ARVO 2014 Annual Meeting Abstracts

159 Retinal detachment and allied diseases

Sunday, May 04, 2014 3:15 PM–5:00 PM
Exhibit/Poster Hall SA  Poster Session
Program #:Board #: Range: 1071–1126/B0209–B0264
Organizing Section: Retina

Program Number: 1071 Poster Board Number: B0209
Presentation Time: 3:15 PM–5:00 PM
Evaluation of a telemedicine model for exudative age related macular degeneration follow-up
Jose Andonegui1, Natalia Arruti1, Daniel Aliseda1, Aitor Eguzkiza2, Luis Serrano2, Araceli Alcaine1. 1Ophthalmology, Complejo Hospitalario de Navarra, Pamplona, Spain; 2Electrical and Electronic Engineering, Public University of Navarra, Pamplona, Spain.
Purpose: To evaluate a telemedicine model for exudative age related macular degeneration (AMD) follow up and to compare the time spent with this model with the time spent in office examination
Methods: We compared the results of office examination and telemedicine evaluation at the time of deciding if patients with exudative AMD treated with at least three anti-VEGF injections needed additional intravitreal treatment. Office examination included visual acuity, fundus exam and optical coherence tomography (OCT). Telemedicine evaluation included evaluation of digital retinographies and OCTs as well as the data of visual acuity obtained in the office. Retinographies and OCTs were converted to DICOM (Digital Imaging and Communication in Medicine) files and stored in a PACS (Picture Archiving and Communication System) server. They were downloaded from the PACS for remote evaluation by means of a DICOM visualizer. Indications to repeat treatment were persistent macular fluid detected by OCT, visual acuity loss in conjunction with macular fluid detected by OCT and new macular hemorrhage. We also measured the time spent in telemedicine evaluation and compared it with office examination.
Results: 185 patients were included in the study. 79 were male (43%) and 106 female (57%). Mean age was 81 years. During office examination in 76 cases (41%) the decision was to repeat the injection while in 109 cases (59%) it was decided not to repeat treatment. With respect to the comparison among office and telemedicine evaluation, in 166 cases the results were the same. Among the 19 remaining patients and considering office examination as the gold standard, 16 correspond to false positives (office examination indicates not to repeat treatment but telemedicine examination indicates to repeat treatment) and 3 to false negatives (office examination indicates to repeat treatment but telemedicine examination indicates not to repeat treatment). With these data the sensitivity and specificity of telemedicine evaluation are 96 and 87% respectively. The average amount of time spent in remote evaluation is 1 minute 21 seconds compared with 10 minutes spent in office examination (p<0.0001)
Conclusions: The telemedicine model described in this study can be a useful alternative for AMD follow-up. It is less time consuming for retina specialists than office examination and provides a more rational approach for digital image management
Commercial Relationships: Jose Andonegui, Novartis Spain (F); Natalia Arruti, Novartis Spain (F); Daniel Aliseda, Novartis Spain (F); Aitor Eguzkiza, Novartis Spain (F); Luis Serrano, Novartis Spain (F); Araceli Alcaine, Novartis Spain (F)
Support: Supported in part by a grant of the “Instituto de Salud Carlos III” (Grant PI11/02797), National Health Care System (Spain) and in part by a grant of Novartis Spain

Program Number: 1072 Poster Board Number: B0210
Presentation Time: 3:15 PM–5:00 PM
Contrast Sensitivity and Optical Coherence Tomography Finding following Epiretinal Membrane Surgery
Yoshimi Sugiyura, Fumiki Okamoto, Yoshifumi Okamoto, Takahiro Hiraoka, Tetsuro Oshika. Department of Ophthalmology, Faculty of Medicine, University of Tsukuba, Tsukuba, Ibaraki, Japan.
Purpose: To evaluate contrast sensitivity (CS) in patients undergoing vitrectomy for epiretinal membrane (ERM), and to investigate the relationship between CS and foveal microstructures with spectral-domain optical coherence tomography (SD-OCT).
Methods: Forty-one eyes of 41 patients with idiopathic ERM were included. We examined contrast sensitivity with CSV-1000E, the minimal angle of resolution best-corrected visual acuity (log MAR BCVA) and foveal microstructure with SD-OCT before and 6 months after surgery. From the data obtained with CSV-1000E, the area under the log contrast sensitivity function (AULCSF) was calculated. Based on the obtained OCT images, we divided the 1.0mm x 1.0mm area centered on the fovea into 9 sections and quantified the following parameters using an image-processing program: mean thickness of the ganglion cell layer (GCL), inner nuclear layer (INL), and outer retinal layer (ONL+OPL: outer nuclear layer and outer plexiform layer). The statuses of the photoreceptor inner and outer segment junction (IS/OS) and external limiting membrane (ELM) were also evaluated.
Results: Vitrectomy significantly improved logMAR BCVA and AULCSF. Even in 17 of 41 patients with poor improvement of visual acuity (changes in logMAR BCVA by surgery was ≤ 0.2), postoperative AULCSF had significantly increased by treatment (p < 0.05). Postoperative AULCSF showed a significant correlation with preoperative and postoperative ONL+OPL thickness (p < 0.005, p < 0.05, respectively), whereas other parameters were not relevant. Postoperative logMAR BCVA significantly correlated with preoperative and postoperative status of IS/OS (p < 0.05, p < 0.05, respectively), and preoperative ONL+OPL thickness (p < 0.005). Postoperative logMAR BCVA was not associated with postoperative ONL+OPL thickness (p = 0.088).
Conclusions: In ERM patients, contrast sensitivity improved even though their visual acuity did not recover significantly by vitrectomy. Contrast sensitivity was associated with the thickness of outer retinal layer, while visual acuity was associated with the status of IS/OS.
Commercial Relationships: Yoshimi Sugiyura, None; Fumiki Okamoto, None; Yoshifumi Okamoto, None; Takahiro Hiraoka, None; Tetsuro Oshika, None

Program Number: 1073 Poster Board Number: B0211
Presentation Time: 3:15 PM–5:00 PM
Comparison between sutureless belt loops technique versus sutured buckle technique for retinal detachment repair
Purpose: To compare anatomic and visual outcome of sutureless belt loops technique versus sutured buckle technique while utilizing approach combined buckle/vitrectomy for primary rhegmatogenous retinal detachment repair.
Methods*
Purpose: To compare anatomic and visual outcome of sutureless belt loops technique versus sutured buckle technique while utilizing approach combined buckle/vitrectomy for primary rhegmatogenous retinal detachment repair.
Methods*:
Results: The study included 35 eyes. Eighteen eyes (18 patients) underwent combined PPV and SB sutureless belt loops technique

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(Group A), and 17 eyes (17 patients) underwent combined PPV and SB sutured to sclera technique (Group B). Successful anatomic attachment and good buckle height was achieved in all 35 cases. Average follow-up was 11.2 (± 3.1) months in Group A and 12.7 (± 3.7) months in Group B. There was one case of re-detachment in each group during the follow-up: 1/17 (5.9%) in Group A and 1/18 (5.6%) in Group B (p = 0.97). The mean preoperative logMAR best corrected visual acuity (BCVA) was comparable between the group A (1.39±0.70) and group B (1.48±0.89) groups (P = 0.499). BCVA improved in both groups at final follow-up (0.56±0.49, Group A) and (0.73±0.34, Group B) and was not statistically different between the groups (p = 0.154). No cases of buckle infection, extrusion or intrusion noted during the follow-up.

**Conclusions:** Sutureless belt loops buckle technique seems to be as safe and effective as sutured buckle technique in combination with vitrectomy for repair of retinal detachment showing similar anatomic and functional outcome.

**Commercial Relationships:** Gennady Landa, None; Joseph Benevento, None; Richard B. Rosen, None

**Clinical Trial:** None

**Program Number:** 1074

**Poster Board Number:** B0212

**Presentation Time:** 3:15 PM–5:00 PM

**Prevalence of Epiretinal Membranes Imaged by OCT in Eyes that Underwent Pars Plana Vitrectomy with or without Scleral Buckle Placement for Repair of Primary Rhegmatogenous Retinal Detachment.**

Valentina Franco-Cardenas, Victoria Gonzalez, Virgilio Morales-Cantón. Retina, Asociacion Para Evitar la Ceguera en Mexico IAP, Mexico City, Mexico.

**Purpose:** To evaluate the prevalence of epiretinal membranes (ERM) imaged by OCT in eyes that underwent pars plana vitrectomy (PPV) with or without scleral buckle (SB) placement for repair of primary rhegmatogenous retinal detachment (RD).

**Methods:** Thirty-four consecutive, phakic, non-diabetic patients with rhegmatogenous RD who underwent complete successful PPV surgery with or without (SB) placement at least 1 month prior to enrollment, where included in the study. Laser photocoagulation was applied to the retinal break and either SF6 or C3F8 was used as temporary endotamponade. Patients underwent complete clinical evaluation. SD-OCT macular scans were obtained using Spectralis® SD-OCT. Two scans were acquired; fast mode volume scan, with 20° OCT scan width x 20° of height, and a section scan at the level of the umbus for both eyes. Contralateral eye (if no surgery had been performed) was used as the control eye. Two independent observers graded the scans for presence or absence of ERM. ERM was determined to be present when a hyper reflective layer was noticed on the surface of the retina in any of the scans reviewed. Age and timing of the OCT after surgery was recorded.

**Results:** Thirty four eyes were in the study, with a mean age of 48.2 ±14 years. Clinical examination and OCT was performed at an average of 28.5 months (1 month to 10 years) after surgery. Total retinal reattachment was accomplished in all eyes with just one surgery. PPV was performed in all eyes. Combined PPV and SB placement was performed in 27 eyes (80%). Temporary endotamponade with SF6 was used in 25 eyes (73.5%) and C3F8 in 9 eyes (26.5%). Epiretinal membranes (ERM) were observed in 22 of 34 participants (65%). ERM were present in both eyes in 8.8%. Prevalence increased significantly by age group: 38% for 20–40 years, 73% for 41–60 years, 83% for 61 years and older. Prevalence was similar in males and females after adjusting for age. A decrease in visual acuity was associated with ERM after surgery.

**Conclusions:** ERM formation appears to be a frequent finding in patients who underwent PPV with or without SB placement for treatment of rhegmatogenous RD. Compared to control eyes, ERM are significantly more frequent in the PPV group. ERM development appears to be age dependent.

**Commercial Relationships:** Valentina Franco-Cardenas, None; Victoria Gonzalez, None; Virgilio Morales-Cantón, None

**Program Number:** 1075

**Poster Board Number:** B0213

**Presentation Time:** 3:15 PM–5:00 PM

**RhoA Signaling in a Live Pig Model of Retinal Detachment.**

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**Purpose:** Visual recovery after a retinal detachment is often not complete with more than half of patients having visual acuity ≤20/50 after reattachment surgery (Ozgur and Esgin, 2007; Ross et al., 2000). We discovered that an increase in RhoA signaling, which promotes axonal retraction by photoreceptors and consequent synaptic breakage between rod and bipolar cells, is a key to detachment injury in vitro (Fontainhas and Townes-Anderson, 2008, 2011). In this study, we used a pig model of retinal detachment to determine whether RhoA signaling is involved in retinal detachment in vivo, as an initial step to develop a therapy to stabilize synaptic connections after detachment.

**Methods:** Under general anesthesia, adult female Yorkshire pigs underwent pars plana vitrectomy; retinal detachments were created by injecting balanced salt solution subretinally. The animals were kept under anesthesia for a total of 2 hrs, and then sacrificed for enucleation. Neural retinal explants from detached and non-detached retinal areas were frozen and lysed for GTPase activity assays and western blot analysis. RhoA activation was determined by a Rhotekin binding assay, while RAC1 activation was determined by a p21 activated kinase 1 binding assay. Remaining tissue was fixed for morphology.

**Results:** After 2 hrs, the ratio of RhoA-GTP/RhoA-Total was increased by 180% (p<0.05) in detached retina in the operated eye compared to the corresponding area in the fellow, unoperated eye. RhoA activity in the non-detached area in the operated eye was also elevated (137%, p < 0.05). Vitrectomy alone did not cause elevation of RhoA activity. The phosphorylation of myosin light chain II (MLCII), which is responsible for actomyosin contraction, and the activity of RAC1 increased significantly in the detached retina by 147% and 62%, respectively. Rod axonal retraction was observed after 2 hrs in both detached and non-detached areas of the operated eye.

**Conclusions:** The activity of RhoA and the phosphorylation of MLC II, a downstream effector of RhoA signaling, are increased after 2 hrs of retinal detachment in vivo, concomitant with the axonal retraction by rod photoreceptors. Increases in RAC-1 activity may also contribute to the rod synaptic rearrangement. These findings suggest that blocking RhoA signaling may prevent the deleterious synaptic breakage between rod and bipolar cells after detachment in vivo.

**Commercial Relationships:** Jianfeng Wang, None; Marco Zarbin, None; Ilene Sugino, None; Ian Whitehead, None; Ellen Townes-Anderson, None

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Pneumatic retinopexy for pseudophakic rhegmatogenous retinal detachment

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Purpose: Pneumatic retinopexy (PR) is less successful in repairing retinal detachment (RD) in the pseudophakic eye (41-67%) compared to the phakic eye (71-84%). Our aim was to identify what pre-operative characteristics predicted PR outcome in this subpopulation.

Methods: Retrospective chart review was performed with patients identified by Current Procedural Terminology (CPT) code for PR between 7/1/2010 and 4/30/2013 at a single institution. Inclusion criteria were RD in a pseudophakic eye. Exclusion criteria were prior RD, scleral buckle (SB), pars plana vitrectomy (PPV), and prior prophylactic laser or cryotherapy. Pre-operative data included demographics, integrity of the posterior capsule, presenting visual acuity (VA), duration of RD symptoms, macular status, the number, location, and extent of RD in clock hours, presence of posterior vitreous detachment (PVD), and presence of lattice degeneration.

Post-operative data included follow-up procedures (SB, PPV, or combination), and 6-month post-operative retinal status and VA.

