The recent review by Bhavsar and colleagues [1] on Acute macular neuroretinopathy (AMN) makes important points drawing on the availability of new multimodal imaging modalities. We agree with the concept that capillary plexus ischemia causes AMN and Paracentral acute middle maculopathy (PAMM). In this context the authors make a convincing point for the future role optical coherence tomography (OCT) angiography (OCTA) likely will play in the diagnostic work up.

Whilst we share the enthusiasm, a word of caution may be helpful as the clinical spectrum of AMN and PAMM keeps expanding and very subtle changes on OCT/OCTA are used to make a diagnosis. Second, as the authors correctly state causality of the presumed microvascular mechanisms still requires to be proven and we illustrate this with a own case.

First, it is relevant to be aware of pitfalls using OCT and OCTA. Artifactual hyperreflective bands may be seen close to the foveola due to oblique entrance of the OCT measurement beam which influences layer thickness data [2]. This is caused by asymmetric light back scattering from Henle fibres. Therefore one needs to be careful to keep the OCT B-scan strictly horizontally aligned during imaging [3]. Next, segmentation failure using automated algorithms may cause atrifactual thickness changes. For this reasons careful manual revision of segmented OCT scans is mandatory [4]. The same applies to OCTA which also requires careful revision of layer segmentation and localization of the capillary plexi. Finally, saccadic intrusions during OCTA may cause artifactual cutoff of vessels. A multimodal retinal imaging approach demonstrating consistent findings across modalities will contribute to optimize diagnostic specificity and sensitivity.
Such an approach should also consider Scanning Laser Polarimetry as probably one of the earliest signs for retinal tissue damage [5].

Second, changes in the retinal microvasculature may exist with and without associated INL thinning and corresponding scotoma. A 68 year old man presented to our clinic on the 6th of May 2015, two months after sudden onset of a scotoma in his left eye inferotemporal to fixation (Figure 1A). He has a past medical history of hypertension, hypercholesterolaemia. He was a non-smoker and did not consume caffeine containing drinks. His best corrected Snellen visual acuity was 6/6 bilaterally. The fundus was normal, arterioles were not attenuated with no emboli seen. Spectral domain OCT showed thinning of the INL.

Automated retinal layer segmentation was performed and carefully quality controlled (blue and orange lines inset to Figure 1B). Following OCT image post-processing a thickness map of the INL was calculated (Figure 1C). Clearly there was localized atrophy of the INL corresponding to the scotoma shown on the Amsler chart. Interestingly OCTA demonstrated localized ramification of the deep capillary plexus adjacent to INL atrophy (Figure 1D). In addition there were additional areas of ramification of the retinal microvasculature not associated with inner or outer nuclear layer thinning or visual symptoms. We have since seen similar in other patients and remain cautious about the specificity of this OCTA finding.

Taken together it remains the possibility that the reported OCT/OCTA signs may not be entirely disease specific and because prone to artifacts, a rigorous quality control pipeline needs to be in place.

Authors:
Lana Del Porto
Axel Petzold MD PhD
Moorfields Eye Hospital, City Road, London, United Kingdom.

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References

1. Bhavsar, K. V.; Lin, S.; Rahimy, E.; Joseph, A.; Freund, K. B.; Sarraf, D. and Cunningham, E. T. (2016). *Acute macular neuroretinopathy: A comprehensive review of the literature.*, Survey of ophthalmology 61 : 538-565.

2. Oberwahrenbrock, T.; Weinhold, M.; Mikolajczak, J.; Zimmermann, H.; Paul, F.; Beckers, I. and Brandt, A. U. (2015). *Reliability of Intra-Retinal Layer Thickness Estimates.*, PLoS One 10 : e0137316.

