Characterization of Structural Changes in Birdshot Chorioretinopathy using Extramacular "Enhanced Depth" Optical Coherence Tomography

Alastair K. Denniston[1,2], Pearse A. Keane[3], Musarrat Allie[2], Stephen J. Turner[2], Philip I. Murray[1]

[1]Academic Unit of Ophthalmology, University of Birmingham, Birmingham, UK; [2]Birmingham & Midland Eye Centre, Birmingham, UK; [3]NIHR Biomedical Research Centre, Moorfields Eye Hospital and UCL Institute of Ophthalmology, London, UK

Purpose

- To use "enhanced depth" optical coherence tomography (OCT), both at the macula and more peripherally, for the characterization of chorioretinal structural changes in patients with Birdshot chorioretinopathy[1].

Methods

- Spectral domain OCT images (Spectralis, Heidelberg Engineering, Germany) were prospectively collected from patients with known HLA-A29 positive Birdshot chorioretinopathy (n=12). Median age was 60 (range 28-69) years.
- Images were acquired both from the macula and from four peripheral locations:
  1) superior to the superior temporal vascular arcade;
  2) inferior to the inferior temporal vascular arcade;
  3) nasal to the optic disc;
  4) temporal to the macula.
- All images were obtained using standard and "enhanced depth" scanning protocols. For “enhanced depth” OCT scanning **(Figure 1),** the OCT instrument was placed close enough to the eye to obtain an inverted image. Seven sections, each comprised of 100 averaged B-scans, were then obtained in a 5 x 30-degree raster scan.
- Qualitative assessment was performed for each case and comparison was made with age-matched healthy controls (n=12).

Results

- Retinal atrophic changes were seen as generalized thinning with loss of normal retinal architecture, accompanied by almost complete disruption of the photoreceptor inner segment - outer segment junctions; these atrophic areas corresponded to the typical ‘Birdshot lesions’ seen clinically (**Figure 2**). In some patients clumps of discrete hyperreflective material were seen in the outer nuclear layer (presumably reflecting clusters of degenerating photoreceptors).
- Images from the macula often appeared normal, despite widespread atrophic changes visible on peripheral scans (**Figure 2**).
- Using “enhanced depth” OCT, the choroid appeared grossly intact in the majority of patients, however, areas of choroidal depigmentation could be seen as focal areas of scleral hyperreflectivity and, in patients with advanced disease, choroidal atrophy could be seen (**Figure 3**).

Enhanced Depth Extramacular Scanning - Controls

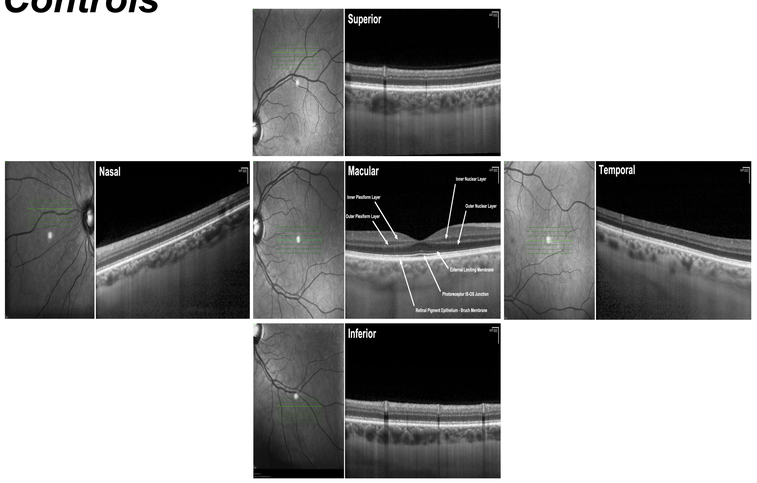

Figure 1. Enhanced depth spectral domain OCT images from representative healthy control. Key retinal features are indicated on macular scan (central panel). Location of extramacular scans are shown in individual panels.

Birdshot – Retinal Features

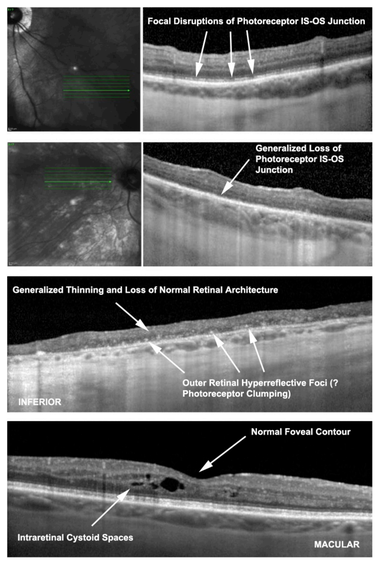

Figure 2. Extramacular and macular enhanced depth spectral domain OCT images of patients with Birdshot chorioretinopathy highlighting distinct retinal features.

Birdshot – Choroidal Features

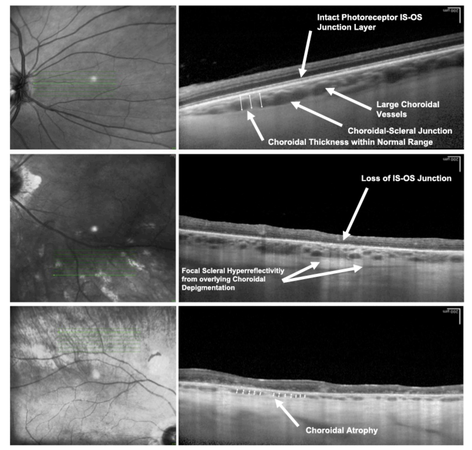

Figure 3. Extramacular enhanced depth spectral domain OCT images of patients with Birdshot chorioretinopathy showing key choroidal features.

Conclusions

- In patients with uveitis, OCT has typically been limited to the use of macular scans for the evaluation of features such as cystoid macular oedema.
- Use of extramacular scanning may extend the range of applications for OCT[2] and allow improved phenotyping of uveitic disorders.
- Similarly, use of "enhanced depth" OCT, allowing improved visualization of the choroid, may be of particular use in patients with choroidal inflammatory conditions.[3]

References

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