Retina Roundup

October 2022

1) Retina.2022 Sep 1;42(9):1655-1664.
doi: 10.1097/IAE.0000000000003529.

Anomalies of choroidal venous structure in highly myopic eyes

Lu, Hongshuang MD; Du, Ran MD; Xie, Shiqi MD; Xiong, Jianping MD; Chen, Changyu MD; Moriyama, Muka MD; Igarashi-Yokoi, Tae MD; Takahashi, Hiroyuki MD, PhD; Kamoi, Koju MD; Uramoto, Kengo MD; Nakao, Noriko MD; Ohno-Matsui, Kyoko MD, PhD

Purpose: To identify anomalies of choroidal venous structure in highly myopic (HM) eyes.

Methods: Widefield indocyanine green angiographic images of 175 HM eyes (refractive error ≤ –6.0D diopters or axial length >26.5 mm) and 100 control eyes taken between January 2014 and December 2018 were reviewed.

Results: There were no significant differences in age and gender between HM patients and controls. Three types of changes of large choroidal veins were found in 103 HM eyes (58.86%): Asymmetry of vortex veins in 44 eyes (25.14%), isolated long vein across the macula in 58 eyes (33.14%), and intervortex anastomoses in 25 eyes (14.29%). Similar changes in controls were found in 12 eyes (12%), 0 eye (0%), and 2 eyes (2%), respectively, which were significantly lower than those in the HM group (all $P < 0.05$). The patterns of asymmetry were affected by steeper staphyloma edges and anastomoses were observed through large trunks and terminal venules. In two eyes with large trunk anastomosis, attenuation of the less dominant vortex vein was observed afterward.

Conclusion: Choroidal venous anomalies are more common in HM eyes than controls. Choroidal venous structure in HM eyes may be altering continuously, and such changes may underlie the development of myopic maculopathy.

PMID: 35994583

DOI: 10.1097/IAE.0000000000003529

2) Retina.2022 Sep 1;42(9):1638-1644.
doi: 10.1097/IAE.0000000000003521.

Sausaging and bulbosities of the choroidal veins in central serous chorioretinopathy

Spaide, Richard F. MD; Ngo, Wei Kiong MD; Barbazetto, Irene MD; Sorenson, John A. MD

Purpose: To evaluate the caliber of the choroidal veins in central serous chorioretinopathy, a disease proposed to be associated with overloading of choroidal venous outflow.

Methods: Widefield indocyanine green angiograms of eyes with central serous chorioretinopathy were graded for sausaging defined as three or more contiguous fusiform dilations that vary by at least 50% from the narrowest to largest diameters. A bulbosity was defined as a focal 2X dilation of a blood vessel as compared with the diameter of the surrounding host vessel. The data underwent statistical analysis including the use of generalized estimating equations.

Results: There were 73 eyes of 41 patients with a mean age of 53.5 years. Sausaging of vessels was seen in a mean and median of three quadrants per eye. Using generalized estimating equations, the only significant risk factor for sausaging was the use of corticosteroids. The two significant predictors of subfoveal choroidal thickness using generalized estimating equations were age ($P = 0.021$) and proportion of quadrants involved by sausaging ($P < 0.001$). The decrease in choroidal thickness per year of age was estimated to be 3.7 μm, while the increase with four quadrant involvement with sausaging was estimated to be 236 μm. There were a total of 39 bulbosities in 26 eyes (35.6%), preferentially involving intervortex venous anastomoses.

Conclusion: Variations in the venous caliber are very common in eyes with central serous chorioretinopathy and seems to be associated with pathophysiologic alterations related to increased pressure within and remodeling of the larger choroidal veins. This may lead to overloading of the choriocapillaris with leakage as one manifestation.

PMID: 35507949

DOI: 10.1097/IAE.0000000000003521

3) SCI REP.2022 Sep 1;12(1):14875.
doi: 10.1038/s41598-022-18619-5.

