Centre for Eye Health

ATLAS LITERATURE REVIEW

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Welcome to the seventh issue of Centre for Eye Health's ATLAS Literature Review. Each quarter we'll be bringing you reviews from our pick of the latest literature as part of your ATLAS subscription.

Gaze Tracker Data is Not Useful for Predicting the Reliability of Visual Field Results

Prepared by Henrietta Wang

Clinical applications: Although visual field testing forms a critical component of optometric examinations, a major obstacle commonly encountered by clinicians is poor reliability or accuracy of the test results. Instrument manufacturers have developed several parameter outputs which aim to quantify the usefulness of results such as fixation losses, false positives or negatives, and gaze tracker graphs. This study aimed to correlate the intra-sessional repeatability of visual field results with gaze tracker outputs.

Summary: This study compared two visual field test results done on the same eye and the same day from over 2800 eyes of patients seen within the CFEH clinic. The two field results were compared to assess whether results with more gaze tracking 'movement' correlated to a different outcome. Gaze tracker data was broken down into: (1) total number of ticks (deviations), (2) sum of amplitudes (total extent of deviation), and (3) average amplitude (average deviation during testing). Visual field parameters such as mean deviation and event analysis were analysed as well as other metrics used to assess visual field reliability.

Key findings: While gaze tracking results can provide information on the steadiness of fixation during the test, there is no correlation between gaze tracker data outputs and intra-sessional repeatability of visual field results. These results highlight the importance of looking beyond gaze tracker data alone when assessing the usefulness or reliability of visual field results.

Reference: Phu J, Kalloniatis M. Gaze tracker parameters have little association with visual field metrics of intrasession frontloaded SITA-Faster 24-2 visual field results. Ophthalmic Physiol Opt. 2022 Sep;42(5):973-985. doi: 10.1111/opo.13006. Epub 2022 May 22. PMID: 35598152; PMCID: PMC9542222.

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Your purchase of ATLAS and our other educational materials helps to support Centre for Eye Health, and Guide Dogs NSW/ACT, and for that we are incredibly grateful.

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Nascent geographic atrophy may predict type 3 MNV development

Prepared by Meri Galoyan

Clinical applications: Early detection of macular neovascularization (MNV) is the key to early intervention and, subsequently, favourable visual outcomes for patients with age-related macular degeneration (AMD). This is particularly true for type 3 macular neovascularization (vessel proliferation at the level of the avascular zone) given long-term poorer visual prognosis compared to other subtypes of MNV despite anti-vascular endothelial growth factor (VEGF) therapy. Hence, it is valuable to detect biomarkers preceding the development of exudative type 3 MNV and identify high-risk patients requiring further imaging.

Summary: This retrospective longitudinal study included 97 eyes which showed the development of type 3 MNV in patients diagnosed with AMD. The study examined serial tracked structural optical coherence tomography (OCT) examinations for ≥ 2 years prior to the detection of exudative type 3 MNV. The study's purpose was to investigate the association between nascent geographic atrophy (GA), its prevalence and clinical characteristics at the site of exudative type 3 MNV development.

Key findings: The findings showed 22.7% of the eyes with type 3 MNV had nascent GA preceding exudative type 3 MNV formation. This occurred after a mean of 9±6 months following the detection of nascent GA. It is possible nascent GA may be a structural biomarker preceding the development of exudative type 3 MNV. Hence, the detection of nascent GA in eyes with AMD may warrant closer monitoring to identify early exudative type 3 MNV warranting treatment.

Reference: Sacconi R, Sarraf D, Sadda SR, Freund KB, Servillo A, Fogel Levin MM, Costanzo E, Corradetti G, Cabral D, Zur D, Trivizki O, Parravano M, Bandello F, Loewenstein A, Querques G. Nascent geographic atrophy as a predictor of type 3 MNV development. Ophthalmol Retina. 2023 Feb 1:S2468-6530(23)00038-6. doi: 10.1016/j.oret.2023.01.019. Epub ahead of print. PMID: 36736896.

