Journal Article Review

Optical coherence tomography angiography for identifying choroidal neovascular membranes: a masked study in clinical practice

Based on:
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Background and Purpose

This study reports on the diagnostic utility of the SPECTRALIS® OCT Angiography (OCTA) Module and Spectral Domain OCT (SD-OCT) for the identification of Macular Neovascularization (MNV), in treatment-naïve patients with neovascular age-related macular degeneration (nAMD). While fluorescein angiography (FA) is the current "gold standard" imaging modality for the evaluation of CNV, OCTA has emerged as a non-invasive alternative for the assessment of these patients. OCTA images provide detailed three-dimensional information of the different vascular layers and can be acquired alongside high-resolution SD-OCT images on a single imaging platform. All imaging in this study was performed as part of routine clinical practice in a real-world setting.

Methods

Forty-three eyes from twenty-six consecutive treatment-naïve patients with suspected nAMD were included in this retrospective study. SPECTRALIS HRA+OCT was used to acquire macular FA (30°), structural OCT (25 B-scans over 20°×20°), and OCTA (512 B-scans over 10°×10°). Three clinicians assessed the presence of nAMD lesions on the OCTA images using a) the avascular complex automated slab, b) a 40µm followed by a 100µm thick slab dragged manually through the OCTA volume. Then, c) the SD-OCT images were included to evaluate potential lesion sites and the presence/absence of MNV at these sites, and a subsequent re-assessment with the OCTA images. Sub-retinal hyper-reflective material (SHRM) and double layer sign (DLS) were also evaluated. Finally, they assessed FA together with the patient's electronic medical records as reference to calculate the sensitivity and specificity for detecting MNV using OCTA alone and combined with SD-OCT.

Results

- Eighteen eyes had no evidence of MNV and twenty-five eyes had active MNV confirmed on FA. There were eight type 1, five type 2, six mixed type 1+2, one predominantly type 1, and five type 3 lesions.
- The pooled sensitivity and specificity values were, respectively, a) automated slab: 84% and 100%, b) custom slab: 92% and 94%, c) combined SD-OCT and OCTA: 88% and 94%.
- The high sensitivity and specificity of evaluating nAMD with combined SD-OCT and OCTA were very similar to those of evaluating structural OCT signs of nAMD. These signs were present in a substantial proportion of nAMD cases (DLS: 65% and SHRM: 55%).
- Using the custom slab to scroll through the OCTA images above and below Bruch's membrane, as well as combining this with viewing the SD-OCT images, showed improved sensitivity for identifying type 1 MNV lesions compared to using the automated slab.
- 100% of the type 2 MNV lesions included in the study were correctly identified using the automated and custom slab.
- Three of the five type 3 MNV cases could be identified on OCTA.

Conclusions

The SPECTRALIS OCT Angiography Module has high sensitivity and specificity for detecting CNV at baseline in treatment-naïve nAMD patients. These real-world findings suggest that it is advantageous to use a combination of the automated and custom slab methods, alongside evaluation of the SD-OCT images, to systematically evaluate OCTA images for MNV. Caution should be exercised in using OCTA to identify type 3 lesions with en-face OCTA slabs; examination of OCT B-scans with flow overlay may improve the detection of type 3 MNV1.

1. Faridi A, et al. Sensitivity and specificity of OCT angiography to detect choroidal neovascularization. Ophthalmol Retin. 2017 1:294–303.