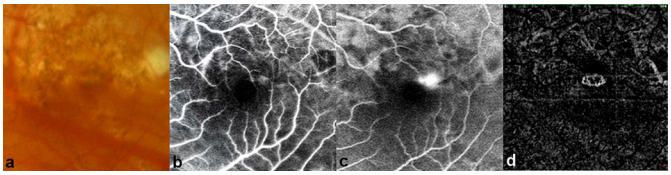
547 Myopic CNV and CSCR
Thursday, May 11, 2017 11:30 AM–1:15 PM
Exhibit/Poster Hall Poster Session
Program #/Board # Range: 5917–5941/B0653–B0677
Organizing Section: Retina

Program Number: 5917 **Poster Board Number:** B0653
Presentation Time: 11:30 AM–1:15 PM
Clinical Use of Optical Density Ratio in determining the Prognosis of Central Serous Chorioretinopathy
Jae Yon Won, Young- Hoon park. The Catholic University of Korea, Seoul, Korea (the Republic of).
Purpose: To evaluate prognostic factors of Central Serous Chorioretinopathy by using initial OCT findings
Methods: A total of 79 participants with new onset CSC (<1 month) from Jan 2014 to Aug 2015 was included.
Spectral-domain optical coherence tomography (SD-OCT) images of SRF were analyzed. The optical density was measured by Image J. The optical density ratios were mesured from the SRF to vitreous, retinal pigment epithelium, and retinal nerve fiber layer reflectivity ratios.
The best corrected visual acuity (BCVA), thickness, and volume were recorded from the medical records through a retrospective review.
Results: Optical density ratios of SRF to the vitreous was significantly higher in patients with acute CSC than in those with chronification of CSC.
Initial Optical density ratios of SRF to the vitreous over 3.687 is suggestive of progression to chronification of CSC (sensitivity 93.9%, specificity 86.7%).
The Optical density ratios of SRF to the vitreous of post-treatment was significantly smaller after PDT and intravitreal injection in patients with chronification of CSC.
Conclusions: By using initial OCT findings, we could predict the prognosis (chronification) of CSC, but further evaluation is needed. Changes in ODR before and after treatment may be used to evaluate the effectiveness of treatment of chronication CSC (esp, PDT or intravitreal injection).
Commercial Relationships: Jae Yon Won;
Young- Hoon park, None

Program Number: 5918 **Poster Board Number:** B0654
Presentation Time: 11:30 AM–1:15 PM
OCT Angiography versus FAG in myopic CNV
Klaus Wehrmann, Katharina Ruether, Nikolaus Feucht, Chris Lohmann, Mathias M. Maier. Department of Ophthalmology, TU Munich, Germany, Munich, Germany.
Purpose: For diagnosis of myopic choroid neovascularisation (mCNV) in eyes with high myopia fluorescein angiography (FAG) is the current gold standard. Due to the specific anatomy of highly myopic eyes, high-quality images are often difficult to generate, and challenging with time-sensitive recording techniques (FAG). The purpose of this essay was to compare mCNV imaging with FAG with optical coherence angiography (OCT-A) and describe the advantages and disadvantages.
Methods: 14 eyes with mCNV were examined on the same day with FAG and OCT-A. Then the recordings were compared with one another and compared according to the following criteria: quality of imaging, mCNV detectable, mCNV vessels can be demarcated, activity can be assessed (leakage in FAG vs. flow in OCTA, aided by SD-OCT)
Results: Of the 14 eyes, 2 could not be used in OCT-A due to poor imaging quality. In these cases, snapshot of leakage were possible during late phase FAG.
In 10 eyes, a diffuse CNV complex with leakage was visible in FAG and a corresponding areas with increased flow were visible in 9 eyes with OCT-A. In one case, the CNV complex was very small and could only be determined clearly in late phase FAG thanks to leakage, while in OCT-A we were not able to separate the CNV network from the physiological choroid flow.
Demarcated vessels were only visible in one case with FAG versus 6 in OCT-A (see example in annex).
Signs of activity were detectable in FAG with all 14 eyes. In OCT-A pathological flow detection was measurable in 11 cases and corresponded to FAG findings.
Conclusions: OCT-A allows an accurate assessment of mCNV in patients with high myopia, often superior in the presentation of blood vessel networks compared to FAG. Since OCT-A allows a layered presentation of the retinal vessels, in myopic eyes with large atrophy areas, clear imaging without choroid blooming is possible. In 11 out of 14 cases OCT-A allowed a precise diagnosis, with similar relevance for therapy decisions. In the future the detailed vascular demarcation provided by OCT-A might be a precise and fast follow-up parameter for the diagnosis of mCNV.
However OCT-A alone does not appear to be a sufficient diagnostic tool in all cases of mCNV and thus should be used in combination with SD-OCT and FAG in challenging cases. Technical advances as well as the unlimited ability to repeat acquisition can partially compensate for these disadvantages.



a: native fundus
b: FAG early phase
c: FAG late phase
d: OCT-A outer retina
Commercial Relationships: Klaus Wehrmann, None; **Katharina Ruether**, None; **Nikolaus Feucht**, None; **Chris Lohmann**, None; **Mathias M. Maier**, None

Program Number: 5919 **Poster Board Number:** B0655
Presentation Time: 11:30 AM–1:15 PM
Intravitreal bevacizumab for neovascular myopic maculopathy
Julio A. Urrets-Zavalia[1], Dana Martinez[1], Eugenia Gonzalez-Castellanos[1], Fernanda Barros-Centeno[1], Leandro Correa[1], Carla D. Guantay[1], Juan A. Dalmagro[1], Fernanda Suarez[2], Evangelina Esposito[1, 3], Horacio M. Serra[2].
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Purpose: Pathological myopia is observed in about 2% of the general population. Submacular choroidal neovascularization is a leading cause of severe visual loss and blindness in eyes with pathological myopia, affecting 4-11% of those eyes. Purpose: Our aim isT to evaluate the efficacy and safety of intravitreal bevacizumab in the treatment of neovascular myopic maculopathy.
Methods: 22 non-previously treated eyes of 22 consecutive patients with neovascular myopic maculopathy were treated with monthly intravitreal injections of bevacizumab and followed up for 12 months. Changes in BCVA and central macular thickness were evaluated at 12 months of follow-up. All patients were evaluated and treated by the

same physician. Wilcoxon test for paired variables, Mann Whitney for independent variables, and Student test for continuous variables, were used for statistical analysis.
Results: Mean age was 54.45± (SD 12.30; (r= 28.00 – 79.00); 7 patients (31.8%) were male and 15 (68.2%) female. Mean spherical equivalent refractive error was -10.89±4.13 (r= -7.00 to -21,00) Mean time elapsed between initial symptoms and the beginning of treatment was 38.68± (SD34.63) days. Patients received a mean of 4.27± (SD 1.86; (r=2.00 to 9.00) injections. Most injections were performed during the first 6 months of treatment (mean 3.36±1.22 months; SD 1.22; r=1.00 to 6.00). Median BCVA at baseline was 1.00 (P25-75=0.40-1.00) and at 12 months 0.45 (P25-75=0.30-0.70) ($p<0.0001$). Significant visual improvement was observed between the first (median=1.00, IQR= 0.6) and the third month of treatment (median=0.60, IQR=0.6) ($p=0.0002$), with no further significant improvement ($p=0.09$). No ocular or systemic side effects attributable to treatment were observed.
Conclusions: Bevacizumab was effective and safe in our series of myopic patients with neovascular maculopathy, and visual gain remained stable during follow-up.
Commercial Relationships: Julio A. Urrets-Zavalia, None; **Dana Martinez**, None; **Eugenia Gonzalez-Castellanos**, None; **Fernanda Barros-Centeno**, None; **Leandro Correa**, None; **Carla D. Guantay**, None; **Juan A. Dalmagro**, None; **Fernanda Suarez**, None; **Evangelina Esposito**, None; **Horacio M. Serra**, None