Results: Forty-seven patients met study criteria. Single PR was successful in twenty-three (48.9%) patients. The remaining twenty-four (51.1%) patients required further SB, PPV, or combination. Of pre-operative characteristics analyzed, a retinal tear located outside the superior 4 clock hours was a significant predictor of PR failure (odds ratio 18, P = 0.009). The VA and anatomic reattachment rates at 6 months post-intervention did not differ among groups.

Conclusions: Prior to this study, the pre-operative factors that predict PR outcome have been investigated in a population of overwhelmingly phakic eyes. This has led to the recommendation that PR be performed when all retinal tears are restricted to the superior 8 clock hours. To our knowledge, no study has examined whether these risk factors differ in the pseudophakic population. In our study, the presence of a retinal tear located outside the superior 4 clock hours was a significant predictor of PR failure. Delineating the location to 8 clock hours did not reach statistical significance. We therefore conclude that narrowing PR criteria in pseudophakic patients may lead to higher single-procedure success rates. However, if further SB or PPV is needed, the final visual acuity and anatomic reattachment are not disadvantaged by the initial PR.

Commercial Relationships: Jennifer Ling, None; Farhad Safi, None; Andrew Eller, None.

Program Number: 1076 Poster Board Number: B0214
Presentation Time: 3:15 PM–5:00 PM

Association between SNPs of COL2A1 and rhegmatogenous retinal detachment

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Purpose: To investigate the association between the single nucleotide polymorphisms (SNPs) of Collagen, Type 2, alpha 1 (COL2A1) gene and sporadic rhegmatogenous retinal detachment (RRD).

Methods: One hundred and eighty two cases with RRD and 182 controls were included in this study. Patients with high myopia, syndromatic retinal detachment were excluded. Genotyping was carried on with Taqman assay for 12 Taq SNPs of COL2A1, including rs12721428, rs4760608, rs1793937, rs2276454, rs917055, rs2071437, rs1034762, rs2213162, rs3737548, rs1793958, rs1793954 and rs1793931. Association of diseases and alleles or genotypes were assessed with logistic regression controlling age and gender.

Results: None of the twelve SNPs showed deviation from Hardy-Weinberg equilibrium in the controls. The SNP rs4760608 (OR = 3.509, 95% CI: 1.203-10.238, P = 0.022), rs917055 (OR = 3.65, 95% CI: 0.76-9.25, P = 0.037), rs1793954 are associated with RRD in recessive model (OR = 4.03, 95% CI: 1.44-11.28, P = 0.008). Rs4760608 was also associated with RRD in homozygous model (OR = 3.58, 95% CI: 1.07-11.994, P = 0.038).

Conclusions: The SNPs of COL2A1 were associated with rhegmatogenous retinal detachment.

Commercial Relationships: Haoyu Chen, None; Wanghao Chen, None; Jianhuan Chen, None; Qianwen Chen, None; Weiqi Chen, None; Chi Pui Pang, None.

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Program Number: 1078 Poster Board Number: B0216
Presentation Time: 3:15 PM–5:00 PM
Relationship Between Metamorphopsia and Foveal Microstructure after Rhegmatogenous Retinal Detachment Surgery

masahiko hasumi, Fumiki Okamoto, Yoshimi Sugiuira, Yoshifumi Okamoto, Tetsuro Oshika. University Hospital of Tsukuba, Tsukuba, Japan.

Purpose: To investigate the relationship between metamorphopsia and morphologic changes in the macular region after successful repair of rhegmatogenous retinal detachment.

Methods: The study included 129 eyes of 129 patients who had undergone successful retinal reattachment surgery. The severity of metamorphopsia was recorded with the M-CHARTS and foveal microstructures were assessed with spectral-domain optical coherence tomography (OCT) at 6-12 months postoperatively.

Results: The mean metamorphopsia score was 0.30 ± 0.46, with 50 of 129 patients having metamorphopsia (metamorphopsia score ≥ 0.2). Metamorphopsia was severer in eyes with macula-off RD than those with macular-on RD (p < 0.001). Eighteen of 50 eyes with metamorphopsia exhibited abnormal structures in the macular region (epiretinal membrane, disruption of the photoreceptor inner and outer segment junction, cystoid macular edema, macular hole or subretinal fluid), whereas other 32 eyes showed no morphologic changes with OCT. In these 32 eyes, the horizontal metamorphopsia score (0.86 ± 0.50) was significantly higher than the vertical metamorphopsia score (0.62 ± 0.39, p < 0.05). Of 9 eyes with macula-on RD and postoperative metamorphopsia, 6 showed abnormal macular structures and other 3 presented normal findings. The macula briefly detached during vitrectomy in these 3 cases.

Conclusions: After successful RD repair, 39% of patients developed metamorphopsia at 6-12 month postoperatively. OCT imaging, however, indicated that more than half of eyes with metamorphopsic had normal macula structures. Our results suggested that retinal vertical displacement after surgery might mainly induce horizontal metamorphopsia. Pre- and intraoperative macula-on RD did not appear to induce metamorphopsia postoperatively.

Commercial Relationships: masahiko hasumi, None; Fumiki Okamoto, None; Yoshimi Sugiuira, None; Yoshifumi Okamoto, None; Tetsuro Oshika, None.
Clinical patterns of perfused central retinal vein occlusion: the initial presence of perivenuellar whitening shifts the balance between disc and macular edema

Michel Paques1, Alexandra Pierru1, 2, Jean-François Girmens1.
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Purpose: The highly heterogeneous presentations of central retinal vein occlusion (CRVO) has yet defied clinical modelling; this impairs the determination of an individual prognosis. We previously identified a peculiar presentation of acute CRVO defined by the presence of perivenuellar whitening (PVW), a feature most likely due to panretinal hypoperfusion (Paques and Gaudric, 2003). We then identified the inner nuclear layer as the anatomical site of PVW, which later on undergoes atrophy (Sarda et al, 2010). Subsequently, we found a high rate of disc edema in these patients which prompted us to further investigate the prognostic value of the initial presence of PVW on the anatomical outcome of CRVO.

Methods: The charts of 130 cases of recent-onset perfused CRVO with at least 3 months of follow-up seen in two centers were reviewed. The anatomical outcomes of those with (n=45) or without (n=85) evidence of PVW at initial examination were compared.

Results: In groups with and without PVW, mean age (48.9y vs 53.2y) were similar while there were more women in the group with PVW (58% versus 31%, p<0.05). Patients with PVW had a higher incidence of glaucoma (22% versus 11%) but a lower incidence of arterial hypertension (32% versus 66%). During follow-up, spotty or diffuse atrophy of the inner nuclear layer was exclusively observed in the PVW group. The incidence and topography of macular thickening differed between groups: eye with initial PVW developing macular thickening had more often fluorescein leakage from the disc (80%) than from the macula (15%); Accordingly, macular thickening predominated nasal to the fovea. By contrast, eyes without PVW were more prone to show leakage in the macula (77%) versus the disc (69%). Rates of rubosis iridis were comparable.

Conclusions: Our findings suggest that, during perfused CRVO, the initial presence of PVW predicts to some extent the anatomical course. CRVO showing evidence of PVW are indeed more prone to develop atrophy of the inner nuclear layer and disc edema. The presence of PVW is also correlated with a peculiar profile of risk factors, raising the hypothesis that ocular perfusion pressure, which is lower in eyes with PVW, modulates the clinical presentation. Distinguishing disc from macular edema may be of interest for defining personalized intravitreal injection regimen.

Commercial Relationships: Michel Paques, Imagine Eye (C), Merck Serono (C); Alexandra Pierru, None; Jean-François Girmens, None

Dasatinib inhibits contraction of Müller and RPE cells on type I collagen gel assay

Rintaro Tsukahara1, 2, Kazuhiko Umazume2, 1, Kevin McDonald1, Hiroshi Goto2, Henry J. Kaplan1, Shigeo Tamiya1. 1Ophthalm & Vis Science, University of Louisville, Louisville, KY; 2Ophthalmology, Tokyo Med Univ, Tokyo, Japan.

Purpose: Proliferative vitreoretinopahty (PVR) is the major complication of retinal detachment surgery and traumatic ocular injury. We have recently demonstrated that Dasatinib, a FDA approved cancer medication, can prevent the complications of PVR in our swine model induced by RPE cells. In this study, we examined the effect of Dasatinib on Müller glial cells, another cell type implicated in PVR development.

Methods: Müller cells and RPE cells were isolated from porcine eyes using a papain/DNase kit and dispase, respectively. Primary cultures were maintained in FBS-supplemented DMEM, and used between passages 3-6 for contraction assays. Müller or RPE cells were cultured on type I collagen matrices for 3 days in DMEM, supplemented with 25% vitreous fluid or 5%FBS, in the presence or absence of Dasatinib. Collagen matrices released from the adhering culture plates were photographed 4 hours later and the change in size measured to determine the degree of contraction.

Results: As previously reported, contraction of RPE cells on collagen matrices was significantly inhibited by dasatinib. We now observed that matrix contraction of Müller cells was also inhibited by dasatinib, in a dose dependent manner. Dasatinib concentrations of 0.1 μM or higher significantly reduced collagen matrix contraction by Müller cells stimulated with either 25% vitreous or 5%FBS.

Conclusions: Contraction by cells involved in the development of PVR leads to retinal folds and traction retinal detachment, the debilitating complications of PVR. The FDA approved cancer medication Dasatinib significantly inhibits contraction of the matrix

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in a collagen I gel assay caused by both RPE and Müller cells, the two major cellular phenotypes implicated in PVR. Therefore, dasatinib may be clinically useful for the prevention of the complications of PVR.

Commercial Relationships: Rintaro Tsukahara, None; Kazuhiko Umagune, None; Kevin McDonald, None; Hiroshi Goto, None; Henry J. Kaplan, None; Shigeo Tamiya, None
Support: DOD DM 090475, KSEF, RPB

Program Number: 1082 Poster Board Number: B0220
Presentation Time: 3:15 PM–5:00 PM
Relationship Between Aniseikonia and Visual Function after Rhegmatogenous Retinal Detachment Surgery
Fumiki Okamoto, Yoshimi Sugiuira, Yoshihumi Okamoto, Takahiro Hiraoka, Tetsuro Oshika. Department of Ophthalmology, University of Tsukuba, Tsukuba, Ibaraki, Japan.

Purpose: To quantify the degree of aniseikonia after successful repair of rhegmatogenous retinal detachment (RD), and to investigate the relationship between aniseikonia and other visual functions as well as clinical factors.

Methods: The study included 104 eyes of 104 patients, without any history of ocular disease/surgery and less than 2 diopters of anisometropia, who had undergone successful retinal reattachment surgery. We examined aniseikonia with New Aniseikonia Test 6 months after surgery. Clinical data were collected, including age, gender, postoperative logarithm of minimum angle of resolution best-corrected visual acuity (logMAR BCV A), severity of metamorphopsia assessed with M-CHARTS, difference of postoperative spherical equivalent between the two eyes, circumferential dimension of retinal tears, area of RD and macular status, to determine the factors related to aniseikonia.

Results: Thirty of 104 patients (29%) had micropsia, 20 patients (19%) had macropsia, 20 patients (19%) had micropsia, 20 patients (19%) had macropsia, and 54 patients (52%) had no aniseikonia. The mean absolute value of aniseikonia was 2.3 ± 2.9% (range: -12.5 – 12.0%). Of 49 eyes with macula-off RD, 26 had micropsia and 6 had macropsia. Of 55 eyes with macula-on RD, 4 had micropsia and 14 had macropsia. The mean absolute value of aniseikonia was significantly correlated with logMAR BCV A (p < 0.005), metamorphopsia score (p < 0.005) and the area of RD (p < 0.0001). No significant relationship was found between aniseikonia and other factors. Multiple regression analysis revealed that the absolute value of aniseikonia was significantly related to the area of RD.

Conclusions: These results suggested that about half of patients with successful repair of RD had aniseikonia. Eyes with macula-off RD tended to show micropsia, while those with macula-on RD mostly presented macropsia. Aniseikonia was associated with visual acuity, metamorphopsia, and the area of RD.

Commercial Relationships: Fumiki Okamoto, None; Yoshimi Sugiuira, None; Yoshihumi Okamoto, None; Takahiro Hiraoka, None; Tetsuro Oshika, None

Program Number: 1083 Poster Board Number: B0221
Presentation Time: 3:15 PM–5:00 PM
Different results between young and old age in scleral buckling for rhegmatogenous retinal detachment

Purpose: To assess the difference of results of buckle surgery between young and old age.

Methods: The medical records of rhegmatogenous retinal detachment (RDRD), treated with scleral buckling in Pusan national university hospital from Jan 2011 to Dec 2012, were reviewed retrospectively. The cases with preserved the fovea or history of intraocular surgery including cataract were excluded. The eyes were classified into group “O” over 36-year-old, group “Y” under 35-year old. Reattachment, macular complication and sustained subretinal fluid (SSF) were compared between two groups.

Results: Sixty five and 63 eyes were included in each group. There were significant differences of reattachment rate between 78.46% in group O and 92.1% in group Y (p=0.030). Macular complication occurred in 4 cases of only group O (p=0.119). SSF at 3 months was 50.0% in group Y more than 25.0% in group O (p=0.017).

Conclusions: In scleral buckling for RRD, it was more difficult to reattach the retina in old age and SSF was common in young age. The age seems to be an important prognostic factor that influences the results of scleral buckling.

Commercial Relationships: Sung Who Park, None; Ik Soo Byron, None; Ji Eun E. Lee, None

Program Number: 1084 Poster Board Number: B0222
Presentation Time: 3:15 PM–5:00 PM
Metamorphopsia after vitrectomy for macula-off rhegmatogenous retinal detachment

Purpose: To quantify the degree of metamorphopsia in patients after successful vitrectomy for macula-off rhegmatogenous retinal detachment (RRD).