Comparison of treatment methods for submacular hemorrhage in neovascular age-related macular degeneration: conservative versus active surgical strategy

Yongseok Mun , Kyu Hyung Park , Sang Jun Park , Han Joo Cho , Chul Gu Kim , Jong Woo Kim , Dong Geun Park , Min Sagong , Jae Hui Kim , Se Joon Woo

Purpose : This study aimed to compare visual outcomes of conservative versus active surgical treatment.

Methods: Two hundred thirty-six eyes of 236 patients with SMH (≥ 1 disc diameter) were stratified into four groups: observation (n = 21); anti-vascular endothelial growth factor (VEGF) monotherapy (n = 161); non-surgical gas tamponade (n = 31); and subretinal surgery (n = 23). The primary outcome was best-corrected visual acuity (BCVA) at 12 months.

Results: The baseline BCVAs of the observation, anti-VEGF monotherapy, non-surgical gas tamponade, and subretinal surgery groups were 1.50 ± 0.70, 1.09 ± 0.70, 1.31 ± 0.83, and 1.62 ± 0.77 logarithm of minimal angle resolution (LogMAR), respectively. The mean BCVAs at 12 months were 1.39 ± 0.84, 0.90 ± 0.83, 1.35 ± 0.88, and 1.44 ± 0.91 LogMAR, respectively. After adjusting for age, baseline BCVA, SMH size, and the number of intravitreal anti-VEGF injections before SMH, the mean BCVA showed no significant difference among treatments at 12 months (P = 0.204). The anti-VEGF monotherapy group showed better mean BCVA significantly at 3 months (P < 0.001). Only baseline BCVA was associated with VA gain at 12 months (Odds ratio = 3.53, P < 0.001).

Conclusion: This study demonstrated that there was no difference in 12 month visual outcomes among treatments and a better early visual outcome can be expected with anti-VEGF monotherapy.

PMID: 36050401

DOI: 10.1038/s41598-022-18619-5

4) Clin Exp Ophthalmol. 2022 Aug 17.
doi: 10.1111/ceo.14146.

Associations between age-related macular degeneration and sleep dysfunction: A systematic review

Josh Tjunrong Sia , Ester P X Lee , Chui Ming Gemmy Cheung , Eva K Fenwick , Augustinus Laude , Kam Chun Ho , Beau J Fenner , Tien Y Wong,Dan Milea, Ecosse L Lamoureux, Ryan E K Man , Raymond P Najjar

Background: Age-related macular degeneration, a prevalent degenerative retinal disease, is associated with non-visual and psychosocial impairments that may affect sleep. In this systematic review, we evaluated associations between age-related macular degeneration (AMD) and sleep, highlighted knowledge gaps and provided evidence-based recommendations to clinicians to enable holistic management of AMD patients.

Methods: We searched PubMed, Embase and the Cochrane Central registries for papers published before May 2022. Non-English, qualitative studies and grey literature were excluded. Studies evaluating the association between AMD and sleep (including sleep disorders like insomnia and sleep apnea), and vice versa, were included. The quality of shortlisted studies was evaluated using the Newcastle Ottawa Scale.

Results: Six (two case-control studies, three longitudinal cohort studies and one cross-sectional study) of 551 studies were included in this review. Four studies found that AMD was associated with increased rates of sleep apnea and poorer reported sleep quality, while five studies showed that patients with sleep apnea or insomnia were at higher risk of developing AMD. Associations between self-reported sleep quantity and AMD were conflicting. No study evaluated the relationship between AMD and sleep using objective sleep assessment tools.

Conclusion: Only a limited number of studies investigated associations between AMD and sleep. These studies suggest a bidirectional relationship between AMD and sleep dysfunction yet disagree on the relationship between sleep quantity and the likelihood of AMD. Additional studies, using objective characterisation of sleep in patients with AMD are required to confirm these findings.

PMID: 36054031

DOI: 10.1111/ceo.14146

5) Retina. 2022 Aug 31.
doi: 10.1097/IAE.0000000000003621.

