SD-OCT Imaging of Laser Lesions Over Time

SD-OCT images were taken at various time points post laser treatment. Disruption of the IS/OS at the site of laser lesions is clearly visualized. Hyperreflective material is also observed in the outer retina at some lesion sites, and similar structures have been previously noted. This hyperreflective material is seen consistently over time in both macular and peripapillary laser lesions. Majority of lesions in the first two images of DH345 prevented AO imaging initially, but AO imaging was successful after edema regressed (1/175 days).

A newly-constructed AOSLO was used to image laser lesions in the superior retinas and correlate them with SD-OCT and fundus images from the same area. Shown below is a horizontally-oriented B-scan acquired using the Bioptigen SD-OCT system (A), a cropped area from a color fundus photo (B), and a corresponding C-scan image (C) acquired with the Cirrus HD-OCT system. Panel D shows an AOSLO montage of these 9 lesions (scale bar is 200µm), and the boundaries of this montage are indicated by the arrows in A-C.

Conclusions

1. SD-OCT imaging shows IS/OS disruption and ORL hyperpigmentation, consistent with photoreceptor damage in the laser-treated areas. This loss was consistent one-year post laser treatment.

2. AO and AOSLO imaging tools enable visualization of laser lesions and individual photoreceptors in laser-treated retinas including the ability to calculate photoreceptor density. These images confirm loss of photoreceptors in the laser lesion, though the normal red and cone density in areas adjacent to the lesions and discrete boundary of the individual lesions suggests that the effects of the short duration Pascal™ laser are limited to the site of application over the time period studied.

3. Hypereflective spots visualized in AOSLO and AO images appear in laser lesion sites. Given the SD-OCT findings, it is unlikely these represent photoreceptors. It is possible that they originate from Müller cells or other glial elements. This reminds us that not all bright spots in AO images necessarily correspond to photoreceptors.

References


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