Methods: Twenty-four eyes of 24 patients whose fovea was reattached and regained normal morphology by optical coherence tomography (OCT) were studied. Eyes with an epiretinal membrane or distorted foveal morphology by OCT were excluded. The degree of metamorphopsia was determined by the M-CHARTS. Metamorphopsia scores for vertical (MV) and horizontal (MH) lines were compared. M-CHARTS scores and best-corrected visual acuity (BCVA) at 3, 6 and 12 months after surgery were measured. Factors affecting the metamorphopsia score including the age and presumed duration of the macular detachment were also evaluated.

Results: Eighteen of 23 patients (78.3%) had a mean metamorphopsia score (MV+MH)/2 of ≥ 0.2 at 3 months after surgery. The average MV scores at 3, 6, and 12 months after surgery were 0.60, 0.53, and 0.40 respectively, and the MH scores at 3, 6, and 12 months after surgery were 0.37, 0.47 and 0.37, respectively. The MV at 3 month was significantly better than that at 12 months. The MV score was significantly larger than the MH score at 3 months. The duration of the macular detachment was from 1 to 10 (median 4) days, and it was significantly correlated with the difference of MV and MH (MV - MH) scores at 3 months. There was no significant correlation between the postoperative BCVA and the metamorphopsia scores at 3, 6, and 12 months postoperatively.

Conclusions: Clinically significant degree of metamorphopsia was present in 78.3% of the patients even if the fovea was reattached anatomically. The metamorphopsia tended to decrease up to 6 months. The greater MV than MH score indicates that the vertical properties of the reattached retina are more influenced by vitrectomy than the horizontal properties.

Commercial Relationships: Hiroyumi Morita, None; Hiroyuki Kondo, None
Support: non
Scleral Buckling and Pars Plana Vitrectomy for Rhegmatogenous Retinal Detachment with inferior retinal tears

Purpose: To investigate the anatomical success rates of scleral buckling (SB) and pars plana vitrectomy (PPV) performed for rhegmatogenous retinal detachment (RRD) with inferior tear and identify disparity between two surgical techniques.

Methods: Retrospective chart review of 377 patients who underwent PPV (163 patients) or SB (214 patients) for initial RRD between 2011 and 2012 at Tokyo Medical University Hospital. The number of RRD with inferior tear was 99 cases (PPV: 35, SB: 64). Inferior retinal tears were defined as tears located between 4 and 8 o’clock. RRD with atopic dermatitis, traumatic RD, RD with macula hole, RD with giant retinal tear and proliferative vitreoretinopathy (over grade C) were excluded from the study. In addition to the number of inferior retinal tears, success rate for each treatment was analyzed in relation to number of retinal tears, as well as the presence of macular detachment.

Results: The primary anatomical success rate was 92.6% and 92.9% for PPV and SB group, respectively, and the final anatomical success rates were 100% in all patients with RRD. On the other hands, reattachment of the retina was achieved in 85.7% (PPV) and 92.8% (SB), respectively, for RRD patients with inferior tears. In SB group with inferior retinal tears, there was no statistic difference between group of success and failure. Although the presence of inferior retinal tear did not affect the success rate of SB, it significantly lowered success rate of primary PPV (p<0.05). In contrast, the number of retinal tears or the presence of macular detachment had no significant effect on success rates in both PPV and SB group.

Conclusions: While both PPV and SB produced excellent primary and final anatomical success rates, the management should be tailored to individual cases including inferior tears by PPV.

Commercial Relationships: Kazuhiko Umazume, None; Hiromichi Yagi, None; Yoshihiro Wakabayashi, None; Jun Suzuki, None; Keisuke Kimura, None; Hiroshi Goto, None

Program Number: 1085 Poster Board Number: B0223
Presentation Time: 3:15 PM–5:00 PM

Surgery for primary rhegmatogenous retinal detachment - Anatomical and visual outcome
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Purpose: To evaluate anatomical and functional outcome after surgery for primary rhegmatogenous retinal detachment and assess prognostic factors.

Methods: In a prospective cohort study all patients undergoing surgery for primary rhegmatogenous retinal detachment (RRD) in the years 2012 and 2013 were included. A total of 8 surgeons were performing the operations. Main outcome measures were single surgery success rate (SSSR), final anatomical SR and best corrected visual acuity (BCVA). Follow up was 6 months. Duration of symptoms, lens status, number of breaks, extent of detachment, status of the macula, PVR, type of surgery and timing of surgery were assessed and correlated with outcome.

Results: 275 eyes of 275 patients were included (98% 177m), 131 eyes presenting with a Macula-on RD (47.6%). Mean extent of RRD was 4.9 hrs, a mean of 1.35 breaks were found preoperatively, 166 patients were phakic (60.36%) of which 24 (14.4%) redetached. 109 pseudophakic (39.6%), of which 9 (8.3%) redetached. PVR grade C was found in 9.45% (26 pat.), of which 6 (23%) redetached. 232 (84.3%) eyes were treated with primary vitrectomy (ppVE), 30 eyes (11%) with buckle procedure (SB) and 13 (4.7%) eyes with a combination of ppVE+SB. SSSR was 88.3% (245 eyes) and final success rate 98.1% (270 eyes)-no difference was found between emergency settings and planned surgery. Re-detachment (RD) rate was 10.7% (25 eyes) in the ppVE-, 13.3% (4 eyes) in the SB- and 30.7% (4 eyes) in the combined group. RD occurred in 15.3% (4 eyes) with PVR grade C. RD occurred at a mean of 5.7 weeks and 0.6 weeks after primary SSSR. BCVA improved from 0.3 to 0.5 Snellen and was significantly better in Macula-on versus Macula-off RRD preoperatively (0.57 vs 0.17) and postoperatively (0.59 vs 0.34).

Conclusions: Macula-on RD patients have a better visual prognosis, which makes earlier diagnosis of RRD desirable. Although final SSSR was high, there is still a chance to improve primary SSR both in ppVE and BS cases. In the past years, ppVE cases have increased in numbers, reducing the numbers of BS performed to only 10% of all cases. Especially young surgeons do not have the possibility to practice their skills on BS regularly, which will lead to an even less frequent performance of this surgical technique. We have to decide now, whether to abandon SB completely or to refine it but keep the main principle of external indentation of the hole for closure and release of vitreous traction.

Commercial Relationships: Eva Smretschnig, None; Katharina Krepler, None; Christiane I. Falkner-Radler, None; Jessica Spörl, None; Susanne Binder, None

Program Number: 1087 Poster Board Number: B0225
Presentation Time: 3:15 PM–5:00 PM

Postoperative refractive outcome change of combined phacoemulsification and pars plana vitrectomy in rhegmatogenous retinal detachment

Purpose: To evaluate the overall refractive outcomes after combined phacoemulsification and pars plana vitrectomy (PPV) between rhegmatogenous retinal detachment (RRD) and other retinal disease.

Methods: Total of 60 patients who had combined surgery between January 2007 to December 2012 at Hallym sacred heart hospital were enrolled in the study. The 25 patients who received combined surgery for RRD were included in RD group and 35 patients who underwent combined surgery for other vitreoretinal pathology were included in control group. Refractive, axial length (AL), Intraocular pressure (IOP) measurements were performed preoperatively, 3 months and 6 months postoperatively. AL was matched between two groups and the factors influencing the postoperative refractive outcomes were analyzed.

Results: Mean difference between the actual and expected postoperative 6 months refractive outcome in RD and control group was -0.43 diopter (D) ± 0.67 (SD) (P = 0.046) and -0.08 ± 0.53 (D), respectively. (P = 0.767) Mean preoperative IOP in affected eye and fellow eye in RD group was 11.44mmHg ± 3.15 and 13.16mmHg ± 2.73, respectively; the difference was significant. (P = 0.045) But no difference was found in affected eye and fellow eye in control group. It was 14.20mmHg ± 2.95 and 14.17mmHg ± 3.50, respectively. (P = 0.974) Mean postoperatively 3 months and 6 months IOP in affected eye and fellow eye of two groups were not significantly different. For all eye, the refractive difference correlated to IOP change in RD group. (r=0.659, r2=0.435, P<0.001)

Conclusions: The postoperative refraction in RD group shifted toward myopia by a mean of 0.35(D) compared with that after combined surgery in control group. Normalizing preoperative
lowered IOP after combined surgery in RRD may be the key factor to understand this myopic shift.

Commercial Relationships: Kwan Hyuk Cho, None; Soon Il Kwon, None

Program Number: 1088 Poster Board Number: B0226
Presentation Time: 3:15 PM–5:00 PM

Characteristics of Eyes with Rhegmatogenous Retinal Detachment Requiring Multiple Rettachment Surgeries


Purpose: To review characteristics of eyes with rhegmatogenous retinal detachment that underwent pars plana vitrectomy, scleral buckle, or both in combination that required multiple surgeries to achieve retinal reattachment in a multioffice retina practice. Characteristics associated with redetachment following primary surgical repair were examined.

Methods: A retrospective record review was conducted identifying eyes that required multiple surgeries for retinal detachment including pars plana vitrectomy (PPV), scleral buckling (SB), or a combination from January 2007 to March of 2013. Eyes with any history of previous retinal surgery were excluded.

Results: 150 charts were reviewed. 27 eyes in 27 patients were included. Mean age at the first retinal detachment was 51.8 years old (range 15 -83). 51.9% (14/27 eyes) were female. 70.4% (20/27 eyes) were phakic and 29.6% (8/27 eyes) were pseudophakic. Lattice degeneration was present in 33.3% (9 /27 eyes). Original detachment extent was 6.6 +/- 3.9 clock hours with 1.7 ± 1.0 breaks. Initial detachment breaks were confined to the superior hemiretina in 44.4% (12/27 eyes) and the inferior hemiretina in 37.0% (10/27 eyes). PVR was noted in 29.6% (8/27 eyes). Initial surgical repair was vitrectomy in 48.1% (13/27 eyes), scleral buckle in 14.8% (4/27 eyes), and combination of both in 37.0% (10/27 eyes). Average time to redetachment was 127 ± 336 days (median 48 days, range 13-1779 days). All but one eye redetached within the first year. Redetachments averaged 2.3±1.1 breaks with an extent of 8.4±3.8 clock hours and PVR was noted in 81.5% (22/27 eyes). Break location in redetachments was confined to the superior hemiretina in 18.5% and to the inferior hemiretina in 70.4%. Redetachment repair was with vitrectomy in 100% and a scleral buckle was added in 7 of 13 (53.8%) of eyes without one previously. 25.9% (7/27 eyes) required a third surgery and ultimately 2 eyes (7.4%) were considered anatomical failures.

Conclusions: Patients requiring multiple surgeries for retinal detachment had recurrence of retinal detachment within the first year following initial retinal detachment surgery. On initial presentation these patients were predominantly phakic (70.4%) with breaks located in the superior 6 clock hours of retina (44.4%). Redetachments were more associated with breaks isolated to the inferior 6 clock hours of retina (70.4%) and PVR (81.5%).

Commercial Relationships: Michael McClintock, None; Kouroos Rezaei, None

Program Number: 1089 Poster Board Number: B0227
Presentation Time: 3:15 PM–5:00 PM

BAX and BCL-2 genes in patients with Retinal Detachment with and without Proliferative Vitreoretinopathy. The Retina 4 project

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Purpose: To compare the distribution of BCL-2 (-938)A, and BAX G(-248)A genotypes among European subjects undergoing rhegmatogenous retinal detachment (RRD) surgery in relation to the further development of proliferative vitreoretinopathy (PVR).

Methods: A case-control gene association study as part of the Retina 4 Project (European multicenter study) was designed. Two promoter single nucleotide polymorphisms (SNP) (rs2279115 and rs4645878) were analysed by TaqMan 5'exonuclease allelic discrimination assay, using a StepOne®system in 134 samples from patients with PVR secondary to RRD and 421 with RRD without PVR. Proportions of genotypes and AA homozygote groups of BCL-2 and BAX polymorphisms between sub-samples were analysed in 2 phases. First, samples from Spain and Portugal were analysed. Once significant results were found, samples from United Kingdom and Netherlands were analysed in a second phase. Genotypic and allelic frequencies were compared in global sample and in sub-samples.

Results: - BAX gene: Significant differences were observed regarding genotype frequencies between cases (AA: 5.2%, GA: 31.3%, GG: 63.4 %) and controls (AA: 2.1%, GA: 21.8%, GG: 76.0%) and in A allelic homozygote carriers (AA) between controls (95% CI: 10.9 to 15.5) and cases (95% CI: 16.2 to 26.3) in the global series. The odds ratio (OR) of A carriers in the global sample was 1.7 (95% CI: 1.23-2.51). Also, in the comparison of proportions of genotypes in Spain+Portugal, significant differences were found. The OR of A carriers from Spain and Portugal was 1.8 (95% CI: 1.11-2.95).

- BCL-2 gene: No significant differences were observed in genotype frequencies and in A allelic homozygote carriers (AA) in global sample and in sub-samples from different countries. However, the comparison of proportions of genotypes in Spain+Portugal, was statistically significant. In addition, a protective effect was found in the analysis of A carriers from Spain and Portugal with an OR of 0.6 (95% CI: 0.43-0.96).

Conclusions: The A allele of BAX is associated with a higher risk of developing PVR in patients undergoing a RRD surgery, suggesting that a down-regulation in the apoptosis pathway could be an important key in PVR pathogenesis. Also, this study highlights the role of the SNP rs 2279115 in the BCL-2 gene (inhibitor of necroptosis pathway) as a possible new target in PVR prophylaxis.

Commercial Relationships: Lucia Gonzalez-Buendia, None; Salvador Pastor, None; Irene Rodriguez-Hernandez, None; Jimena Rojas, None; Rogelio Gonzalez-Sarmiento, None; Jose-Carlos Pastor, None

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Changes in Outer Retinal Structure Following Closed Globe Blunt Ocular Trauma

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Purpose: Imaging with adaptive optics scanning light ophthalmoscopy (AOSLO) has shown persistent photoreceptor mosaic disruption following ocular trauma, though only a single time point was examined. Here, we assess changes in photoreceptor structure over time following closed globe blunt ocular trauma and employ a novel AOSLO imaging modality to better delineate the extent of photoreceptor disruption in these patients.