Evaluation of the Retinal Hazard with 3D Digitally Assisted Visualization System and Conventional Microscope in Macular Surgeries

Yuka Horigome, Yume Iwashita, Kazushi Hirono, Tatsuya Inoue, Ami Konno, Kazuaki Kadonosono, Yasuo Yanagi

Purpose: To investigate the retinal light hazard during macular surgery using a digital three-dimensional visualization system (3D) and conventional microscope (CM).

Design: Experimental study and retrospective evaluation of case-control study.

Subjects: A total of 20 and 10 patients who underwent pars plana vitrectomy (PPV) for epiretinal membrane using 3D and CM, respectively.

Methods: Spectral irradiances of endoilluminators were measured for representative settings used during core vitrectomy and macular manipulations with 3D and CM. From the medical record of the patients, times needed for core vitrectomy and macular manipulations were extracted. Total retinal light hazard index (THI) and macular hazard index (MHI) were calculated based on the spectral irradiances weighted by the standard functions. THI, MHI and the number of cases that exceeded the maximum permissible radiant power exposure were compared between the two groups.

Results: The spectral irradiance were 1.6 and 3.9 mW/cm2 for core vitrectomy and 3.4 and 8.1 mW/cm2 for macular manipulations using typical settings for 3D and CM groups, respectively. The THI ranged from 4.31 kJ/m2 to 17.37 kJ/m2 for 3D and 11.09 kJ/m2 to 27.70 kJ/m2 for CM groups, respectively whereas the MHI ranged from 2.93 kJ/m2 to 14.58 kJ/m2 for 3D and from 6.84 kJ/m2 to 23.55 kJ/m2 for CM, respectively ($P<0.001$). One (5%) and 6 (60%) PPV cases exceeded the threshold limits with 3D and CM groups, respectively ($P<0.05$, Chi square test).

Conclusions: The 3D digitally assisted visualization system offers significantly safer macular surgery compared to conventional microscope, considering the potential retinal hazard.

PMID: 36053901

DOI: 10.1097/IAE.0000000000003621

6) Retina: 2022 Aug 25.
doi: 10.1097/IAE.0000000000003612

Fluorescence Lifetime Imaging Ophthalmoscopy as Predictor of Long-term Functional Outcome in Macula-off Rhegmatogenous Retinal Detachment

Jaggi, Damian MD, Solberg, Yasmin MD, Dysli, Chantal MD, PhD, Lincke, Joel MD, Habra, Oussama MD, Wolf, Sebastian MD, PhD, Zinkernagel, Martin MD, PhD

Purpose: To assess whether macular fluorescence lifetimes may serve as a predictor for long-term outcomes in macula-off rhegmatogenous retinal detachment (RRD).

Methods: We conducted a single center observational study. Patients with pseudophakic macula-off RRD were included and evaluated one and six months after successful reattachment surgery. We analyzed Fluorescence lifetime imaging ophthalmoscopy (FLIO) lifetimes in the central ETDRS grid subfield, in two distinct channels (short spectral channel; SSC and long spectral channel; LSC). Best-corrected visual acuity (BCVA) and fluorescence lifetimes were compared between month one and six. Optical coherence tomography (OCT) metrics were correlated with fluorescence lifetime data.

Results: Nineteen patients were analyzed. Lifetimes of the previously detached retinas were prolonged compared to the healthy fellow eyes. Short lifetimes at month one were associated with better BCVA improvement (SSC: $r^2 = 0.27$, $p < 0.05$, LSC: $r^2 = 0.23$, $p < 0.05$) and with good final BCVA (SSC: $r^2 = 0.43$, $p < 0.01$, LSC: $r^2 = 0.25$, $p < 0.05$). Lifetimes were prolonged in some cases of outer retinal damage in OCT scans.

Conclusion: FLIO might serve as a prediction tool for functional recovery in pseudophakic macula-off RRD. Retinal fluorescence lifetimes could give insight in molecular processes after RRD.

DOI: 10.1097/IAE.0000000000003612