Program Number: 5920 **Poster Board Number:** B0656
Presentation Time: 11:30 AM–1:15 PM
Ranibizumab versus verteporfin photodynamic therapy for myopic choroidal neovascularization: Results from RADIANCE
Nathan Steinle[1], Avanti Ghanekar[2], Carlos Quezada-Ruiz[2]. [1]California Retina Consultants, Santa Barbara, CA; [2]Genentech, Inc., South San Francisco, CA.
Purpose: According to Intelligent Research in Sight (IRIS®) Registry data, myopic choroidal neovascularization (mCNV) affected over 41,000 patients in the US in 2014 (Willis JR et al. *Ophthalmology*. 2016;123(8):1771-1782). The previous FDA-approved mCNV treatment of verteporfin photodynamic therapy (vPDT) stabilized visual acuity (VA) without improvement (VIP clinical trial, VIP Study Group. *Ophthalmology*. 2001;108(5):841-852 and VIP Study Group. *Ophthalmology*. 2003;110(4):667-673). The prospective RADIANCE trial, which has received limited attention in the US, directly compared the anti-vascular endothelial growth factor agent ranibizumab (RBZ) to vPDT to investigate which treatment provided the best VA outcomes for patients with mCNV.
Methods: RADIANCE was a phase 3, randomized, double-masked clinical trial conducted in patients with visual impairment due to mCNV. Patients (N=277) were randomized 2:2:1 into 2 RBZ treatment arms and a vPDT arm. Patients treated with RBZ received RBZ 0.5-mg injections on day 1, at month (M1) (required for VA group only), then as-needed based on VA (RBZ-VA, n=106) or disease activity (RBZ-DA, n=116) criteria. In the vPDT arm, patients were treated on day 1 then received RBZ or vPDT after M3 based on disease activity (vPDT, n=55). The primary efficacy end point was mean average best-corrected visual acuity (BCVA) change from baseline to M1 through M3; superiority was achieved at the multiple one-sided alpha-level of 0.001. BCVA outcomes were assessed through M12.
Results: RBZ treatment groups were significantly superior to the vPDT treatment group with respect to mean average BCVA change from baseline to M1 through M3 (RBZ-VA: +10.5, RBZ-DA: +10.6 ETDRS letters versus vPDT: +2.2 ETDRS letters; both $P<0.00001$). The mean BCVA change from baseline to M12 in the RBZ-VA, RBZ-DA, and vPDT with RBZ rescue injection arms was +13.8, +14.4, and +9.3 ETDRS letters, respectively. The median number of RBZ injections by M11 were 4.0 (RBZ-VA), 2.0 (RBZ-DA), and 2.0 (vPDT/RBZ). By M12, no deaths or endophthalmitis occurred in any treatment arm.
Conclusions: RBZ treatment guided by disease activity criteria or BCVA stability criteria was superior to vPDT for vision loss due to mCNV. Clinically significant BCVA gains were achieved and maintained through M12 with as-needed treatment in the RBZ-VA and RBZ-DA arms (median 2.0-4.0 number of RBZ injections through M12).
Commercial Relationships: Nathan Steinle, Regeneron (S), Alimera (C), Regenerative Patch Technologies (C), Genentech, Inc. (F), Zeiss (F), Genentech, Inc (C); **Avanti Ghanekar**, Genentech, Inc (F); **Carlos Quezada-Ruiz**, Genentech, Inc (F)
Support: Genentech, Inc., South San Francisco, CA, provided support for the study and participated in the study design; conducting the study; and data collection, management, and interpretation.
Clinical Trial: NCT01217944

Program Number: 5921 **Poster Board Number:** B0657
Presentation Time: 11:30 AM–1:15 PM
Comparative proteomic analysis of idiopathic epiretinal membrane and internal limiting membrane
Christos Christakopoulos[1], Lasse J. Cehofski[2], Steen Rugaard Christensen[1], Henrik Vorum[2], Bent Honoré[3]. [1]Ophthalmology, Zealands University Hospital, Naestved, Denmark; [2]Aalborg Hospital, Aalborg, Denmark; [3]Department of Biomedicin, Aarhus, Denmark.
Purpose: Few data exist regarding the protein composition of idiopathic epiretinal membranes. In the present study we compared the proteome of epiretinal membrane of idiopathic epiretinal membrane (iERM) to the proteome of the internal limiting membrane (ILM) of idiopathic macular hole (iMH).
Methods: The study was approved by the Zealand Region Committee on Health Reasearch Ethics (permission identification SJ-393), and adhered to the tenets of Helsinki declaration. Twelve samples of idiopathic epiretinal membrane and 12 samples of internal limiting membrane were obtained from patients during therapeutic vitrectomy. The samples were analyzed with nano-liquid chromatography tandem mass spectrometry. The retrieved data files were used to search against human protein database from UniProt using Max Quant Software. Identified proteins were filtered with Perseus software. Perseus was also used to conduct a student's t-test with a permutation based false discovery rate (FDR). ConsensusPathDB was used for bioinformatic analysis.
Results: A total of 2,183 different proteins were identified. Amongst the 357 proteins identified in all samples 70 proteins were significantly increased in content ($p<0.05$, FDR < 0.01) in iERM. Upregulated proteins in epiretinal membranes were components of the cytoskeleton or played a role in signal transduction, inflammation and cellular metabolism. Upregulated pathways in iERM included platelet derived growth factor receptor beta signaling pathway, beta 1 and beta 3 integrin cell surface interactions and leukocyte transendothelial migration. In total 11 proteins were significantly increased in content in ILM of macular holes ($p<0.05$, FDR < 0.01) comprising mainly proteins involved in cellular adhesion, proliferation and differentiation. Principal component analysis as well as cluster analysis showed that iERM and ILM of iMH were generally different.
Conclusions: Epiretinal membrane in iERM consists of different proteins than ILM in patients with iMH.

The differences between the two conditions were statistically significant. The study identified proteins that have not earlier been associated with iERM. Proteins increased in iERM were involved in signal transduction, integrin signaling and inflammatory processes.
Commercial Relationships: Christos Christakopoulos, None; **Lasse J. Cehofski**, None; **Steen Rugaard Christensen**, None; **Henrik Vorum**, None; **Bent Honoré**, None

Program Number: 5922 **Poster Board Number:** B0658
Presentation Time: 11:30 AM–1:15 PM
Ocular perfusion pressure and choroidal thickness in central serous chorioretinopathy
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Purpose: To investigate the ocular perfusion pressure (OPP) and choroidal thickness (CT) in patients with central serous chorioretinopathy (CSC).
Methods: In this retrospective study, consecutive patients with CSC were classified into two groups with pigment epitheliopathy (PE group) or without PE (non-PE group) in their fellow eyes. PE was defined as any of the following, semicircular or irregular flat pigment epithelial detachment (PED) or retinal pigment epithelial protrusion, is visible on the 6 x 6 mm zone of macular on optical coherence tomography. We compared systemic and ocular factors among patients groups and age-matched normal controls. The mean OPP was obtained from BP and intraocular pressure (IOP). OPP was calculated from mean arterial pressure (MAP) and IOP using the following formula, Mean OPP = 2/3 x MAP – IOP. The MAP was obtained from systolic blood pressure (SBP) and diastolic blood pressure (DBP) with a following formula, MAP = DBP + 1/3(SBP – DBP). CT was measured at the center of fovea, 500 μm, 1000 μm and 1500 μm from nasally and temporally and the mean of these values were defined as mean macular CT.
Results: We included 94 eyes of 47 CSC patients and 47 eyes from normal controls. Of 47 patients, 21 (44.7%) patients were classified into PE group and 26 (55.3%) into non-PE group. Age and sex were not different among patient groups and normal controls. However, PE group had higher prevalence of prehypertension than non-PE group or normal control group ($P = 0.043$). Mean OPP of CSC and fellow eyes in group PE (50.02 ± 4.98 and 50.83 ± 4.12 mmHg) were greater than that of non-PE group (43.69 ± 6.88 and 44.0 ± 6.57 mmHg) and normal controls (45.64 ± 8.73 and 45.64 ± 8.73 mmHg) (all, $P < 0.05$). Mean macular CT of CSC and fellow eyes in PE group was thicker than that of non-PE group ($P = 0.028$ and $P = 0.014$). In multivariate analysis, greater macular CT and higher OPP were associated with the PE on fellow eyes ($P = 0.002$, OR = 1.043 and $P = 0.003$, OR = 1.315, respectively).
Conclusions: Thicker choroid and higher OPP were associated with the PE on fellow eyes of CSC patients. Increased OPP might contribute the bilateral characteristics of CSC.
Commercial Relationships: Cheolmin Yun, None; **Jaeryung Oh**, Topcon (C); **Seong-Woo Kim**, None; **Jun Ho Yoo**, None
Support: This material is based upon work supported by the Ministry of Trade, Industry & Energy (MOTIE, Korea) under Industrial Technology Innovation (10063364)