Methods: Two subjects with histories of visual complaints following ocular trauma were initially imaged between 4 and 6 months post trauma. To assess changes in outer retinal structure, imaging was repeated 4 to 15 months later. SD-OCT was used to acquire high-density volume scans through the fovea for assessment of retinal architecture. Confocal and split-detector AOSLO were used to visualize the waveguided and non-waveguided photoreceptor signals, respectively.

Results: In one subject the area of the ellipsoid zone (EZ) disruption decreased between 6 and 21 months post trauma from 0.070 to 0.017 mm² on SD-OCT and from 0.075 to 0.029 mm² on confocal AOSLO. Confocal AOSLO imaging on a second subject revealed diffuse photoreceptor disruption that remained grossly unchanged between 4 and 8 months post trauma. In both subjects, visualization of the inner segments by split-detector AOSLO allowed for more definitive assessment of residual cone structure. In one subject, confocal AOSLO overestimated the focal lesion size by over 300% with respect to split-detector AOSLO (Figure). Split-detector imaging also revealed the presence of enlarged cones bordering the focal photoreceptor mosaic disruption (Figure), and microcysts in areas of parafoveal photoreceptor mosaic disruption visualized by confocal AOSLO.

Conclusions: Assessment of the degree of residual cone structure following trauma is challenging when relying solely on confocal AOSLO imaging and/or en face SD-OCT. Split-detector imaging was able to disambiguate reflective signals derived from remaining cones from those originating from other retinal structures, and this technique may be useful as a prognostic indicator of expected recovery in these patients.
the military setting. Open globe injuries often lead to severe loss of retinal tissue complicating retinal detachment repair. The above limitations have lead to a lower final visual acuity and anatomic reattachment rate than typically reported in the civilian literature.

Intraocular foreign body removed from a patient following an improvised explosive device injury.

Pie chart depicting the injury patterns sustained in eyes treated for traumatic retinal detachments.

Commercial Relationships: James Weightman, None; Marcus Colyer, None; Dal Chun, None; Eric Weichel, None

Program Number: 1092 Poster Board Number: B0230
Presentation Time: 3:15 PM–5:00 PM
In Vivo and In Vitro Feasibility Studies of Intraocular Use of FocalSeal® to Close Retinal Breaks in Porcine and Rabbit Eyes
Sujin Hoshi1, Fumiki Okamoto1, Yuichi Kaji1, Mikki Arai1, Tatsuo Hirose1, Tetsuro Oshika1. 1Department of Ophthalmology, Institute of Clinical Medicine, University of Tsukuba, Tsukuba, Japan; 2Department of Ophthalmology, Arai Eye Clinic, Fukuoka, Japan; 3The Schepens Eye Research Institute, Harvard Medical School, Boston, MA.

Purpose: FocalSeal® is an absorbable polyethylene glycol-based synthetic hydrogel sealant. This liquid is polymerized under visible xenon illumination, and forms clear, flexible, and firmly adherent hydrogel. In this study, we evaluated the intraocular biocompatibility of the sealant and explored its efficacy for closing retinal breaks.

Methods: An in vitro study was conducted to assess the efficacy of FocalSeal® in enucleated porcine eyes, and an in vivo study was performed to evaluate its safety in Dutch pigmented rabbit eyes. In the in vitro study, retinal detachment with a hole was created in porcine eyecups after the vitreous gel was removed. FocalSeal® was applied to cover the hole, and was polymerized with 60-second application of xenon light. The strength of the retinal adhesion was tested by forcefully pouring balanced salt solution (BSS) to the retinal hole. The pH of FocalSeal® soaked in the BSS, incubated at 37°C, was measured periodically for 72 hours. In the in vivo study, FocalSeal® was injected into the vitreous cavity of left eyes of the rabbits. Ophthalmologic examinations were performed and bilateral electroretinograms (ERG) were recorded simultaneously before and 4 weeks after injection. Both eyes were enucleated for histological evaluation.

Results: Adhesion of FocalSeal® to the retina was relatively strong. The forceful application of BSS to the retinal hole covered with FocalSeal® did not detach the retina, while the retinal hole without FocalSeal® detached immediately after BSS application. The pH of BSS containing FocalSeal® was between 7.2 to 8.0. With slit lamp microscopy and funduscopy, no inflammatory reaction was observed in the eyes during the 4-week follow-up after treatment. ERGs recorded before and after injection showed typical patterns. There was no significant difference in the amplitude or implicit time of the a-waves, b-waves, and oscillatory potentials of the ERG between the study and control groups. Histological examination with a light microscope did not reveal any abnormality or inflammation in either group at the end of the study.

Conclusions: FocalSeal® appeared to effectively seal retinal breaks in our in vitro experiment, and the in vivo studies indicated that FocalSeal® was not toxic to the eye.

Commercial Relationships: Sujin Hoshi, None; Fumiki Okamoto, Genzyme (F); Yuichi Kaji, None; Mikki Arai, None; Tatsuo Hirose, None; Tetsuro Oshika, None

Program Number: 1093 Poster Board Number: B0231
Presentation Time: 3:15 PM–5:00 PM
TGF-β1 Induced Epithelial-Mesenchymal Transition in RPE cell is Mediated by TAK-1 Activation
Zeev Dvashi, Mordechai Goldberg, Ayala Pollack. ophthalmology, kaplan Medical Center, Rehovot, Israel.

Purpose: Proliferative vitreoretinopathy (PVR) is a scarring process that develops as a complication during retinal detachment (RD), accompanied by formation of fibrotic tissue and it is the most common cause of RD failure. Retinal pigment epithelial (RPE) cells regulates the development of the fibrotic tissue during PVR. RPE cells are quiescent and differentiated cells, however upon RD and the break of the blood-retina barrier, RPE cells are exposed to a variety of growth factors. TGF-β1 is a major growth factor that induces epithelial-mesenchymal transition (EMT) in RPE cells. TGF-β1 signaling is mediated by the serine/threonine kinase TAK-1, which is activated by TGF-β1 induced phosphorylation of TAK-1 at Thr184/Tyr187.

Methods: Primary RPE cells were isolated from Sprague Dawley rats and cultured in Dulbecco’s Modified Eagle’s Medium (DMEM) supplemented with 10% fetal bovine serum (FBS). The effects of TGF-β1 on EMT were determined by investigating the expression of EMT markers such as N-cadherin, vimentin, αSMA, and fibronectin. The expression of TAK-1 was determined by Western blot analysis. The activation of TAK-1 was determined by Western blot analysis of phospho-TAK-1 (Thr184/Tyr187).

Results: TGF-β1 induced EMT in RPE cells as demonstrated by increased expression of EMT markers such as N-cadherin, vimentin, αSMA, and fibronectin. Treatment with TGF-β1 significantly increased the expression of N-cadherin, vimentin, αSMA, and fibronectin. TAK-1 was activated by TGF-β1 as demonstrated by increased expression of phospho-TAK-1 (Thr184/Tyr187).

Conclusions: TGF-β1 induced EMT in RPE cells is mediated by TAK-1 activation. These results suggest that TAK-1 is a key regulator of EMT in RPE cells and may be a potential target for the treatment of PVR.

Commercial Relationships: Zeev Dvashi, None; Mordechai Goldberg, None; Ayala Pollack, None

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of cytokines and growth factors. Upon this exposure the RPE cells undergo epithelial-mesenchymal transition (EMT) characterized by enhanced expression of α-smooth muscle actin, secretion of chemokines and cytokines, increased cell motility and production of extracellular matrix components. Transforming growth factor-β1 (TGF-β1) plays a key role in EMT of RPE cells. In this study we examined the effect of inhibition of the canonical and non-canonical pathways of TGF-β1 on EMT of RPE cells.

Methods: ARPE-19 Cells were treated with SZ-7 oxoozoeanol [transforming growth factor beta-activated kinase 1 (TAK-1) inhibitor] or SB431542 (TGF-β1 receptor kinase inhibitor) followed by TGF-β1 (5 ng/ml) stimulation for all experiments. Immunofluorescence assays examined: phospho-p38, α-SMA, E-cadherin and stress fiber assembly and subcellular distribution. Cell migration was determined using scratch assay. Cell contractility was examined using collagen contraction assay. Real time PCR assessed the transcription of pro inflammatory factors.

Results: Stimulation of RPE cells with TGF-β1 increase α-SMA expression, cell migration, contractility and the transcription of CTGF (connective tissue growth factor) and collagen type I, all are EMT features. However, addition of TAK-1 inhibitor abolishes all these processes. Moreover, while TGF-β1 treatment reduced E-cadherin expression during the EMT process addition of TAK-1 inhibitor halt this process and maintains the naive form of the cells.

Conclusions: This study demonstrates TAK-1, the non-canonical pathway of TGF-β1, as a key player in the EMT process and in the homeostasis of RPE cells. The ability to halt the process of EMT in RPE cells may reduce the severity of the fibrotic response that occurs upon PVR, leading to a better prognosis and increase the probability of success in RD.

Commercial Relationships: Zeev Dvashi, None; Mordechai Goldberg, None; Ayala Pollack, None

Program Number: 1094 Poster Board Number: B0232
Presentation Time: 3:15 PM–5:00 PM
Efficacy of Preoperative Intravitreal Bevacizumab for Diabetic Tractional Retinal Detachment Repair
Sean Tsao, Saadia Rashid. Department of Ophthalmology and Visual Sciences, Montefiore Medical Center, Albert Einstein School of Medicine, Bronx, NY.

Purpose: To evaluate the effect of preoperative intravitreal bevacizumab on outcomes in diabetic tractional retinal detachment repair.

Methods: Retrospective chart review of all patients who underwent 23-gauge pars plana vitrectomy for tractional retinal detachment (TRD) repair performed by a single surgeon over a 13 month period from November 2012 to November 2013 at a single academic center. Cases of diabetic vitreous hemorrhage without TRD were excluded. Mean follow-up was 4 months (range 1 to 12 months). Outcome measures include logarithm of the minimal angle of resolution (logMAR) best corrected visual acuity (BCVA), mean surgical time, incidence of iatrogenic retinal breaks, postoperative hemorrhage and macular edema.

Results: 27 eyes from twenty-six patients were included in this study (n= 18 foveal sparing TRD; n= 9 foveal involving TRD). Mean age was 52 years (range 36 to 67). Twenty-two eyes received preoperative intravitreal bevacizumab 2-3 days prior to vitrectomy and 7 eyes did not. Incidence of intraoperative iatrogenic breaks was significantly reduced by preoperative bevacizumab (10% vs 43%, p=0.05) with a trend towards shorter mean operative time. There was also a non-significant trend towards lower incidence of postoperative hemorrhage in bevacizumab treated eyes (15% vs 43%, p=0.13). Postoperative macular edema was not significantly different between the two groups (40% with bevacizumab vs 43% without, p=0.90). Mean logMAR BCVA was similar preoperatively (1.7±1.0 with bevacizumab vs 1.7±0.9 without, p=0.96) and 1 month postoperatively (1.2±1.0 with bevacizumab vs 1.7±0.8 without, p=0.25). Subset analysis showed that in foveal involving TRD, mean preoperative logMAR visual acuity was similar (1.1±0.6 with bevacizumab vs 2.0±0.9 without, p=0.11); however, bevacizumab treated eyes achieved significantly better BCVA at 1 month (0.7±0.2 with bevacizumab vs 2.0±0.9 without, p=0.02)

Conclusions: Preoperative intravitreal bevacizumab helps reduce incidence of iatrogenic breaks during repair of diabetic tractional retinal detachment and may also help reduce operative time, most likely due to less intraoperative bleeding. Postoperative hemorrhage appeared less frequently in eyes pretreated with bevacizumab, consistent with findings in the literature. We suggest that preoperative intravitreal bevacizumab be routinely used prior to surgical repair of diabetic tractional retinal detachments.

Commercial Relationships: Sean Tsao, None; Saadia Rashid, None
Support: Research to Prevent Blindness

Program Number: 1095 Poster Board Number: B0233
Presentation Time: 3:15 PM–5:00 PM
Subfoveal choroidal thickness is not correlated with retinal sensitivity but with age in the fellow eye of patients with neovascular age-related macular degeneration
Elizabeth Pearce1, 2, Elizabeth Yang2, Joshua Harvey2, Matthew Richardson2, Sobha Sivaprasad2, Victor Chong1. Department of Ophthalmology, King’s College Hospital, London, United Kingdom; 2Oxford Eye Hospital, Oxford University Hospitals, Oxford, United Kingdom.

Purpose: To evaluate the correlation of retinal sensitivity and subfoveal choroidal thickness of the fellow eye of patients with neovascular age-related macular degeneration (AMD)

Methods: Patients who had neovascular AMD in one eye were invited to take part in the study. To be included, the best corrected visual acuity (BCVA) of the fellow eye (study eye) was 60 letters or better as measured with ETDRS chart. Microperimetry and fixation analysis were carried out with Nidek MP1 and Optical Coherence Tomography were performed with Heidelberg Spectralis using the Enhanced Depth Imaging mode. Bivariate contour ellipse area (BCEA) was calculated using the raw data from the MP1 fixation analysis. Two independent graders manually measured the subfoveal choroidal thickness (CT), and the mean of the 2 graders were used for analysis. Pearson correlation between different variables was calculated using SPSS software.

Results: A total of 38 patients were included in the study. The mean age was 75.03 (SD 6.79) years, the mean BCVA was 76.11 (SD 7.82) letters, the mean subfoveal CT was 494 (SD 228) microns, the mean BCEA score was 924 (SD 735) and the mean microperimetry (MP) score was 10.14 (SD 4.13) dB. The BCVA positively correlates with the BCEA (p=0.009) and MP score (p=0.023). The subfoveal CT negatively correlates with age (p=0.021) (i.e. thinner choroid with increasing age) but not with BCVA (p=0.45), BCEA (p=0.43) or MP (p=0.18). MP and BCEA scores were highly correlated (p<0.0001).

