inherited or acquired alterations in normal cellular behaviour need to be considered in the differential diagnosis of ocular surface keratinization. Although our patient benefitted from surgical management, it is expected that his condition will progress. Topical treatment with immunomodulating agents such as cyclosporine or mast-cell stabilizers may be of potential benefit.

## Poster 28

**Title:** The Use of Serum Drops for the Treatment of Ocular Surface Disease in Canada - A National Survey of Cornea Specialists

**Authors:** Michael Marchand, Mona Harissi-Dagher, Marc Germain, Paul Thompson, Marie-Claude Robert

### **Abstract Body:**

**Purpose:** To review the use and preparation of serum eye drops for the treatment of ocular surface disease in Canada, and to assess the need for an improved access to this therapy.

**Study Design:** Cross-sectional study.

**Methods:** A confidential survey was emailed to cornea specialists members of the Canadian Ophthalmological Society, and to laboratories preparing serum eye drops. The survey was sent in April 2016 and continued through September 2016. The research protocol was reviewed and approved by the CHUM Research Ethics Committee and was conducted in compliance with the Declaration of Helsinki. Descriptive statistics on serum drops accessibility, production and use are reported.

**Results:** Thirty-three (33) Canadian cornea specialists (out of 93) and eight (8) laboratories completed the survey. The majority of participants were practicing at a university hospital centre (61%), and the mean duration of practice as a cornea specialist was  $18 \pm 14$  years (range 1-44). Forty-nine percent of respondents described serum drops as very or somewhat inaccessible in their practice setting, mainly because of financial (74%) and logistic (65%) barriers. Sixty-one percent agreed that drops made of allogeneic serum would allow this treatment to be provided more readily. Fifty-two percent had serum drops produced by a private laboratory or pharmacy, and 32% by a hospital laboratory. No quality control tests or serological tests were routinely performed, and sterility checks were done by only one laboratory. The mean production cost for one patient was 1.29\$ per daily dose (range 25-60\$ per month), which was paid by the patient in 50% of cases. Over the last year, each laboratory prepared serum eye drops for  $49 \pm 32$  patients, and each ophthalmologist prescribed serum eye drops to a median 10 to 20 patients.

**Conclusions:** While most cornea specialists agree that serum eye drops are indicated for several refractory ocular surface disorders, there is significant discrepancy in accessibility to this treatment across Canada. This study confirms the need for an improved access to this therapy. Use of serum tears is limited by financial and logistic barriers which could be reduced by the introduction of an allogeneic serum drop.

## Poster 29

**Title:** Evaluation of dry eye disease in children with systemic lupus erythematosus, external eye disease and normal controls

**Authors:** Stephan Ong Tone, Uri Elbaz, Earl Silverman, Deborah Levy, Sara Williams, Kamiar Mireskandari, Asim Ali

### **Abstract Body:**

**Purpose:** To evaluate dry eye disease (DED) in children with systemic lupus erythematosus (SLE), external eye diseases (blepharokeratoconjunctivitis and Stevens-Johnson syndrome), and normal controls using common diagnostic tools.

**Study Design:** Prospective observational study

**Methods:** Between March 2015 and December 2015, SLE patients were recruited from the Rheumatology clinic and external eye disease and normal patients were recruited from the Ophthalmology clinic. All patients underwent a subjective and objective dry eye assessment using the Canadian Dry Eye Assessment (CDEA) questionnaire, tear film osmolarity, slit lamp examination, tear film break-up time (TFBUT), Schirmer's Test 1, and ocular staining score with corneal fluorescein staining and lissamine green conjunctival staining. The primary outcome measurement was the severity of DED in children with SLE, external eye disease and normal children. For each test, the more severe measurement of the two eyes was used for statistical analysis. Secondary outcome measurements included symptoms to signs correlation.

**Results:** Sixty-six patients and 132 eyes were recruited to the study. Our 3 study groups included 34 patients with SLE, 17 patients with external eye disease (5 patients with Stevens-Johnson syndrome and 12 patients with blepharokeratoconjunctivitis), and 15 normal controls. Subjectively, children with external eye disease exhibited worse symptomatology compared to the SLE and normal groups (CDEA score  $9.12 \pm 8.45$  vs  $6.35 \pm 5.38$  vs  $3.80 \pm 3.19$ , respectively,  $p=0.0455$ ). Objectively, children with SLE or external eye disease had more DED compared to normal controls (corneal fluorescein staining score  $1.68 \pm 1.72$ ,  $1.82 \pm 2.01$  vs  $0.20 \pm 0.41$ , respectively,  $p=0.0080$ ). No statistically significant differences in maximum tear osmolarity, inter-eye absolute differences in tear osmolarity, TFBUT, Schirmer's Test 1, lissamine green staining score or ocular staining score were observed between children in the three groups. The CDEA questionnaire scores correlated with corneal fluorescein staining ( $r=0.2413$ ,  $p=0.0067$ ), conjunctival lissamine staining ( $r=0.1792$ ,  $p=0.0455$ ) and total ocular staining scores ( $r=0.2382$ ,  $p=0.0075$ ).

**Conclusions:** Children with SLE are less symptomatic from dry eyes as per the CDEA questionnaire compared to children with external eye disease, even though they have similar corneal fluorescein staining scores. Tear osmolarity, TFBUT, Schirmer's Test 1, conjunctival lissamine staining and total ocular staining scores are unable to differentiate between children with SLE, external eye disease and normal controls.

## Poster 30

**Title:** Collagen cross-linking as an adjunct for repair of corneal lacerations: a cadaveric study

**Authors:** Timothy Ratzlaff, David Wei, Yao Wang, Mark Xu, Davin Johnson

### **Abstract Body:**

**Purpose:** To determine the efficacy of collagen cross-linking (CXL) as an adjunct to suturing in the repair of corneal lacerations.

**Study Design:** Prospective cadaveric study.

**Methods:** A total of 20 fresh cadaveric eyes had a linear 5 mm full-thickness laceration created in the central cornea. The eyes were then randomized to receive either 1 (n=8), 2 (n=8), or 3 (n=4) standard corneal sutures. The burst pressure of the wound was then measured. All eyes in the 1- and 2-suture groups then underwent standard CXL, with burst pressure repeated afterwards.

**Results:** The initial wound burst pressure in the 1-, 2-, and 3-suture groups was 54.9, 74.0, and 201.2 mmHg, respectively. After CXL, wound burst pressure increased by a mean of 3.2 and 62.3 mmHg in the 1- and 2-suture groups, respectively. This change was statistically significant in the 2-suture group ( $p=0.017$ ). After CXL, the 2-suture group still had a significantly lower burst pressure compared to the 3-suture group ( $p=0.011$ ).

**Conclusions:** This study highlights a potential novel application for CXL to strengthen corneal wounds. Provided suture density is sufficient to appose the wound edges, CXL may result in short-term wound strengthening. This could potentially allow for decreased corneal suture density and a corresponding decrease in suture-related complications.

## Poster 31

**Title:** Practice Patterns in the Interdisciplinary Management of Corneal Abrasions

**Authors:** Michael Ross, Jean Deschenes

### **Abstract Body:**

**Purpose:** To characterise the treatment and follow up patterns of corneal abrasions at an academic health center.

**Study Design:** A retrospective chart review.

**Methods:** This is a retrospective review of 90 cases of corneal abrasions over a 2-year period at a tertiary care academic hospital, of which 75 were seen by the ophthalmology department. All consultations whose primary reason was a corneal abrasion, as determined by the emergency department physician, were included in the study. Information on treatment regimen, corneal findings by emergency and ophthalmology physicians, time between follow ups and final outcomes was collected.

**Results:** 75 patients were seen by ophthalmology a median of 1 day after the ER visit. 25 patients did not arrive for their follow up appointment. 22 of the abrasions were healed by time of the ophthalmology exam, and 51 patients had unhealed corneal abrasions, and 2 had corneal ulcers. Management was changed in 29 of the patients by ophthalmology. The most common management changes were hypertonic saline ointment for prophylaxis or treatment of recurrent erosion syndrome, followed by bandage contact lenses for comfort. 86 patients were prescribed topical antibiotics, and 3 patients received topical diclofenac as well.

**Conclusions:** Corneal abrasions are a common condition, and practice patterns for follow up vary widely. While the vast majority of patients do very well and likely would heal on their own without ophthalmology referral, it seems reasonable that patients with corneal abrasions are assessed once by an ophthalmologist, which could be 1-2 days after the initial emergency visit.

## Poster 32

**Title:** Ophthalmia nodosa secondary to caterpillar setae in a youth

**Authors:** Solin Saleh, Seymour Brownstein, Mustafa Kapasi, Michael O'Connor, Paula Blanco

### **Abstract Body:**

**Purpose:** Ophthalmia nodosa is an inflammatory reaction in and around the eyes to certain types of insect and plant hairs which may possess special mechanical and toxic attributes. We present a case of ophthalmia nodosa secondary to caterpillar hairs that became embedded in the eye of a 6-year-old boy, causing irritation and decreased vision. Other cases of caterpillar hair-induced ophthalmia nodosa have been reported, varying from keratoconjunctivitis to penetration into the eye and subsequent endophthalmitis or chorioretinitis.

**Study Design:** Case report

**Methods:** A 6-year-old boy who had a caterpillar thrown into this right eye presented with redness, swelling, pain and decreased vision. About 100 caterpillar hairs were found embedded in the periorcular skin, eyelids and ocular surface. Removal of the hairs with forceps was technically difficult as the fine hairs broke easily and the remaining shafts travelled deeper into the anterior ocular structures. Several attempts to remove the hairs over multiple clinic visits were unsuccessful, and the child eventually required removal of the foreign bodies under general anesthesia.

**Results:** In the operating room, many residual hairs were found in the deep palpebral conjunctiva and plica semilunaris. Histopathologic examination of an inflamed conjunctival biopsy specimen revealed a fragment of fibrous tissue that contained an occasional multi-nucleated giant cell, as well as focal collections of lymphocytes, plasma cells, and macrophages that stained positive with CD 68. In deeper sections, a round, light brown structure with an inner tubule and outer barb-like projections was visualized, consistent with a *Pyrrharctia isabella* caterpillar hair. Gross and light microscopic examination of the caterpillar hair revealed a dark hair shaft with multiple, regularly placed sharp barbs aligned in the same direction and protruding at about 30° angles.

**Conclusions:** Caterpillar setae injuries, although uncommon, are a known cause of ophthalmia nodosa, leading to a variety of potentially serious ocular disorders. The pathophysiology of the inflammation is thought to be due to the mechanical progression of the hairs into the eye secondary to barb-like projections, as well as a toxic protein from a venom gland within the caterpillar hair shaft, features that are both highlighted histopathologically in our case. Patients should be advised to seek medical treatment immediately once a caterpillar injury has occurred. Removal under general anesthesia may be required in pediatric cases, as residual hairs that are missed will continue to penetrate into the ocular structures and may cause further damage and irritation.

### Poster 33

**Title:** A unique case of peripheral ulcerative keratitis secondary to hepatitis B-associated cryoglobulinemia and vasculitis

**Authors:** David W. Wei, Christian Pagnoux, Clara C. Chan

#### **Abstract Body:**

**Purpose:** To present a case of peripheral ulcerative keratitis (PUK) caused by hepatitis B virus (HBV), a previously unreported etiology, and discuss the pharmacological and unique customized glue-patch surgical treatment with visual results at two-year follow-up.

**Study Design:** Observational case report with discussion of diagnosis and treatment.

**Methods:** A 52-year-old female patient presented with unilateral eye pain, photophobia, arthralgia, scarring from a maculopapular rash, and subsequently facial numbness. At presentation, her best spectacle corrected visual acuity in the affected eye was 20/80. Severe superior corneal thinning without infiltrate was seen on slit lamp exam. Progression of corneal ulceration continued until 10% of cornea thickness remained. Full workup for autoantibodies was positive for rheumatoid factor. C4 complement was also significantly decreased, and positive HBV serology was confirmed.

**Results:** Clinical symptoms, physical exams, and lab findings suggest HBV-associated cryoglobulinemia and vasculitis. Initial management included prednisone for immunosuppression which did not stop the progression of corneal thinning. Cyclophosphamide and tenofovir were subsequently added for increased immunosuppression and HBV treatment. Conjunctival resection was performed to excise the inflammatory area and a custom-cut glue patch technique was used to stabilize the corneal melt. She was tapered off prednisone and cyclophosphamide and currently only takes mycophenolate for continued immunomodulation. Best corrected visual acuity improved progressively following commencement of treatment. Two years after initial presentation, her cornea is well healed and her best corrected visual acuity is notably improved at 20/30<sup>-2</sup>.

**Conclusions:** Given the numerous etiologies of PUK, diagnosis requires detailed history and physical examination with appropriate consultation with rheumatology specialists. Prompt pharmacologic immunosuppression and treatment of the underlying cause in combination with surgical intervention when necessary is crucial to preventing serious visual consequences including corneal perforation and blindness.

## GLAUCOMA

### Poster 34

**Title:** Bio-modulation of Primary Human Tenon's Capsule Fibroblasts Using a Novel Application of Coated Magnesium

**Authors:** James J. Armstrong, Brian Dang, Vasiliki Tellios, Nikoleta Tellios, Cindy Hutnik

#### **Abstract Body:**

**Purpose:** Trabeculectomy is currently the most common surgical method for the treatment of glaucoma, but has only a moderate success rate due to unpredictable and variable wound healing responses. A hallmark of wound healing is increased deposition of extracellular matrix by Tenon's capsule fibroblasts which become activated following injury. The present adjunctive use of antimetabolite drugs inhibits wound healing but cannot be precisely dosed and adds additional risk. Magnesium is implicated as having the ability to negatively modulate wound healing, but normally corrodes rapidly in solution. The aims of this study are to regulate corrosion through the use of biocompatible coatings and examine the ability of coated magnesium to modulate human Tenon's capsule fibroblast activity.

**Study Design:** *In vitro* assessment of Tenon's capsule fibroblast activity in the presence of coated magnesium disks.

**Methods:** Primary cultures of human Tenon's capsule fibroblasts (HTCFs) were established from tissue specimens obtained during ophthalmic surgery. Characterization of the cells was performed through immunostaining. Cells were cultured on a glass surface or one of three types of coated magnesium: hydroxyapatite, dicalcium phosphate dihydrate (DCPD), or dicalcium phosphate dihydrate conjugated with stearic acid (DCPD-SA). Fluorescence imaging was used to assess cell adhesion and spreading. Metabolic activity (MTT), proliferation (BrdU), cytotoxicity (LDH), apoptosis (ELISA), and protein secretion (fibronectin ELISA) cellular assays were completed.

**Results:** Cells grown on all magnesium coatings displayed poor spreading and adhesion. Those grown on DCPD and DCPD-SA coated magnesium had significantly lower metabolic, proliferative, and protein secretory activity than control. HA coated magnesium had a lesser effect on these activities. None of the treatments resulted in increased apoptosis or necrosis.

**Conclusions:** Coated magnesium have varying degrees of modulatory effect on Human Tenon's Capsule Fibroblasts and is biocompatible *in vitro*.



## Poster 35

**Title:** The Temporal Raphe of the Retinal Nerve Fibre Layer (RNFL) in Glaucoma Patients with a Horizontal Hemi-field Visual Field Defect

**Authors:** Ziad Butty, Jayme R. Vianna, Glen P. Sharpe, Donna M. Hutchison, Lesya M. Shuba, Paul E. Rafuse, Marcelo T. Nicolela, Balwantray C. Chauhan

### **Abstract Body:**

**Purpose:** To determine whether the angle between the fovea and the temporal raphe (temporal raphe angle, TRA) respected the angle of a clear nasal step visual field (VF) defect.

**Study Design:** Prospective study in glaucoma patients with unequivocally and repeatable hemi-field VF defect.

**Methods:** Open-angle glaucoma patients followed in a prospective study who had all 5 locations immediately above or the below the horizontal midline with a pattern standard deviation value of  $P < 0.5\%$  in at least the last 3 consecutive visual fields (Program 24-2, Humphrey Field Analyzer) were identified and recruited. Optical coherence tomography (OCT, Spectralis) consisting of 500 horizontal  $30^\circ$  B-scans acquired in coordinates respecting the fovea to Bruch's membrane opening (FoBMO angle) was performed. A customized VF test with 7 stimuli separated by  $1^\circ$  vertically at each of 6 horizontal eccentricities ( $6^\circ$  apart) nasal to the fovea was designed and performed in all patients. The TRA was measured independently by two investigators, while the angle of the VF defect angle was measured with a best fit through the 2 vertical points with the highest difference in sensitivity at each horizontal eccentricity and the fovea. Spearman's correlation was performed to correlate the TRA and VF defect angles.

**Results:** We included 11 (6 right and 5 left) eyes of 8 patients with median age of 67 (range: 63 to 74) years. There were 8 patients with an inferior hemi-field VF defect. The FoBMO angle was always negative with a median of  $-7.0^\circ$  (range:  $-9.9^\circ$  to  $-1.4^\circ$ ). The TRA had a median of  $+3.2^\circ$  (range:  $-1.8^\circ$  to  $+11.6^\circ$ ). The VF angle was  $+0.1^\circ$  (range:  $-4.1^\circ$  to  $+6.3^\circ$ ). The correlation between the TRA and VF angles ( $\rho = 0.63$ ,  $P = 0.04$ ) was higher than that between the TRA and FoBMO angle ( $\rho = -0.20$ ,  $p = 0.55$ ).