Program Number: 5923 **Poster Board Number:** B0659
Presentation Time: 11:30 AM–1:15 PM
Systemic complement activation in central serous chorioretinopathy
Elon Van Dijk[1], Ngaisah Klar[3], Roula Tsonaka[3], Eiko de Jong[2], Cees van Kooten[3], Camiel J. Boon[1]. [1]Ophthalmology, Leiden University Medical Center, Leiden, Netherlands; [2]Ophthalmology, Radboud University Medical Center, Nijmegen, Netherlands; [3]Leiden University Medical Center, Leiden, Netherlands.
Purpose: Several variants in genes involved in the complement system have been described to be associated with chronic central serous chorioretinopathy (cCSC). Previously, systemic activation of the complement system in age-related macular degeneration, a disease that shows clinical features that overlap with CSC, has been found. With this case-control study, we assessed whether there is a systemic activation of the complement system in patients with cCSC.
Methods: A prospective cohort study of 77 typical cCSC patients and 31 age- and gender-matched controls without ophthalmological history. Either in serum or plasma, hemolytic complement assays (AP50, CP50, and LP50), complement components C3, C4, CFB, CFH, and CFI and C3d, C5a and C5b-C9 (activation products), and the C3d/C3 ratio were analysed. A correction for possible effects of gender, age, body mass index, and smoking status was performed.
Results: Before performing the Bonferroni correction for multiple testing, activation of the classical complement pathway (p=0.049) and C5a (p=0.012) were associated with cCSC. However, after performing this correction, none of the tested variables proved to be statistically significantly different between the included groups.
Conclusions: Despite the available literature regarding a possible relationship between cCSC and variants in genes involved in the complement system, the current study did not find evidence that cCSC is associated with systemic complement activation.
Commercial Relationships: Elon Van Dijk, None; **Ngaisah Klar**, None; **Roula Tsonaka**, None; **Eiko de Jong**, None; **Cees van Kooten**, None; **Camiel J. Boon**, None

Program Number: 5924 **Poster Board Number:** B0660
Presentation Time: 11:30 AM–1:15 PM
Combined Alpha-1 and Beta Adrenergic Blockade for Recurrent or Severe Central Serous Chorioretinopathy
Cyrus Golshani[1], Patricia J. Pahk[2], Steven A. Teich[1], Dalia S. Nagel[1], Alan H. Friedman[1]. [1]Ophthalmology, Icahn School of Medicine at Mount Sinai, New York, NY; [2]Ophthalmology, Stony Brook University Hospital, Stony Brook, NY.
Purpose: No treatment is of proven efficacy for central serous chorioretinopathy (CSC) patients with frequent recurrences or the chronic severe variant with diffuse pigment epitheliopathy and chronic subretinal fluid. There is clinical and experimental evidence of autonomic nervous system dysfunction with sympathetic system over activity in CSC but questionable efficacy of beta adrenergic blocking agents. We evaluated the use of labetalol in a prospective series to test the hypothesis that combined alpha-1 and beta-1 and 2 blockade could reduce the number and duration of episodes of CSC.
Methods: A total of 5 patients were included. 4 patients had frequent recurrent disease and 1 had the chronic severe variant with pigment epitheliopathy and subretinal fluid bilaterally. All findings were confirmed by fluorescein angiography and/or OCT. Subjects were all male with ages ranging from 44 to 52 years old at presentation. Treatment was initiated with labetalol, an alpha-1 and beta-1 and 2 adrenergic blocking drug which has been shown to have increased affinity for melanin in the retinal pigment epithelium and choroid. All patients had received medical clearance by their internist prior to initiating labetalol.

Results: All 5 patients had improvement in vision with resolution of neurosensory retinal detachments, reduced or no frequency of recurrences, and absence of leakage on fluorescein angiography. Duration of therapy ranged from 2.5 months to 10 years. 1 patient had a positive challenge, de-challenge, and re-challenge with labetalol. 3 patients had side effects of lethargy. 1 patient discontinued the drug and 1 continued at a reduced dosage. Follow-up ranged from 8.5 months to greater than 10 years at last visit.
Conclusions: The results of this prospective series support the hypothesis that some patients with CSC have an underlying autonomic nervous dysfunction with sympathetic system over activity that may be amenable to pharmacologic therapy. CSC episodes may be triggered by other factors that exacerbate this dysfunction. These may include psychological stress, use of adrenergic agents, exogenous or endogenous corticosteroids, sleep disorders, pregnancy, or other factors. Blockade of both alpha-1 and beta adrenergic receptors therefore seems to be a rational approach to treat patients with frequent recurrences or the severe variant. We believe this treatment is worthy of further investigation.
Commercial Relationships: Cyrus Golshani, None; **Patricia J. Pahk**, None; **Steven A. Teich**, None; **Dalia S. Nagel**, None; **Alan H. Friedman**, None

Program Number: 5925 **Poster Board Number:** B0661
Presentation Time: 11:30 AM–1:15 PM
Association between *CFH* variants and choroidal thickness in central serous chorioretinopathy
Akiko Miki[1], shigeru honda[1], Yoichi Sakurada[3], kohji tanaka[2], Yoshinori Mitamura[4], Makoto Nakamura[1]. [1]Ophthalmology, Kobe University Graduate School of Medicine, Kobe, Japan; [2]Ophthalmology, Department of Visual Sciences, Nihon University School of Medicine, Chiyoda-Ku, Japan; [3]Ophthalmology, Yamanashi university, Chuo, Japan; [4]Ophthalmology, Institute of Health Biosciences, The university of Tokushima Graduate School, Tokushima, Japan.
Purpose: We previously reported the association between central serous chorioretinopathy (CSC) and complement factor H (*CFH*) gene variants. In this study, we analyze the association between the choroidal thickness (CCT) in eyes with CSC and *CFH* gene variants.
Methods: Patients were recruited from four collaborating hospitals in Japan including Kobe university hospital. One hundred and seventy two eyes of 172 patients (men 77.9%) were enrolled. The average age (mean±SD) was 53.8±11.1years. We manually measured CCT on SD-OCT taken by enhanced depth imaging technique. Genotyping of five single nucleotide polymorphisms (SNPs) including *CFH* I62V (rs800292), *CFH* (rs3753394, rs2284664, rs1329428, rs1065489), which we previously reported, were conducted using Taqman technology.
Results: The average CCT (mean±SD) in patients with CC genotype of rs2284664(C/T) was 425.1±139.9mm, 388.4±140.8 mm in patients with CT+TT genotype. There was a significant difference between 2 groups (p=0.043). There was no significant difference in the CCT among genotypes of other 4 snps.
Conclusions: It is suggested that rs2284664 in *CFH* region may effect the CCT in patients with CSC.
Commercial Relationships: Akiko Miki; **shigeru honda**, None; **Yoichi Sakurada**, None; **kohji tanaka**, None; **Yoshinori Mitamura**, None; **Makoto Nakamura**, None

