-Retina-

Journal Article Review

Optical Coherence Tomography 2

Diagnostic tool to study peripheral vitreoretinal pathologies

Cereda MG, Corvi F, Cozzi M, Pellegrini M, Staurenghi G. Retina, Nov 2017. Article in Press.

Background and Purpose

Optical coherence tomography (OCT) has become a standard of care in ophthalmology, allowing for improved understanding of (chorio-) retinal pathogenesis and the development of new therapies. Although the standard 30° field of view (FOV) on the OCT base platform is useful to examine diseases that primarily affect the macula, loss of OCT sensitivity with depth and optical distortions may limit the visualization of sight-threatening diseases in the periphery such as retinal tears, holes, detachments, peripheral retinoschisis and vascular diseases. Heidelberg Engineering offers 55° widefield OCT (WF OCT) as well as the OCT2 Module for the SPECTRALIS® multi-modal imaging platform. The OCT2 Module increases the scan speed from 40 to 85 kHz as well as the signal-to-noise ratio throughout the retina and deeper into the choroid. Similar to the base platform, the OCT2 Module can perform 55° WF OCT scans. Considering these improvements, the authors of this study investigated the clinical feasibility of using WF OCT together with the OCT2 Module, along with its potential benefits in the evaluation of the aforementioned diseases that present in the mid- to far periphery.

Methods

31 eyes from 31 patients (18 males), mean age 48.4 ± 15.6 years, were included in the study. Inclusion criteria were the presence of a peripheral retinal pathology and a documented attempt at scanning the same lesions with SPECTRALIS HRA+OCT using the 30° lens and with SPECTRALIS HRA+OCT with OCT2 Module using the 55° WF lens. Excluded eyes had significant media opacities, diseases which may affect image quality, or inadequate pupil dilation. Lesions were classified according to position (e.g. superior) and location in the mid- or far periphery; the course of the major temporal arcade delimited the macula, an imaginary line connecting the vortex veins delimited the mid-periphery, and the ora serrata delimited the far periphery.

Discussion

44 lesions were successfully imaged with OCT2 with the WF lens, including 18 retinal detachments, 15 retinal holes and tears, 9 retinoschisis and 2 retinal tufts. 14 (32%) pathologies were found in the mid-periphery and 30 (68%) in the far periphery. Using the standard 30° objective without the OCT2 Module, lesion visualization was limited to 10 (71%) and 11 (37%), respectively. No lesions were observed by standard 30° imaging on OCT that were not observed by OCT2 and 55° FOV. In this sample, OCT2 with the WF lens obviated the need for B-scan ultrasonography to differentiate between asymptomatic and rarely-progressive retinoschisis from retinal detachment in the periphery (**Fig 1**). This combination also provided supplemental information to WF infrared imaging in order to facilitate this differentiation, as infrared imaging guides the detection of retinoschisis while OCT2 with the WF lens allows for better characterization of its margins (**Fig 2**). Retinal tears and holes could also be differentiated using multiple WF OCT scans.

Conclusions

WF OCT with the OCT2 Module was helpful in identifying and characterizing various lesions in the mid- and far-periphery, and may prove helpful in patient management, treatment, and surgical planning. This technique obviates the need to montage multiple OCT scans, and it provides an enhanced view of the choroid, retina and vitreous without specific imaging protocols such as enhanced depth or vitreous imaging. The authors note: “OCT2 could be used to differentiate and better characterize retinal holes and tears, especially to evaluate the presence of vitreoretinal traction” that would require different treatment approaches. The authors conclude: “The application of OCT2 with the 55° lens, along with scan length and angle modulation in the retinal periphery, could expand our understanding of peripheral vitreoretinal diseases, providing advancements that may have positive impact on both clinical and surgical care.”