**Conclusions:** Clear and repeatable glaucomatous hemifield scotomas do not respect the horizontal midline. Instead, the VF angle in individual patients correlates with the orientation of the RNFL temporal raphe which itself is variable among patients and which also does not respect the horizontal midline.

## Poster 36

**Title:** Ontario Glaucoma Management Study- Results From a Provincial Survey

**Authors:** Michael V. Caputo, Steve A. Arshinoff, Grace M. Scott, Brian J. Mitchell

### **Abstract Body:**

**Purpose:** To identify the current state of glaucoma management in remote Northern Ontario communities.

**Study Design:** Survey of Ontario ophthalmologists.

**Methods:** This research ethics board approved study employed a cross-sectional, self-report research design. A previously validated survey was distributed electronically to all public and private eye departments and practices in Ontario listed on the official list of members of the Canadian Ophthalmological Society. Geographical region was compared by LHIN and also by urban/rural status. Rurality was assessed using Statistics Canada's definition of urban as a population of 1000 or more and no fewer than 400 persons/square kilometer.

**Results:** There was clear variability in access to resources, diagnostic procedures and standards of practice in glaucoma management across the province. The ophthalmology teams assessed also ranged in number and scope of interprofessional characteristics.

**Conclusions:** The results of this study highlight the uneven distribution of ophthalmology services and availability of technology in Ontario. In order to enhance eye care and vision related disability management in remote areas, health service delivery models specific to ophthalmology care must be identified. Enhanced methods of delivering care to remote populations warrants exploration.

## Poster 37

**Title:** A Decade of Surgical Eye Removals in Ontario: A Clinical-Pathological Study

**Authors:** Sze W. S. Chan, Shireen Khattak, Narain Yücel, Neeru Gupta, Yeni Yücel

### **Abstract Body:**

**Purpose:** To assess patient demographics, clinical indications and pathological causes of surgically removed eyes over a decade in Ontario and to identify areas of ocular disease management needing more attention.

**Study Design:** This is a retrospective cross-sectional study. Participants include the surgically removed eyes of 713 consecutive patients from 2004 - 2013.

**Methods:** Demographic, clinical and pathological data were collected on all eyes received by the University of Toronto Ophthalmic Pathology Laboratory from 2004 - 2013.

**Results:** Of 713 eyes removed, 52% were males and 48% were females. Enucleations accounted for 60% of cases, eviscerations for 39% of cases, and exenteration for 1% of cases. The most common clinical indications for surgical eye removal were blind painful eye (37%), neoplasm (35%), and trauma (6%). The leading pathological causes of eye removal were neoplasm (36%), glaucoma (21%), infection or inflammation (17%), and trauma (16%). Glaucoma-related findings were the most common pathological findings observed (38%), regardless of the primary cause. Males were more affected by ocular trauma (68% vs. 32%) while females were more affected by infection or inflammation (67% vs. 37%). Trauma cases were significantly younger ( $49.5 \pm 19.2$  years,  $p = < 0.0001$ ), compared to older infection or inflammation cases ( $71.2 \pm 17.1$  years,  $p = < 0.0001$ ).

**Conclusions:** A blind painful eye and neoplasm were the most commonly documented indications prior to removal of the eye. Common pathologies included glaucoma, neoplasm, infection/inflammation, and trauma. However, regardless of the primary cause, glaucoma-related pathologies were the most common pathological findings. Refractory glaucoma and pain continue to be important reasons to remove the eyes of patients in Ontario. More effective and targeted management strategies are needed to reduce the need for this radical eye surgery of last resort.

**Acknowledgements:** The Dorothy Pitts Research Fund and Henry Farrugia Research Fund.

## Poster 38

### Third Prize, COS Awards for Excellence in Ophthalmic Research

**Title:** Standalone Ab Interno Gelatin Stent with MMC Versus Standalone Trabeculectomy with MMC: Post-operative Patient Experience and Healthcare Utilization

**Authors:** Husayn Gulamhusein, Matthew Schlenker, Alix Somers, Ina Conrad-Hengerer, Ingeborg Stalmans, Fritz Hengerer, Iqbal K. Ahmed

#### **Abstract Body:**

**Purpose:** In evaluating new surgical approaches for uncontrolled glaucoma on maximum tolerated therapy, we not only need to evaluate efficacy and safety, but also patient experience and effect on healthcare utilization. This is critical in determining an approach's merit from the patient's perspective and to feed into decision analysis and cost effectiveness models for policy makers.

**Study Design:** Multi-center retrospective interventional cohort study.

**Methods:** 373 eyes in 311 patients were identified from January 2011 to July 2015 in 3 centers. 80 eyes were excluded due to previous incisional surgery, atypical forms of glaucoma, age extremes, or follow-up <1 month. Assessed outcomes include: 1) number of in clinic maneuvers, 2) proportion of eyes receiving, and time to, needling, 3) number of post-operative visits at 1 month and 3 month, 4) proportion of patients with >2 lines vision loss at last follow-up, 5) time to visual recovery, 6) proportion of patients with  $\geq 0.5D$  surgically induced astigmatism. Time to failure was assessed with a Cox-proportional hazards model and continuous or categorical outcomes were assessed with a mixed-effects linear model adjusted for baseline characteristics accounting for correlation between eyes.

**Results:** The microstent eyes had 1.0 maneuvers per eye (148 total) and the trabeculectomy eyes had 1.6 (219 total). There were 92 needlings in 67 eyes (40%) and 70 needlings in 42 (31%) (adjusted HR 1.4 [0.9-2.3]). In microstent eyes, there were 7 lasers to the iris/microstent area, 3 iris sweeps, and 3 Xen repositions. In trabeculectomy eyes, there were 101 laser suture lyses in 68 eyes (49.6%) and 23 bleb/conj/flap revisions. Trabeculectomy eyes had an adjusted average 1.4 (0.8-2.0) extra visits in the 1st month and 1.8 (0.8-2.8) in the first 3 months. 13% and 25% of eyes lost >2 lines of vision at last follow-up (adjusted OR 0.4 [0.2-0.8]), and the adjusted rate of visual recovery to baseline was 1.4 (0.95-2.0) higher for microstent eyes. 37% and 63% of eyes had an increase of  $\geq 0.5D$  of corneal astigmatism (adjusted OR 0.3 [0.2-0.6]).

**Conclusions:** In a large multi-center cohort, ab interno gelatin microstent eyes had fewer in clinic maneuvers (though some evidence for more needlings), fewer postoperative visits, less vision loss, and experienced less surgically induced astigmatism than trabeculectomy eyes. Overall the post-operative course is less intensive for the microstent, with the exception of increased needlings.



**Title:** Comparison of Outcomes of Trabeculectomy with Subconjunctival Injection of Mitomycin C versus topical application with Cellulose Sponge

**Authors:** Claire Hamilton, Lesya Shuba

**Abstract Body:**

**Purpose:** To present results of a retrospective case series of surgical outcomes in trabeculectomy comparing sponge application of Mitomycin C (MMC) with an intraoperative subconjunctival injection method of 10 or 20 micrograms of MMC.

**Study Design:** Retrospective case series and chart review

**Methods:** Charts of consecutive patients from one surgeon's practice (LS) that received trabeculectomy with mitomycin C by sponge application or subconjunctival injection at the Nova Scotia Eye Care Center between 2010 and 2016 at the Nova Scotia Eye Care Center satisfying inclusion and exclusion criteria were reviewed. Inclusion criteria were open or closed angle glaucoma and history of trabeculectomy or phaco-trabeculectomy. Exclusion criteria included age less than 40, less than 3 months follow up post surgery, history of previous intraocular surgery other than uncomplicated cataract surgery (phaco/PCIOL) and inflammatory or neovascular glaucoma. Primary outcome measures were (1) complete success - number of patient with IOP less than 21 mmHg of  $\geq 30\%$  reduction from the pre-operative IOP without glaucoma medications, and (2) qualified success - number of patients who achieved the goals of complete success with addition of glaucoma medications. Secondary outcomes included number of glaucoma medications, intra- and post-operative complications, other post-operative procedures and visual acuity. Results from three groups ((1) MMC sponge, (2) 10 micrograms subconjunctival MMC, (3) 20 micrograms subconjunctival MMC) will be presented with a non-inferiority analysis.

**Results:** Preliminary results demonstrate cumulative success (defined as complete and qualified success) of 67.5% in the sponge application method and 80% in the 20 microgram injection method (N=62,  $p = 0.032$ ) at three months following surgery. Intra-operative and post-operative complications rates were similarly low across groups. Additional post-operative data and the outcomes using 10 microgram injection will also be presented and discussed.

**Conclusions:** Results to date demonstrate that subconjunctival injection of mitomycin C is non-inferior during trabeculectomy surgery compared with cellulose sponge application with comparable secondary outcome measures.

## Poster 40

**Title:** Evaluating Patient Perceptions of Marijuana Effectiveness on Glaucoma

**Authors:** Nadia Hua, **Sharnjit Bains**, Isabel Ng, Enitan Sogbesan

### **Abstract Body:**

**Purpose:** Marijuana (MJ) has been proposed as an alternative therapy to reduce intraocular pressure (IOP), a risk factor for developing glaucoma. However, its negative effects include cognitive impairment and increased risk of cancer. Thus, the safety and effectiveness of MJ treatment for glaucoma compared to other alternative therapies should be studied. The study's purpose was to determine the proportion of glaucoma patients self-medicating with MJ, their perceived effectiveness, and compliance to regular glaucoma treatment following MJ and/or other substance use.

**Study Design:** This is a cross-sectional study.

**Methods:** Recruited glaucoma patients in Hamilton, ON were asked to anonymously fill out a survey about their glaucoma medication and use of MJ, alcohol, cigarette, and other substances. Effectiveness and compliance were reported using a Likert Scale. Data was analyzed using SPSS Statistics v20.

**Results:** 463 patients completed the survey (43% Male, age  $68 \pm 15$ ). Results showed the current use of glaucoma medication (53%), MJ (3%), vitamins & herbal therapies (55%), alcohol (40%), cigarettes (8%), and illicit drugs (2%). When asked how MJ users ( $n=14$ ) perceive MJ effectiveness on glaucoma (1=NOT, 5=VERY), 3 scored 3 and 1 scored 5. All 4 believed stopping MJ would worsen their glaucoma ( $p=0.18$ ). However, all those who used glaucoma medication still reported consistent use despite also using MJ. No other substance was reported effective at managing glaucoma, and only 3 cigarette smokers reported not using glaucoma medication after smoking. All patients were asked about medication compliance (1=NOT, 5=VERY), and 84.1% scored  $\geq 4$ .

**Conclusions:** 3% of glaucoma patients in our clinic report MJ use, which is less than the Canadian population use of 9%. We also did not observe a significant difference between those who found MJ effective with those who did not. Other studies have shown that people who use multiple substances were 56.8% adherent to medications, which is lower than our result. While studies have shown MJ to reduce IOP, our results demonstrate that the perceived effectiveness is limited in the clinical setting and may not be the most appropriate therapy compared to proven pharmaceuticals or other alternative therapies. Limitations include the older study cohort and patient hesitation to report private information about their drug use. Studies in other populations are warranted to confirm our results, and more marijuana users should be recruited to adequately determine a difference in effectiveness.

## Poster 41

**Title:** SIRT3 Increases Peripheral Ganglion Cell Survival in a Kainic Acid Induced Model of Glaucoma

**Authors:** Henry Liu, Xiaoxin Guo, Joanne E. Nash, Jeremy M. Sivak

### **Abstract Body:**

**Purpose:** Currently, there is a lack of effective neuroprotective agents available to slow the disease progression of glaucoma, a neurodegenerative disease characterized by a loss of retinal ganglion cells (RGCs). RGCs have higher energy requirements than most cells rendering them more susceptible to hypoxia and oxidative stress. SIRT3, a deacetylase in the sirtuin family, has been linked to the attenuation of oxidative stress and maintenance of mitochondrial ATP production and previously evidenced to exhibit protective effects in neuronal cells. We hypothesized that elevating the levels of cellular SIRT3 will increase RGC survival in a Kainic Acid (KA) excitotoxin model by mediating protection from metabolic stress.

**Study Design:** Randomized experimental study

**Methods:** C57BL/6J mice received bilateral intravitreal injections of 2 $\mu$ L AAV1-SIRT3-Myc diluted 1:1 in PBS in the experimental group (n = 4) or 2 $\mu$ L AAV1-null in the control group (n = 5). 0.0002% pronase, a protease that showed increased AAV1 affinity to the ganglion cell layer based on our pilot study on transduction efficiency, was added to the injection solution. At 5 weeks post-transduction, animals from both groups were challenged with 2 $\mu$ L of 0.5mM KA or PBS to the left and right eyes respectively. Animals were sacrificed 24h later using CO<sub>2</sub> asphyxiation and eyes were immediately removed, washed with PBS, then fixed in 4% paraformaldehyde for 1h. Eyes were flat mounted and stained with anti-Myc, anti-RBPMS (a ganglion cell marker) and DAPI. Flat mounts were imaged using confocal microscopy and RGCs were counted in concentric sections of the retina from the optic disk and categorized into inner, middle and outer retina as a function of absolute distance from the optic nerve head.

**Results:** Intravitreal injection of KA resulted in rapid cell loss with a graded reduction of RGCs from inner to outer retina as reflected by a mean cells/mm<sup>2</sup> of 3250.7 $\pm$ 206.2, 2937 $\pm$ 159.0 and 2427.2 $\pm$ 123.2. SIRT3 treated eyes exhibited an 8.4% overall increase in RGC survival, calculated as a proportion between KA challenged eye and contralateral PBS treated eye. Greatest RGC survival occurred in the outer retina with 53.7 $\pm$ 4.1% in the control group and 81.2 $\pm$ 7.7% in the experimental group (p<0.05). Interestingly, no significant difference in cell loss was observed between the control and treatment groups for the inner and middle quadrants of the retinal flat mount.

**Conclusions:** The results are consistent with our hypothesis that overexpressing SIRT3 in RGCs can increase cell survival histologically. Furthermore, the neuroprotective effect is localized to the peripheral retina correlating with the region of maximal RGC loss.

## Poster 42

**Title:** Outcomes of Gonioscopy-assisted Transluminal Trabeculotomy (GATT) in Juvenile and Adult Glaucoma

**Authors:** Natalya Kovalyuk, Paul Harasymowycz

### **Abstract Body:**

**Purpose:** To evaluate the efficacy of gonioscopy-assisted transluminal trabeculotomy (GATT) in reducing intraocular pressure (IOP) and glaucoma medications.

**Study Design:** Retrospective noncomparative case series

**Methods:** Seventeen eyes of 16 patients with noncontrolled juvenile (3 eyes), pigmentary (5), uveitic (5), primary open angle (3) and low tension (1) glaucoma who underwent GATT were evaluated. Data recorded included a history, demographic profile, and ophthalmic examination including gonioscopy. Any complications or secondary procedures performed after surgery were recorded. Success was defined as a postoperative IOP of less than 18mm and more than 20% reduction from baseline IOP with and without glaucoma medications. Failure was defined as less than 20% reduction in the IOP from baseline or need for additional glaucoma surgery.

**Results:** The mean age of the patients was 48 (22-64) years, 7 males and 9 females. 16 eyes were phakic. Only one patient underwent prior incisional glaucoma surgery. The mean IOP decreased from  $27 \pm 9.4$  mm Hg to  $11.6 \pm 4.2$  mm Hg ( $p=0.0008$ ) at 3 months, to  $11.7 \pm 5.7$  mm Hg ( $p=0.004$ ) at 6 months and to  $13.2 \pm 5.4$  mm Hg ( $p=0.019$ ) at 12 months postoperatively. The median number of glaucoma medications decreased from  $3.7 \pm 1.1$  to  $2.1 \pm 1.3$  at 12 months postoperatively. This resulted in success rate of 63 % at 12 months postoperatively. The most common complication of the procedure was transient hyphema, seen in 35% of patients at the 1-week visit

**Conclusions:** In this cohort of relatively young phakic patients, GATT significantly reduced IOP and number of glaucoma medications, with transitory hyphema (35%) and cataract progression (11%) as main side effects.



## Poster 43

**Title:** Efficacy and Safety of Ab Interno Trabeculectomy in Juvenile Open Angle Glaucoma

**Authors:** Samir Nazarali, Sourabh Arora, Masahiro Maeda, Brian Francis, Mariko Maeda, Arthur J. Sit, Sameh Mosaed, Karim F. Damji

### **Abstract Body:**

**Purpose:** To determine the efficacy and safety of ab interno trabeculectomy (AIT) with Trabectome® in juvenile open angle glaucoma (JOAG) patients. Trabeculectomy with and without Mitomycin C has a notable pressure lowering effect; however, safety is a concern with complications such as hypotony, bleb leak, and endophthalmitis. We present a series of JOAG patients treated with AIT.

**Study Design:** Prospective cohort study.

**Methods:** The Neomedix database was utilized to identify Trabectome patients that met the following criteria: age 3 - 40 years, open angles (angle grade > 2), open angle glaucoma with no other identifiable etiology, and on one or more IOP medications. Primary outcome was 12 month IOP change vs baseline. There were two sub groups. Group 1: primary AIT & Group 2: AIT after prior incisional surgery.