Program Number: 5926 **Poster Board Number:** B0662
Presentation Time: 11:30 AM–1:15 PM
Subthreshold 577 nm micropulse laser for the treatment of Chronic Central Serous Chorioretinopathy (CCSC)
Feria Estephania. retina, Asociacion para evitar la ceguera en mexico, Mexico City, Mexico.
Purpose: To evaluate the effect of subthreshold micropulse laser (SMP) in eyes with CCSC.
Methods:
A consecutive series of patients with CCSC who consulted to Asociacion para Evitar la Ceguera en Mexico who had undergone treatment with SMP yellow laser were retrospectively analyzed between September 2015 to October 2016. Patients with an idiopathic serous macular detachment of the neurosensory retina on optical coherence tomography (OCT) and with a focal or diffuse leak at the level of the RPE on FA were included. These patients had been observed for a minimum period of 3 months for spontaneous resolution and then given SMP yellow laser treatment. All patients had undergone BCVA, OCT and FA before laser therapy with SMP using a 577nm laser (Iridex, Mountain View, CA) with 5% duty cycle, power of 450 mW, exposure duration 200 ms, high density, and spot size of 200 µm, confluent applied to all areas of leakage or subretinal fluid. Laser was delivered using an automated grid to cover the whole macular area. It is important to emphazise that we noted that the maximal subretinal fluid height was not always central. Hence, we manually measured the maximal height of the fluid on the OCT images and used it to assess the treatment outcome. Clinical examination, OCT and FA were performed at 1 and 3 months after treatment.
Results: 12 eyes of 11 patients were included. All eyes responded to SMP treatment. The mean best-corrected visual acuity measured 6 months after laser treatment was 3.9 Snellen lines (P<0.015). Mean BCVA showed stabilization at 4 months after SMP. Mean foveal thickness improved from 340.50µm before SMP to 160.50µm after SMP (P<0.002, paired t-test). One patient required additional SMP. Average resolution of leakage was 3 months. There was no evidence of RPE or retinal damage on OCT or FA.
Conclusions: We have the largest consecutive series of patients in the literature treated with SDM. This therapy may be a useful treatment modality for idiopathic CCSC. Its inherent property of using less energy, and thus, minimizing chorioretinal disruption, is appealing. However, randomized controlled trials are needed to establish long-term efficacy and to identify which patients may benefit most from this treatment. SDM is in fact superior to alternative treatment approaches.
Commercial Relationships: Feria Estephania, None

Program Number: 5927 **Poster Board Number:** B0663
Presentation Time: 11:30 AM–1:15 PM
Topographic correlation of retinal pigment epithelial detachment to choroidal filling defects in central serous chorioretinopathy
Juan Lyn Ang[1], Jocelyne Rivero Alvarez[1], Chandra Bala[2], Kanishka R. Mendis[1]. [1]Canberra Hospital, Canberra, ACT, Australia; [2]Royal Perth Hospital, Perth, WA, Australia.
Purpose: Choroidal filling defects (CFD) and retinal pigment epithelial detachments (PED) have been reported to be associated with central serous chorioretinopathy (CSC).
The localized shut down of the choriocapillaris (CC) could lead to an alteration in the trans-retinal pigment epithelium (RPE) hydrostatic pressure differential, affect the hydraulic conductivity, and lead to a delamination of the RPE from the Bruch's membrane causing a PED. There is paucity, in the literature correlating the topography of the PED with CFD.

Methods: This was a retrospective study. All consecutive patients diagnosed with CSC using optical coherence tomography (OCT) and fluorescein angiography (FA) at the retinal service at Canberra Hospital, Australia between 2012-2016 were included. Patients with poor quality images and those with exudative maculopathy due to choroidal neovascularisation secondary to CSC were excluded. CSC diagnosis was confirmed in all selected patients with classic OCT features and typical 'smoke stack', 'inkblot' leak pattern on FA. Patients without the typical FA leak pattern were excluded. CFD was defined as patchy choroidal hypofluorescence that remained hypofluorescent into the late venous phase of the FA. PED was defined as a smooth elevation of the RPE as seen on spectral domain OCT. Topographic relationships between PED location and CFD, as seen on FA, were subsequently determined. The outcome measure was the anatomical correlation of the CFD to PED.
Results: A total of 40 patients were identified and 39 eyes of 36 patients were selected for further investigation. Then mean age was 43.6 years (±9.4 years). There were 32 males and 4 females. Five patients reported a history of steroid use and 10 patients reported stressful life events related to presentation. There were 9 eyes with a smoke stack and 30 eyes with an inkblot RPE leak pattern on FA. There were 32 eyes (82.1%) with a CFD and 13 eyes (33.3%) with a PED. The eyes with PED correlated 100% with CFD.
Conclusions: The degree of topographic correlation of PED to CFD may imply a causative relationship however this result will require further investigation and reproduction.
Commercial Relationships: Juan Lyn Ang, None; **Jocelyne Rivero Alvarez**, None; **Chandra Bala**, None; **Kanishka R. Mendis**, None

Program Number: 5928 **Poster Board Number:** B0664
Presentation Time: 11:30 AM–1:15 PM
Changes in axial length and subfoveal choroidal thickness after photodynamic therapy for central serous chorioretinopathy
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Purpose: To investigate the changes in axial length (AL) and subfoveal choroidal thickness (SCT) after half-dose verteporfin photodynamic therapy (PDT) for central serous chorioretinopathy (CSC).
Methods: This retrospective, observational case series involved 48 eyes (24 CSC eyes and 24 unaffected fellow eyes) of 24 patients (4 females and 20 males; mean age: 55.0+/-10.5 years) with unilateral CSC which showed the disappearance of serous retinal detachment after PDT. CSC was diagnosed using optical coherence tomography (OCT), fluorescein angiography, and indocyanine green angiography. The primary outcomes were the changes before and at 3-months after PDT in AL, SCT and spherical equivalent (SE) in the treated eyes and those in the unaffected fellow eyes. SCT was measured on enhanced depth imaging-OCT (EDI-OCT) images and AL was measured via partial coherence interferometry (IOLMaster; Carl Zeiss Meditec).
Results: The mean AL in the treated eyes increased significantly from 23.85+/-1.11mm at baseline to 24.01+/-1.13mm (P<0.001) at 3-months after PDT, whereas that in the unaffected eyes changed from 24.06+/-1.16mm at baseline to 24.05+/-1.16mm at 3-months after PDT (P=0.118). The mean SCT in the treated eyes decreased significantly from 462+/-70μm at baseline to 391+/-90μm (P<0.001) at 3-months after PDT, whereas that in the unaffected eyes changed from 363+/-95μm at baseline to 366+/-96μm (P=0.479). In the treated eyes, significant elongation of AL (mean change: 0.16+/-0.13mm=160μm; P<0.001; 95%CI: 0.11-0.21) and significant reduction of SCT (mean change: 71+/-44μm; P<0.001; 95%CI: 52-90) were observed at 3-months after PDT. No difference was found at baseline and at 3-months after PDT in regard to SE in both the treated eyes and the unaffected fellow eyes.
Conclusions: A distinct difference was found between the elongation of AL and the reduction of SCT after PDT in the treated eyes. This finding suggests that PDT may have a secondary morphological change in tissues (i.e., suprachoroidal space or sclera) other than choroid. During the active phase of CSC, the excessive fluid may pool in the submacular suprachoroidal space in association with the impaired choroidal outflow induced by the scleral thickening.
Commercial Relationships: Nobuhiro Terao, None; **Tetsuya Yamagishi**, None; **Yuji Yamamoto**, None; **Hideki Koizumi**, None; **Chie Sotozono**, None

Program Number: 5929 **Poster Board Number:** B0665
Presentation Time: 11:30 AM–1:15 PM
Peripapillary Pachychoroid Syndrome
Nopasak Phasukkijwatana[1, 2], Rosa Dolz-Marco[3], Mayss Al-Sheikh[1], Lee M. Jampol[4], Pearse A. Keane[5], Catherine A. Egan[5], Sandeep Randhawa[6, 7], Jay M. Stewart[8], Qingyun Liu[8, 9], Alex P. Hunyor[10, 11], Allan E. Kreiger[1], Aaron Nagiel[1], Robert A. Lalane[1], Won Ki Lee[12], K Bailey Freund[3, 13], David Sarraf[1]. [1]Stein Eye Institute, UCLA, Los Angeles, CA; [2]Ophthalmology, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand; [3]Vitreous Retina Macula Consultants of NY, New York, NY; [4]Ophthalmology, Northwestern University Feinberg School of Medicine, Chicago, IL; [5]Moorfields Eye Hospital NHS Foundation Trust, London, United Kingdom; [6]Associated Retinal Consultant, PC, Royal Oak, MI; [7]Ophthalmology, Oakland University William Beaumont School of Medicine, Royal Oak, MI; [8]UCSF, San Francisco, CA; [9]Ophthalmology, Tongliao City Hospital, Tongliao, China; [10]Retina Associates, Chatswood, NSW, Australia; [11]Save Sight Institute, University of Sydney, Sydney, NSW, Australia; [12]Ophthalmology, Seoul St. Mary's Hospital, Catholic University of Korea, Seoul, Korea (the Democratic People's Republic of); [13]Ophthalmology, New York University Langone Medical Center, New York, NY.
Purpose: We performed a multi-centered retrospective study to determine the clinical features of a novel variant of central serous chorioretinopathy (CSC) in the pachychoroid spectrum of disorders. The term peripapillary pachychoroid syndrome (PPS) was proposed for this unique entity.
Methods: A total of 31 eyes with PPS from 16 patients demonstrating intraretinal cysts and thick choroid in the nasal macular region (Group 1) were recruited. Detailed medical history was reviewed and findings of ocular examination and multimodal imaging were reviewed. Macular choroidal thickness was measured on enhanced depth imaging optical coherence tomography (EDI-OCT) at several pre-defined locations. For analysis of the choroidal thickness, 17 eyes with typical CSC or pachychoroid neovasculopathy from 11 patients aged > 50 years old (Group 2) and 19 age-matched normal eyes from 12 subjects (Group 3) were included for comparisons.
Results: PPS patients were aged 71±7 years (range 58-86 years) and 13/16 (81%) were male. PPS was characterized by markedly thickened nasal macular choroid significantly greater than temporal macular choroid (P<0.0001), and significantly different from typical CSC. Associated intraretinal cysts and/or subretinal fluid was noted in the nasal macula extending from the optic disc margin in all eyes. Intraretinal cysts were often present nasal to the disc as well.