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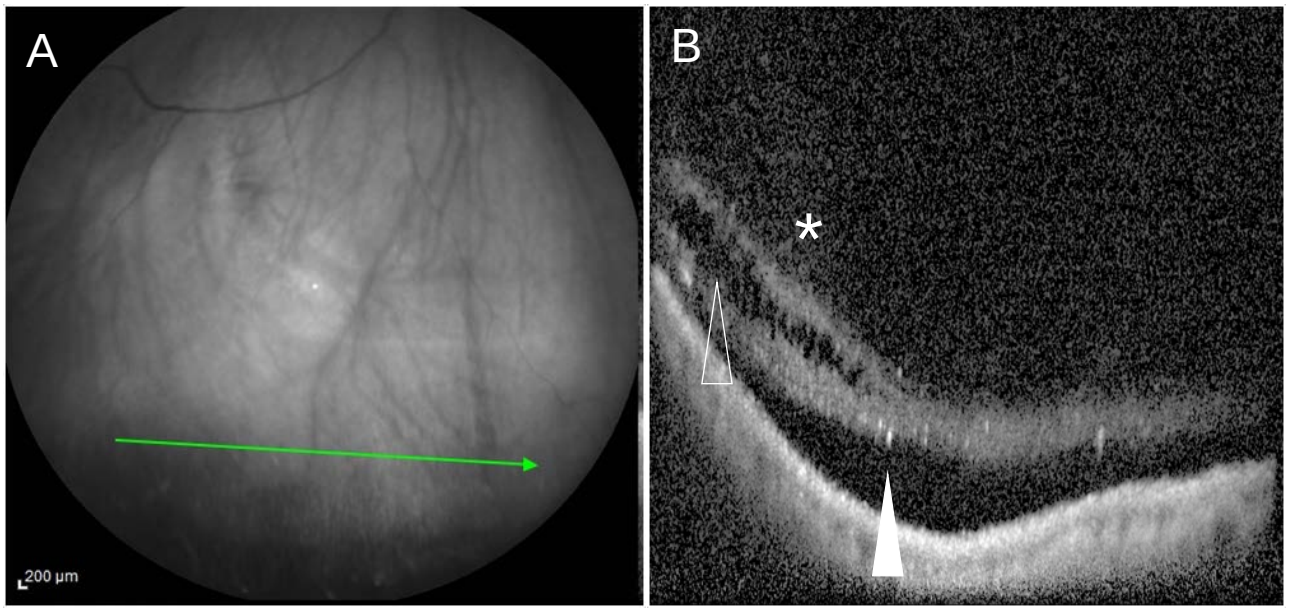

Fig 1. Widefield infrared imaging showing the position of a WF OCT scan (**A**). WF OCT scans taken with the OCT2 Module enable a clear distinction between the split in the neurosensory retina typical for retinoschisis (open arrowhead) and retinal detachment, which is characterized by a separation of the neurosensory retina from the retinal pigment epithelium (arrowhead) (**B**). The asterix indicates the vitreous.

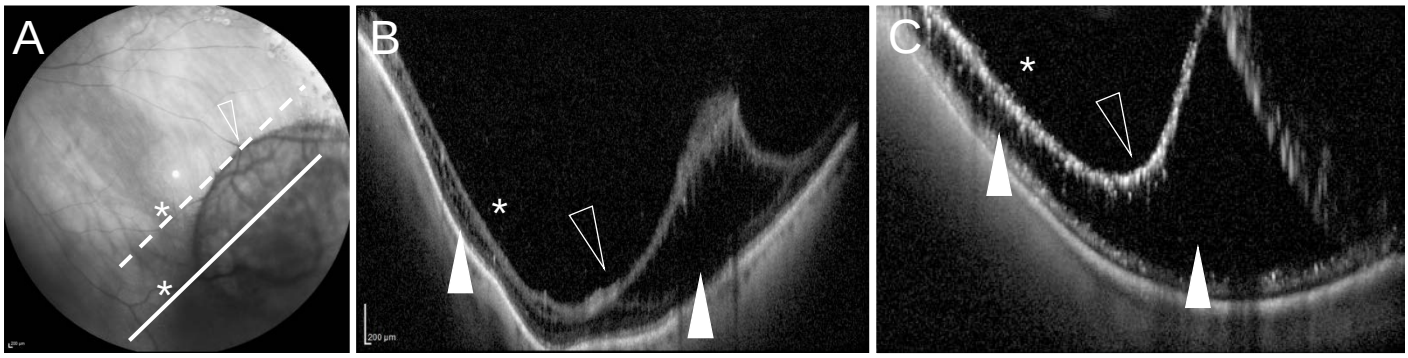

Fig 2. In this case of retinoschisis, a well-defined border is visible on widefield infrared (**A**). However, WF OCT scans taken with the OCT2 Module show that the margins of retinoschisis are in fact at a different position (dashed and continuous lines indicate the exact positions of OCT scans in **B** and **C**, respectively). The split in the neurosensory retina –without retinal detachment– is clearly visible (arrowheads).

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