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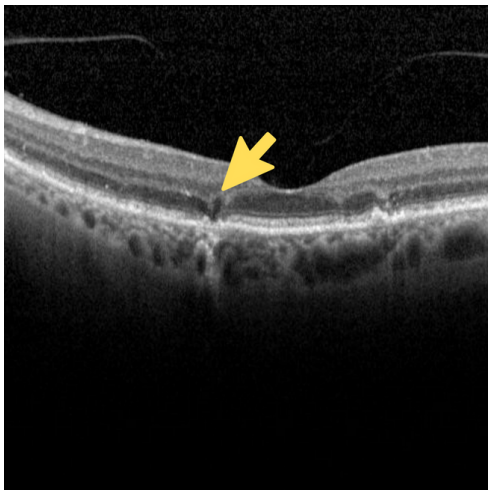
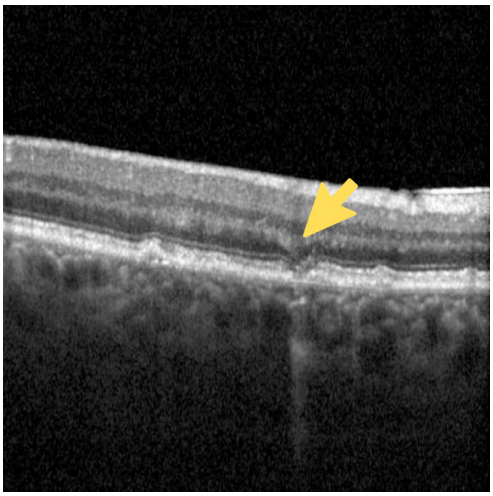
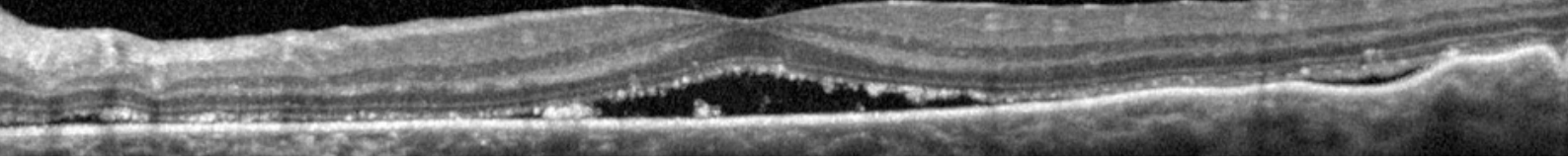
Click here for further information about classification of CNV





Figures 1 and 2: Examples of nascent geographic atrophy as seen on Spectralis OCT. Nascent GA is characterised by the subsidence of the outer plexiform (OPL) and inner nuclear layer (INL) with the presence of a hyporeflective wedge shaped band. They are typically located in the central 1500m of the macula. It is also termed IRORA (incomplete retinal pigment epithelium and outer retinal atrophy).



Choroidal Melanoma May Masquerade as Central Serous Chorioretinopathy (CSCR)

Prepared by Meri Galoyan

Clinical applications: Choroidal Melanoma is a rare finding and when it presents with associated subretinal fluid, it may masquerade as CSCR, a frequently diagnosed macular condition. This paper explores the clinical features and outcomes associated with choroidal melanomas that previously had been misdiagnosed as CSCR. Hence, raising awareness for patients with presumed chronic CSCR to be evaluated for thin melanoma with multimodal imaging and dilated fundus examination.

Summary: There are 22 patients presented in this retrospective case series. These patients were diagnosed with choroidal melanoma at Ocular Oncology Service at Wills Eye Hospital from 2004 to 2022 but were previously misdiagnosed with CSCR elsewhere. At the time of diagnosis, melanoma was submacular in 73% of the patients and extramacular in 27%. The article acknowledges the similarities between the two conditions, particularly if thin or amelanotic submacular melanomas are present or if these are located outside of macula with subretinal fluid leaking toward the macula. The characteristics to differentially diagnose these two are described in the context of multimodal imaging.

Key findings: The paper presents the following features which may be important in differentially diagnosing the two. On optical coherence tomography (OCT), CSCR presents with retinal pigment epithelial detachment (PED), increased choroidal thickness bilaterally, choroidal pachyvessels and flat choroidal surface. Most importantly no choroidal mass was detected with ultrasonography. In contrast, choroidal melanoma presents with no PED, increased choroidal thickness unilaterally, choroidal surface elevation and no signs of choroidal pachyvessels. There is a choroidal mass with acoustic hollowness on ultrasonography. Further imaging properties for fundus autofluorescence, fluorescein angiography and indocyanine green angiography are also provided in the article. It is advisable for patients with any suspicions to undergo dilated fundus examination, peripheral OCT and be referred for further imaging, as necessary.