Fundus autofluorescence and fluorescein angiography (FA) showed peripapillary mottling of the retinal pigment epithelium with late staining and no frank leakage in all 29 eyes with FA available. Indocyanine green angiography showed peripapillary dilated large choroidal vessels with hyperpermeability when performed. The optic nerve head was usually crowded or with small cupping or even edematous and illustrated mild late leakage in FA in half of the cases. PPS was significantly associated with old age, choroidal folds, short axial length and hyperopia.
Conclusions: PPS is a distinct variant of CSC and falls within the pachychoroid spectrum of disorders. Peripapillary choroidal congestion exhibiting a compartment-like effect was proposed as an etiologic mechanism. It is important to recognize this clinical entity, which can be confused with posterior uveitis and neuro-ophthalmologic disorders to avoid unnecessary interventions.
Commercial Relationships: Nopasak Phasukkijwatana, None; **Rosa Dolz-Marco**, None; **Mayss Al-Sheikh**, None; **Lee M. Jampol**, None; **Pearse A. Keane**, Novartis (C), Heidelberg (R), Novartis (R), Haag-Streit (R), Bayer (R), Allergan (R), Topcon (R), DeepMind (C); **Catherine A. Egan**, None; **Sandeep Randhawa**, None; **Jay M. Stewart**, None; **Qingyun Liu**, None; **Alex P. Hunyor**, None; **Allan E. Kreiger**, None; **Aaron Nagiel**, Allergan (C); **Robert A. Lalane**, None; **Won Ki Lee**, Bayer Healthcare Pharmaceuticals (C), Santen, Inc. (C), Novartis Pharmaceuticals Corporation (C), Allergan (R); **K Bailey Freund**, Genentech (C), Optos (C), Heidelberg Engineering (C), Optovue (C), Bayer Healthcare (C); **David Sarraf**, Regeneron (F), Optovue (R), Bayer (C), Heidelberg (F), Allergan (F), Genentech (C), Optovue (F), Genentech (F), Optovue (C)

Program Number: 5930 **Poster Board Number:** B0666
Presentation Time: 11:30 AM–1:15 PM
Combination Photodynamic Therapy and Anti-Vascular Endothelial Growth Factor for Recalcitrant Chronic Central Serous Chorioretinopathy
Andrew T. Chon[1, 2], Masumi G. Asahi[1, 2], Ron P. Gallemore[1], Joshua Wallsh[1]. [1]Clinical Research, Ophthalmology, Retina Macula Institute, Torrance, CA; [2]Western University of the Health Sciences, Pomona, CA.
Purpose: To determine whether combination photodynamic therapy (PDT) and anti-vascular endothelial growth factor (VEGF) therapy is effective in the management of chronic central serous chorioretinopathy (CSC) recalcitrant to conventional therapy.
Methods: A retrospective case series of 8 patients with chronic CSC unresponsive to topical non-steroidal anti-inflammatory drops, focal photocoagulation, anti-VEGF alone, or PDT alone. All patients were evaluated with a full ophthalmic exam, spectral-domain optical coherence tomography (SD-OCT), fluorescein angiography, and most with indocyanine green angiography followed by half-fluence PDT and intravitreal anti-VEGF injection (7 Bevacizumab, 1 Aflibercept). Patients were seen in follow-up one month after treatment.
Results: All 8 patients achieved complete resolution in subretinal fluid following combination treatment. Average duration of CSC prior to initiation of combination therapy was 4.25 months. Mean central macular thickness on SD-OCT decreased significantly from 401.2 +/- 52.7 microns to 297.9 +/- 18.2 microns (p=0.0010) by four months after treatment (1.63+/-1.18 months). 7 of 8 patients were followed for an average of 13 months with no recurrence during that time. One case recurred at eight months and was treated with repeat combination at that time. Frank CNV was not identified in these cases on FA or ICG studies. 8 of 8 patients showed significant improvement in vision from a logMAR of 0.1125 +/- 0.099 to 0.0125 +/- 0.064 (p=0.019).
Conclusions: Combination PDT and anti-VEGF is effective for chronic CSC which has failed conventional therapy. As high as 50% recurrence rate has been reported within 1-year after treatment of the first event with conventional therapy. Associated CNV and/or inflammation may be reasons for greater success in patients treated with combination therapy. A larger randomized controlled study is needed to confirm benefit of combination therapy for chronic CSC.
Commercial Relationships: Andrew T. Chon, None; **Masumi G. Asahi**, None; **Ron P. Gallemore**, None; **Joshua Wallsh**, None

Program Number: 5931 **Poster Board Number:** B0667
Presentation Time: 11:30 AM–1:15 PM
Chronic central serous chorioretinopathy treated with mineralocorticoid-receptor antagonists: long-term follow up
Marta Zola, Alejandra Daruich, Alexandre Matet, Francine F. Behar-Cohen. Jules Gonin Eye Hospital, Lausanne, Switzerland.
Purpose: To report the outcomes of patients with chronic central serous chorioretinopathy (cCSCR) treated with mineralocorticoid-receptor (MR) antagonists after 24 months of follow-up.
Methods: Nineteen eyes of 17 patients with non-resolving cCSCR were treated with oral MR antagonists, either eplerenone or spironolactone. Best-corrected visual acuity (BCVA) and anatomical parameters including central macular thickness, subretinal fluid (SRF) height at the fovea, and sub-foveal choroidal thickness (SFCT) were measured during 24 months following initiation of treatment, and were compared with baseline values using the Wilcoxon test.
Results: Thirteen patients (78%) were male and 4 (22%) were female. The mean age at presentation was 53±11 years. The mean duration of subretinal detachment affecting the fovea was 8.9±4.9 months before initiation of treatment. The mean duration of treatment was 22.1±8 months. Logarithm of the minimum angle of resolution (LogMAR) BCVA was 0.21 at baseline, 0.19 at 6 months (p=0.39), 0.15 at 12 months (p=0.086) and 0.17 at 24 months (p=0.25). The central macular thickness (CMT) was 320±67 μm at baseline, 270±36 μm at 6 months (p=0.0007), 276±47 μm (p=0.017) at 12 months and 259±42.8 μm at 24 months (p=0.0002). Foveal SRF was 95 ± 71 μm at baseline, 41±49 μm at 6 months (p=0.02), 51±58 μm at 12 months (p=0.052), and 25±35 μm at 24 months (p=0.004). Mean subfoveal choroidal thickness was 439±105 μm at baseline, 422±104 μm at 6 months (p=0.15), 376±91 μm at 12 months (p=0.019) and 392±99 μm at 24 months (p=0.046).
Conclusions: Oral MR antagonists had a favorable long-term anatomical effect in chronic, recalcitrant central serous chorioretinopathy. The decrease in choroidal thickness supported the involvement of the MR in CSCR pathogenesis. The treatment also led to a moderate visual improvement that remained non-significant due to the small study population. Results from prospective randomized studies are needed to confirm these encouraging observations.
Commercial Relationships: Marta Zola, None; **Alejandra Daruich**, None; **Alexandre Matet**, None; **Francine F. Behar-Cohen**, Treatment of mineraolcorticoid receptor antagonists in retinal diseases (P)