Outcomes included IOP over time, glaucoma medications, and any secondary glaucoma surgeries.

Success criteria for Kaplan-Meier survival analysis was IOP  $\leq$  21 mmHg with IOP  $\leq$  20% from pre-operative IOP on any 2 consecutive follow-up visits after 3 months and no secondary glaucoma surgery.

**Results:** 66 eyes of 60 patients were included. Group 1 (n=44) had an IOP reduction from a baseline of 27.3 $\pm$ 8.1 mm Hg to 17.7 $\pm$ 6.3 at 6 months (n=21) and 17.0 $\pm$ 4.2 at 12 months (n=12; p=0.04). Over one-year, number of medications was reduced by 0.2 (p=0.88) and five eyes (11%) required secondary glaucoma surgery. Group 2 (n=22) had an IOP reduction from a baseline of 27.6 $\pm$ 7.2 mm Hg to 19.6 $\pm$ 4.1 at 6 months (n=11) and 18.3 $\pm$ 2.1 at 12 months (n=8; p=0.04). Over one-year, number of glaucoma medications was reduced by 1.4 (p=0.36) and six eyes (27%) required secondary glaucoma surgery. For all patients, the survival rate at 12 months was 69%. The main limitation in our study was the loss to follow-up. However, this to our knowledge is the first study that suggests reasonable efficacy and safety of AIT in treating patients with JOAG with a one-year follow-up.

**Conclusions:** AIT appears to be a safe and effective intervention for patients with JOAG

## Poster 44

**Title:** Fluctuation of intraocular pressure pre versus post pharmacological pupillary dilation measured by Goldmann applanation tonometry and transpalpebral Diaton tonometry

**Authors:** Cynthia Qian, Salima Hassanaly, Jean Duperre, Mona Harissi-Dagher

### **Abstract Body:**

**Purpose:** To measure the difference in intraocular pressure (IOP) before and after pharmacologic mydriasis in nonglaucomatous subjects by comparing measurements obtained by Goldmann applanation tonometer (GAT) and the Diaton transpalpebral tonometer (DT).

**Study Design:** Prospective case series

**Methods:** Sixty-seven consecutive adult patients without a history of glaucoma were recruited and examined. Prior to dilation, intraocular pressure in both eyes was measured using GAT followed immediately by DT. Forty-five minutes after pharmacologic mydriasis, the measurements were repeated in the same order. Additional demographic parameters were also collected.

**Results:** Using GAT, the mean IOP pre dilation was  $16.7 \pm 3.1$  mmHg OD and  $16.12 \pm 3.0$  mmHg OS. The mean difference between pre- and post dilation time-points was  $-1.1 \pm 2.5$  mmHg OD and  $-0.7 \pm 2.3$  mmHg OS. Using DT, the mean IOP pre dilation was  $12.8 \pm 3.8$  mmHg OD and  $13.2 \pm 3.5$  mmHg OS. The mean difference between pre- and post dilation time-points was  $-0.8 \pm 4.0$  mmHg OD and  $-0.7 \pm 3.6$  mmHg OS. The difference in IOP measured by the two instruments was statistically significant both pre and post dilation (paired sample analysis pre correlation 0.38  $p=0.002$ ; post correlation 0.40  $p=0.001$ ), indicating an intrinsic difference between the two types of instrumentation.

**Conclusions:** The use of pharmacologic mydriasis affected the reliability of IOP measurements. Post-dilation measurements were lower on average than pre-dilation values by both GAT and DT. The poor agreement between GAT and DT measurements at both time points calls into question the value of using the latter as a reliable replacement for the gold standard in situations where changes in corneal biomechanics preclude the use of GAT.

## Poster 45



**Title:** Ocular rigidity differences between myopic and non-myopic eyes as measured with a novel non-invasive method based on high-speed OCT imaging

**Authors:** Diane Sayah, Javier Mazzaferri, Luke Beaton, Maribel Hidalgo, Félix Lalonde, Denise Descovich, Santiago Costantino, Mark Lesk

### **Abstract Body:**

**Purpose:** The biomechanical properties of the sclera are thought to be an important characteristic in axial myopia. Ocular rigidity (OR) differences should exist between eyes with myopia and non-myopic eyes, as longer eyes are expected to have lower rigidity. While there is currently no reliable clinical method to assess OR, our group has recently developed a technique permitting a direct and non-invasive measurement in humans (Beaton et al., 2015). The purpose of this study is to compare OR in healthy myopic and non-myopic eyes, as well as demonstrate the reproducibility of our novel technique.

**Study Design:** This study was approved by our institutional ethics committee. Participants were enrolled and measurement of OR was done using our technique. Based on Friedenwald's equation, this method involves high-speed OCT time series imaging of the choroid coupled with a novel automated segmentation algorithm to measure the pulsatile ocular volume change, as well as Dynamic Contour Tonometry (DCT, Ziemer group) to determine the ocular pulse amplitude, and thus calculate OR.

**Methods:** Thirty-six age-matched ( $68.56 \pm 9.74$  years) subjects with healthy eyes (7 myopic eyes with axial length  $> 25.00$ mm, and 29 non-myopic eyes) were recruited and OR measurement was carried out using our novel method. An independent-samples t-test was conducted to compare differences between both groups. Thirty-eight additional subjects were enrolled for the study of reproducibility. OR was measured twice on the same eye within the same session using this novel method. Reproducibility was assessed using the Bland-Altman Plot and the Intraclass Correlation Coefficient (ICC).

**Results:** There was a significant difference in the OR coefficients between the axial myopic eyes ( $OR = 0.02728 \pm 0.10863 / \mu L$ ) and the non-myopic eyes ( $OR = 0.05239 \pm 0.02369 / \mu L$ );  $t(34) = 2.71$ ,  $p = 0.010$ . The Bland-Altman plot, as well as the ICC (0.889, 95% CI [0.785, 0.943]), showed good agreement between intra-session measurements of OR in all examined eyes.

**Conclusions:** This study confirms that eyes with axial myopia have lower scleral rigidity than non-myopic eyes, perhaps permitting further investigation unto the progression of myopia. The reproducibility of intra-session OR measurements using our novel non-invasive method is also confirmed, thus permitting further investigation of the role of OR in ocular disease such as glaucoma.

## Poster 46

**Title:** Association of Ocular Dominance and Humphrey Visual Field Parameters: Mean Deviation, Pattern Standard Deviation, and Visual Field Index

**Authors:** Enitan Sogbesan, Nadia Hua, Sharnjit Bains

### **Abstract Body:**

**Purpose:** This study aims to determine whether ocular dominance is associated with glaucoma severity using visual field (VF) parameters in glaucoma patients.

**Study Design:** This is a cross-sectional study.

**Methods:** Consented glaucoma patients underwent a complete standardized ophthalmological assessment including baseline Humphrey Visual Fields (HVF). Ocular dominance was determined using the Dolman Test (hole-in-the-card). VF mean deviation (MD), pattern standard deviation (PSD) and visual field index (VFI) for each eye was extracted from the HVF printout and classified. Glaucoma severity was determined based on HVF by using standardized Glaucoma Staging System, as recommended by the Canadian Ophthalmology Society's clinical practice guidelines for the treatment of glaucoma. Data was analyzed using SPSS Software v20.

**Results:** Patients (n = 207) mean age was  $67.5 \pm 10.6$  years; 35.3% were male and 64.7% were female and approximately 90.3% Caucasian population. Right-eye dominance was observed in 58.8%, left-eye dominance in 38.2%, and 3.4% were both-eyed dominant. Paired t-test analysis of HVF-MD was found to be lower in the non-dominant eye ( $-4.92 \pm 6.54$ ,  $p < 0.001$ ) and higher in the dominant eye ( $-2.77 \pm 4.24$ ,  $p < 0.001$ ). There was a greater proportion of suspect and early (87.5%) stages of glaucoma severity for MD in the dominant eye compared to the non-dominant eye which tended to have greater proportions within moderate to severe (24.0%) glaucoma severity. VFI was found to be higher in the dominant eye ( $93.5 \pm 12.2$ ,  $p < 0.001$ ) compared to the non-dominant eye ( $87.7 \pm 19.8$ ,  $p < 0.001$ ). PSD was found to be higher in the non-dominant eye ( $4.00 \pm 3.47$ ,  $p < 0.001$ ) indicating greater variation compared to the dominant eye ( $3.02 \pm 2.69$ ,  $p < 0.001$ ). This study shows that the non-dominant eye has greater glaucoma severity based on lower MD, lower VFI, and an increase in the proportion of patients who progressed into more severe stages of glaucoma classification in the non-dominant eye.

**Conclusions:** Glaucoma appears to be more severe in the non-dominant eye using HVF parameters. The dominant eye tends to have a protective effect on glaucoma onset and severity based on higher MD, higher VFI, a lower variation of PSD and the occurrence of less severe glaucoma classifications in the suspect and early stage categories. This study shows that glaucoma progression is independent of ocular dominance and occurs in either eye. However, further investigation is required to confirm these observations.

## Poster 47

**Title:** Efficacy of selective laser trabeculoplasty versus argon laser trabeculoplasty in patients with pseudoexfoliative glaucoma

**Authors:** Jin Soo A. Song, Jayme Vianna, Lesya Shuba, Paul Rafuse, Marcelo Nicolela

### **Abstract Body:**

**Purpose:** Pseudoexfoliation (PXE) is the most common cause of secondary open angle glaucoma. Laser trabeculoplasty is an effective intervention to reduce intraocular pressure (IOP), with argon laser trabeculoplasty (ALT) and selective laser trabeculoplasty (SLT) showing equivalent outcomes in primary open angle glaucoma. However, it is unclear which laser modality is more effective in PXE glaucoma. This study was undertaken to compare the effectiveness of ALT and SLT in PXE glaucoma.

**Study Design:** Retrospective cohort study.

**Methods:** A retrospective chart review evaluating patients diagnosed with PXE glaucoma and treated with laser trabeculoplasty from 2005-2015 was undertaken. Patients with previous glaucoma surgery, other forms of secondary glaucoma, ocular surgery within six months of initial trabeculoplasty or lacking preoperative IOP measurements were excluded.

Baseline IOP values were determined by averaging the three most recent preoperative measurements prior to initial trabeculoplasty, and post-laser measurements were recorded until 24 months after initial intervention. Follow-up data was censored if the patient underwent a subsequent trabeculoplasty different from initial laser treatment, or underwent glaucoma surgery. Both treatment groups were compared with unpaired t-tests. Failure criteria for survival analysis were 1) inability to decrease IOP by at least 15% for two consecutive follow up visits, or 2) addition of 2 or more medications at any follow up visit relative to baseline number.

**Results:** We included 84 patients in the ALT group and 123 in the SLT group. This sample would give us the ability to detect a minimum difference of 2.5mmHg IOP between groups with 80% power. The mean (SD) baseline IOP values were 22.7 ( $\pm$ 5.6) and 21.5 ( $\pm$ 4.8) respectively ( $p = 0.11$ ). The mean IOP reduction for the ALT group at 6, 12 and 24 months were 5.2( $\pm$ 6.1), 5.4( $\pm$ 6.9), and 4.9( $\pm$ 7.7) respectively. The corresponding values for the SLT group were 3.4( $\pm$ 5.2), 3.8( $\pm$ 4.6), and 4.6( $\pm$ 6.5). The mean baseline number of medications were 2.0( $\pm$ 1.0) and 1.8( $\pm$ 1.3) for ALT and SLT groups respectively ( $p = 0.36$ ). The mean reduction in glaucoma medications for the ALT group at 6, 12 and 24 months were 0.2( $\pm$ 0.9), 0.02( $\pm$ 1.18), and 0.1( $\pm$ 1.3), respectively. The corresponding values for the SLT group were 0.2( $\pm$ 0.7), 0.1( $\pm$ 0.8), and 0.1( $\pm$ 1.1). Comparison of both lasers at each time point revealed no significant differences ( $p > 0.05$ ) in IOP reduction or reduction of glaucoma medication. There was no significant difference in the Kaplan Meier survival curves ( $p=0.29$ ).

**Conclusions:** Conclusion: Our study showed equivalent efficacy between ALT and SLT in patients with PXE glaucoma.

## Poster 48

**Title:** Early Post-Operative Outcomes of an Ab Externo SIBS Micro-Shunt with Mitomycin C

**Authors:** Andrei-Alexandru Szigiato, Monika Baltaziak, Matthew Schlenker, Dominik Podbielski, Iqbal Ike K. Ahmed

### **Abstract Body:**

**Purpose:** To evaluate the post-operative outcomes of standalone ab-externo poly(styrene-block-isobutylene-block-styrene) (SIBS) micro-shunt implantation with mitomycin C (MMC), as well as risk factors for needling and failure in consecutive eyes from July 2015 onwards in Mississauga, Canada.

**Study Design:** Single-center retrospective cohort study.

**Methods:** 58 consecutive eyes in 55 patients were identified who had no prior incisional glaucoma surgery with more than 1 month of follow-up. Primary outcome was IOP of 6-17 mm Hg with no glaucoma medications, secondary outcomes included IOP of 6-14 and 6-21 on no medications, and then the same IOP cutoffs allowing for medications. The number of needlings, complications, and reoperations were also recorded. A Cox proportional hazards model accounting for correlation between eyes was used to assess risk factors for failure, including demographics, preoperative vision, previous glaucoma laser, diabetes, glaucoma type, and glaucoma stage.

**Results:** At six months follow-up, survival analysis yields an 82% chance of achieving an IOP of 6-17 mm Hg (6 failures, median follow-up 4.8 months [IQR 2.9-7.1]), 82% chance of 6-14, and 83% chance of 6-21. Allowing for medications yields success rates of 88%, 88%, and 90%. Survival analysis yields an 11% chance of requiring needling (7 needlings in 6 patients). 2 patients had transient hyphemas, 3 patients had anterior chamber reformations, and 1 patient received a second micro-shunt implantation.

**Conclusions:** Ab externo SIBS micro-shunt implantation with MMC had acceptable complete and qualified success rates 6 months post-operatively. Overall, the procedure was well tolerated with few adverse events in this early post-operative period. Longer follow-up and larger sample size are required to further investigate.

## Poster 49

**Title:** The Impact of Glaucoma Visual Field Severity and Self-perceived Visual Disabilities on Driving Cessation and Driving Difficulty

**Authors:** Alex Lai Chi Tam, Graham E. Trope, Yvonne M. Buys, Ye Lin Yang, Carl Shen, Ya-Ping Jin

### **Abstract Body:**

**Purpose:** To investigate if glaucoma visual field severity, and self-perceived visual disabilities such as glare and difficulty with dark adaptation are associated with driving cessation or driving difficulties.

**Study Design:** Cross-sectional survey.

**Methods:** Individuals with glaucoma, age 50+, and with visual acuity in the better eye  $\geq 20/50$  were enrolled. Glaucoma severity was defined by the visual field mean deviation (MD) in the better eye and was classified into 2 groups: mild ( $MD < 6\text{dB}$ ), and moderate/severe ( $MD \geq 6\text{dB}$ ). We reported on responses from the GQL-15 glare and dark adaptation subscale regarding self-perceived visual disabilities. Driving cessation was defined as cessation of driving due to vision. Driving difficulty was defined as either having moderate/extreme driving difficulty, or not driving at night or during poor driving conditions. Individuals who had never driven ( $n=10$ ) or who had stopped driving due to non-vision related issues ( $n=8$ ) were excluded. Associations were assessed utilizing prevalence ratios (PR).

**Results:** A total of 99 participants (57% female) were included. A higher proportion of patients with moderate/severe glaucoma field loss quit driving (33% vs. 8% with mild field loss,  $p=0.002$ ), experienced self-reported glare (27% vs. 6% with mild field loss,  $p=0.012$ ), and experienced self-reported difficulty with dark adaptation (31% vs. 10% with mild field loss,  $p=0.011$ ). Multivariate analyses revealed moderate/severe glaucoma field loss ( $PR=2.26$ ,  $p=0.115$ ), presence of self-reported glare ( $PR=4.79$ ,  $p=0.128$ ), and self-assessed difficulty with dark adaptation ( $PR=1.47$ ,  $p=0.391$ ) were all associated with an increased risk of driving cessation. Individuals with self-perceived difficulty with dark adaptation were about 4 times more likely than those without to have difficulty driving at night (adjusted  $PR=3.94$ ,  $p < 0.0001$ ) or in poor driving conditions (adjusted  $PR=4.09$ ,  $p=0.0002$ ). Self-reported glare was not associated with difficulty driving at night (adjusted  $PR=1.0547$ ,  $p=0.883$ ), but was marginally associated with an increased risk of driving difficulty in poor driving conditions ( $PR=4.17$ ,  $p=0.050$ ).

Moderate/severe glaucoma was neither associated with difficulty driving at night (adjusted  $PR=1.1301$ ,  $p=0.530$ ), nor with poor driving conditions (adjusted  $PR=0.9014$ ,  $p=0.574$ ).

**Conclusions:** Moderate/severe glaucoma field loss with self-perceived glare and difficulty with dark adaptation is associated with an increased risk of driving cessation. Difficulty with dark adaptation associated with difficulty driving at night or in poor driving conditions is more significant than moderate/severe glaucoma with the presence of self-reported glare. Further studies are needed to confirm these findings.