Reference: Negretti GS, Kalafatis NE, Shields JA, Shields CL. Choroidal Melanoma Masquerading as Central Serous Chorioretinopathy. Ophthalmol Retina. 2023 Feb;7(2):171-177. doi: 10.1016/j.oret.2022.08.013. Epub 2022 Aug 13. PMID: 35973646

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Figure 3

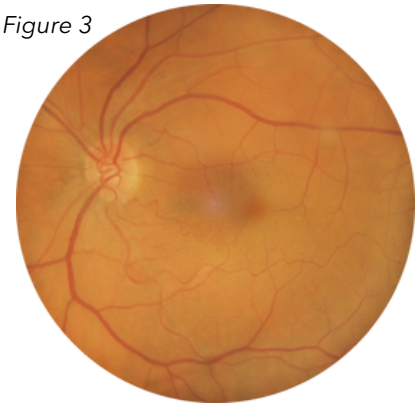


Figure 4

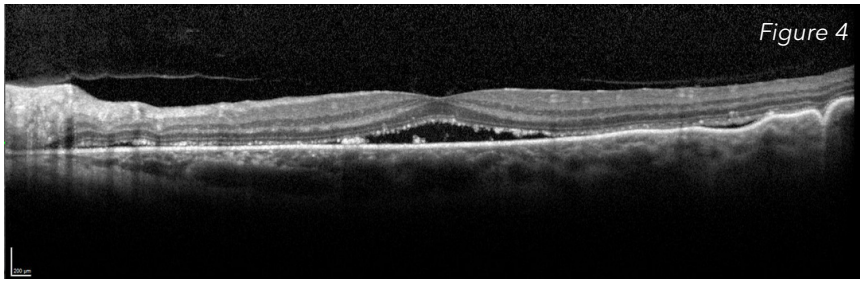


Fig 3 and 4: Posterior pole fundus photograph and OCT macular line scan from a 63 yo Caucasian male with reduced vision and distortion on Amsler grid. These images in isolation indicate likely CSCR.

Figure 5

Figure 6

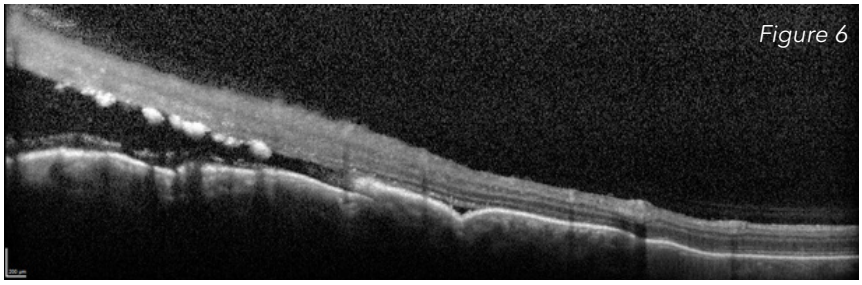
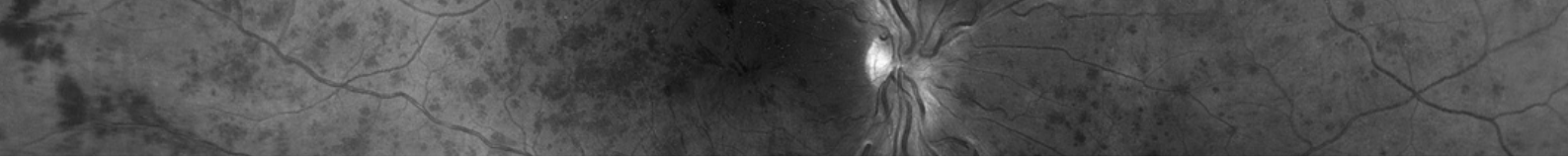


Fig 5 and 6: Optomap widefield image of the same patient shows a large choroidal elevation temporally in the left eye. A vertical line scan at the edge of the lesion shows an exudative retinal detachment overlying choroidal undulations, an appearance highly suggestive of choroidal melanoma.



Effective Blood Pressure Control May Reduce the Incidence of Retinal Vein Occlusion

Prepared by Michele Clewett

Clinical applications: The results of this study suggest that hypertension is a strong risk factor for retinal vein occlusion (RVO), and that the incidence of RVO may be reduced through effective control of blood pressure (BP). Clinically, these findings lend support to the concept of Optometrists taking in-office blood pressure measurements. Patients with elevated BP should be referred on to their general practitioner for assessment, potentially helping to prevent future RVO. Additionally, those presenting with an acute RVO should also be referred for medical assessment.