Conclusions: In the fellow eye of patients with neovascular AMD, we have previously reported that increasing drusen load and the presence of psuedoreticular drusen were significantly associated with reduction of retinal sensitivity. Using the same methodology, we were not able to find correlation between subfoveal choroidal thickness and retinal sensitivity, but were able to confirm previous report that the choroidal thickness reduces with age.
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Seven eyes underwent PR after prior PPV. Indications for the initial PPV included: 2 patients with retained lens fragments after complicated cataract surgery, 2 patients with macular hole surgeries, 1 patient with a prior retinal detachment managed by PPV alone, one patient with an epiretinal membrane peel after prior retinal detachment managed by SB, and one patient undergoing PPV for a subluxed crystalline lens in the setting of Marfan Syndrome. The average time to RD after PPV was 67 days (range: 15 – 232 days). The location of the break was superior in 4 eyes, horizontal in 2, and inferior in 1. Anatomic reattachment with PR alone occurred in 4/7 (57%) eyes. At final follow-up after additional treatments, the retina was reattached in 7/7 eyes and median BCVA was 20/40 (range: 20/20 to 20/80)

Conclusions: In the setting of recurrent RD after initial SB, pneumatic retinopexy was usually successful in the early postoperative course. In the setting of a new-onset RD after PPV, pneumatic retinopexy was a useful option but recurrent RD was more common.

Commercial Relationships: Yasha Modi, None; Justin Towsend, None; Aliza Epstein, None; William Smiddy, Alimera Scientific (C); Harry W. Flynn, Santen Inc. (C), Vindigo Inc. (C)

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Program Number: 1099 Poster Board Number: B0237
Presentation Time: 3:15 PM–5:00 PM

Pars Plana Vitrectomy with Juxtapapillary Laser

Photoagulation (JLP) Versus without JLP for the Treatment of Optic Disc Pit Maculopathy: Functional and Anatomic Outcomes

Purpose: Functional and Anatomic Outcomes

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Purpose: To compare the functional and anatomic outcomes of pars plana vitrectomy (PPV) with juxtapapillary laser photoagulation (JLP) versus without JLP in optic disc pit maculopathy.

Methods: Retrospective review of consecutive patients with optic disc pit maculopathy seen at two tertiary eye centers between 1992 and 2012. Twenty-six patients with optic nerve pit maculopathy were included. All patients underwent complete ophthalmic evaluation, fundus photography, fundus fluorescein angiography, and macular optical coherence tomography (OCT). Indications for surgery included distorted or decreased vision. Surgical intervention included PPV, posterior vitreous detachment, and gas tamponade. Fourteen patients had laser photoagulation at the temporal edge of the optic disc pit (Group A) and 12 patients had no laser (Group B). Pre and postoperative snellen best-corrected visual acuity (BCVA) as well as OCT findings were recorded.

Results: Mean follow up was 18 months (range: 2 to 52 months). LogMAR BCVA in Group A improved significantly from a mean of 0.85 ± 0.54 (p = 0.003) at the last follow-up. In Group B, mean LogMAR BCVA improved from 0.88 ± 0.64, however this difference was not significant (p = 0.528). Similarly, the mean OCT central macular thickness (CMT) in Group A improved significantly from 705.4 ± 343 µm in the pre- and post-operative assessments, respectively (p = 0.001). Meanwhile, the corresponding change in mean CMT in Group B improved from 611.9 ± 290 µm, however this difference was not statistically significant (p = 0.225).

Conclusions: Patients who underwent pars plana vitrectomy with juxtapapillary laser photoagulation for optic disc pit maculopathy showed better visual and anatomic outcome than those with no laser at the last follow-up.

Commercial Relationships: Sulaiman Alsulaiman, None; Marwan Abouammoh, None; Ahmed Moussa, None; Vishali Gupta, None; J Fernando Arevalo, None

Program Number: 1100 Poster Board Number: B0238
Presentation Time: 3:15 PM–5:00 PM

Changes in Retinal Function and Structure Following Intravitreal Anti-Vascular Endothelial Growth Factor (Anti-VEGF) Treatment for Diabetic Macular Edema

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Purpose: To investigate spectral domain optical coherence tomography (SDOCT) and microperimetry (MP) findings in patients before and after intravitreal bevacizumab or ranibizumab treatment for diabetic macular edema (DME), and to investigate their predictive value of SDOCT findings with regards to retinal functions assessed with MP.

Methods: Forty-five patients (59 eyes) with center-involving DME were randomly assigned to receive either 1.5 mg/0.06 cc intravitreal bevacizumab (IVB);33 eyes) or 0.5 mg/0.06 cc intravitreal ranibizumab (IVR; 26 eyes). Injections were performed at baseline and monthly if central subfield thickness (CSFT), measured by SDOCT, was 275 µm or higher. Evaluations including best-corrected visual acuity (BCVA) and SDOCT were performed monthly. MP (MAIA – CenterVue) was performed pre-injection and at 3, 6, and 12 months of follow up to determine the fixation stability (95 % bivariate contour ellipse area – BCEA), and the sensitivity threshold (ST) on 37 test points. DME was classified using SDOCT as diffuse or focal, and by the presence or absence of cysts in the inner (cINL) or outer (cONL) nuclear layer, serous retinal detachment (SRD), and hyporeflective hard exudates (HE).

Results: A significant (P<0.05) improvement in BCVA (logMAR) (IVB: 0.24 ± 0.16; IVR: 0.28 ± 0.19) and a significant reduction in CSFT (IVB: 121.6 ± 145.0 µm; IVR: 118.8 ± 122.6 µm) were observed, but there was no significant correlation between BCVA improvement and CSFT reduction within the IVB or IVR (IVB: r=0.29; P=0.11, IVR: r=0.24; P=0.24). There was a significant improvement in the ST in the IVB and IVR groups( 3.0 ± 0.6 dB and 2.7 ± 0.6 dB, respectively), but there was no significant change in BCEA in either group. Eighteen of the 59 eyes (31%) showed focal DME, and these eyes demonstrated a lower mean change in ST (1.4 ± 1.0 dB; P=0.088) compared to eyes with diffuse DME (3.4 ± 0.4 dB; P<0.001). Eyes with cINL (25%), cONL (66%), SRD (14%) or HE (47%) demonstrated a similar mean improvement in ST compared to eyes without these findings.

Conclusions: This data indicate that anti-VEGF treatment is associated with diffuse, but not focal, DME. The presence of cINL, cONL, SRD or HE was not associated with the magnitude of ST improvement.

Commercial Relationships: Monique V. Sousa, None; Antonio Bruno Nepomuceno, None; Andre Messias, None; Rodrigo Jorge, None; Ingrid U. Scott, None

Clinical Trial: NCT01487629

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Residual Cone Structure in Achromatopsia: Implications for Gene Therapy

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Purpose: Achromatopsia (ACHM) is associated with absent or severely reduced cone function. Central to the success of emerging gene-replacement therapies is identifying patients with residual cone structure despite functional deficits. Adaptive optics (AO) imaging studies have shown that most residual cones have reduced or absent reflectivity, interfering with quantification of cone populations. Here we demonstrate a novel AO imaging method to visualize cones regardless of their waveguided signal.

Methods: Twenty-three subjects with a clinical diagnosis of ACHM, 13 with confirmed genetic mutations, were imaged using confocal and split-detection AOSLO. Split-detection AOSLO enables visualizing structures using multiply scattered light. These images were captured concurrently, in exact spatial registration with one another. Cones with visible confocal signal were matched to locations of cone inner segments (IS) in split detection images. In regions of mismatch between the two images, cone IS diameters were measured in the split detection images.

Results: All subjects showed regions of diminished or absent reflectivity as previously reported. Structures seen in three subjects using the split detector method were found to have a mean diameter of 6.0, 6.3, 6.7 and 7.0μm at 0.5, 5, 10 and 15° from the foveal center. The structures nearest the fovea were about twice the size of histologic values of cone IS diameter and change with increasing eccentricity was smaller than in histology. In images acquired with split-detection the location of many IS correspond to regions with no waveguided signal. We demonstrate a novel AO imaging method to visualize cones regardless of their waveguided signal.


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**Results:** SD-OCT findings were variable across subjects and included macular atrophy, the presence of a large hyporeflective zone, and subtle mottling of the ellipsoid zone. Confocal AOSLO revealed altered reflectivity of the perifoveal cone mosaic, showing sporadic “dark” cones throughout the perifovea, which were aided in visualization by the presence of neighboring rod photoreceptors. Confocal AOSLO near the fovea showed irregular reflective structure, precluding analysis of residual cone structure (see Figure). However, using AOSLO split-detection, we were able to clearly visualize cone inner segments. At 0.65° from the fovea, cone density was significantly reduced from normal (approximately 17,000 cones/mm² in the two subjects compared to 72,500 cones/mm² expected for normals), while residual cone inner segments were found to be enlarged.

**Conclusions:** Interpretation of confocal AOSLO images of degenerative retinal disease can be challenging. AOSLO split-detection allows direct quantification of residual inner segment cone structure and is complementary to the confocal signal from the cone outer segments. These techniques should prove to be a powerful clinical tool to aid in the examination of cone rod dystrophies and other retinal disorders.

**Program Number:** 1104 **Poster Board Number:** B0241

**Presentation Time:** 3:15 PM–5:00 PM

**Transplantation of c-kit positive / SSEA-1 negative human retinal progenitor cells into the subretinal space of mice**

Caihui Jiang, Caiyun Fu, Guanhua Peng, Zhengqin Yin. Department of Ophthalmology, Chinese PLA General Hospital, Beijing, China.

**Purpose:** Many retinal degenerative diseases result in irreversible visual damage due to photoreceptor loss. Cell replacement therapy represents a novel approach for treatment of retinal degenerative diseases, such as retinitis pigmentosa and age-related macular degeneration. In this study, we assessed the ability of c-kit positive / SSEA-1 negative human retinal progenitor cells (hRPCs) to engraft, survive and differentiate into retinal cells in the mouse retinas with laser injury.

**Methods:** hRPCs were isolated from 12-16 wks gestational age retina. c-kit positive / SSEA-1 negative hRPCs were selected by Fluorescence-activated cell sorting (FACS) and expanded in vitro. Cells were characterized by immunohistochemistry for expression of retinal progenitor markers. PKH26-labeled c-kit positive / SSEA-1 negative hRPCs in HBSS were transplanted into the subretinal space of mice with retinal laser injury. Mice in control group received subretinal injection of HBSS. Fundus examination and optical coherence tomography (OCT) were performed at various time after transplantation. Mice were sacrificed 3 to 6 weeks after transplantation and eyes were collected for immunohistochemistry study.

**Results:** At both 3 and 6 weeks after transplantation, the injected c-kit positive / SSEA-1 negative hRPCs were able to engraft, survive and differentiate into retinal cells in the mouse retinas with laser injury.
and migrate within the mouse retina with laser injury. Furthermore, most of the integrated cells resided in the outer nuclear layers of the mice. Immunohistochemistry analysis revealed that some transplanted cells co-labeled with human mitochondria and retinal photoreceptor markers rhodopsin and recoverin.

**Conclusions:** c-kit positive / SSEA-1 negative hRPCs transplanted into the subretinal space of mice with retinal laser injury can migrate, integrate and differentiate into photoreceptors. These results suggest that c-kit positive / SSEA-1 negative hRPCs could be a source for cell replacement therapy for retinal degenerative diseases.

**Commercial Relationships:** Caihui Jiang, None; Caiyun Fu, None; Guanghua Peng, None; Zhengqin Yin, None

**Support:** Supported by 973 National Basic Research Program and National Natural Science Foundation of China.

**Program Number:** 1105
**Poster Board Number:** B0243
**Presentation Time:** 3:15 PM–5:00 PM

**Evolution of vitreoretinal modification after posterior vitreous detachment (PVD) and clinical management**

Jennifer Cattaneo, Valentina Viganò, Luigi Cerri, Simone Donati, Claudio Azzolini. Dept. of Surgical and Morphological Sciences - Section of Ophthalmology, University of Insubria, Varese, Italy.

**Purpose:** To evaluate the perspective retinal tear risk in patients presenting with acute onset of floaters and/or flashes.

**Methods:** 28 patients, 17 females and 11 males, have been recruited. Mean age was 66.7 ± 12.3 years old. Inclusion criteria was recent diagnosis of acute complete or partial PVD with reported flashes and floaters. Exclusion criteria were recent ocular trauma or ocular surgery, retinal laser photocoagulation, severe ocular media opacities, diabetic retinopathy and active inflammatory eye disease. All patients have been investigated about related symptoms and underwent a complete ophthalmic evaluation including visual acuity with refractive error and peripheral retina examination with Goldmann 3-mirror contact lens. Follow up was at 2 weeks, 6 weeks and 3 months. A prompt treatment was expected in presence of tractional retinal tears.

**Results:** Our patients reported an incidence of retinal tears of 8.6% with a peak at 2 weeks; no more retinal tears were reported on further follow up. All patients reported floaters at baseline and during follow up visits. At baseline, 78.2% of patients reported flashes, 60.8% at 2 weeks, 17.3% at 6 weeks and 8.6% 3 months follow up. 17.3% of patients presented peripheral retinal hemorrhages at baseline which resolved during following clinical visits and no more retinal hemorrhages were reported during follow up. In 4.3% of patients we found mild vitreous hemorrhage at baseline which resolved in the following visits. In 21.7%, we found a peripheral non symptomatic vitreo-retinal traction at baseline, 21.7% at 2 weeks, 13% at 6 weeks,4.3% at 3 months. Weiss ring was clearly appreciable in 13% of patients at the last follow up visit.

**Conclusions:** Our protocol expected to visit patients 4 times in 3 months. All patients with acute PVD showed floaters that persisted during follow up whereas 78% of patients showed flashes that decreased to 8.6% after 3 months. As the maximum manifestation of retinal tear was at week 2, we conclude that it is important to perform a early clinical evaluation in presence of symptoms in order to refer patients for a possible retinal laser photocoagulation and avoid retinal tear complications. We didn’t find a significative correlation between the entity of refractive error and risk of retinal tears. We underline a significative association between retinal tear and persistence of flashes.