## Poster 50

**Title:** Transcleral intraocular lens fixation combined with an Ahmed implantation for late IOL dislocation associated with high intraocular pressure: a case series

**Authors:** Lucas A. Torres, Jayme R. Vianna, Marcelo T. Nicolela

### **Abstract Body:**

**Purpose:** The aim of the study is to demonstrate the short and long-term safety and efficacy of transcleral intraocular lens (IOL) fixation combined with an Ahmed implantation for patients presenting with delayed IOL dislocation and high intraocular pressure (IOP).

**Study Design:** This is a non-interventional retrospective study of a series of patients that underwent to this combined surgery with the same surgeon (MTN), between May/2008 to December/2015.

**Methods:** This study was conducted in a single center, in accordance to the Health Canada and the Public Health Agency of Canada's. Research Ethics Board and Ethics approval was obtained from Nova Scotia Health Authority. Clinical information prior, during and following surgery was obtained from the clinical charts. The postoperative change in visual acuity, IOP and number of medications were compared using the Wilcoxon signed rank test. Kaplan-Meier survival analysis estimated the cumulative success. Failure criteria defined as decreased visual acuity by at least 3 Snellen lines from preoperative levels, IOP above 20mmHg or IOP reduction lower than 25% from pre-operative levels at two or more consecutive visits, at least 2 months apart. Data from the first 60 postoperative days was not considered to define surgical failure.

**Results:** The study included 11 patients (10 females and 1 male), with median age of 83 years (range: 77 - 91 years). 10 of 11 patients had a previous diagnosis of Pseudoexfoliation, and all 11 eyes had previous glaucoma diagnosis. The median time from the cataract surgery to the transcleral IOL fixation with Ahmed implantation was 9 years (range: 5 - 13 years). All the cases had in-the-bag IOL dislocation, 9 eyes (81.9%) had the IOL-bag complex displaced inferiorly, 1 eye (9.1%), superiorly, and 1 eye had no clear dislocation but significant pseudophacodonesis with vision fluctuation. The median follow-up time from the surgery was 1.75 years (range: 0.83 - 2.50 years). Median VA improved (0.77 [range: 0.3 - 2] vs. 0.44 [range: 0 - 3],  $p=0.27$ ), IOP and number of drops decreased (33mmHg [range: 24 - 47] vs. 13mmHg [range: 5 - 16],  $p<0.01$  and 3 [range: 1 - 4] vs. 2 [range: 0 - 4],  $p=0.03$ ; respectively) after surgery. 4 patients had surgical complications: choroidal detachment (1), choroidal detachment and shunt occlusion by vitreous (1), vitreous haemorrhage and hyphema (1), vertical diplopia (1). One patient needed surgical re-intervention. The survival probability over 2.5 years was 85.7% (CI: 63.3% - 100%).

**Conclusions:** Transcleral IOL suturing associated with an Ahmed implantation is a safe and effective surgical option for patients with late IOL dislocation and elevated IOP.



## Poster 51

**Title:** Impact of first line treatment on quality of life among glaucoma and glaucoma suspect patients

**Authors:** Lavanya Uruthiramoorthy, Cindy Hutnik, Dan Lizotte, Monali Malvankar

### **Abstract Body:**

**Purpose:** To evaluate the health-related quality of life (HRQoL) in patients treated for glaucoma and assess its association with the first line treatment and other variables.

**Study Design:** Cross-sectional, observational study.

**Methods:** Two hundred and fifty patients diagnosed with glaucoma or glaucoma suspects were recruited from Ivey Eye Institute in London, Ontario from February to August 2016. Medical records were abstracted to collect information on clinical variables. In- person questionnaires were conducted to obtain information on patient demographics, vision-related quality of life as measured by Visual Function Questionnaire-25 (VFQ-25); community integration as measured by the Community Integration Questionnaire (CIQ); severity of depression as measured by the Patient Health Questionnaire-9 (PHQ-9); and preference-based HRQoL as measured by the Time-Trade off (TTO) technique. Logistic odds of the calculated utility scores were assessed against variables that were deemed appropriate through the use of a directed acyclic graph.

**Results:** A total of 223 patients received a first line treatment, of which, about 20% received Selective Laser Trabeculoplasty (SLT) and 80% received glaucoma medications. Patients generally reported a high HRQoL. Mean composite score of the VFQ-25 was 88.73 (SD=12.4). Mean community integration score of the patients was 17.9 (SD=4.99) out of a possible 29, on the CIQ questionnaire. About 79% of patients scored a depression severity of '*none to minimal*' on the PHQ-9 questionnaire.

On average, patients had a TTO utility score of 0.91 (SD=0.18), representing a high preference-based HRQoL. Three variables were significantly associated with HRQoL after adjusting for age, first line treatment, income, education, number of comorbidities, ocular conditions, ocular procedures, best corrected visual acuity and glaucoma stage in the worse-seeing eye. Patients who chose SLT as their first line treatment were more willing to trade years of life for perfect vision (OR=2.56, P=0.026). Patients were more willing to trade years of life for perfect vision with increasing number of ocular conditions (OR=1.49, P=0.014). Younger patients were more likely to trade years of life for perfect vision (OR=1.04, P=0.048).

**Conclusions:** HRQoL across different measures were generally high among our study population. However, patients who chose SLT, patients with increased number of ocular conditions and the younger patients were more likely to report poor HRQoL. The causes and implications of this association, requires further investigation of the other three HRQoL measures and future studies assessing SLT versus medication as first line of treatment in a larger diverse population, potentially in a randomised trial setting.

## Poster 87

**Title:** A randomized controlled study to evaluate the effect of preoperative brimonidine tartrate 0.2% on intraocular pressure in patients undergoing robot-assisted radical laparoscopic prostatectomy in steep Trendelenburg position

**Authors:** Rana Greene, Graham E. Trope, Matteo Parotto, Antonio Finelli, Numan Hallaji, Ya-Ping Jin, Yvonne M. Buys

### **Abstract Body:**

**Purpose:** Postoperative visual field (VF) defects and vision loss secondary to markedly elevated intraocular pressure (IOP) have been reported with robot-assisted radical laparoscopic prostatectomy (RALP) in steep Trendelenburg position (sTBURG). This study evaluated the effect of preoperative brimonidine on IOP during RALP in sTBURG.

**Study Design:** Prospective randomized controlled masked interventional trial # NCT02818816.

**Methods:** Patients scheduled for RALP in sTBURG at the University Health Network were screened for eligibility. Exclusion criteria included a diagnosis of glaucoma or ocular hypertension and ophthalmic surgery in the preceding 6 months. With informed consent, subjects were randomized to right or left eye. The study eye was then randomized to either placebo (artificial tears) or drug (brimonidine tartrate 0.2%) preoperatively. Comprehensive eye examination was done preoperatively and at 1-month postoperatively, inclusive of visual acuity (VA), tonometry, disc photography, VF and retinal nerve fiber layer thickness (RNFL) assessments. Intraoperatively, a standardized anesthesia protocol was followed and a 33° angle of inclination of the surgical bed was used. IOP measurements were recorded for both eyes using a Tono-Pen as follows: pre-anesthesia, anaesthetized in supine position, hourly in sTBURG position intraoperatively and awake in supine position postoperatively. The mean of 3 IOP readings within 2 mmHg at each time point was recorded, each with 5% confidence interval. Primary outcome measure was IOP. Secondary outcomes were changes in VA, VF and RNFL. A sample size of 26 subjects is planned.

**Results:** To date 7 patients have been recruited and 5 have completed the study (2 brimonidine, 3 placebo). Significant IOP elevation was noted in control, placebo & drug treated eyes at the first recording (1 hour of sTBURG) and remained elevated throughout the time in sTBURG. Mean IOP during sTBURG was  $31.4 \pm 3.6$ ,  $30.8 \pm 2.4$  and  $35.9 \pm 6.7$  mmHg in the control, placebo and drug eyes respectively,  $p=0.11$  for drug versus placebo. Highest IOP recorded was 44 mmHg at 1 hour of sTBURG representing an IOP spike of 30 mmHg from baseline in a drug treated eye. The IOP returned to preoperative levels in 8 of the 10 eyes 30 minutes after supine positioning but remained above baseline by 8mmHg in one placebo treated eye and by 4 mmHg in one drug treated eye. There were no significant changes in VA, VF or RNFL 1-month postoperatively.

**Conclusions:** There is a significant and sustained IOP increase during sTBURG. Preliminary data analysis suggests preoperative brimonidine may not prevent IOP spikes. Enrolment is ongoing.

## PEDIATRIC OPHTHALMOLOGY AND STRABISMUS

### Poster 52

**Title:** Endothelial cell loss in obstetrical forceps-related corneal injury: a specular microscopy study

**Authors:** Ali El Hamouly, Hamza Sami, Simon Fung, Dishay Jiandani, Kamiar Mireskandari, Asim Ali

#### **Abstract Body:**

**Purpose:** To assess the impact of obstetrical forceps delivery complicated by ocular trauma on the corneal endothelium in children.

**Study Design:** Retrospective cohort study.

**Methods:** Patients who attended the Hospital for Sick Children, Toronto between 2002 and 2016, inclusively, with a diagnosis of obstetrical forceps-related corneal injury were included in this study. Case records were retrieved and their clinical course was reviewed. Data including best-corrected visual acuity (BCVA), refractive error and clinical presentation were documented. Data on corneal endothelial cell densities (ECD), cell hexagonality (HEX) and coefficient of variance (CV) in these eyes was also obtained. Student t-test was used to test for statistical differences.

**Results:** Four patients with forceps injury, ages 4-6 years on their first specular microscopy scan, were included. All patients had corneal scarring, high astigmatism and anisometropic amblyopia but no other ophthalmic pathology or surgery. All the patients had significantly poorer visual acuity in the affected eye compared to the unaffected eye on first scan dates (mean BCVA logMAR scale, 0.575 and 0.125, respectively,  $P=0.0324$ ). On final assessment after a minimum one year of recovery, the difference in visual acuity between the two eyes became insignificant ( $P=0.4226$ ), but nonetheless, raises the concern for amblyopia if the recovery process is unmonitored. The mean ECD after initial specular microscopy in the affected eyes was significantly lower than that of the unaffected eye (2401 cells/mm<sup>2</sup> and 3430 cells/mm<sup>2</sup>, respectively,  $p = 0.038$ ). Mean HEX values were 66 and 75, and mean CV were 23.25 and 29.5, respectively, in the affected and unaffected eyes. HEX and CV values were indirectly proportional; the endothelial cells lost their natural hexagonal shape and adopted pleomorphic structures in order to fill the tear defect. Three patients had longitudinal specular microscopy data. All eyes demonstrated a decline of ECD, with the annualized rate of decline significantly higher in the affected eyes compared to the unaffected eyes (11.18% vs -0.42%, respectively,  $p = 0.012$ ).

**Conclusions:** Obstetrical forceps-related corneal delivery causes significant and progressive damage to the corneal endothelium in addition to anisometropic amblyopia and high astigmatism.

## Poster 53

**Title:** Unique ocular findings in Primordial Dwarfism: A case study

**Authors:** Paul Huang, Peter Huang, Vivian Hill

### **Abstract Body:**

**Purpose:** Primordial dwarfism is a rare syndrome characterized by profound proportionate growth restriction early in development that continues postnatally. There are less than two hundred individuals with primordial dwarfism worldwide. There are approximately thirty reported cases in the scientific literature of microcephalic osteodysplastic primordial dwarfism type II (MOPDII), the most common form of primordial dwarfism. There have been reports of ectopia lentis, cataracts, corneal clouding, and ocular moyamoya syndrome in individuals with MOPDII. Over half of affected individuals develop hyperopia and/or astigmatism requiring glasses, and many have esotropia. We present a case of a 6 year old male with MOPDII with multiple unique ocular findings not previously reported.

**Study Design:** This is a case study highlighting the natural history and physical examination of one individual with primordial dwarfism.

**Methods:** The ocular development of a 6 year old male from birth is described. Ophthalmic examination and imaging information were collected in two private non-hospital settings in collaboration with the Rockyview General Hospital Eye Clinic in Calgary, Alberta from 2008 to 2015.

**Results:** Our patient is a 6 year old male with a height of 34 inches and weight of 18 pounds. He was first seen by Ophthalmology as an infant for possible microphthalmia while being investigated for a chromosomal abnormality. He developed nasal lacrimal duct obstruction that resolved spontaneously. He has worn glasses since the age of 4, with a current best hyperopic corrected visual acuity of 20/40 in both eyes. He has an intermittent exotropia, but has never required patching. Unique ocular features include high corneal astigmatism, thickened corneas, anisocoria, iris maldevelopment, pupillary iris vascular remnants, peripheral anterior synechiae, and disc vessel decentration of the right eye.

**Conclusions:** In summary, primordial dwarfism is a rare syndrome under which several distinct single-gene abnormalities exist, including MOPDII. Given the rarity of this condition, ocular findings have been reported, but not definitively associated with primordial dwarfism. We present a case of an individual with multiple ocular findings, which to our knowledge, have not been previously described in primordial dwarfism. Continued diligence in reporting ocular findings associated with primordial dwarfism may lead to better understanding the ocular pathology in this syndrome.

## Poster 54

**Title:** Rates of Loss to Follow Up in Pediatric vs Adult Ophthalmology Patients

**Authors:** Hussain Khimji, Deepak Karivelil, Fariba Nazemi

### **Abstract Body:**

**Purpose:** An integral part of patient management has always been follow up. This is especially important in pediatric ophthalmology, as it facilitates monitoring of ophthalmic conditions during vital stages of eye development. It is also important because the diagnosis and treatment plan for pediatric eye conditions is often not clear on the first examination. Current research regarding loss to follow up in this area is limited. This retrospective chart review compares adult/pediatric follow up rates, and explores reasons why patients are lost to follow up. The study endeavours to develop strategies to address loss to follow up, thereby improving quality of clinical care.

**Study Design:** This study is a cross-sectional retrospective chart review.

**Methods:** Charts were chronologically examined within a 12 month window. New patients and patients requiring follow up within 6+/-1 months were exclusively assessed to meet major cohort quotas (adult/pediatric/medical/surgical patient combinations). Follow up attendance was recorded; reasons for missing were categorically stratified.

**Results:** Adult medical follow up: 162/200 (81%); Pediatric medical follow up: 124/200 (62%); Adult surgery follow up: 48/50 (96%); Pediatric surgery follow up: 38/48 (79.2%).

**Conclusions:** The pediatric population is identified as more inclined to be lost to follow up, compared to adults. Results yielded that surgical patients were more likely to attend follow ups, when compared to medical patients. Notwithstanding this, follow up rates were significantly lower in the pediatric population overall, compared to adults. The implementation of improved support structures to aid with follow ups is, evidently, essential for pediatric populations. There is now a sound foundation for further research to explore these issues more in depth. With these results and continued investigation, guidelines and structures can be established to manage and prevent patient loss to follow up.

## Poster 55

**Title:** Subretinal fluid in the presence of torpedo maculopathy: two pediatric cases

**Authors:** Wai-Ching Lam, Stephanie A. Low

### **Abstract Body:**

**Purpose:** To present the clinical presentation, characteristic diagnostic findings, and management of torpedo maculopathy in two pediatric cases. A brief review of the literature is also discussed.

**Study Design:** Case series.

**Methods:** Review of patient files and a systemic appraisal of the literature for torpedo maculopathy.

**Results:** Two cases of pediatric torpedo maculopathy are presented. Both cases are of otherwise healthy 8-year-old females referred for incidental fundus findings on routine examination. On dilated fundus examination, each patient had a unilateral, solitary, well demarcated, hypopigmented ovoid retinal pigment epithelial (RPE) lesions located in the temporal macula, not involving the fovea. Both cases had normal visual acuity and otherwise unremarkable ocular examinations. Optical coherence tomography (OCT), fundus autofluorescence, and intravenous fluorescein angiography were completed, which confirmed the diagnosis of torpedo maculopathy. The lesions in both cases had characteristic OCT findings with thinning of the outer retina and RPE, as well as a retinal cleft with associated subretinal fluid.

**Conclusions:** Torpedo maculopathy is a relatively new entity with characteristic clinical appearance and diagnostic findings, and no known systemic associations. It should be considered on the differential diagnosis for retinal and RPE lesions. Given the non-progressive and largely asymptomatic nature of Torpedo Maculopathy, observation is the mainstay of management despite the presence of subretinal fluid associated with retinal cleft.

## Poster 56

**Title:** Phacomorphic glaucoma following silicone oil tamponade in a paediatric patient

**Authors:** Victoria C. Leung, Simon Fung, Rajeev Muni, Asim Ali

### **Abstract Body:**

**Purpose:** To report a case of phacomorphic glaucoma following retinal detachment repair with silicone oil in a pediatric patient.

**Study Design:** Case report

**Methods:** A chart review was conducted at St. Michael's Hospital and The Hospital for Sick Children (Toronto, Canada), where the patient received ophthalmic care from July 28, 2015 onwards.