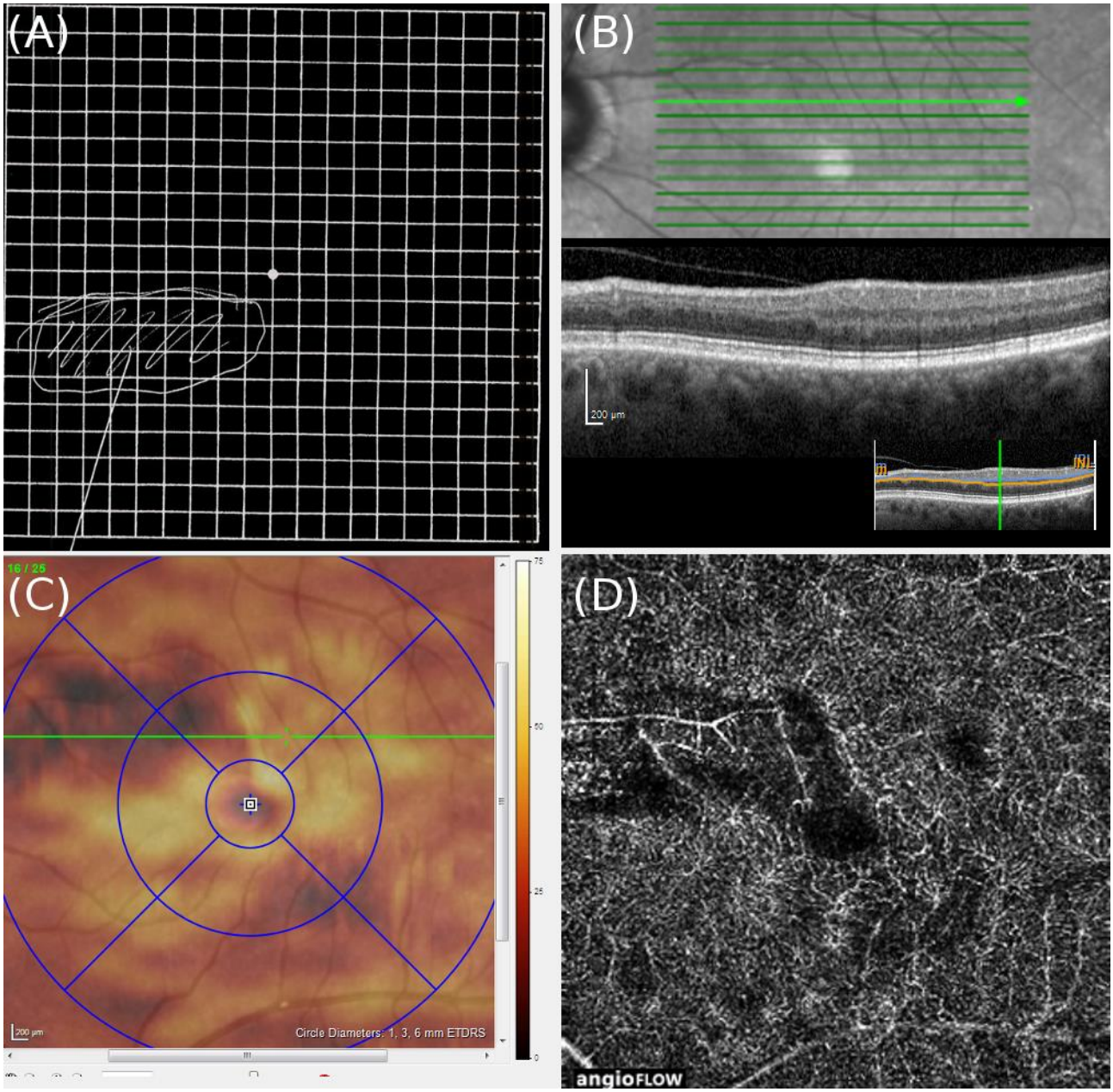
3. Balk, L. J.; de Vries-Knoppert, W. A. E. J. and Petzold, A. (2012). *A Simple Sign for Recognizing Off-Axis OCT Measurement Beam Placement in the Context of Multicentre Studies.*, PLoS One 7 : e48222.

4. Cruz-Herranz, A.; Balk, L. J.; Oberwahrenbrock, T.; Saidha, S.; Martinez-Lapiscina, E. H.; Lagreze, W. A.; Schuman, J. S.; Villoslada, P.; Calabresi, P.; Balcer, L.; Petzold, A.; Green, A. J.; Paul, F.; Brandt, A. U.; Albrecht, P. and IMSVISUAL consortium (2016). *The APOSTEL recommendations for reporting quantitative optical coherence tomography studies.*, Neurology 86 : 2303-2309.

5. Kupersmith, M. J.; Anderson, S.; Durbin, M. K. and Kardon, R. H. (2013). *Scanning Laser Polarimetry, but not Optical Coherence Tomography Predicts Permanent Visual Field Loss in Acute Non-Arteritic Anterior Ischemic Optic Neuropathy.*, Invest Ophthalmol Vis Sci 54 : 5514-5519.

FIGURE LEGEND

Figure 1: PAMM in a 68 year old male patient. **(A)** The Amsler chart demonstrates a scotoma inferior paracentral, extending to 5 degrees of visual angle horizontally and 1.5 degrees vertically. **(B)** Top of images show the confocal scanning laser ophthalmoscopy. The green line overlay indicates the OCT macular volume scan performed. The bold green line shows the location of the OCT B-scan to the bottom of the figure. The OCT B-scan reveals thinning of the inner nuclear layer (INL). This is the 4th layer from the top appearing as a thin dark grey band to the left which becomes thicker further to the right. Note compensatory thickening of the adjacent outer plexiform and outer nuclear layers. The inset shows the result of retinal segmentation with the INL located in between the blue and orange lines. **(C)** The thickness map of the INL provides evidence for localized atrophy. The legend to the right of the image indicates that the degree of atrophy is 5-10 um (dark red colour) at the location of the horizontal green line. The adjacent healthy INL (already shown in B) has a thickness of 55-65 um (light yellow colour). (D) OCTA shows corresponding ramification (dark areas) of the deep capillary plexus just inferior to the INL. In addition there are multiple areas of ramification not corresponding to other signs or symptoms.


(A)
(B)
200 µm
(C)
16 / 25
200 µm
Circle Diameters: 1, 3, 6 mm ETDRS
75
50
25
0
(D)
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