Program Number: 5932 **Poster Board Number:** B0668
Presentation Time: 11:30 AM–1:15 PM
COMPARISON OF EPLERENONE VERSUS MELATONIN AS THERAPEUTIC OPTIONS FOR THE TREATMENT OF CHRONIC CENTRAL SEROUS CHORIORETINOPATHY
Eleonora B. Lavaque[1], Laura Gramajo[2, 5], Juan Pablo Real[3, 4], Claudio P. Juarez[2, 5], Ruth E. Rosenstein[6, 7], Jose D. Luna Pinto[2, 5].
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Purpose: At present, there are no optimal therapies for chronic CSCR (central serous chorioretinopathy). Epleronone and melatonin are two of the many therapeutic option described for the treatment of disease. The aim of this study is to compare the efficacy of melatonin and eplerenone for the treatment of chronic CSCR.
Methods: Comparative, retrospective study. A total of 35 patients with chronic CSCR were treated: 20 patients were treated with 50 mg/day of oral eplerenone for 3 months, 10 patients were treated orally with 3 mg melatonin t.i.d for 1 month, and 5 patient were treated with placebo. All patients had 20/40 or worse Early Treatment Diabetic Retinopathy Study (ETDRS) best-corrected visual acuity (BCVA) in the affected eye or presented an incapacitating scotoma. Most of the patients had previous failed treatments for their condition. Observational procedures included ETDRS BCVA, and complete ophthalmic examination. Optical Coherence Tomography (OCT) was performed at day 1 and week 4.
Results: At one month follow up, CMT (central macular thickness) showed a significant decrease ($P < 0.005$) on both treatment groups, but change in macular thickness was significantly lower in the eplerenone group ($P > 0.05$ at 1 and 3 months). The mean decreased on CMT at 1 month was -43.9 µm and -146.5 µm for the eplerenone and melatonin groups respectively. These numbers were maintained at month 3. In terms of BCVA, both groups of treatment showed a mean significant improvement on visual acuity at one month, without significant differences between groups. No changes on BCVA or CMT were noted in the control group. No significant side effects were observed in any of the treatment groups.
Conclusions: Melatonin and eplerenone can be considered equally effective in improving BCVA on patients with chronic CSCR, although melatonin is statistically superior in promoting the reabsorption of SRF (subretinal fluid).

	Control Group	EPLERENONA 50 mg	MELATONINA 9 mg
Baseline BCVA (letters)	72.6 ±8.7	65.2 ±21	72.0 ±7.7
BCVA 1 month after(letters)	68.6 ±5,7	71.15 ±22	81.2 ±8.5
Change in BCVA (letters)	-4.00	5.95 *+	9.20 *+
BCVA 3 month after(letters)	-	75 ±13	81.2 ±8.5 *
Change in BCVA (letters)	-	9.80 *+	9.20 *+
Baseline CMT (OCT)	323 ± 71	320 ± 99	420 ± 105 *°
CMT 1 month after	338 ±77	276 ± 106	274 ± 50
Changes in CMT (µm)	14.6	-43.9 *+	-146.5 *+°
CMT 3 month after	-	268 ± 90	273.8 ± 49.9
Changes in CMT (µm)	-	-43.9 *+	-146.2 *+°

+ Significant difference with respect to the baseline measurement
* Significant difference with respect to the control group
° Significant difference with respect to the other treatment group

Commercial Relationships: Eleonora B. Lavaque, None; **Laura Gramajo**, None; **Juan Pablo Real**, None; **Claudio P. Juarez**, None; **Ruth E. Rosenstein**, None; **Jose D. Luna Pinto**, None

Program Number: 5933 **Poster Board Number:** B0669
Presentation Time: 11:30 AM–1:15 PM
Choriocapillaris and outer choroid blood flow in acute central serous chorioretinopathy: a swept source OCT angiography study
Paolo Lanzetta[1, 2], Valentina Sarao[1, 2], Daniele Veritti[1, 2]. [1]Dept of Medical and Biological Sciences - Ophthalmology, University of Udine, Udine, Italy; [2]Istituto Europeo di Microchirurgia Oculare (IEMO), Udine, Italy.
Purpose: To evaluate the choriocapillaris and outer choroid blood flow in acute and resolved central serous chorioretinopathy (CSC) by the means of flow density index using swept source optical coherence tomography (SS-OCT) angiography.
Methods: A series of consecutive patients diagnosed with acute CSC underwent conventional SS-OCT and SS-OCT angiography (Triton, Topcon, Japan) during the acute phase and after resolution of the neuroretinal detachment. Controlateral healthy eyes were also evaluated. OCT angiography images were acquired and manually segmented in order to compare the same frames at baseline and after resolution. In order to avoid the OCT angiography attenuation due to the presence of subretinal fluid, we analyzed areas located outside the region involved by the neuroretinal detachment.
Results: Thirteen eyes of 11 patients were enrolled. Nine healthy controlateral eyes were also evaluated. Gradable and high-quality images were available in all cases. At choriocapillaris level the mean (±SD) flow density index was 96.3 ±15.2 during the acute CSC and 95.7 ±11.7 after resolution of neuroretinal detachment (the difference was not statistically significant). In controlateral healthy eyes the density index was 92.3 ±10.2. The mean (±SD) flow density index at level of the outer choroid was 39.6 ±20.4, 79.6 ±15.3 and 75.4 ±12.7 in acute, resolved CSC and controlateral eyes, respectively ($p<0.05$).
Conclusions: These results suggest that blood flow in the outer choroid is impaired during the acute phase of CSC compared to the values obtained after resolution of the neuroretinal detachment and in controlateral eyes.
Commercial Relationships: Paolo Lanzetta, Novartis (C), Teva (C), Roche (C), Lutronic (C), Bayer (C), Alcon (C), Lupin (C), Genentech (C), Centervue (C), Alimera (C), Boeringher (C), Bausch&Lomb (C), Topcon (C), Iridex (P), Allergan (C); **Valentina Sarao**, None; **Daniele Veritti**, None

Program Number: 5934 **Poster Board Number:** B0670
Presentation Time: 11:30 AM–1:15 PM
Computer Adaptive Contrast Sensitivity Testing in Macula-involving Retinal Detachment and Central Serous Retinopathy
Merina Thomas, Gina Yu, Katherine A. Joltikov, Vinicius M. de Castro, David N. Zacks. Kellogg Eye Center, University of Michigan, Ann Arbor, MI.
Purpose: To evaluate the Sentio Platform's (Adaptive Sensory Technology, Boston) suitability for clinical application of computer-adaptive contrast sensitivity function (CSF) assessment compared to traditional letter acuity in patients with macula-involving retinal detachment (RD) and central serous retinopathy (CSR).
Methods: Following approval by the University of Michigan School of Medicine's Institutional Review Board, all eligible participants had the following criteria: age 18 years or older; and 1 study eye with macula-involving retinal detachment or central serous retinopathy. Best corrected Snellen and ETDRS (Early Treatment Diabetic Retinopathy Study) visual acuities were obtained from consented participants. Participants also completed an in-office CSF test.
Results: The mean age of all participants was 58 years (range 47 to 73). 3 participants had macula-involving RD and 3 participants had CSR. Mean visual acuity in macula-involving RD and CSR eyes,

respectively, was logMAR 0.41 (20/50) and logMAR 0.22 (20/32). Mean visual acuity in control eyes was 0.03 (20/20). In macula-involving RD and CSR eyes, mean CSF area under the curve (AUC), a measure of all letters seen across all contrast levels, respectively was 0.67 and 1.16. Mean CSF AUC in control eyes was 1.39. In a macula-involving RD eye in which the logMAR was -0.125 (20/16), the CSF AUC was 1.37; in control eyes in which the logMAR was 0 or less (20/20 or better), the CSF AUC was 1.47. Macula-involving RD eyes with poor visual acuity, logMAR 0.875 (20/125) and logMAR 0.477 (20/50-20/63), had CSF AUC of 0.15 and 0.50.
Conclusions: These data suggest that the CSF assessment may detect differences in vision in patients with macula-involving retinal detachment and central serous retinopathy that may not be detectable with traditional visual acuity testing. In a macula-involving RD eye with visual acuity of 20/15, the CSF AUC was lower than the average CSF AUC of control eyes with visual acuity of 20/20 or better. Also, eyes with a poor visual acuity had a lower CSF AUC. Further studies and longitudinal follow-up would be needed to determine if this device has a role in vision assessment of patients with macula involving disease processes.
Commercial Relationships: Merina Thomas, None; **Gina Yu**, None; **Katherine A. Joltikov**, None; **Vinicius M. de Castro**, None; **David N. Zacks**, None
Support: Vitreoretinal Surgery Foundation Research Award