**Results:** A 14 year-old boy with a history of traumatic retinal detachment and proliferative vitreoretinopathy in the left eye, requiring two pars plana vitrectomies, membrane peel, and silicone oil tamponade, presented with one-day history of decreased vision in the left eye, severe headache, nausea, and vomiting. Visual acuity was hand motions; intraocular pressure (IOP) was 54 mmHg; the pupil was mid-dilated and minimally reactive with a reverse relative afferent pupillary defect. Slit lamp examination revealed an injected eye with diffuse microcystic corneal edema, a shallow anterior chamber (AC), and an intumescent cataract. Gonioscopy demonstrated closed angles in three quadrants. Compared to his last examination six weeks prior, where only a mild posterior subcapsular cataract was noted, the patient's presentation was suggestive of rapid lens intumescence causing acute angle-closure glaucoma. He was given topical and systemic treatment, including intravenous mannitol, and his IOP reduced to 22 mmHg after 7 hours. Urgent lensectomy was performed the following day. Pre-operative ultrasound biomicroscopy revealed a greatly increased lens thickness of 5.12mm and an AC depth of 1.12mm. The integrity of both anterior and posterior lens capsules was confirmed intraoperatively, and silicone oil remained confined to the posterior segment. Post-operatively, the iris returned to a normal configuration with open angles, and IOP was 16mmHg with no anti-glaucoma medications at the last follow-up.

**Conclusions:** Acute angle-closure in children is a rare event. To our knowledge, this is the first reported case of phacomorphic glaucoma secondary to vitreoretinal surgery in the pediatric population. Although uncommon, ophthalmologists should be aware of this potential complication with the intraocular use of silicone oil and administer urgent treatment accordingly.

## Poster 57

**Title:** Acquired cataract from self-injurious behavior in the pediatric population

**Authors:** Kamiar Mireskandari, Tina Felfeli, Anne-Marie Yardley, Asim Ali

### **Abstract Body:**

**Purpose:** Self-inflicted traumatic cataracts and retinal detachment, associated with self-injurious behaviour, are uncommon but have significant implications in the pediatric population. We present the largest single series in Canada of self-inflicted ocular injuries leading to traumatic cataracts in a pediatric population and suggest strategies to improve visual outcomes.

**Study Design:** Retrospective case series.

**Methods:** A review of all consecutive patients presenting to a tertiary care hospital with self-inflicted cataract from January 1, 2002 to September 30, 2016 was conducted. Demographic data as well as all medical and ophthalmic clinical features, structural and visual outcomes of each patient were documented.

**Results:** Seven patients (3 females) were identified with a mean diagnosis age of  $11.6 \pm 4.3$  years (range 2.8-14.9 years). Five patients had autism spectrum disorder and two were diagnosed with global developmental delay. All patients presented with cataract (4 bilateral; 3 unilateral) secondary to blunt self-inflicted injury, and two had concurrent unilateral retinal detachment (RD). On presentation, visual acuity was  $1.7 \pm 1.2$  logMAR (range 0.3-2.3 logMAR). During the course of management, two additional eyes developed a cataract and four developed RD. On average, patients had  $16.4 \pm 11.1$  eye examinations, with 43.5% being completed under anesthesia. Patients underwent an average of  $2.4 \pm 1.8$  procedures for cataract and retinal repair. In 50% of the eyes, cataract surgery was deemed inappropriate based upon existing retinal pathology and the likelihood of postoperative complications associated with continued self-inflicted injuries. Rate of successful retinal reattachment for eyes was 28.6% following vitreoretinal surgeries. Measures were taken to reduce postoperative ocular injury with protective headgear (4/5 patients undergoing surgery) and immobilizing elbow splints (2/5). Final average visual acuity was  $1.8 \pm 1.1$  logMAR (range 0.3-3 logMAR) with complete loss of vision in 35.7% of all eyes (unilateral for all patients).

**Conclusions:** The visual prognosis in this patient population is often poor and treatment is complicated by continued self-inflicted injuries. High index of suspicion for ocular injury, preventative measures and regular surveillance to identify complications early, may improve visual prognosis. The complex interplay between underlying etiology, continued self-injury and limited options for treatment, necessitated the expertise of an inter-professional team for management of this patient population.



## Poster 58

**Title:** Case Report: Primary orbital rhabdomyosarcoma occurring concurrently with a choroid plexus carcinoma in a toddler later diagnosed with Li-Fraumeni Syndrome

**Authors:** Simrenjeet Sandhu, Thomas Hardy, Natashka Pollock

### **Abstract Body:**

**Purpose:** To increase awareness of Li-Fraumeni syndrome (LFS), which is an autosomal dominant syndrome predisposing to early-onset cancers and multiple malignancies. It is caused by germline mutations of the p53 tumor suppressor gene which is linked to soft tissue and brain tumours, including rhabdomyosarcoma (RMS) and choroid plexus carcinoma (CPC).

**Study Design:** This data was retrieved retrospectively from the patient's electronic health record.

**Methods:** A previously healthy 23-month old boy presented to his doctor with a one-week history of "red eye" and orbital swelling OS. He was diagnosed with cellulitis OS but worsened over 24 hours despite antibiotic and steroid treatment. MRI revealed two unrelated masses: one large mass in the inferior orbit suspicious for RMS and a large cauliflower-like mass in the lateral ventricle characteristic of CPC. In the context of synchronous primary tumours, we suspected LFS as a unifying diagnosis. We describe the histopathology of the tumours as well as the results of genetic testing in this patient.

**Results:** A previously healthy 23-month old boy presented to his doctor with a one-week history of "red eye" and orbital swelling OS. He was diagnosed with cellulitis OS but worsened over 24 hours despite antibiotic and steroid treatment. MRI revealed two unrelated masses: one large mass in the inferior orbit suspicious for RMS and a large cauliflower-like mass in the lateral ventricle characteristic of CPC. In the context of synchronous primary tumours, we suspected LFS as a unifying diagnosis. We describe the histopathology of the tumours as well as the results of genetic testing in this patient.

**Conclusions:** Individually, pediatric CPC or RMS diagnoses should raise suspicion for Li Fraumeni syndrome. To our knowledge, this is the first description of both CPC and RMS occurring simultaneously in a young patient with LFS. We discuss the treatment and clinical course of our patient as well as the genetic implications and screening recommendations for others with LFS.

## Poster 59

**Title:** Factors influencing the success of treatment for children diagnosed with hyperopic and astigmatic anisometropia in London, Ontario

**Authors:** Fady Sedarous, Toylin Musewe, Alex Mao, Inas Makar

### **Abstract Body:**

**Purpose:** To examine all patients presenting with hyperopic and astigmatic anisometropia to a pediatric ophthalmology practice in London with regards to referral pattern, presenting findings and outcomes. Factors influencing successful resolution of amblyopia were also examined.

**Study Design:** Retrospective chart review.

**Methods:** A chart review was conducted to identify children treated for hyperopic and astigmatic anisometropia from 2008 - 2016. Presenting degree of anisometropia, compliance, age at presentation and initial visual acuity (VA) were all statistically analyzed to determine effect on final VA.

**Results:** Data from 39 children was used for statistical analysis. The mean age of referral to pediatric ophthalmology from the referring optometrist or physician was 5.2 years old. 47% (16/39) presented with dense amblyopia, with the poorer eye having a VA of 6/30 or worse. 62% (24/39) had a positive family history of strabismus and/or amblyopia. Mean duration of follow-up was 22.5 months. 51% of children were successfully treated, with a final VA of 6/9 or better in the worse eye, and 5% of children had residual dense amblyopia. VA following treatment was improved by at least 3 lines in 77% of children. Magnitude of anisometropia upon presentation was the only factor found to have a significant effect on successful treatment, as for every one diopter decrease in magnitude of anisometropia, there was a 40% higher odds of achieving a final VA of 6/9 or better (point estimate 0.62, 95% CI 0.39 - 0.97,  $p=0.03$ ). Presenting  $\leq 4$  years old, presenting with dense amblyopia and compliance to treatment all had no significant outcome on treatment success.

**Conclusions:** The results from this study demonstrate that magnitude of anisometropia has a significant influence on final VA of children diagnosed with hyperopic and astigmatic anisometropia, while presenting age, presenting VA, and compliance to treatment regimen do not.

## Poster 60

**Title:** Orthoptic eye patch efficacy in the treatment of amblyopia

**Authors:** Joelle Tremblay, Louis-Philip Pelchat, Marcelle Falcao

### **Abstract Body:**

**Purpose:** The purpose of this study is to determine if the occlusion provided by various patches is adequate to optimize the treatment of amblyopia. The five patches tested were the white Ortopad, the beige Ortopad, the Ortopad with designs (Master-Aid, PietrasantaPharma, Italy), the beige Opticlude (Nexcare, 3M, Canada) and finally the DrPatch eye occlude (DrPatch, Canada).

**Study Design:** We use a prospective experimental approach.

**Methods:** We tested each of the 5 different eye patches on the right eye of 45 patients in a sequential approach and we held the left upper eyelid over the left eye to ensure maximum occlusion. The vision with the eye patched was reported as on Snellen visual acuity Chart.

**Results:** The most frequent visual acuity noted with all the patches was light perception. We observed that the best visual acuity possible with the white Ortopad was 20/40 and 20/50 with the beige Ortopad. The Ortopad with design allowed a vision of 20/100 and the Opticlude allowed a vision of 20/250. The DrPatch occluder was the only one permitting only light perception. We noticed that 22,2% [11,20-37,09%] of patients could see better than 20/200 with the white Ortopad and 15,6% [6,49-29,46%] with the beige Ortopad. We also observed that only two patches allowed a vision better than 20/100. We used the Friedman analysis and the Wilcoxon test to determine the differences. The white and beige Ortopad are statistically significantly less efficient than the other occluders. The Opticlude is more efficient than the white Ortopad and finally, the DrPatch occlude is the most efficient at blocking the vision.

**Conclusions:** The final choice of patches relies on various aspects like the attractive look for the patient, the comfort, the price and the availability. We believe that the efficacy should also be taken in account. In cases of severe amblyopia, we believe all 5 patches are good. However, in cases of mild amblyopia, we think an opaque patch should be prioritize. An interesting finding was the relatively high visual acuity possible through some patches. We searched the classification of those occluders on the Food and Drug Administration and discovered that the Ortopad is classified under the classification name "Pad, Eye" and is part of a Class 1 device for General and Plastic Surgery. The Opticlude is classified under "Shield, Eye, Ophthalmic (including sunlamp protective eyewear and post-mydratic eyewear" and is part of a Class 1 device for Ophthalmic. FDA has exempted almost all class 1 devices including those two. A premarket notification application and FDA clearance is not required before marketing those devices in the U.S. While still using them for amblyopia treatment, we have to be careful since we are using them out of the purpose they were approved for.

## Poster 61

**Title:** Long-term vision and alignment outcome in children with unicoronal craniosynostosis

**Authors:** Julie Vadboncoeur, Luis H. Ospina

### **Abstract Body:**

**Purpose:** To evaluate the long-term vision and eye alignment outcome in children with unicoronal craniosynostosis (UC) and its correlation with craniofacial surgery.

**Study Design:** A medical chart review was performed of all patients referred to our paediatric ophthalmology center in the last ten years.

**Methods:** Data were compiled and included complete eye exam (visual acuity, pupillary function, orthoptic exam, fundoscopy and cycloplegia) before and after cranial surgery, need for strabismus surgery, method of surgery preferred and complete eye exam following strabismus surgery.

**Results:** A total of 34 patients (74% female) were followed over the study period. Anisometropic amblyopia and strabismus were diagnosed in 38% and 76%, respectively. Significant refractive error, often astigmatism, was found in 32%. A contralateral head tilt was found in 62% of the patients and wasn't always associated with the presence of strabismus. Thirteen patients underwent strabismus surgery, performed after craniofacial reconstruction in 73% of them. An ipsilateral inferior oblique (IO) myectomy was performed in the majority (77%). The average hypertropia of 9.6 prism diopters (PD) in primary position improved to 2.7 PD after strabismus surgery and head tilt improved in 46%. Three patients (23%) required a second strabismus surgery for residual or consecutive vertical deviation.

**Conclusions:** The high incidence of amblyogenic anisometropia and strabismus in children with UC warrants early ophthalmological assessment and later follow-up. Unlike other types of craniosynostosis, the IO myectomy is useful to correct the vertical strabismus of UC. Multidisciplinary work with craniofacial surgeons results in improved vision and ocular alignment outcomes in children with UC.

## CATARACT SURGERY

### Poster 62

**Title:** Wound Architecture and Functional Outcome After Cataract Surgery with Manual vs. Femtosecond Laser Assisted Catalys Procedures

**Authors:** Etienne Benard-Seguin, Raphaëlle Fadous, Leila Mejdoub, Hasitha Jaliya de Alwis Weerasekera, Isabelle Brunette, Paul Harasymowycz

#### **Abstract Body:**

**Purpose:** Femtosecond laser-assisted cataract surgery (FLACS) offers several advantages for wound construction, including high precision, repeatability and a variety of corneal wound profiles. The aim of this study is to evaluate the restitution of normal corneal anatomy of two types of FLACS 3- plane wound profiles compared to the standard keratome.

**Study Design:** This Phase IV ambispective case study involved consecutive cases of cataract surgery performed between January 2015 and June 2015 by a single surgeon (PH) at the Clinique d'ophtalmologie Bellevue, Montreal, Canada, using either a FLACS or a manual technique.

**Methods:** The primary outcome measured will be the restitution of a normal corneal anatomy as measured by the difference between pre- and postoperative biometry as well as postoperative wound leakage. Corneal wound profiles will be assessed qualitatively by OCT.

**Results:** This study included 257 eyes of patients. FLACS was performed in 105 eyes (40.9%) and manual cataract surgery in 152 eyes (59.1%). Wound Leakage occurred in 25 eyes that underwent FLACS (23.8 %) and in 10 eyes that underwent manual surgery (6.60%). FLACS was associated with an increase in wound leakage (RR 3.62,  $p < 0.05$ ). Of the 103 patients who underwent FLACS, 57 had combined glaucoma surgery (i-stent, NPGS, GSL). Wound leakage occurred in 13 patients (22.8%) who underwent combined FLACS and in 11 patients (22.9%) who underwent standard FLACS. Combined surgery was not associated with an increase in wound leakage ( $p = 0.89$ ). Various FLACS wound profiles were compared. A reduction in wound leakage was observed by decreasing the posterior side cut angle from 70° to 45° (RR 0.37,  $p < 0.05$ ) and by increasing the anterior side cut angle from 100° to 120° (RR 0.24,  $p < 0.05$ ).

**Conclusions:** The incidence of wound leakage is linked to corneal wound profile, a highly adaptable parameter with FLACS. Preliminary results favor a narrow posterior side cut angle for better wound sealing and decreased leakage. Combined glaucoma surgery does not increase wound leakage. Optimized FLACS wound profiles are being designed.

## Poster 63

**Title:** Combining an Extended Depth-of-Focus Intraocular Lens with a Low-Add Multifocal Intraocular Lens to Extend Patient's Functional Vision

**Authors:** Sondra Black

### **Abstract Body:**

**Purpose:** To evaluate the uncorrected binocular distance, intermediate and near visual acuities, and assess patient's spectacle independence and satisfaction in individuals undergoing bilateral cataract extraction that have received a Tecnis® Symphony IOL in their dominant eye and a +3.25 D Tecnis® Multifocal 1-piece IOL in their fellow eye.

**Study Design:** This will be a single center, non-comparison, evaluator masked clinical study design. Fifty (50) qualified study patients (100 eyes) will receive a Tecnis® Symphony IOL in their dominant eye and a +3.25 D (KLB00) Tecnis® Multifocal 1-piece IOL in their non-dominant eye. Each study patient will undergo the same routine cataract extraction procedures for each eye, with the second eye scheduled to undergo cataract extraction within one to two days after the first eye. In addition, as is customary for the surgeon, each study patient will receive the same open-label pre-operative, operative and post-operative medications over the course of the study period.

**Methods:** This is a single-center, non-comparison, open-label clinical study design. Fifty qualified study patients received a Tecnis® Symphony IOL in their dominant eye and a +3.25 D Tecnis® Multifocal in their non-dominant eye. Each study patient underwent the same routine cataract extraction procedure for each eye, with the second eye undergoing the procedure within one day after the first. Inclusion required a potential for 20/30 vision or better post-op and less than 1.5 diopters of corneal astigmatism. Monocular and binocular vision were assessed at distance, intermediate and near, as well as contrast sensitivity. A Quality-of-Life questionnaire was utilized to assess patient satisfaction.

**Results:** study still undergoing final analysis

**Conclusions:** Combining the increased depth of focus of the Symphony IOL with a Tecnis MF low add (+3.25) is allowing patients to be less dependent on glasses at distance, intermediate and near

## Poster 64

**Title:** First Real-World Canadian Experience with the Optiwave Refractive Analysis (ORA) System with VerifEye+ Technology in Patients Undergoing Cataract Surgery in a Single Ophthalmology Clinic

**Authors:** John F. Blaylock, Emmanouil Rampakakis

### **Abstract Body:**

**Purpose:** Intraoperative aberrometry was developed for the aphakic and pseudophakic of measurement of a patient's eye during their cataract surgery allowing IOL power confirmation and lens placement to optimize visual outcomes. The purpose of this study is to describe the effectiveness of using the ORA System with VerifEye+ in improving visual and refractive outcomes and its usefulness in intraocular lens (IOL) selection among patients undergoing cataract surgery in routine Canadian clinical practice.