**Commercial Relationships:** Jennifer Cattaneo, None; Valentina Viganò, None; Luigi Cerri, None; Simone Donati, None; Claudio Azzolini, None

**Program Number:** 1106
**Poster Board Number:** B0244
**Presentation Time:** 3:15 PM–5:00 PM

**Autophagy in retinal detachment is mediated by hypoxia-inducible factor**


**Purpose:** Retinal detachment results in a time-dependent death of the photoreceptor cells. This separation also results in a hypoxic environment for the photoreceptors. Previous studies from our lab have shown that autophagy becomes activated post separation, and serves to delay apoptotic photoreceptor death. In the present study we test the hypothesis that hypoxia leads to increased levels of hypoxia-inducible factor (HIF) in the photoreceptors, and secondary activation of autophagy.

**Methods:** Retina-RPE separation was created in Brown-Norway rats by injection of 1% hyaluronic acid into the subretinal space. Retinas were harvested 1-7 days after detachment, and assayed for HIF protein levels with attached retinas serving as controls. Cultured (661W) photoreceptor cells were subjected to hypoxic conditions (1% O2, 5% CO2) and assayed for induction of HIF and autophagy. The requirement of Hif1α in regulating photoreceptor autophagy was tested using siRNA in cultured cells.

**Results:** Hif1α and Hif2α protein levels peak at 1 day post retina-RPE separation and gradually decrease over time. In cultured photoreceptor cells, hypoxia results in increased levels of HIF and activation of autophagy. Silencing of Hif1α by siRNA appears to reduce the hypoxia-induced increase in autophagy.

**Conclusions:** Photoreceptor hypoxia due to retina-RPE separation results in increased Hif1α and Hif2α protein levels which contribute, at least in part, to the activation of autophagy. Future studies will use inhibitors of HIF proteins in the rodent model of retinal detachment to confirm the mechanism in vivo.

**Commercial Relationships:** Shameka J. Shelby, None; Pavan S. Angadi, None; David N. Zacks, None

**Support:** NIH Grant EY020823

**Program Number:** 1107
**Poster Board Number:** B0245
**Presentation Time:** 3:15 PM–5:00 PM

**IL-6 response to Edn2 stimulation in Müller cells**

Pavan S. Angadi, Shameka J. Shelby, David N. Zacks. Ophthalmology, University of Michigan Kellogg Eye Center, Ann Arbor, MI.

**Purpose:** Retinal detachment results in the death of photoreceptors. The separation of the neurosensory retina from the retinal pigment epithelium (RPE) is both medically and surgically managed; however, significant vision loss is often seen, primarily due to the apoptotic death of the photoreceptor cells. During retina-RPE separation there are multiple molecules that are up regulated in the retina. Our lab has previously shown increased levels of Interleukin-6 (IL-6), Endothelin 2 (Edn2), and Endothelin Receptor B (EdnRB). The purpose of this study is to test the hypothesis that the release of Edn2 in the retina causes an increase in expression of IL-6, an anti-apoptotic cytokine, from Müller cells.

**Methods:** Retinal detachments were created in Brown Norway rats according to existing protocols, and retinas harvested at 1, 3, and 7 days post separation. Rats with attached retinas served as controls. Whole cell RNA was obtained from the retinas and assayed for transcript expression via PCR. Imm10 cells, an immortalized line of Müller cells, were used to test Müller cell specific response. Transcript levels were obtained following incubation of the cells in hypoxic conditions (our simulation of retinal detachment in cell
culture), addition of mature Edn2, and both hypoxia and Edn2 addition across multiple time points. 

**Results:** Transcript levels of IL-6 and Edn2 peak at day 1 post detachment and gradually decrease over time in detached rat retinas. There was no change in expression of EdnRB. In ImM10 cells, transcript expression of IL-6 is increased in the presence of hypoxia, as well as in the presence of Edn2 over multiple time points. IL6 expression is further upregulated in the presence of both hypoxia and Edn2 simultaneously.

**Conclusions:** IL-6 and Edn2 expression increases following retina-RPE separation. Addition of exogenous Edn2 to Müller cells, leads to an increase in IL-6 transcript levels over untreated and hypoxic cells only. In addition, higher IL6 expression levels occurred under conditions of combined Edn2 and hypoxia. This information is the basis for further studies to understand the molecular mechanisms behind Edn2 effect on an IL-6 protective response.

**Commercial Relationships:** Pavan S. Angadi, None; Shameka J. Shelby, None; David N. Zacks, None

**Support:** EY020823

**Program Number:** 1108 Poster Board Number: B0246
**Presentation Time:** 3:15 PM–5:00 PM
**Visual and Anatomical Outcomes in Congenital Glaucoma-Related Rhegmatogenous Retinal Detachment**

Ramzi M. Al Judaibi1, Abdulaziz Al Hadlaq2, Nicola G. Ghazi3

1Research, King Khalid Eye specialist Hospital, Riyadh, Saudi Arabia; 2Ophthalmology, University of Virginia, Charlottesville, VA; 3Epidemiology, Queen’s University, Kingston, ON, Canada.

**Purpose:** To study the visual and anatomical outcomes after at least five years follow up of surgically repaired rhegmatogenous retinal detachment (RRD) in patients with congenital glaucoma.

**Methods:** A retrospective comparative case series of 100 eyes with RRD in patients known to have congenital glaucoma was conducted. The data of 25 eyes was collected at the time of this abstract submission. Of those, 10 eyes underwent surgical retinal repair. The primary outcome measures included the final visual and anatomical results of surgical intervention.

**Results:** The mean age of the patients was 20 years (range: 13 to 33 years). The mean duration of follow-up was 10.8 years (range: 5 to 21 years). All patients were diagnosed with congenital glaucoma within the first year of life and only two were diagnosed after the first month. The mean age of onset of RRD was 8.7 years (range: 4.2 to 18.8 years). The median baseline visual acuity was hand motion (range: light perception to 20/160). All eyes underwent pars plana vitrectomy with internal tamponade, with or without scleral buckling. Among operated eyes, all except two eyes (80%) were attached on last follow up. At last follow-up, the median visual acuity was hand motion (range: No light perception to 20/80) and No light perception (range: light perception to No light perception) for operated and non-operated eyes respectively. The difference was not significant between the two groups.

**Conclusions:** Our results suggest that surgical repair of congenital glaucoma-associated RRD has a lower success rate than reported for typical RRD cases. Moreover, successful repair dose not appear to significantly alter the final visual outcome mainly due to associated ocular co-morbidities such as amblyopia and optic neuropathy.

**Commercial Relationships:** Ramzi M. Al Judaibi, None; Abdulaziz Al Hadlaq, None; Nicola G. Ghazi, None

**Program Number:** 1109 Poster Board Number: B0247
**Presentation Time:** 3:15 PM–5:00 PM

**An analysis of spectral domain optical coherence tomography features that influence conversion to neovascular age-related macular degeneration in high-risk patients**

Gary Yau1, Lisa Jagdan1, Sanjay Sharma2. 1Ophthalmology, Queen’s University, Kingston, ON, Canada; 2Epidemiology, Queen’s University, Kingston, ON, Canada.

**Purpose:** To assess the relative contribution of various tomographic features on SD-OCT that influence conversion to neovascular AMD.

**Methods:** This study was designed as a retrospective, consecutive, cohort study. Two-hundred and thirty-two fellow eyes of patients initiating treatment for unilateral neovascular AMD from January 2010 to January 2012 were included in the analysis. Baseline demographics including age, gender, and snellen visual acuity were recorded. Baseline SD-OCT (Cirrus HD-OCT, Carl Zeiss Meditec, Dublin, CA) of the non-neovascular eye was reviewed and the following features were recorded: central retinal thickness (CRT), presence or absence of vitreomacular adhesion (VMA), epiretinal membranes (ERM), drusenoid pigment epithelial detachment (dPED) and retinal pigment epithelium (RPE) saw-toothing. Each patient was followed for 12 months, with the primary outcome being conversion to neovascular AMD. The proportion or means of each SD-OCT feature was compared between the converters and non-convertors. Multivariate logistic regression was performed to determine demographic and SD-OCT features that correlated with neovascular conversion.

**Results:** Participants had a mean age of 78.4 (SD 8.6), 63% female, and a median Snellen acuity of 20/30. The incidence of neovascular conversion of the cohort at 12 months was 13.4% (31/232). There was no significant difference between presence of VMA (p=0.350), ERM (p=0.117), VMA+ERM (p=0.180), dPED (p=0.730), RPE saw-toothing (p=0.457) or dPED+RPE saw-toothing (p=0.477) between converters and non-convertors. The only significant difference was the mean CRT being thicker in the converters group, 276.39 (SD 46.9) μm, compared to the non-convertors, 257.4 (SD 32.1) μm (p<0.01). The multivariate regression model, which included all studied features, revealed the only significant association with conversion was increasing CRT (p=0.01).

**Conclusions:** The presence of vitreomacular interface abnormalities or outer retinal features detectable on SD-OCT do not appear to influence conversion to neovascular AMD in high-risk patients. This study validates that increasing CRT values continues to be the most important, and conveniently most robust, SD-OCT parameter useful for monitoring those with high-risk non-neovascular AMD.

**Commercial Relationships:** Gary Yau, None; Lisa Jagdan, None; Sanjay Sharma, Alcon (F), Allergan (F), Bausch and Lomb (F), Bayer (F), CHIR (F), Genentech (F), Health Canada (F), Novartis (F)

**Program Number:** 1110 Poster Board Number: B0248
**Presentation Time:** 3:15 PM–5:00 PM
**Outcomes of Sustained Perfluoro-n-octane Tamponade for Retinal Detachment Associated with Giant Retinal Tear**

Dustin Pomerleau1, Mei Hong Tan2, 3, Jane Huan-Ling Lock2, Timothy Isaacs2, 3, Ian McAllister2, 3.

1University, Kingston, ON, Canada; 2Epidemiology, Queen’s University, Kingston, ON, Canada; 3Department of Ophthalmology, Royal Perth Hospital, Perth, WA, Australia; 4Centre for Ophthalmology and Visual Science, Lions Eye Institute, Perth, WA, Australia.

**Purpose:** To assess the outcomes and potential complications of sustained tamponade with perfluoro-n-octane (PFO) in retinal detachment cases involving giant retinal tears (GRT).
Methods: 168 charts from 2 centers were retrospectively reviewed, and cases involving sustained PFO tamponade were evaluated for inclusion. 26 eyes met inclusion criteria, with a primary diagnosis of rhegmatogenous retinal detachment, presence of a GRT (≥ 3 clock-hours), and 12 months of follow-up. Treatment consisted of a primary vitrectomy, PFO tamponade and endolaser followed by postoperatively predominantly supine positioning. Patients were evaluated at 1 week and 1, 3, 6, and 12 months. Primary treatment success was defined as anatomical attachment at 12 months without need for additional surgery after PFO removal.

Results: Mean presenting visual acuity (VA) for patients with quantifiable vision was 0.40 logMAR, with 13 (50%) presenting macula-on and 13 (50%) presenting macula-off. 18 Eyes were phakic, 7 were pseudophakic and 1 was aphakic. 20 (77%) eyes had GRTs involving inferior quadrants, and 6 (23%) had superior GRTs not extending below the horizontal meridian. The surgical procedure was 20 gauge in 11 (42%) cases and 25 gauge in 15 (58%) cases, and was combined with encircling scleral buckle in 5 (19%) cases. PFO was left in-situ for a mean of 7 days (range 4-18 days). PFO was exchanged for SF6 in 17 (63%) eyes, C3F8 in 5 (19%) eyes, and silicone oil in 4 (15%) eyes. Over 12 months, the primary success rate was 85%, with 4 eyes requiring additional surgery for persistent/ recurrent detachment. Mean VA at 1, 3, 6, and 12 months was 0.52, 0.48, 0.73, and 0.55 logMAR, respectively. Associated findings and adverse events included anterior chamber inflammation in 3 (12%) eyes, IOP elevation (> 22 mm Hg) in 6 (23%) eyes, epiretinal membrane sufficient to warrant surgery in 2 (8%) eyes, prolapse of PFO into the anterior chamber in 1 (4%) eye, and progression of nuclear sclerosis sufficient to warrant cataract surgery in 9 (35%) eyes. Subretinal PFO was not identified in any of the study eyes. There were no instances of retinal slippage.

Conclusions: Short-term (1-2 week) tamponade with PFO is an effective treatment strategy in retinal detachments associated with giant retinal tear. Careful patient selection and close follow-up are required to mitigate potential adverse events.

Commercial Relationships: Dustin Pomerleau, None; Mei Hong Tan, None; Jane Huan-Ling Lock, None; Timothy Isaacs, None; Ian McAllister, None

Program Number: 1111 Poster Board Number: B0249
Presentation Time: 3:15 PM–5:00 PM

Coloboma associated retinal detachment: characteristics, surgical management, and outcomes

Priyanka Kumar, Jonathan E. Sears. Cole Eye Institute, Cleveland Clinic, Cleveland, OH.

Purpose: Colobomas are congenital anomalies caused by incomplete fusion of the optic fissure. The purpose of this study was to evaluate the characteristics, management, and outcomes of coloboma associated retinal detachment.

Methods: The study design was a retrospective chart review of 9 eyes from 8 patients diagnosed with colobomatous retinal detachments who underwent retinal detachment repair. Each patient received complete medical and ophthalmic evaluation.