Program Number: 5935 **Poster Board Number:** B0671
Presentation Time: 11:30 AM–1:15 PM
Indocyanine green angiography-guided photodynamic therapy for chronic central serous chorioretinopathy: digital fundus camera versus scanning laser ophthalmoscope
SEUNG MIN LEE[1, 3], Hanjo Kwon[2], Sungwho Park[2], Ji Eun E. Lee[2, 4], Ik Soo Byon[1, 3]. [1]Ophthalmology, Pusan National University Yangsan Hospital, Yangsan-si, Korea (the Republic of); [2]Ophthalmology, Pusan National University Hospital, Busan, Korea (the Republic of); [3]Research Institute for Convergence of Biomedical Science and Technology, Pusan National University Yangsan Hospital, Yangsan-si, Korea (the Republic of); [4]Medical institute, School of medicine, Pusan National University, Busan, Korea (the Republic of).
Purpose: To compare the effect of the digital fundus camera (DFC) versus scanning laser ophthalmoscope (SLO) indocyanine green angiography (ICGA)-guided photodynamic therapy (PDT) on the treatment of chronic central serous chorioretinopathy (CSC)
Methods: The data of 38 eyes of 37 patients with chronic CSC were retrospectively reviewed. Choroidal hyper-permeability lesion was assessed in late phase ICGA images using both DFC and SLO type machines. Subjects were divided to DFC and SLO groups, regarding the method to determine the choroidal hyper-permeability lesion. Half-fluence PDT (25J/cm^2) was performed in all eyes. Outcome measures included the greatest linear diameter (GLD), best-corrected visual acuity (BCVA) and central macular thickness (CMT).
Results: Sixteen and 22 eyes were in the DFC and SLO groups, respectively. Baseline parameters did not differ between both groups. GLD was 4013 ± 931 μm and 3314 ± 979 μm in DFC and SLO group, respectively. GLD of DFC group was larger than that of SLO group (p = 0.042). Follow up BCVA (logMAR) significantly improved at 3 months in DFC group, and at 6 months in SLO group, compared to baseline BCVA (p = 0.002 and 0.003, respectively). Mean CMT significantly improved at all follow-up visit in both groups (p < 0.001). The subretinal fluid disappeared in all eyes of DFC group, but remained in 2 eyes (9 %) of SLO group.
Conclusions: DFC ICGA image showed the larger choroidal hyper-permeability lesion in late phase than SLO ICGA image, which induced to treat the greater area in DFC ICGA guided PDT. This may influence the anatomical and visual outcomes of treatment for chronic CSC.
Commercial Relationships: SEUNG MIN LEE, None; **Hanjo Kwon**, None; **Sungwho Park**, None; **Ji Eun E. Lee**, None; **Ik Soo Byon**, None

Program Number: 5936 **Poster Board Number:** B0672
Presentation Time: 11:30 AM–1:15 PM
Multimodal retinal imaging evaluation may predict the response to eplerenone therapy in central serous chorioretinopathy
Riccardo Sacconi[1, 2], Giovanni Baldin[1], Adriano Carnevali[1, 3], Lea Querques[1], Alessandro Rabiolo[1], Maria Vittoria Cicinelli[1], Giorgio Panozzo[1], Giorgio Marchini[2], Francesco Bandello[1], Giuseppe Querques[1]. [1]Ophthalmology, University Vita-Salute, IRCCS Ospedale San Raffaele, Milan, Italy, Milano, Italy; [2]Ophthalmology, University of Verona, University hospital of Verona, Verona, Italy, Verona, Italy; [3]Ophthalmology, University of "Magna Graecia", Catanzaro, Italy, Catanzaro, Italy.
Purpose: To evaluate the effects of oral eplerenone in treatment-naïve patients affected by central serous chorioretinopathy (CSC), and to identify predictive factors associated with a better response to eplerenone by multimodal retinal imaging.
Methods: Interventional non-randomized clinical study. Twenty-eight treatment-naïve CSC eyes were prospectively enrolled and treated with oral eplerenone for 1 to 3 months. Primary outcomes included the percentage of eyes achieving complete resolution of subretinal fluid (SRF) on structural optical coherence tomography (OCT) after treatment, and changes in best-corrected visual acuity (BCVA) and central macular thickness (CMT). Secondary outcomes included the presence of pathological findings on indocyaine green angiography (ICGA) and OCT-angiography (OCT-A) at baseline associated with different response to eplerenone treatment.
Results: Seventeen eyes (61%) demonstrated total reabsorption of SRF on structural OCT, 5 eyes (18%) presented a partial response to eplerenone therapy and 6 eyes (21%) showed no response. Eplerenone treatment has also proven efficacy in reducing CMT and improving BCVA (p<0.001). The complete response to eplerenone treatment was associated with absence of CNV at OCT-A and the presence of hotspot at ICGA (p<0.001 and p=0.002, respectively). None of 7 eyes with CNV in OCT-A imaging had a complete response to eplerenone and none of 3 eyes without hotspot at ICGA showed a complete response to the treatment.
Conclusions: Our results confirmed the effectiveness of eplerenone therapy in treatment-naïve CSC. Multimodal retinal imaging allowed us to propose predictive factors (i.e. absence of CNV on OCT-A and presence hotspot on ICGA) for better response to eplerenone.
Commercial Relationships: Riccardo Sacconi, None; **Giovanni Baldin**, None; **Adriano Carnevali**, None; **Lea Querques**, None; **Alessandro Rabiolo**, None; **Maria Vittoria Cicinelli**, None; **Giorgio Panozzo**, None; **Giorgio Marchini**, Bausch and Lomb (C), Allergan Inc (C), Santen (C), Alcon (C); **Francesco Bandello**, Hoffmann-La-Roche (C), Bausch And Lomb (C), Bayer Shering-Pharma (C), Novartis (C), Sanofi-Aventis (C), Farmila-Thea (C), Alimera Sciences (C), Alcon (C), NovagaliPharma (C), Genentech (C), Thrombogenics (C), Zeiss (C), Allergan Inc (C); **Giuseppe Querques**, Bayer Shering-Pharma (C), Novartis (C), Zeiss (C), Heidelberg (C), Allergan Inc (C), Alimera Sciences (C)

Program Number: 5937 **Poster Board Number:** B0673
Presentation Time: 11:30 AM–1:15 PM
OCT angiography characteristics in patients with chronic CSCR complicated with polypoidal choroidal vasculopathy
Rita Serra, CLAUDIO IOVINO, Giulia Caminiti, Maurizio Fossarello, Enrico Peiretti. Eye Clinic, University of Cagliari, Cagliari, Italy.
Purpose: To evaluate the OCT angiography (OCT-A) characteristics in patients with chronic central serous chorioretinopathy (CSCR) complicated with polypoidal choroidal vasculopathy (PCV).
Methods: 12 eyes of 10 consecutive patients with an history of chronic CSCR have been evaluated with complete ophthalmological examination including fluorescein angiography (FA) and indocyanine green angiography (ICGA) and SD-OCT (HRA+OCT Spectralis Heidelberg), that revealed the presence of polypoidal lesions with their neovascular network. The patients were then scanned with OCT-A, using AngioVue technologies (Optovue Inc), in order to define the clinical characteristics in those lesions previously observed on multimodal imaging. The images were then analyzed by three different retinal specialists.
Results: Outer retina and choriocapillaris segmentation on OCT-A analysis confirmed the presence of the neovascular network in 100% of the eyes, while the polyps were seen in 8 eyes (66,6%) and not detectable in 4 eyes (33,3%), on the basis of the ICGA matching images. In the majority of the cases the polyp-lesion appeared as an hyperflow aneurysmatic dilatation surrounded by a dark halo. The observers were in agreement in 75% of cases.
Conclusions: OCT-A appears to be less precise compared to ICGA in order to detect the presence of the polyps although the neovascular network was always detectable with both machines in patients with PCV complicating chronic CSCR.
Commercial Relationships: Rita Serra, None; **CLAUDIO IOVINO**, None; **Giulia Caminiti**, None; **Maurizio Fossarello**, None; **Enrico Peiretti**, None