**Study Design:** Observational case-series study of patients undergoing cataract surgery at a private ophthalmology clinic in October and November 2016.

**Methods:** Twenty-three eyes of 23 patients that underwent cataract surgery using the ORA System with VerifEye Technology as part of their routine care were included in the study. Visual and refractive outcomes were evaluated during a 2-week follow-up period. Descriptive statistics including the mean for continuous variables and counts and proportions for categorical variables were produced. For exploratory purposes, a subgroup analysis by prior refractive surgery was conducted.

**Results:** The majority of patients (65.2%) had no prior refractive surgery and 8 (34.8%) were post-refractive. Roughly equal proportions of OD vs. OS eyes underwent surgery (47.8% vs. 52.2%) and the most commonly used IOL type was lentis (56.5% of patients; 13.0% lentis toric) followed by monofocal (30.4%) and toric (13.0%). Mean visual acuity (VA) post 24 hours and 2 weeks from surgery were 0.86 (20/22) and 0.8 (20/25), respectively; mean manifest refraction at 2 weeks was -0.21. Patients without prior eye surgery had improved 24-hour (0.93 vs. 0.53,  $p < 0.001$ ) and 2-week (0.85 vs. 0.69,  $p = 0.123$ ) VA, as well as manifest refraction (-0.12 vs. -0.41,  $p = 0.136$ ). The surgical plan in terms of IOL selection was modified in 39.1% of patients without any difference based on prior refractive surgery (40.0% vs. 37.5%).

**Conclusions:** The current study supports the effectiveness of intraoperative use of the ORA System with VerifEye+ during cataract surgery both in surgery naïve and post-refractive patients. Furthermore, modification of the pre-operative IOL selection was exercised in 39% of cases suggesting that ORA can assist in treatment optimization which, in turn, could result in improved outcomes and patient satisfaction.

## Poster 65

**Title:** Intraocular lens biocompatibility: a novel, objective approach

**Authors:** Christina Mastromonaco, Matthew Balazsi, Pablo Zoroquiain, Patrick Logan, Evangelina Esposito, Jacqueline Coblenz, Aya Siblino, Miguel Burnier

### **Abstract Body:**

**Purpose:** Understanding factors that contribute to posterior capsular opacification (PCO) development is a significant public concern since treatment can lead to complications. In order to prevent PCO, a better understanding of intraocular lens (IOL) implant characteristics, including design and material, and patient interaction is required. Herein, we performed a retrospective multivariable analysis to determine which factors (IOL- and patient-based) were least likely to result in PCO.

**Study Design:** Retrospective multivariable analysis.

**Methods:** 180 post-mortem eyes with implanted IOLs were collected from the Minnesota Eye Bank, along with clinical history, including date of cataract surgery and IOL model number. The capsular bag (CB) with the IOL implant was removed from all eyes to obtain digital images. PCO outcome was quantified on CB images using an objective, automated custom image analyzer (Medical Parachute Automated Detector Opacification Software). The software measured intensity and area of the opacification within the IOL optic edge, intra-optic edge (IOE=intensity/area), and in Soemmering's ring (SR=intensity/area). Epidemiologic analysis assessed which IOL characteristics and patient-related factors correlated with PCO development. IOL characteristics included material, edge design, lens filter, company, IOL model, decentration and time from cataract surgery to death. Patient factors included gender, age, diabetic, hypertension, high cholesterol, smoker status, and glaucoma.

**Results:** Bivariate and multivariate analyses showed non-diabetic patients between the ages of 50-80 had less SR PCO. Non-blue light filter IOLs made of hydrophobic acrylic material, with either square or frosted optic edge design, had lower SR PCO rates. The IOL model that had the least amount of PCO was the ZA9003 model, but this was only significant for SR and not IOE PCO. Non-blue light filter with square and frosted edge design had lower IOE PCO. Adjusting for patient-factors, hydrophobic acrylic materials were no longer a contributing factor to SR PCO. Patients with an IOL implanted for <7 years had lower SR PCO, whereas lower IOE PCO was seen in implants <4 years old.

**Conclusions:** In order to generate a lens that does not develop PCO, it is critical to understand the IOL- and patient-related factors that lead to PCO development. Based on our data, the most susceptible patients are elderly and diabetic, and it may be preferable to implant a square and frosted edge lens without blue-light filtering in this cohort.



## Poster 66

**Title:** Management of anterior capsular tears with a capsulorrhexis relaxing incision

**Authors:** Kelsey A. Roelofs, **Chris J. Rudnisky**

### **Abstract Body:**

**Purpose:** To evaluate the effectiveness of using a balancing, relaxing incision of the capsulorrhexis to manage anterior capsular tear (ACT).

**Study Design:** Retrospective, interventional, case-control study.

**Methods:** Following ethics approval, the surgical operative records of 4301 consecutive patients undergoing cataract surgery by a single surgeon, at a single centre, were reviewed for cases of ACT. All ACT's were managed using a balancing incision of the capsulorrhexis margin 180° away from the tear. The charts were reviewed to collect demographics, intraoperative data, complications, post-operative visual acuity and post-operative refraction. If their other eye had undergone cataract surgery by the same surgeon, it was included as a control.

**Results:** Fifty-one eyes of 51 patients were complicated by ACT, which is an overall incidence of 1.2%. The mean age of patients in the study was  $64.2 \pm 12.1$  years, and 43.1% were female. Of the 51 patients with ACT, 34 had their second eye done, which formed the control group. There was no difference in preoperative visual acuity ( $p=0.683$ ) or cataract severity, as indicated by the surrogate cumulative dissipated energy ( $p=0.530$ ), between groups. There was no difference in the proportion of eyes that received in-the-bag intraocular lens placement between ACT (92.2%;  $n=47$ ) and control eyes (97.1%;  $n=33$ ;  $p=0.347$ ). In 3 ACT eyes the tear extended into the posterior capsule (5.9%), and while this did not occur in control eyes, this difference was not statistically significant ( $p=0.150$ ). There was no difference in best-corrected final logMAR visual acuity between groups ( $p=0.424$ ), with ACT eyes realizing a mean logMAR acuity of  $0.29 \pm 0.42$  units, in comparison to control eyes with  $0.24 \pm 0.43$  units. Similarly, there was no difference in post-operative spherical equivalent between ACT ( $-0.23 \pm 1.2D$ ) and control ( $-0.15 \pm 0.62D$ ) eyes ( $p=0.985$ ).

**Conclusions:** The use of a balancing, relaxing incision of the capsulorrhexis is an effective technique to manage ACT, preventing extension into the posterior capsule in 94.1% of cases. There was no difference in visual or refractive outcomes in comparison to uncomplicated cataract surgery. To the best of our knowledge, this represents the largest case series studying an ACT management technique reported in the literature.

## INTERNATIONAL AND PUBLIC HEALTH OPHTHALMOLOGY

### Poster 67

**Title:** Diabetic Retinopathy Screening in a Community Pediatric Diabetes Clinic at Peterborough Regional Health Center

**Authors:** Kedija M. Abdella, Karolyn Hardy-Brown, Kylene McReelis, Hermina Strungaru

#### **Abstract Body:**

**Purpose:** To evaluate retinopathy screening rates for pediatric diabetic patients in a regional center and to determine the diabetic retinopathy incidence and compliance of those patients with current guidelines.

**Study Design:** Retrospective study

**Methods:** The study included 71 patients seen in the pediatric diabetes clinic at Peterborough Regional Health Center between July and November 2016. Medical records for all pediatric patients with diabetes were reviewed. Parents and children were asked questions about eye examination history.

**Results:** Of the 125 patients studied, 71 consented to participate in our study. Mean age for participants was 13 years and 30 patients were female. Sixty-eight patients (95.7%) had type 1 diabetes and three patients (4.3%) had type 2 diabetes. Mean age at diabetes diagnosis was 8 years, and mean duration of diabetes was 3 years. Average HbA1c level was 9.2. Only 17 patients (23.9%) were following the Canadian Diabetes Association guidelines for diabetic retinopathy screening. Of major interest in the group of fifty-four patients who were not following the guidelines, 52 patients (96.2%) were receiving too many eye exams with only two patients (3.8%) were receiving too few eye exams. Of the sixty-one patients who had received eye exams in the past, 51 patients (83.6%) had received an eye exam during the past year. The dilated eye examination for all patients who had an eye examination was normal without any diabetic retinopathy being found. Seven of the 61 patients (11.5%) received eye exams from an ophthalmologist and the other fifty-four patients (88.5%) received eye exams from an optometrist.

**Conclusions:** This is the first study in Canada looking at the compliance rate of screening guidelines for diabetic retinopathy in a pediatric population. As no retinopathy was identified we confirm the very low incidence of anticipated complications. Our study shows a low compliance rate however with screening guidelines (23%) in diabetic pediatric population, and the low compliance in our cohort was related to many unnecessary eye exams. As we locally strive to deliver quality based care more emphasis on proper screening protocols is needed to effect some system savings. We found a low incidence of diabetic retinopathy despite poor control of diabetes, due to recognized challenges for glucose control in this age group with relatively short duration of disease treatment.

## Poster 68

**Title:** Evaluating Canadian Ophthalmology Residents' Attitude, Knowledge and Perceptions of Interprofessional Collaboration

**Authors:** Sharnjit Bains, Isabel Ng, Enitan Sogbesan

### **Abstract Body:**

**Purpose:** The aim of this study was to investigate ophthalmology residents' level of understanding of collaborative practice; their attitudes, knowledge, and perceptions towards Interprofessional Collaboration (IPC) with other eye care professionals (ECP).

**Study Design:** Knowledge, Attitude, and Practice Survey

**Methods:** IPC survey was sent via email to residents, with aid from Medical School Residency Directors. Survey had multiple sections evaluating different aspects of IPC: 1) Demographics; 2) Knowledge & Understanding of IPC Concepts; 3) IPC Competencies - Communication, Interprofessional Relations/Team Functioning, Conflict Management/Resolution; 4) IPC Preparation & Barriers. Questions were open-ended or used Likert scale.

**Results:** 24 residents completed the survey; 45.8% were male respondents. Personal knowledge of IPC concepts varied: 2.5% stated excellent understanding, 41.7% had a very good understanding, 20.8% had a good understanding, 20.8% had a fair understanding and 12.5% stated poor understanding. Residents understanding of optometrist's scope of practice was: 12.5% excellent, 41.7% very good and 41.7% was good. Communication: residents stated they consistently listened (62.5%), expressed concerns and ideas (26.1%), replied to requests in a timely manner (58.3%) and shared information/resources (66.7%) with other ECP. Team Functioning: residents stated they consistently work effectively (58.3%), respect the roles/expertise (62.5%), learn with/from (58.3%) and integrate information and perspectives (50.0%) to enhance patient care with other ECP. Conflict Management: they consistently seek clarification when misunderstandings arise (45.8%) and work with others to resolve conflicts (50.0%). IPC Preparation, Practice, and Barriers: 41.7% are extremely prepared to collaborate (37.5% very good, 16.7% good, and 4.2% not at all); 37.5% they have been well prepared from their education or workplace for IPC (12.5% Not at all). IPC training included: web-based modules (29.2%), in-person courses (33.3%), workshops/conferences (33.3%), teambuilding activities (45.8%), group projects (41.7%). 29.2% did not receive IPC training. Above average responses indicated barriers such as lack of training/education, administrative support, time and financial limitations, and confidentiality issues do prevent effective IPC between ECP's.

**Conclusions:** This study assessed the resident level of training in IPC and their readiness to collaborate with ECP's instead of the extent to which ophthalmology residents engage in collaborative practice with ECP's. Survey was focused on IPC training and not on questions about already using IPC in their practice. It was shown that majority of residents are prepared to collaborate with ECP's, however, a few residents (12.5%) were not prepared or had an insufficient education or training. Residents understand the importance of collaboration but require "a better understanding of what is and are not within the scope of their practice." Residents agree more constructive workshops, courses, guidelines, and meetings are required to improve IPC training. Further investigation is still required to better understand interprofessional collaboration and education amongst ophthalmology residents.

## Poster 69

**Title:** Publication rate of abstracts presented at the 2010 Canadian Ophthalmological Society Annual Meeting

**Authors:** Alfred Basilio, Ana Maria Benavides Vargas, Yvonne Buys

### **Abstract Body:**

**Purpose:** To evaluate the publication rate of submitted abstracts accepted for presentation at the 2010 Canadian Ophthalmological Society (COS) Annual Meeting in peer reviewed journals.

**Study Design:** A retrospective analysis and literature search of abstracts presented at the 2010 COS Annual Meeting.

**Methods:** Abstracts accepted as an oral presentation or poster from the 2010 COS Annual Meeting were tabulated by type of presentation (oral vs poster), subspecialty, study design, number of authors and principal investigator's institution. A PubMed search was conducted for each abstract by key word, first author, and last author. The year of publication, journal, and impact factor was recorded for identified publications. Publication rate was calculated by type of presentation, subspecialty, study design, number of authors and institution.

**Results:** A total of 175 abstracts were presented at the 2010 COS Annual Meeting. There were 105 (60%) oral and 70 (40%) poster presentations. The overall publication rate was 45.7%; 49.5% for oral presentations and 40.0% for posters. Cornea (57.6%) and public health (54.5%) had the highest publication rates of all subspecialties. Randomized control trials (71.4%) and cohort studies (70.0%) had higher publication rates than other study designs. Overall, 28.8% of abstracts were published in the Canadian Journal of Ophthalmology. The average impact factor of all publications was 2.73.

**Conclusions:** 45.7% of abstracts presented at the 2010 COS Annual Meeting were published within 5 years after the conference. This publication rate is within the upper end of previously reported meeting publication rates for medical societies.

## **Poster 70**

**Title:** The changing face of the ophthalmology workforce: an analysis of practice patterns and associations over two decades

**Authors:** Yvonne M. Buys, Tina Felfeli, Yaping Jin

### **Abstract Body:**

**Purpose:** There has been a growing cohort of females and a seven-fold increase in the number of ophthalmologists above the age of 65 since 1970. In response to demographic changes of the ophthalmology workforce, an analysis of the practice patterns of ophthalmologists over the past two decades will provide a valuable reference for physician resource management.

**Study Design:** Population-based study of annual Ontario Health Insurance Plan (OHIP) billings and number of patient visits amongst ophthalmologists in Ontario, Canada from 1992 to 2014.

**Methods:** The Institute for Clinical Evaluative Sciences (ICES) database was used to determine the yearly headcount, gender, median yearly OHIP billings and patient visits of Ontario-licensed ophthalmologists for the following age groups; <35, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-70, 70-74, ≥75. All billing data were adjusted to 2014 dollars to account for inflation.

**Results:** Female representation of ophthalmologists in Ontario has steadily increased from 11.1% in 1992 to 19.2% in 2014. Ophthalmologists within the 35-55 age groups represented the highest billing cohort throughout the study period. Early-career ophthalmologists in the <35 years of age group had the greatest variability in their yearly median billings, with the largest pay discrepancy between males and females of 89.1% in 1992 and smallest of 9.15% in 2014. The later-career ophthalmologists in the 40-44 age group showed a 72.2% billing difference between males and females in 1992 compared to 19.9% in 2014, while showing the smallest changes in billing patterns over time. Gender differences in billing within the 35-39, 40-45 and 50-54 age groups continued to narrow, such that in 2014, females earned 26.6%, 19.9% and 27.8% less than males, respectively. Despite narrowing gaps seen in these age groups, women of 45-49 years of age earned 49.9% less than males in 2014. Male ophthalmologist had 2.7% more patient visits than females in the <35 age group, however greater discrepancies were seen in later-career ophthalmologists, where females in 35-39, 40-44, 45-49, 50-54 age groups saw 8.8%, 28.3%, 39.8% and 10.8% fewer patients, respectively. There was insufficient data to perform a gender analysis for the remaining age groups.

**Conclusions:** The proportions of females and males entering ophthalmology has changed significantly over the past two decades. Female ophthalmologists continue to bridge the gender gap as illustrated by the decline in the difference in median billing once entering the work force. However, gaps in billing trends continue to exist across all age groups with women billing less than their male counterparts. Complex differences in practice patterns of ophthalmologists by age groups affects both the workforce and highlight the need for a better understanding of changing characteristics relating to aspects of work-life balance and access to resources.

## Poster 71

**Title:** Emergency Ophthalmology Consults at a Canadian Tertiary Teaching Hospital: A Retrospective Review

**Authors:** Gavin Docherty, **Carol Tadrous**, Brennan Eadie, Simon Warner

### **Abstract Body:**

**Purpose:** To evaluate the frequency and nature of after hour emergency ophthalmology consults and to assess the agreement between referring diagnosis and ophthalmologic diagnosis.

**Study Design:** Retrospective chart review.

**Methods:** Chart review of ophthalmology consults was conducted between September 1 2015 and October 21, 2016 at a single center Canadian tertiary hospital. The variables assessed included the gender and age of the patient, date of consult, reason for consult, and ophthalmic diagnosis.