Results: Patient age ranged from 3 to 32 years. One patient had LENZ syndrome and one patient had CHARGE syndrome. All patients had bilateral colobomas and an associated iris coloboma (9/9). Over half the patients had microphthalmos or microcornea (5/9). Two patients had optic nerve colobomas alone. All detachments were rhegmatogenous. Eight of nine eyes underwent scleral buckling and vitrectomy, while one eye received scleral buckle alone. Silicone oil (SO) was used in 3/9 eyes, SF6 in 5/9, and 1 eye received no tamponade. Locations of retinal breaks were varied and included holes in the intercalary membrane (3/9), peripheral horseshoe tears directly inferior to the coloboma (3/9), giant retinal tear (1/9), or open retinal hole on the optic nerve head (2/9). Six of nine eyes remained attached after initial intervention. Three of nine eyes had recurrent detachment requiring repeat vitrectomy. Of the eyes that received SO, 2/3 detached after SO removal. Eight of nine eyes had colobomas that affected the fovea and never achieved acuity better than 20/200 postoperatively, whereas the sole extrafoveal coloboma-associated detachment improved to 20/25 after surgery.

Conclusions: Patients with large choroidal colobomas may develop retinal detachments from a variety of holes, breaks or tears. Holes in the intercalary membrane require endolaser encircling the coloboma whereas peripheral tears may benefit from scleral buckling. We postulate that inferior horseshoe tears might be related to the location of inferior iris/zonular defects.

Commercial Relationships: Priyanka Kumar, None; Jonathan E. Sears, None

Program Number: 1112 Poster Board Number: B0250
Presentation Time: 3:15 PM–5:00 PM

Outcomes of Retinal Detachment Repair After Scleral Laceration

David C. Reed, Alexander Juhn, Nadim Rayess, Jason Hsu, Allen Chiang. Wills Eye Hospital, Philadelphia, PA.

Purpose: To report the outcomes of retinal detachment (RD) repair following recent scleral laceration repair.

Methods: This retrospective, observational, consecutive case series consisted of patients who underwent RD repair for a retinal detachment that was diagnosed within two weeks of scleral laceration repair at our institution between January 1, 2007 and June 8, 2013. Patients with less than 5 months of follow-up and those with intraocular foreign bodies were excluded.

Results: Twenty patients met inclusion criteria. Five of these cases were deemed inoperable at the time of retina surgery. Among the 15 who had successful primary RD repair, the average follow-up was 23 months (range 5-52). Six had re-detachments requiring additional surgery. The average number of surgeries for RD in this group was 1.6 (range 1-4). At the last visit, 10 of 15 were still attached. The final visual acuities were as follows: better than counting fingers in 3, counting fingers in 5, hand motions in 5, light perception in 1, and no light perception in 1. None of the patients were known to have undergone enucleation or evisceration. No cases of sympathetic ophthalmia developed.

Conclusions: Retinal detachment after scleral laceration carries a grave prognosis, but preservation of the eye was common and attempted repair gave ambulatory vision in over half of patients.

Commercial Relationships: David C. Reed, None; Alexander Juhn, None; Nadim Rayess, None; Jason Hsu, None; Allen Chiang, None

Program Number: 1113 Poster Board Number: B0251
Presentation Time: 3:15 PM–5:00 PM

Preamacular Vitreous Pocket and Traction of the Vitreous Trigger the Maculopathy Associated with Optic Disc Pit

Tadashi Yokoi, Sachiko Nishina, Noriyuki Azuma. Ophthalmology and Laboratory of Cell Biology, Natl Center for Child Hlth and Dev, Setagaya-ku, Japan.

Purpose: Maculopathy associated with optic disc pits (ODP), sometimes causes severe visual loss, usually appears in late childhood or early adulthood. However, it has long been unclear how the disease begins to develop from those ages. We evaluated the relationship between vitreous structure and maculopathy associated with ODP.

Methods: Methods: Six patients (7 eyes) with ODP was diagnosed between July 1990 and May 2013. Fundus photographs and swept-

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source optical coherence tomography (SS-OCT) images were evaluated retrospectively, and the vitreous at the vitreoretinal interface was visualized by reconstructing three-dimensional SS-OCT images. Vitrectomy was performed in the eyes with maculopathy. 

**Results:** Results: In six patients (7 eyes) with OPD, five patients had unilateral disease and one patient was affected bilaterally. The pits were mainly located temporally, and maculopathy, including retinoschisis and retinal detachment, was detected in five eyes associated only with the temporal pits. A flat retinal detachment was observed in four eyes and identified within the vascular arcade except in one eye. A premacular vitreous pocket was observed in all eyes except for one eye without maculopathy. Reconstructing images from SS-OCT clarified the vitreoretinal interface abnormalities around the optic disc and inner arcade area in all eyes. Vitrectomy was performed in four eyes with a retinal detachment to resect the abnormal vitreous traction. A posterior vitreous detachment was created in two eyes. Retinal reattachment was achieved in three eyes, and subretinal fluid receded in one eye. The visual acuity improved in all four eyes.

**Conclusions:** Conclusion: Development of a PVP and strengthening traction on the vitreous due to a congenital abnormality of the vitreoretinal interface may generate the maculopathy associated with ODPs.

**Commercial Relationships:** Tadashi Yokoi, None; Sachiko Nishina, None; Noriyuki Azuma, None

**Program Number:** 1114 **Poster Board Number:** B0252

**Presentation Time:** 3:15 PM–5:00 PM

**The role of thrombin in proliferative vitreoretinopathy**

Jeroen Bastiaans1, Jan C. van Meurs2, Verena C. Mulder2, Petrus M. Van Hagen1, Herbert Hooijkaas3, Willem A. Dik1. 1Immunology, Erasmus MC, Rotterdam, Netherlands; 2Rotterdam Eye Hospital, Rotterdam, Netherlands.

**Purpose:** Proliferative vitreoretinopathy (PVR) is a difficult to treat inflammatory fibrotic disorder complicating retinal detachment.

Understanding of the activating processes involved in PVR is still incomplete. Because breakdown of the outer blood-retinal barrier is one of the first events in PVR development we believe that coagulation proteins may be involved. In recently published studies we demonstrated that factor Xa and, more potently, thrombin induces the production of a broad panel of pro-inflammatory cytokines and growth factors by RPE. This resulted in the differentiation of RPE into a mesenchymal cell type via autocrine PDGF-R signaling. In our current study we demonstrate that thrombin activity is significantly higher in the vitreous of patients with established PVR compared to control groups. We also show that vitreous contributes to PVR-associated changes in RPE cell behavior.

**Methods:** Thrombin activity in vitreous (macular pucker n=8, retinal detachment (no PVR development after 3 months) n=15, retinal detachment (PVR development after 3 months) n=11 and established PVR n=14) was determined with a thrombin-specific substrate (Tes-Gly-Pro-Arg-pNA) in the absence/presence of hirudin, a direct thrombin-inhibitor. RPE cells were cultured with vitreous or thrombin (5 U/ml) in the absence/presence of hirudin. Changes in cytokine and growth factor expression levels were determined by RQ-PCR. Proliferation of RPE was determined with the MTT assay.

**Results:** Thrombin activity was significantly (P < 0.05) higher in vitreous of patients with established PVR compared to all other groups. RPE cells cultured with vitreous of PVR patients showed significantly (P < 0.05) higher mRNA expression levels of cytokines and growth factors like IL6, IL8, PDGFα and PDGFβ, compared to control groups. All increased expression levels of cytokines and growth factors were significantly (P < 0.05) inhibited by hirudin.

Vitreous from all groups did not affect RPE proliferation.

**Conclusions:** Our data clearly imply involvement of thrombin in PVR pathology via activation of pro-inflammatory and pro-fibrotic pathways in RPE. The effects of the vitreous on RPE can be inhibited with a direct thrombin-inhibitor. These data demonstrate that thrombin may therefore be an interesting therapeutic target in the prevention of PVR development.©2014, Copyright by the Association for Research in Vision and Ophthalmology, Inc., all rights reserved. Go to iovs.org to access the version of record. For permission to reproduce any abstract, contact the ARVO Office at pubs@arvo.org.
layers of photoreceptors can be formed in each in vitro-generated retina. In addition we proved that transplantation of ESC-derived photoreceptors is feasible. No appearance of tumour formation was detected after transplantation of sorted photoreceptor cells. Many Crx-GFP-positive cells show the presence of outer-segments, ribbon synapses, and light signal transduction pathway proteins.

Conclusions: These experiments show the feasibility to reliably generate a large quantity of integration-competent photoreceptors from ESCs. A further characterization of the transplanted photoreceptors to reveal their capacity to mediate light stimuli is underway.

Commercial Relationships: Sarah Decembrini, None; Ute Koch, None; Freddy Radtke, None; Alexandre P. Moulin, None; Yvan Arsenijevic, None

Program Number: 1116 Poster Board Number: B0254
Presentation Time: 3:15 PM–5:00 PM
Refractive Outcome after Combined Cataract Surgery and Vitrectomy in Patients with Retinal Detachments
Enikoe Bukaty, Christiane I. Falkner-Radler, Eva Smretschnig, Katharina Krepler, Jessica Spörl, Susanne Binder. Rudolf Foundation Hospital, Vienna, Austria.

Purpose: To evaluate the accuracy of intraocular lensometry and therefore the refractive outcome after combined phacovitrectomy in patients with primary rhegmatogenous retinal detachment (RD).

Methods: This prospective study included 59 patients (24 women and 35 men) with the diagnosis of primary retinal detachment who underwent primary phacovitrectomy in 2012 with an additional gas tamponade. Preoperative intraocular lensometry was performed using the IOL-Master (Carl Zeiss Meditec AG). Exclusion criteria were the following: follow up less than 6 months, multimorbid patients, pseudophakia, previous surgery and silicone oil tamponade. Main outcome measure was the IOL power prediction error (PE). Cofactor analysis included patient demographics, macula status and best corrected visual acuity (BCVA, logarithm of the minimum angle of resolution, log MAR).

Results: Fifty-nine patients (mean age 59, 24 women and 35 men) were enrolled. Thirty-three patients presented with a “macula-on” retinal detachment (57%), whereas 26 patients had a “macula-off” retinal detachment (43%). At the 6 months follow-up, the mean IOL power PE for all 59 patients was -0.07 diopters +/- 0.91 SD. “Macula-on” patients showed a mean IOL power PE error of -0.15 diopters +/- 0.53 SD and “macula-off” patients 0.04 diopters +/- 1.23 SD. Mean BCVA significantly improved from 0.84 log MAR +/- 0.62 SD at baseline to 0.27 log MAR +/- 0.32 SD at the 6 months follow-up.

Conclusions: Phacovitrectomy is a safe and effective procedure with a good refractive outcome for the treatment of patients with retinal detachment. Our results suggest that the IOL power PE does not depend on the macula status.

Commercial Relationships: Enikoe Bukaty, None; Christiane I. Falkner-Radler, None; Eva Smretschnig, None; Katharina Krepler, None; Jessica Spörl, None; Susanne Binder, None

Program Number: 1117 Poster Board Number: B0255
Presentation Time: 3:15 PM–5:00 PM
Fas Apoptotic Inhibitory Molecule 2 (Faim2) prevents retinal detachment induced photoreceptor apoptosis
Mercy D. Pawar, Boris Busov, Jingyu Yao, Qiong-Duon Zheng, David N. Zacks, Cagri G. Besirli. University of Michigan, Ann Arbor, MI.

Purpose: To test the role of Fas Apoptotic Inhibitory Molecule 2 (Faim2), an intrinsic inhibitor of the Fas death receptor apoptotic pathway, on photoreceptor survival after retinal detachment.

Methods: Retina-retinal pigment epithelium (RPE) separation was created in wild type and Faim2 knockout mice by subretinal injection of 1% hyaluronic acid. Level of Faim2 expression was determined in attached and detached retinas by Western blotting. Cell-specific expression of Faim2 was analyzed by immunohistochemistry. Terminal deoxynucleotidyl transferase dUTP nick-end labeling (TUNEL) was performed in wild type and Faim2 knockout retinal sections 1, 3 and 7 days after retina-RPE separation. Photoreceptor survival was quantified in wild type and Faim2 knockout retinas 1 and 2 months after experimental detachment.

Results: Retinal detachment led to rapid increase in Faim2 expression, which was primarily detected in the outer nuclear layer. Compared to wild type animals, Faim2 knockout mice showed increased TUNEL staining of the photoreceptors. Outer nuclear layers of Faim2 knockout retinas were thinner and had decreased number of photoreceptor nuclei 1 and 2 months post-detachment compared with retinas in wild type animals.

Conclusions: Expression of Faim2 protects photoreceptors from retinal-detachment induced, Fas-mediated apoptosis.

Commercial Relationships: Mercy D. Pawar, None; Boris Busov, None; Jingyu Yao, None; Qiong-Duon Zheng, None; David N. Zacks, None; Cagri G. Besirli, None

Program Number: 1118 Poster Board Number: B0256
Presentation Time: 3:15 PM–5:00 PM
Morphology function analysis in drusenoid pigment epithelial detachment
Christoph R. Clemens, Florian Alten, Peter Heiduschka, Nicole Eter. Ophthalmology, University Eye Hospital, Muenster, Germany.

Purpose: To evaluate the impact of drusenoid pigment epithelial detachment (dPED) due to age-related macular degeneration (AMD) on retinal function beyond best corrected visual acuity (BCVA).

Methods: Thirteen eyes of 11 patients with dPED due to AMD were included (age 74 ± 3.2 years). All underwent volume SD-OCT, enhanced-depth-imaging (EDI) SD-OCT, fluorescence angiography and confocal scanning laser ophthalmoscopy (cSLO) infrared (IR) imaging as well as multifocal electroretinography (mfERG) and microperimetry (MP). A new dPED morphology score was introduced containing lesion height, lesion diameter, migration of hyperreflective foci (HRF), presence of vitelliform-like material in the subretinal space or presence of subretinal fluid and localization of the fovea in relation to dPED lesion. Subsequently, the score was correlated to fixation stability, measurements from mfERG and MP. Data were compared to age-matched healthy controls.

Results: Mean BCVA was 0.5 (+0.18). Mean height and mean diameter of dPED were 308 ± 122 μm and 2331 ± 967 μm. Three dPED showed no HRF in cSLO IR images, three displayed mild stage of HRF and seven had severe HRF. Three patients showed subretinal fluid and seven patients showed subfoveal localization of dPED lesion. MP showed a dislocated fixation towards the edge of dPED in four patients. Mean retinal sensitivity in MP and mean amplitudes in mfERG measured in dPED-affected areas differed significantly compared to healthy controls. While no correlation was found between dPED morphology score and BCVA, particularly eyes with a high dPED morphology score revealed distinctly decreased values in functional measurements.