Summary: In this cross-sectional study, the health records of 379 008 randomly selected Koreans were analysed. The authors referenced the 2017 American College of Cardiology/American Heart Association Hypertension Guidelines below to classify blood pressure (BP):

	Systolic BP (mmHg)	Diastolic BP (mmHg)
Normal BP	<120	<80
Elevated BP	120-129	<80
Stage 1 Hypertension	130-139	80-89
Stage 2 Hypertension	≥140	≥90

Based on the patient history, hazard ratios (HR) were calculated and adjusted for risk factors such as age, sex, BMI, fasting glucose, cholesterol, medications, smoking and alcohol consumption.

Key findings: The incidence rate of RVO was found to be 89.91 per 100 000 person-year while central retinal artery occlusion (CRAO) and branch retinal artery occlusion (BRAO) were 5.89 and 83.75 respectively. Of note, the risk of RVO increased with each classification stage above 'normal'.

When the BP of those with stage 2 hypertension was lowered to "normal" levels, the risk of RVO was reduced but was still higher than those patients with no historical increase in BP. If the BP was only reduced to an "elevated" level, the risk of RVO was not significantly reduced.

The low incidence of CRAO meant that findings relating to this condition were not considered statistically significant, however the risks were consistently higher across all hypertensive groups. Analysis of the incidence of BRAO in the studied population did not show any statistical differences between hypertensive groups.

Reference: Kim HR, Lee NK, Lee CS, Kim SS, Lee SW, Kim YJ. Retinal Vascular Occlusion Risks in High Blood Pressure and the Benefits of Blood Pressure Control. Am J Ophthalmol. 31st Jan 2023. doi.org/10.1016/j.ajo.2023.01.023 EPub ahead of print

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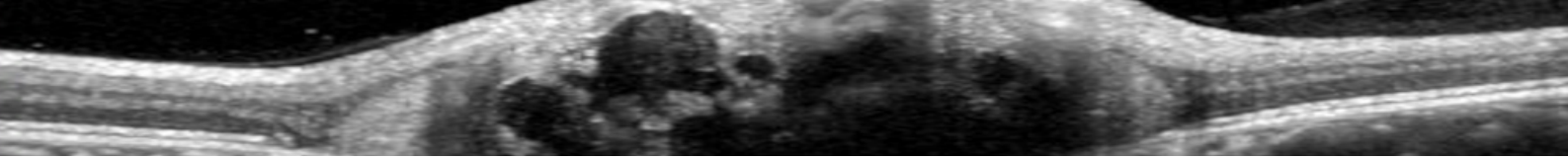
For more information on the ocular effects of hypertension, please join our interactive webinar on 11th April 2022 at 6:30pm AEST. This webinar is included as part of the 2023 CFEH Education package. For more information, please email education@cfeh.com.au



Younger Patients with Optic Nerve Head Drusen Have Greater Short-Term Fluctuations in RNFL Thickness Compared to Older Patients

Prepared by Henrietta Wang

Clinical applications: As there is notable overlap in the clinical features between optic nerve head drusen (ONHD) and true disc swelling, patients presenting with elevated optic nerves are often closely reviewed using repeat fundus photography, fields and OCT. A change in RNFL thickness or disc appearance over a short period of time is often considered a sign of papilloedema as ONHD are thought to be slow progressing. This study aimed to evaluate the natural history of short-term RNFL thickness changes in patients with ONHD.

Summary: This retrospective study included 80 eyes in total (40 without ONHD and 40 with ONHD). Participants were split into two categories based on age (20 years or younger versus over 20 years). The difference in RNFL thickness from RNFL scans taken less than one year but at least one month apart was evaluated. Patients under 20 years old with ONHD had significantly greater fluctuations in RNFL thickness compared to those greater than 20 years old with ONHD. The inferonasal sector was the most common location for change.

Key findings: When reviewing patients with elevated optic nerves, clinicians should be aware that short-term RNFL variability is higher in younger patients with ONHD. As a result, it is important to assess any suspected changes in RNFL thickness in the context of other clinical findings such as the disc appearance.

Reference: Tonagel F, Wilhelm H, Stock L, Kelbsch C. Influence of Patient Age and Presence of Optic Disc Drusen on Fluctuations in Retinal Nerve Fiber Layer Thickness. J Neuroophthalmol. 2022 Dec 6. doi: 10.1097/WNO.0000000000001766. Epub ahead of print. PMID: 36730153.

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We appreciate any feedback you may have about our educational resources, particularly the CFEH Atlas. This resource will undergo continuous review and improvement and more cases will be added over time. If you have any feedback or suggestions, we would love to hear them! Please send us an email: education@cfeh.com.au.