**Results:** A total of 620 consults were reviewed. The average age of patients was 51.6 years. There were 312 (50.3%) males and 308 (49.7%) females in the study. The most frequent reason for consult involved ocular surface disorders (28%). Posterior segment (27.9%), anterior segment (12.9%), neurological (7.7%), and orbit (5.3%) complaints were the next most frequent reasons for consult. The most common diagnoses were posterior vitreous detachment/vitreous syneresis (12.4%), corneal abrasion (6.3%), conjunctivitis (6%), keratitis/keratopathy (4.4%), and anterior uveitis (4%). Urgent ophthalmic consults, including acute angle closure glaucoma (2.4%), retinal detachment (2.4%), globe rupture (1.3%), and endophthalmitis(0.5%) made up a total of 6.6% of consults. Diagnostic agreement between consulting diagnosis and ophthalmic diagnosis was 48%. Diagnoses with lower rates of agreement included Iritis (44%), corneal ulcer (62%), globe rupture (63%), and hyphema (77%).

**Conclusions:** The most frequent reasons for ophthalmic consults, such as posterior vitreous detachment, corneal abrasion and conjunctivitis, had relatively good agreement between the referring emergency physician and the consulting ophthalmologist. There was a low agreement rate between ophthalmic diagnosis and referring diagnosis for other specific conditions such as iritis, corneal ulcer globe rupture and hyphema. This study highlights areas that ophthalmologists can focus on for educational initiatives targeting primary care physicians.

## Poster 72

**Title:** Eye on the future of ophthalmology: development of the University of Toronto's ophthalmology undergraduate preclerkship medical education curriculum

**Authors:** Tina Felfeli, Hannah H. Chiu, Daniel J. Weisbrod, Kathy Cao, Sherif El-Defrawy

### **Abstract Body:**

**Purpose:** In the current socioeconomic climate of Canadian healthcare, there is an increasing demand for both primary and specialty-trained physicians to have a solid grasp of cost-effective and patient-centered eye care. Ophthalmic undergraduate medical training is the cornerstone to this goal. However, studies show an inadequate amount of exposure to ophthalmology at the undergraduate level. In the context of an ever-expanding foundation of medical knowledge, it is increasingly important to optimize medical education through teaching modalities that are evidence-based to be effective in pedagogy including a shift away from didactic lectures and towards case-based and interactive curricula. In the quest to address barriers and the erosion of exposure to ophthalmology teaching for medical students, we describe the process of developing one of the largest ophthalmology medical education curriculums in Canada and present novel approaches to ophthalmic education.

**Study Design:** Needs assessment and curriculum development.

**Methods:** Responses were gathered from the University of Toronto Undergraduate Medical Education curriculum student evaluation questionnaires for years 2012-2016. Quantitative evaluations for efficacy of curriculum design, teaching, and assessment were compiled, and qualitative data were subject to a thematic analysis guided by theoretical constructs related to the aforementioned areas. In consideration of the identified gaps within the curriculum as identified by student evaluations, objectives and a curriculum design were developed to cover core ophthalmic principles in the realms of knowledge, skills and competencies.

**Results:** Quantitative analysis of course evaluations for ophthalmology showed an average overall evaluation of 3.97/5 (5-point Likert scale; 1='strongly disagree' to 5='strongly agree'), compared to the average score of 3.99/5 (range= 3.86-4.16) for all other specialty curricula. A review of student evaluations demonstrated gaps in the curriculum relating to several important learning themes including: 1) a lack of cohesiveness between lectures, 2) a need for algorithms for managing patients with eye diseases, and 3) insufficient time to take in concepts. In the newly designed curriculum an emphasis was placed on: 1) condensed interactive lectures that were reviewed by an education committee of different disciplines to ensure cohesiveness of learning material, 2) 'virtual clinic' case-based learning sessions that demonstrated stepwise approach to ophthalmic diseases for students to learn management algorithms, and 3) self-directed learning via online teaching e-modules.

**Conclusions:** Ophthalmology remains a critical facet of the fundamentals of undergraduate medical education and is essential to eye health of all Canadians through appropriate training of future physicians. We believe that the new University of Toronto's ophthalmology undergraduate preclerkship medical education curriculum will enhance knowledge transfer, skills, and attitudes of future physicians and provide them with the competency to recognize the signs and symptoms of common eye diseases and preventable vision loss. Medical schools across Canada are encouraged to participate in these efforts.

## Poster 73

**Title:** Risk of Bias Assessment of Randomized Controlled Trials in High-Impact Ophthalmology Journals and Medical Journals: A Systematic Review

**Authors:** Lazar Joksimovic, Robert Kouchekei, Marko Popovic, Matthew Schlenker, Iqbal Ike Ahmed, Yusuf Ahmed

### **Abstract Body:**

**Purpose:** This systematic review investigates the risk of bias in randomized controlled trials (RCTs) published in high-impact ophthalmology journals and general medical journals. We also aim to identify factors associated with high risk of bias.

**Study Design:** Systematic review

**Methods:** Using Ovid MEDLINE (1946-2016), RCTs in the top 10 high-impact ophthalmology journals published in the year 2015 were systematically identified and critically appraised for the risk of bias prevalence. To perform the critical appraisal, relevant extracted RCTs were assessed in all domains of bias as defined by the Cochrane Collaboration. In addition, the prevalence of conflict of interests (COIs) and industry sponsorship of trials was investigated. A comparison to ophthalmology articles from four high-impact general medical journals was performed.

**Results:** Of the 151 records that were screened from ophthalmology-specific journals, 119 RCTs met all inclusion criteria and were critically appraised. In total, 29.4% of domains had an unclear risk, 13.8% had a high risk and 56.8% had a low risk of bias. In comparison, ophthalmology articles from general medical journals had a lower prevalence of unclear risk (18.2%), higher prevalence of high risk (23.4%) and a higher proportion of low risk domains (58.4%). A total of 89.2% of RCTs from ophthalmology-specific journals had at least one domain with an unclear risk of bias, and 56.7% of RCTs had at least one high risk domain.

**Conclusions:** Almost 90% of critically appraised RCTs from ophthalmology-specific journals had at least one unclear risk domain, while more than half of RCTs had at least one high risk domain. Given the influence that bias can have on study results, it is necessary that future RCTs closely follow published guidelines to minimize the possible risk of bias.



## Poster 74

**Title:** Trends in Canadian Ophthalmology Residency Applications

**Authors:** Irfan N. Kherani, Bernard Hurley

### **Abstract Body:**

**Purpose:** Upon completion of their undergraduate medical training, graduates enter the R-1 Residency Match if they wish to complete their post-graduate training in Canada. The Canadian Resident Matching Service (CaRMS) administers an arms-length application and match system. Data collected through the process can be used to inform human resource planning. Reports argue for significant increases in demand for both eye services and training. However, neither the number of applicants and positions available, nor their long-term trends are understood. The purpose of this study is to work with CaRMS to establish trends in ophthalmology applications and residency positions to aid human-resource planning.

**Study Design:** Eight sets of aggregate data have been requested from CaRMS.

**Methods:** The first two sets have been delivered and analyzed: the number of available and matched ophthalmology positions in the match from 2007 to 2016, and the number of Canadian Medical Graduate (CMG) applications submitted to programs between 2013 and 2016.

**Results:** Canadian ophthalmology residency positions for CMGs increased from 31 in 2007 to 39 in 2016 (peak 40 in 2014). 99.7% of CMG positions were filled in the first iteration, with 100% match by the second. On average, 1.3 positions were available yearly for international graduates (IMG), for a total of 13 positions over the past ten years. Between 2013 and 2016, 592 CMG applications were submitted to ophthalmology programs each year. Each program received an average of 39 CMG applications (max 59, min 17). English CMG applications make up 89%, and French CMG applications make up 11% of the total pool. English programs received an average of 44 (59 max, min 33), and French programs received an average of 22 (27 max, 17 min) CMG applications per year.

**Conclusions:** The number of ophthalmology positions for CMGs increased by 26% between 2007 and 2016. Between 1 and 2 positions are available each year for IMGs through the CaRMS match. The total number of CMG ophthalmology applications submitted to programs has remained constant between 2013 and 2016 (max 605, min 575). French-program CMG applications make up 11%, and English account for 89% of the total pool. The number of distinct CMG and IMG applicants is still unknown, limiting assessment of interest. Further study to examine programmatic data before 2007 and applicant data before 2013 is necessary and has begun. Once trends have been established it can be combined with demographic data of the current workforce to develop future projections catalyzing data-based health human resource planning.

## Poster 75

**Title:** Emergency ophthalmology in rural communities and the development of a novel ocular triage algorithm

**Authors:** Anmol Lamba, Hyder Shah, Aurinjoy Gupta, Sanjoy Gupta

### **Abstract Body:**

**Purpose:** To identify the role patient demographics play in accessing emergency ophthalmology care in a rural setting.

**Study Design:** This was a single centre, retrospective chart review in Thunder Bay, Ontario.

**Methods:** Retrospective data collection was done on patient charts accepted for urgent consultation by ophthalmology during a one year period. A subgroup analysis on local patients (0-99km from the ophthalmology centre) was used to develop an ocular triage algorithm to assist with referral services. Research Ethics Board approval was obtained.

**Results:** 118 charts were analyzed. 16.1% of patients lived 100km to 499km away whereas 10.2% lived greater than 500km away. The average time a patient waited to be seen by ophthalmology was 2.2 days. Patients that lived 500km away or further were less likely to be referred from an emergency room (ER,  $p < 0.05$ ), and waited longer to see ophthalmology (5.2 days vs. 1.9 days,  $p < 0.04$ ). Locally, patients with more ominous presentations (retinal symptoms, acute vision loss, and/or trauma) were triaged to be seen quicker (1.31 days) than those without these symptoms (2.32 days) ( $p < 0.01$ ). A novel triage score based on visual acuity and the presence of these ominous presentations was found to effectively sort patients into more and less urgent categories in a statistically significant manner ( $p = 0.05$ ).

**Conclusions:** Patients that live a considerable distance from the nearest ophthalmologist experience longer times to ophthalmology consultation and are less likely to be seen at an ER. General practitioners and optometrists must be equipped to deal with acute ophthalmologic emergencies in these settings. An ocular triage algorithm was developed to assist primary care services in triaging patients and to emphasize the importance of a complete history and physical. The algorithm will be used in a future prospective clinical trial.

## Poster 76

**Title:** Quantifying the level of evidence presented at the 2016 Canadian Ophthalmological Society Annual Meeting

**Authors:** Sarah J. Mullen, Joshua Barbosa, Michael Mak, Michael T. B. Nguyen, Payal Patel, Varun Chaudhary

### **Abstract Body:**

**Purpose:** To characterize the level of evidence (LOE) of oral presentations delivered at the 2016 Canadian Ophthalmological (COS) Annual Meeting.

**Study Design:** Systematic Review

**Methods:** All oral presentation abstracts from the 2016 COS Annual Meeting scientific program were reviewed by two independent reviewers using the Oxford Centre for Evidence Based Medicine Levels of Evidence (CEBM) grading metric. Presentation type, session topic, study design, number of centres, LOE and LOE adjustments (effect size, >30% missing data, controlling for confounding factors) were recorded for each study. Abstracts reporting results of basic science or qualitative research were excluded from analysis. In the case of disagreement between reviewers, an expert in biostatistics/epidemiology blinded to their responses graded the LOE, serving as the truth measure. An intraclass correlation (ICC) statistic was calculated to evaluate interrater reliability.

**Results:** Of the 87 oral presentation abstract results, 12 were excluded from analysis due to incompatibility with the CEBM scoring system for clinical research. There was high agreement between the two independent reviewers (ICC=0.866, 95%CI=0.787-0.915,  $p<0.001$ ), with 55(73%) studies having perfect agreement. Of the 75 abstracts reviewed, 6(8.0%) were a meta-analysis or systematic review, 3(4.0%) were a blinded randomized controlled trial (RCT), 1(1.3%) was a non-blinded RCT, 12(16.0%) were prospective cohort studies, 40(53.3%) were retrospective observational reviews, 8(10.7%) were cross-sectional design and 5(6.7%) represented another design. 22(29.3%) of studies were multi-centered. 12(16.0%) studies received a CEBM rating of level I, 5(6.7%) received a score of level II, 13 (17.3%) received a score of level III, 39(52.0%) received a score of level IV, and 6(8.0%) received a score of level V. The proportion of high-level studies (LOE II or higher) was greatest in the international/public health(66.7%), glaucoma (57.2%) and uveitis(50%) categories; however, this analysis is limited by small sample size and variable numbers of presentations at each session.

**Conclusions:** The majority of oral presentations at the 2016 COS Annual Meeting represented level IV evidence and were retrospective in nature.

## Poster 77

**Title:** Realist evaluation of an ophthalmology clerkship evaluation: What works, how and why

**Authors:** Nawaaz Nathoo, **Jane Gardiner**, David Maberley

### **Abstract Body:**

**Purpose:** The UBC ophthalmology clerkship for third year medical students operates in a variety of contexts: as a 1 week mandatory rotation (either in a tertiary academic centre or out of 3 distributed sites around BC), or as a longitudinal set of clinical experiences in an integrated community clerkship (ICC) model. The purpose of this study was: (1) to evaluate the undergraduate clerkship experience at UBC to ensure that experiences are comparable and objectives are being met across the various sites and models; and (2) to apply educational theories to the evaluation outcomes to better understand why the clerkship works as it does, in order to be able to use this to inform the development of other similar clerkships, both at UBC and outside.

**Study Design:** Cross-sectional evaluation of UBC ophthalmology clerkship using a critical realist paradigm.

**Methods:** We identified inputs, activities, and outputs of the clerkship experience at each site. Site directors and administrators were contacted for information regarding the program design and delivery, and outcomes were described using existing UBC assessment data (written exam and clinical assessment scores) and student and instructor feedback (questionnaires with narrative responses).

**Results:** Site directors and administrators from all clerkship sites participated in the study. Clerkship experiences across all sites (rotation-based and ICC) were found to be unique in contexts and clinical activities but nevertheless produce similar outcomes in terms of assessment scores, student satisfaction, and self-reported attainment of rotation objectives. Adult learning theory (i.e. that education is practical, relevant, related to prior experiences and to future learning goals) was applied to justify the organization of the clerkship with clear objectives, orientation and hands-on clinical experiences. One significant challenge identified was the use of optometrists as clinical instructors in one site, which created the perception of inadequate teaching amongst some students. Social learning theory suggests that learning is about induction into a community (specifically in our case, the medical community); the role of instructors is therefore not only as content experts but also as physician-role models. This would not necessarily be replicated by non-physician instructors and may explain the resistance of students to learn from allied health professionals.

**Conclusions:** In an era of distributed models of education including both rotation-based and integrated clerkships, it is important to recognize that varying contexts/activities for clinical learning can still lead to appropriate and equivalent learning outcomes. Aspects of both adult learning and social learning theories were found to apply to the design and implementation of the clerkship experiences.

**Title:** Fragility of results in randomized control trials in ophthalmology

**Authors:** Carl Shen, Isabel Shamsudeen, Forough Farrokhyar, Kourosh Sabri

**Abstract Body:**

**Purpose:** P-values are widely used in medical studies to indicate statistical significance but recent literature has highlighted the potential pitfalls in their interpretation. Fragility Index (FI) is a novel measure of the robustness of statistically significant dichotomous outcomes. The FI is calculated by iteratively changing a patient from a non-event to an event in the treatment group, keeping overall trial group numbers stable, until statistical significance is lost. The purpose of this study was to determine the robustness of statistically significant results published in ophthalmology randomized controlled trials (RCTs) through FI.

**Study Design:** Review of published RCTs in the field of ophthalmology.

**Methods:** A literature search (MEDLINE) was performed for all RCTs published in top ophthalmology journals, and ophthalmology-related RCTs published in high-impact journals in the past 10 years. Two reviewers independently screened 1811 identified articles for inclusion if they (1) were an ophthalmology-related trial, (2) had a 1:1 prospective study design, and (3) reported a statistically significant dichotomous outcome in the abstract. All relevant data, including outcome, p-value, number of patients in each group, number of events in each group, number of patients lost to follow-up, and trial characteristics were extracted. The FI of each RCT was calculated and correlations between FI and trial parameters were determined. Lower FI values represent more fragile results

**Results:** The 156 included articles had a median total sample size of 89 patients/eyes (range: 13-2593), and a median total number of events of 27.5 (range: 4-2217). The median Fragility Index of the included trials was 2 (range: 0-48), which means that if 2 non-events were switched to events in the treatment group, the result would lose its statistical significance. A quarter of all trials had a FI of 1 or less, and 75% of trials had a FI of 6 or less. The FI was less than the number of patients/eyes lost to follow up in 52.6% of trials. A positive correlation was found between FI and total trial sample size and total number of events. FI and reported p-value for included outcomes were negatively correlated.

**Conclusions:** In ophthalmology trials, statistically significant dichotomous results are often fragile, meaning that a difference of only a few events can change the statistical significance of the result. An application of the Fragility Index in RCTs may aid in the interpretation of results.

## UVEITIS

### Poster 79

**Title:** Disease characteristics, complications and treatment patterns in non-infectious intermediate, posterior and panuveitis in Canada

**Authors:** Marie-Josée Aubin, Julie Vadboncoeur, Véronique Lambert-Obry, Avril Gouault-Laliberté, Alex Castonguay, Marie-Claude Laliberté, Jean Lachaine

#### **Abstract Body:**

**Purpose:** To describe disease characteristics, complications and treatment patterns of non-infectious intermediate, posterior, or panuveitis (NI-IPP) in Canada.