Program Number: 5938 **Poster Board Number:** B0674
Presentation Time: 11:30 AM–1:15 PM
Optical Coherence Tomography Angiography Imaging in Serpiginous Choroidopathy
Ria Desai, Peter L. Nesper, Debra A. Goldstein, Amani A. Fawzi, Lee M. Jampol, Manjot Gill. Ophthalmology, Northwestern University, Chicago, IL.
Purpose: To report optical coherence tomography angiography (OCTA) findings in three cases, two active and one inactive, of serpiginous choroidopathy (SC) and describe OCTA changes in response to treatment.
Methods: Retrospective observational case series of three patients with SC undergoing multimodal imaging, including OCTA. In one treated eye, both pre and post treatment images were compared.
Results: OCTA of active SC lesions in our series demonstrated a consistent apparent absence of the underlying choriocapillaris layer with variable overlying retinal pigment epithelium (RPE) and outer retinal swelling/disruption. Additionally, in one case, OCTA of an active lesion also demonstrated partial absence of larger choroidal vessels. In the single treated case, post-treatment OCTA imaging of previously active lesions showed partial reappearance of choriocapillaris, especially at lesion margins. In inactive SC, the choriocapillaris, along with the RPE and outer retina, is notably absent.
Conclusions: The variability of outer retina/RPE thickening along with a consistent absence of choriocapillaris on OCTA imaging suggests that the choriocapillaris is likely the primary site of disease activity in active SC. Post-treatment OCTA images also suggest potential for choroidal remodeling following steroid therapy and lend support to a primary inflammatory etiology. Lastly, for all cases, active and inactive, there may be errors of interpretation given that OCTA is a relatively new technology, as well as errors due to artifact which may ultimately affect assessment of the disease process. Therefore, a definitive conclusion regarding pathogenesis of SC is not elucidated by these findings and further studies must be performed.
Commercial Relationships: Ria Desai, None; **Peter L. Nesper**, None; **Debra A. Goldstein**, None; **Amani A. Fawzi**, None; **Lee M. Jampol**, None; **Manjot Gill**, None

Program Number: 5939 **Poster Board Number:** B0675
Presentation Time: 11:30 AM–1:15 PM
OCT angiography in chronic central serous chorioretinopathy
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Purpose: To evaluate the potential of OCT angiography to detect and characterize choroidal neovascular networks in eyes with in chronic central serous chorioretinopathy (CSC).
Methods: This study was designed to compare OCT angiography with conventional angiography in a cohort of patients affected by chronic CSC. Patients underwent fluorescein (FA) and indocyanine green (ICGA) angiography, swept source OCT and OCT angiography (Triton, Topcon, Japan). A qualitative analysis of the entire imaging data was performed.
Results: Fifteen eyes of 10 patients were evaluated. Mean age was 56.1±7.7 years. FA and ICGA were able to detect abnormal subfoveal choroidal neovascular networks in two eyes (13%). OCT angiography detected choroidal neovascular networks in 7 out of 15 eyes (47%). Two cases showed an indistinct tangled pattern, 3 neovascular networks appeared as a classic “ball of wool” pattern, and 2 eyes exhibited a pruned tree pattern.
Conclusions: OCT angiography is able to detect abnormal neovascular networks which are not identifiable with conventional angiographic modalities. Neovascular lesions in chronic CSC may be more frequent than expected.
Commercial Relationships: Valentina Sarao, None; **Daniele Veritti**, None; **Paolo Lanzetta**, Boerhinger (C), Novartis (C), Teva (C), Roche (C), Lutronic (C), Bayer (C), Iridex (C), Alcon (C), Lupin (C), Genentech (C), Centervue (C), Alimera (C), Bausch&Lomb (C), Topcon (C), Allergan (C)

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Mineralocorticoid antagonist effects on choroidal thickness in central serous chorioretinopathy
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Purpose: Central serous chorioretinopathy (CSCR) is characterized by increased choroidal thickness (CT), and subretinal fluid (SRF) accumulation that can lead to vision loss. Despite the increased risk of visual morbidity, definitive treatment and pathogenesis remain elusive. Recently, overactivation of mineralcorticoid receptors (MR) in choroidal vessels has been implicated in the pathophysiology of CSCR. Though the use of MR antagonists has been described clinically, their anatomic effects on CT has not yet been quantified. The purpose of this study is to quantify the effect of MR antagonists on CT in CSCR.
Methods: A retrospective chart review of CSCR patients treated with spironolactone (S) and eplerenone (E) for at least 4 months’ follow up was conducted. CT from optical coherence tomography images was

computed by using the Zen linear measuring tool. CT was measured from the outer edge of the hyperreflective RPE to the inner sclera, nasal to temporal at 500µm intervals to span 3000µm per scan. The baseline for each individual and overall average was compared to each follow up measurement using a T-test.
Results: A total of 19 patients (5S and 14E) were included in the study. Average baseline CT for S-OD was 226.30µm and OS was 167.77µm. Average baseline CT for E-OD was 188.80µm and OS was 185.10µm. There was no significant decrease in CT from baseline for all individuals in the study throughout the treatment for both E and S ($p>0.05$). There was no significant decrease in overall averaged CT from baseline compared to each follow up for both E and S ($p>0.05$).
Conclusions: In this treatment series, patients on MR antagonists did not have a statistically significant decrease in overall CT ($p>0.05$). These results differ from previous results with rat eyes that found MR antagonists to inhibit choroidal thickening promoted by retinal vasodilation from inappropriate MR activation. MR antagonists have clinical effects of SRF resolution and visual acuity improvements, but the measurements of CT taken throughout these treatment groups may show the actual anatomic effects of MR antagonists in CSCR. These results may suggest that MR antagonists work differently in humans due to potential differences of anatomy and physiology. In light of these results, the role and mechanism of MR antagonists in the treatment of CSCR need to be further researched and better defined.
Commercial Relationships: Jennifer Sim, None; **Kapil Kapoor**, None

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Irregular Pigment Epithelial Detachment in Chronic Central Serous Chorioretinopathy : SD-OCT and OCTA Findings
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Purpose: To evaluate the prevalence of irregular pigment epithelial detachment (PED) in chronic central serous retinopathy (CSC) and to identify the incidence of neovascular change in patients with CSC during the follow-up.
Methods: The review of medical records of 142 eyes with chronic CSC which were examined in the Ophthalmology Department of Kyunghee University Hospital retrospectively. Analyzing SD-OCT, fluorescein angiography (FA) and indocyanine green angiography (ICGA) and optical coherence tomography angiography (OCTA) findings.
Results: 47 eyes of 142 eyes (33.1%) showed irregular PED on macular OCT finding. The mean age was 53.45 years in irregular PED group and 49.73 years in non-irregular PED group. 12 eyes of 47 eyes (25.5%) was occurred neovascular change during the follow-up, especially 9 eyes in CNV and 3 eyes in PCV. Mean duration at onset of neovascular change was 41.83±46.28 months. To compare between eyes with and without neovascular change in patients with irregular PED, follow-up duration of neovascular change group was 45.25 months and control group was 21.46 months. There was significantly difference between the group ($p=0.009$). The presence of optically filled sub-RPE space was 11 eyes (91.7%) in neovascular change group and 14 eyes (40.0%) in control group. There was significantly difference between the group ($p=0.011$). Type 1 neovascular networks were detected in 5 out of 8 eyes (67.5%) on En face OCTA(3x3mm).
Conclusions: The presence of irregular PED and the opacity of sub-RPE space was significant correlation with neovascular change. Also, OCTA was useful diagnostic tool for type 1 neovascularization as much as dye injection angiography.
Commercial Relationships: Seul Ki Bang, None; **Eung-Suk Kim**, None; **Seung-Young Yu**, None