Conclusions: In contrast to BCVA, determination of dPED morphology score offers a quick impression of true functional impairment caused by dPED.

Commercial Relationships: Christoph R. Clemens, Bayer (C), Heidelberg (C), Novartis (C); Florian Alten, Heidelberg (C), Novartis (C); Peter Heiduschka, Novartis (C); Nicole Eter, Allergan (C), Bayer (C), Heidelberg (C), Novartis (C), Pfizer (C)
Purpose: Proliferative vitreoretinopathy (PVR) remains a serious medical problem despite advances in vitreoretinal surgery. Connective tissue growth factor (CTGF) is over expressed in human PVR and is believed to play a key role in development of ocular fibrosis. We have developed a new class of stable, self-delivering RNAi compounds (sd-rxRNA®) that incorporate features of both RNAi and antisense and are spontaneously taken up by cells. Intradermal injection of the CTGF-targeting sd-rxRNA RXI-109 results in robust, dose-dependent, long-lasting reduction of CTGF in a rodent model of dermal wound healing. Silencing of CTGF also impacts myofibroblast differentiation and collagen deposition, both key markers of fibrosis. Previously we evaluated the tissue distribution pattern of fluorescein-tagged RXI-109 in vivo in a rat model of retinal detachment and established uptake throughout the retina in both the presence and absence of retinal detachment. Here we extend these findings by evaluating the in vivo expression profile of CTGF mRNA in detached rat retina over time to determine the optimal time for dosing for future studies.

Methods: Retinal detachments were created in rat eyes on day 0. Retinas were collected on days 1, 3, and 14 post detachment and CTGF mRNA levels were determined by qPCR to establish the typical expression level of CTGF mRNA following retinal detachment.

Results: Following retinal detachment in rat, retinal CTGF mRNA levels were found to increase by 1.3-fold at day 3 and by 1.8-fold 14 days post detachment relative to undetached retina in the contralateral eyes. These data indicate that CTGF is elevated for at least 2 weeks following retinal detachment.

Conclusions: In the rat model of retinal detachment CTGF mRNA levels are upregulated over time. Ongoing studies are focusing on the impact that treatment with RXI-109 has on CTGF mRNA levels post detachment. RXI-109 was administered by intravitreal injection at the time of detachment and CTGF mRNA levels are being evaluated by qPCR. The current results, along with our previous report of specific and extended silencing of retinal genes by sd-rxRNA, supports the potential use of an anti-CTGF treatment for PVR. Future studies will focus on optimizing dose level of RXI-109, evaluating duration of effect and determining if RXI-109 can prevent subsequent scarring and/or detachment in a rat model of PVR.

Commercial Relationships: Lyn Libertine, RXi (E); Geoffrey P. Lewis, None; Gabriel Luna, None; Steven K. Fisher, None; James Cardia, RXi (E); Lakshimipathi Panderrainathan, RXi (E); Karen Bulock, RXi (E); Pamela A. Pavco, RXi (E); Michael Byrne, RXi (E)
by intravitreal administration of XOMA 089 once weekly for 28 days or as a single injection. Rabbit eyes were monitored ophthalmoscopically for four weeks. PVR grade was determined by established classification criteria. At sacrifice, all animals’ eyes were encucléed, fixed, embedded and sectioned for histopathological evaluation.

**Results:** Intravitreal injection of XOMA 089 reduced the clinical stage and severity of PVR including the severity of retinal detachment and formation of intraocular membrane in both dose and time-dependent manner. Administration of XOMA 089 at 5 mg/vitreous significantly reduced PVR grading by 64.3% on Day 28. The disease severity in the affected eye was reduced from a mean score of 4.5 to 2.0 in one experiment and from 3.25 to 1.25 in another experiment. In addition, we found single injection of XOMA 089 is as efficacious in inhibiting PVR as weekly injection of XOMA 089 at the same dose level. Histopathological examinations confirmed the XOMA 089-mediated changes within retinal compartments characterized by decreased fibrosis, degeneration and detachment. Terminal concentrations of XOMA 089 in rabbit vitreous humor showed sustained levels of exposure and the peak concentrations of XOMA 089 in peripheral blood were delayed and significantly lower than those of eyes.

**Conclusions:** Taken together, our results demonstrate that XOMA 089 is effective in treating PVR in this animal model and represents a promising new strategy with the potential to ameliorate PVR in humans.

**Commercial Relationships:**
- Amer Mirza, XOMA (US) LLC (E);
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- Paul Rubin, XOMA (US) LLC (E)

**Program Number:** 1122 Poster Board Number: B0260

**Presentation Time:** 3:15 PM–5:00 PM

**Retinal Pigment Epithelial Changes on Wide-Field Fundus Autofluorescence and Swept-Source Optical Coherence Tomography Imaging After Successful Retinal Detachment Surgery**

Kenneth Yau, Maria Gil Martinez, Salvador Pastor, Yianna Antoniou, Tsveta Ivanova, Assad Jalil, Jose Luis Vallejo-Garcia, Stephen Charles, Rita Mclaughlan, Paulo E. Stanga

1. Ophthalmology, Manchester Vision Regeneration (MVR) Lab at NIHR/Wellcome Trust Manchester CRF and Manchester Royal Eye Hospital, Manchester, United Kingdom; 2. Manchester Academic Health Science Centre and Centre for Ophthalmology and Vision Research, Institute of Human Development, University of Manchester, Manchester, United Kingdom

**Purpose:** To analyse retinal pigment epithelium (RPE) and neuroretinal (NR) changes on Wide-Field Fundus Autofluorescence (WF-FAF) and Swept-Source Optical Coherence Tomography (SS-OCT) imaging after successful rhegmatogenous retinal detachment (RD) surgery.

**Methods:** Retrospective, non-interventional study. We analysed the images of 15 patients (8 male, 7 female) who underwent RD surgery. All patients were post-operatively imaged using wide-field colour and fundus autofluorescence (200TX®, Optos plc.) and 1,050nm SS-OCT (Atlantis Deep Range Imaging OCT1®, Topcon Inc.). All images were analysed by two independent observers.

**Results:** Mean age was 59 years (Range: 26-82). The macula was preoperatively detached in 8 eyes and attached in 7. Eleven patients (73%) underwent 23G pars plana vitrectomy (PPV) surgery with endolaser and intracocular injection of gas; cryotherapy was also used in 6 (55%) of these patients. Four patients (27%) underwent cryobuckel surgery. Post-operative vision improved in all patients. Reported post-operative symptoms were: metamorphopsia (1) and central blurred vision (8). Macular relative hypo-autofluorescence was present postoperatively in 4 patients with pre-operative macula OFF RD and postoperative blurred vision and in 1 patient with pre-operative macular ON and post-operative improvement of vision. Relative macular hyper-autofluorescence was present postoperatively in 9 patients. A pattern of “patchy” relative autofluorescence was present in one eye with postoperative metamorphopsia. SS-OCT showed discontinuation at the junction of the inner and outer segment of the photoreceptor (IS-OS) line in 7 patients. (SEE TABLE)

**Conclusions:** Wide-Field Fundus Autofluorescence and Swept-Source OCT imaging following RD surgery can be useful for evaluating RPE function and changes in the neuroretina, thus explaining visual outcome. Further studies are required to look for pre-operative markers of post-operative improvement in vision.

**Commercial Relationships:**
- Kenneth Yau, None; Maria Gil Martinez, None; Salvador Pastor, None; Yianna Antoniou, None; Tsveta Ivanova, None; Assad Jalil, None; Jose Luis Vallejo-Garcia, None; Stephen Charles, None; Rita Mclaughlan, None; Paulo E. Stanga, Allergan plc (C), Allergan plc (R), Bausch & Lomb Inc. (C), Bausch & Lomb Inc. (F), Bausch & Lomb Inc. (R), Bayer AG (C), Bayer AG (R), Novartis AG (C), Novartis AG (R), Optos plc (C), Optos plc (F), Optos plc (R), Thombougenics Inc. (C), Thombougenics Inc. (R), Topcon Corp. (C), Topcon Corp. (F), Topcon Corp. (P), Topcon Corp. (R)

**Program Number:** 1123 Poster Board Number: B0261

**Presentation Time:** 3:15 PM–5:00 PM

**Intravitreal aflibercept for the treatment of macular edema associated with radiation retinopathy**

Kimberly Hsu, Sam Pistorius, James Earl, Mouhammed Abuaittieh, David Chin Yee, Prabakar K. Rao. Ophthalmology, Washington University in St Louis, St Louis, MO

**Purpose:** To report the study design and interim results of a phase I clinical trial of intravitreal aflibercept injection (IAI) in the treatment of macular edema associated with radiation retinopathy.

**Methods:** This is a phase 1, double masked, randomized clinical trial to assess IAI in the treatment of patients with macular edema associated with radiation retinopathy. Twenty patients with retinopathy associated with previous brachytherapy for uveal melanoma will be randomized and included in the study. Patients will receive 3 initial monthly doses of IAI followed by randomization to receive an injection either every 4 weeks or every 8 weeks. Patients will be followed for 12 months. Primary outcome measures include incidence and severity of adverse events, and secondary outcome measures include mean change in visual acuity, mean change in central foveal thickness by OCT, and mean change in macular volume by OCT.

**Results:** Three patients are currently enrolled in the study. One patient had a Grade 1 adverse reaction of nausea/syncope during...
an injection. The other two patients had no adverse events. The patients enrolled currently have a follow up of 9 months, 5 months, and 2 months. Visual acuity improved in all subjects, from 20/100 to 20/50, 20/125 to 20/40, and 20/30 to 20/20, respectively. Mean central foveal thickness and macular volume by OCT were also both improved in all subjects.

**Conclusions:** This is an ongoing, phase I, double blinded, randomized, active controlled study for intravitreal aflibercept in the treatment of macular edema associated with radiation retinopathy. Based on this interim data, IAI may be an option for these patients. There is currently no approved therapy for radiation retinopathy, and this trial will be an important step toward assessing the feasibility of treatment with intravitreal aflibercept.

**Commercial Relationships:** Kimberly Hsu, Regeneron Pharmaceuticals (F); Sam Pistorius, Regeneron Pharmaceuticals (F); James Earl, Regeneron Pharmaceuticals (F); Mouhammed Abuattieh, Regeneron Pharmaceuticals (F); Prabakar K. Rao, Regeneron Pharmaceuticals (F)

**Support:** Regeneron Pharmaceuticals grant

**Clinical Trial:** NCT01579760

**Program Number:** 1124 Poster Board Number: B0262

**Presentation Time:** 3:15 PM – 5:00 PM

**Bivariate contour ellipse area (BCEA) variability: comparison of two methods for recording.**

Vittoria De Rosa, Leopoldo Spadea, Serena Fragiotta, Alessandro Cutini, Cristina Diana, Michela Marcelli, Enzo M. Vingolo, Department of Medical–Surgical Sciences and Biotechnologies, U.O.S. Ophthalmology, University “Sapienza” of Rome, Terracina, Italy.

**Purpose:** To compare bivariate contour ellipse area (BCEA) values obtained using two different methods to calculate fixation stability.

**Methods:** 57 healthy subjects (57 eyes) and 54 age related macular degeneration (AMD) patients (54 eyes) were enrolled to perform two consecutive examinations, fixation test before and during microperimetry, using MP-1 microperimeter (Nidek Technologies, NAVIS software version 1.7.6).

Fixation stability was quantified by calculating the BCEA obtained during a 30 second fixation test. A 2° red cross was used as fixation target. Micropemetric examination was performed using the same target of fixation test, Humphrey 10 to 2 grid of 68-loci grid, stimuli Goldmann III with a projection time of 200 ms, white background illumination of 4 asb (1.27 cd/m²), and a 4-2 staircase strategy. BCEA (deg²) was normalized by logarithmic transformation (Shapiro-Wilk test, p<0.05). Statistical analysis was performed using paired t-test and a Bland-Altman analysis to assess the reliability of measurements. Statistical significance was set at P < 0.05.

**Results:** In healthy subjects, mean log BCEA recorded during fixation test was significantly smaller than microperimetry examination (P<0.001, in all three standard deviations). Also in AMD group there was a highly significant differences between the two methods of recording BCEA (P<0.001, in the 3 standard deviations). The Bland Altman plot analysis that demonstrates there were not agreement between two methods of quantifying BCEA.

**Conclusions:** BCEA calculated with fixation test is significantly smaller respect to micropemetric examination. This is probably due to short duration and the ease of performance of the fixation test, whereas micropemetric BCEA may be influenced by the duration of examination and by the projection of the stimuli at different locations. In AMD patients to detect changes in fixation stability is important to use the same method during follow-up. Finally, fixation test seems to have less variability than micropemetric examination.
Methods: Experimental, cross-sectional, comparative, prospective for quantification of IL2, IL4, IL6, IL10, TNF-α, IFN-γ Study in vitreous samples of 13 controls (RRD), 3 (PVR A), 5 (PVR B), 4 (PVR C) with flow cytometry.

Results: All groups showed activation of IL-2, average control group (CG) 9.02pg/mL against 9.45pg/mL in study groups. IL-4, CG 6.53pg/mL against (Group A : 5.75pg/mL, 6.40pg/mL Group B, Group C 7.21pg/mL), although no statistical significance was shown with an upward trend in PVR. Concentration of IL-6 and IL-10 is present in all groups and was not statistically significant. The final concentration of TNF-α, in CG against all study groups (p> 0.05), PVR A against PVR C (p> 0.05), PVR A versus PVR B (p> 0.05), between group B and C, no statistically significant difference was obtained.

Conclusions: This study observed an increase of TNF-α in PVR grades. An expansion the sample is required to identify TNF-α as responsible for the genesis of PVR.

Commercial Relationships: Juan Pablo Davila, None; Abel Ramirez, None; Atzin Robles, None