**Study Design:** A retrospective medical chart review was performed in a tertiary eye care center in Montreal, Canada.

**Methods:** Eligible patients were  $\geq 18$  years old with a diagnosis of NI-IPP made before or on January 1st 2013. Disease characteristics, uveitis treatments and ocular complications were collected. Best-corrected visual acuity (BCVA) measures, collected as Snellen fractions, were converted into letter count scores where a higher score is associated with a better vision. Disease activity collected during the study period was defined according to the SUN Working Group and categorized as follow: inactive, worsening, improved and remission. Data were collected from the diagnosis until death, loss to follow-up or end of data availability. Change in BCVA, described in terms of letter loss, was calculated by using first and last evaluations available for both eyes, for each patient.

**Results:** A total of 10 patients are included in this analysis. Of these, 50% were male and the mean age at diagnosis was 44 (SD=15) years. Proportion of intermediate, posterior and panuveitis was 60%, 20% and 20% respectively. Most cases (60%) were idiopathic. All patients were affected in both eyes at diagnosis. The mean follow-up time was 10 years (SD=3). Mean annual number of worsening activity per patient was 0.6 (SD=0.4). Most frequent complications were cataract (80%), cystoid macular edema/macular edema (70%) and ocular hypertension (60%). Topical, periocular (sub-tenon injection) and/or systemic corticosteroid treatment was used in 80%, 60% and 90% of patients respectively. Mean systemic corticosteroid starting dose prescribed was 50 mg (SD=15). Mean treatment duration on systemic corticosteroid represented on average 10.5% (SD=12.5) of patients' follow-up period. Four patients (40%) were prescribed an immunosuppressant as a corticosparring agent and 1 (10%) received a biologic. Mean BCVA value for the first available evaluation for both eyes was 6/10 for the right eye and 6/7.5 for the left eye, which represent a mean letter score of 89 (SD=9) and 95 (SD=5) respectively. As for change in BCVA, 3 patients (30%) suffered a loss of  $\geq 15$  letters in at least one eye and 1 patient (10%) suffered a loss of  $\geq 30$  letters in at least one eye.

**Conclusions:** A high proportion of patients suffered from a potentially sight-threatening complication. Due to the difficulty of controlling the inflammation, NI-IPP remains a clinical and therapeutic challenge.

## Poster 80

**Title:** Multifocal Toxoplasma chorioretinitis and neuroretinitis in an immunocompetent adult

**Authors:** Ibrahim Elaraoud, Walter Andreatta, Soaib Tarin

### **Abstract Body:**

**Purpose:** To report a challenging diagnostic case of Toxoplasma neuro-retinitis in an immunocompetent patient.

**Study Design:** Case report

**Methods:** Retrospective case note review and retinal imaging assessment.

**Results:** A 29 year-old immune competent patient presented to Eye Casualty complaining of a gradual reduction in vision in his RIGHT eye over the previous two weeks. His Snellen visual acuity was counting fingers in the right and 6/6 in the left. On examination there was a right panuveitis which included a swollen optic disc, a macular scar and a white superotemporal chorioretinal infiltrate (ultra-widefield imaging is available), This certainly was a new event as patient had his fundus checked previously by an Ophthalmologist and no abnormalities were detected. The clinical picture suggested neuroretinitis. A vitreous biopsy was performed and the polymerase chain reaction test unexpectedly revealed the presence of Toxoplasma gondii. Serum antibodies suggested an acquired infection. The patient was immediately started on oral azithromycin 500mg once a day and two days later also on prednisolone 30 mg daily. The retinal changes slowly resolved and the patient's Snellen visual acuity improved to 6/9 in the right eye.

**Conclusions:** Although Toxoplasma chorioretinitis is common, Neuroretinitis is considered to be atypical presentation and in immunocompetent patients it is extremely unusual to present with de novo multifocal lesions, clinicians have to keep a high index of suspicion and consider Toxoplasmosis in such cases.

## Poster 81

**Title:** Vogt-Koyanagi-Harada Syndrome with granulomatous tattoo-related Dermatitis: Case Presentation

**Authors:** Ishrat Gill, Olga Ziouzina, Mike Kalisiak, Michael Fielden

### **Abstract Body:**

**Purpose:** To present an unusual case of Vogt-Koyanagi-Harada (VKH) syndrome that had concurrent dermatitis in previously tattooed skin regions.

**Study Design:** Retrospective observational case study.

**Methods:** Patient information was retrieved from medical records. This included clinical ocular examination, optical coherence tomography (OCT), fluorescein angiography (FA), visual fields (VF), and dermatopathological report.

**Results:** A 31 year old caucasian woman with numerous tattoos presented with serous retinal detachments and panuveitis in both eyes consistent with the ocular findings of VKH. Three weeks after the onset of ocular symptoms (prior to the onset of treatment), the patient developed granulomatous dermatitis in the region of a skin tattoo on her arm. This was confirmed on biopsy. Both the ocular and dermatological diseases responded well to oral prednisone and cyclosporine.

**Conclusions:** This case highlights a rare finding of VKH syndrome. The relation of the granulomatous tattoo-related dermatitis and the granulomatous uveitis may occur from cross reaction of underlying T-cell mediated autoimmune response to melanocytic-antigens. There are numerous published cases of uveitis induced by tattoos. Although describing a rare complication, this case highlights a potential risk for tattooed individuals susceptible to autoimmune disease such as VKH.



## Poster 82

**Title:** Herpes Zoster Ophthalmicus: Presentation, Initial Management and Delayed Ocular Involvement

**Authors:** Michael Ross, Jean Deschenes

### **Abstract Body:**

**Purpose:** To characterise the presentation, initial management, and delayed ocular involvement of patients with Herpes Zoster Ophthalmicus at an academic health centre.

**Study Design:** Retrospective chart review of all consults over a 2-year period to a multi-site academic health centre

**Methods:** All new ophthalmology consults entered into the electronic medical record system of the Montreal General Hospital and Royal Victoria Hospital between July 1, 2014 and June 30, 2016 were reviewed. Patients with confirmed diagnosis of HZO were classified as having ocular involvement or not at both the initial and follow up visits. Demographic data was collected from the electronic medical record. Information on past ocular history and past medical history were recorded, as was any information on when oral antiviral agents were started and by which practitioner.

**Results:** 50 patients were referred for the reason of Herpes Zoster Ophthalmicus and diagnosed as the same by an ophthalmologist. Median age was 60.5 (range 22-91, with 6 under the age of 30, and 10 under the age of 40), and patients presented after a median of 4.5 days of symptoms (range 1-21). At presentation, 19/50 patients (38%) had ocular involvement. 5/19 (26%) had a positive Hutchison sign. 3/31 (10%) of those with no initial ocular involvement, were diagnosed at follow up with ocular involvement, and 3/19 (16%) patients who had initial ocular findings had additional findings at follow up. Of the 28/50 patients with no ocular involvement (56%), 3 were Hutchison positive (11%). For those with ocular involvement, 20 had conjunctivitis, 17 had keratitis, and 12 had uveitis. At long term follow up (range 1-10 months), 2 of the patients remained on treatment at last follow up note for chronic herpes zoster complications (10%). 45 out of the 50 patients received oral antiviral agents (Valtrex most commonly 36/45).

**Conclusions:** Herpes zoster ophthalmicus presents with a wide age range, including relatively young adults. Despite the widespread use of oral antivirals for herpes zoster, a large percentage of patients with herpes zoster ophthalmicus had ocular involvement. As well, a significant minority of patients who initially had a negative ocular exam, were later found to have ocular involvement. In our relatively small study sample, a positive Hutchison's sign was not predictive of ocular involvement. These findings reinforce the need for prompt ophthalmological exam and close follow up for all patients diagnosed with V1 herpes zoster.

## Poster 83

**Title:** Ocular syphilis : case series (2000-2015) from two tertiary care centers in Montreal

**Authors:** Julie Vadboncoeur, Yasmine Rabia, Annie-Claude Labbé, Claude Fortin, Laurence Jaworski, Marie-Josée Aubin

### **Abstract Body:**

**Purpose:** To describe the demographics, clinical presentations, proportion of co-infection with HIV, treatments and visual outcomes.

**Study Design:** Retrospective and descriptive study of patients with a confirmed positive syphilis serology, who visited the ophthalmology department of two university hospitals between 2000 and 2015.

**Methods:** Several data were compiled and included patient demographics, clinical presentation, syphilis serology results, cerebrospinal fluid analysis results, HIV status, ophthalmological diagnosis, medical treatment and final best-corrected visual acuity.

**Results:** Among the 119 patients (174 eyes) included in the study, 80% were male; mean age of onset was 55 years. Mean presenting logMAR visual acuity was 0.70 (20/100 Snellen) and unilateral ocular involvement occurred in 54%. HIV status was undetermined in 39 (33%); among those whose serology was performed (or previous status known), 38 (48%) were HIV-infected. Ocular manifestations included : interstitial keratitis (24 eyes), anterior uveitis (37 eyes), intermediate uveitis (17 eyes), posterior uveitis (31 eyes), panuveitis (27 eyes), isolated optic nerve involvement (25 eyes) and others (12 eyes) including VI nerve palsy, scleritis, episcleritis and ocular ischemic syndrome. Cerebrospinal fluid (CSF) examination was performed in 65 (55%) patients. Of those, CSF Venereal Disease Research Laboratory (VDRL) test was positive in 14 (22%) patients; CSF white blood cell as well as CSF protein were elevated in respectively 28 (43%) and 39 (60%) patients. Treatment consisted of intravenous aqueous penicillin G in 69 (58%), intramuscular benzathine penicillin in 25 (21%) or other antibiotics due to penicillin allergy in 3 (3%) patients (doxycycline, azithromycin, ceftriaxone). Twenty-two (18%) patients were not treated, either because of no clear association between ocular presentation and syphilis, refusal, or loss to follow-up. The treatment allowed a visual improvement of -0.22 logMAR (gain of 5 lines on Snellen chart) after a mean follow-up period of 19 months. A subgroup analysis between HIV-positive and both HIV-negative and undetermined HIV status patients found no differences in the laterality of the disease and in visual improvement. HIV-positive patients had higher rates of panuveitis and abnormal CSF exam.

**Conclusions:** Syphilis is known as the great masquerader with a diversified presentation. In the context of increasing rates of syphilis, it is primordial to keep this diagnosis in mind and when ocular syphilis is diagnosed, it is essential to treat as neurosyphilis, obtain lumbar puncture, consider HIV and treat the partner(s).

## Poster 84

**Title:** A Profile of Acute Anterior Uveitis in Saskatoon

**Authors:** Melody E. Wong, María Gabriela Campos-Baniak, Vasudha Erraguntla

### **Abstract Body:**

**Purpose:** To survey the profile of acute anterior uveitis (AAU) patients presenting to our urgent eye care clinic in order to review epidemiology, presentation, systemic features, investigations and management.

**Study Design:** Retrospective chart review

**Methods:** All patients presenting to the Urgent Eye Care clinic at the Saskatoon City Hospital Eye Centre with anterior uveitis between the years 2010 - 2015 were included. Demographics, symptoms, prior episodes, past and family history, physical exam, initial diagnosis, investigations ordered, investigation results, treatment (topical or systemic), course of topical steroids, time to taper, number of flares, and subsequent episodes were collected. Secondary uveitis (traumatic, post-operative or keratitis) was excluded.

**Results:** 410 charts were analyzed, and 359 were included. Mean age was 44.8 years and 47.6% were female. 5.3% had bilateral eye involvement. In those with documentation of symptoms, eye pain was the most common (96.4%) followed by photophobia (92.7%). 75 patients had two or more episodes of uveitis previously.

207 patients (57.7%) had documentation for review of systems. Of these patients, the most frequently reported symptoms were back pain (40.3%) and joint pain (33.3%), and 56 (25.6%) had positive review of systems.

In the affected eye(s), 19.7% had presenting visual acuity worse than 20/50, 58.5% had greater than 1+ cells, and synechiae was seen in 33.6%.

Investigations were sent in 73 patients (20.4%). Among those investigated, CBC, HLA-B27, ANA, RF, CRP, ACE or CXR were ordered in over 60%. HLA-B27 was the most common test ordered (56 patients). 40 patients had positive investigation results, with the most common being HLA-B27 positive (30.1% of patients investigated) followed by elevated CRP (9.5% of patients investigated).

4.3% of patients tapered off topical steroids in less than 4 weeks. 64.1% of patients had follow-up until resolution of symptoms.

**Conclusions:** We present an institutional review of acute anterior uveitis patients in Saskatoon that has not been previously published, adding to the body of Canadian literature. By analyzing the presentation of AAU in Saskatoon, we will propose a standard work-up specific to Urgent Care clinics.

## Poster 85

**Title:** Birdshot Chorioretinopathy: Disease Severity and HLA-A29 Subtype

**Authors:** Lisa Zhang, Harrish Nithianandan, Rahul Sharma, Chloe Gottlieb

### **Abstract Body:**

**Purpose:** To investigate an association between human leukocyte antigen A29 (HLA-A29) subtypes and birdshot chorioretinopathy (BSCR) disease severity. Additionally, we investigated the possible association of patient demographics, including place of birth and upbringing, with BSCR subtypes

**Study Design:** A combined prospective/retrospective chart review of patients with BSCR at the University of Ottawa Eye Institute. The primary outcome of the study was an association between disease severity and HLA-A29 subtypes. The secondary outcome was an association between demographic/geographic data and BSCR disease severity and visual acuity.

**Methods:** HLA-A29 subtyping was done through high resolution DNA sequencing using DNA samples from a blood draw. Mean best-corrected visual acuity (BCVA) was used as a surrogate marker for disease severity, with worse mean BCVA indicating advanced BSCR disease. BCVA was converted from Snellen Chart into logarithm of the minimum angle of resolution (logMAR). Demographic and geographic data was obtained through a patient survey.

**Results:** 24 patients with BSCR were identified through a retrospective chart review and 10 patients participated. All 10 research participants were of subtype HLA-A\*29:02. No other subtypes were found in the study patient population. 35% of patients were of French background, 6% English, 29% Irish, 24% Scottish and 6% Ukrainian. Differences in mean BCVA were not statistically significant for correlation with ethnic background, city of birth, city of upbringing, city of birth of the patient's mother or city of birth of the patient's father.

**Conclusions:** As only HLA-A\*29:02 subtypes were identified, no conclusions can be drawn about HLA-A29 subtype and disease severity. However, our findings strengthen the observation that HLA-A29 is predominantly found in the Caucasian population. Additionally, it was determined that there is no difference in disease severity for ethnic background, city of birth, city of upbringing, city of birth of the patient's mother, and city of birth of the patient's father. Future steps may include acquisition of additional data from a geographically distant second eye clinic to increase the sample size and identify alternate HLA-A29 subtypes.

## VISION REHABILITATION

### Poster 86

**Title:** eQUEST - ESIGHT QUALITY OF LIFE AND EFFICACY STUDY

**Authors:** Beatrice Patino, Sophia Reyes, Robert Devenyi, **Samuel N. Markowitz**, Multicenter Group of Investigators (1).

#### **Abstract Body:**

**Purpose:** Close Circuit TV (CCTV) units are one type of magnifying devices which are currently popular and efficient for many tasks. eSight Eyewear (eSE) is the latest version of a headborn CCTV unit available in clinical practice. Limited experiments have demonstrated the benefits of eSight Eyewear to certain subjects however many aspects related to the utility and benefits of the eSE need further clarifications. This study seeks to generate further evidence-based conclusions about the utility and efficacy of the eSE for various ADLs in the low vision population with loss of macular vision.

**Study Design:** This is a prospective multicenter study. Included in the study were cases aged between 13-75 years with macular loss of vision. Included were those with vision in the range between 20/60 - 20/400 in the better eye and residual fields of vision of no less than 20 degrees in the better eye.

Exclusion criteria included current or recent surgical or medical conditions resulting in unstable vision.

**Methods:** An individual standard eSE unit was assigned for demonstration and actual planned usage for each subject. All aspects of the study took place over a period of approximately 4 months. Pre and post intervention assessment included the following tests: Visual acuity, contrast sensitivity, fields of vision, MOCA cognitive test, MNRead test, Facial recognition test, Melbourne low vision ADL index test and the LV ADL V48 questionnaire.

**Results:** 60 study subjects (age mean 47 years, std 18) completed the study. Partial data analysis shows that: the 36 items self-reported health survey showed a positive impact on the subject from the use of the device (2%), as with the modified Melbourne LV ADL index test score (63.8 versus 54.9). Also the face recognition test score was better with use of the device (47.5 versus 38.1). ETDRS visual acuity, contrast sensitivity and MNRead acuity scores were all better with use of the device (0.91 logMar versus 0.17, 0.87 logMar versus 1.51, 0.92 logMar versus 0.31, respectively). Detailed statistical analysis will be provided in final paper.

**Conclusions:** The eSight device is useful to patients with low vision. All across the board outcome measures show an improvement beneficial to each patient.

(1 -The multicenter group of investigators: Gartner S, Goldstein J, Jayasundera K, Tolentino M, Wittich W, Dagnelie G, Lam B, Braudway S, Devenyi R, Howson A, Resende F, Lorenzini MC, Jarry J, , Godsey L, Collins T, Gartner S, Natochy L, Dilts V, Lindeman K, Chan T, Meil G, Hilkes R)