Appearance of large drusen and reticular pseudodrusen on adaptive optics in age-related macular degeneration

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Purpose: To describe the appearance of large drusen and reticular pseudodrusen on adaptive optics (AO) in non neovascular age-related macular degeneration (AMD).

Methods: Flood illumination AO infrared (IR) fundus images were obtained using an AO retinal camera (rtx1; Imagine Eyes, Orsay, France) in 13 consecutive patients with large drusen only or reticular pseudodrusen only. AO IR images were overlaid with confocal scanning laser ophthalmoscope (cSLO) IR reflectance images and spectral domain optical coherence tomography (SD-OCT) scans to allow direct correlation of en face AO features, including cone appearance, with drusen/pseudodrusen.
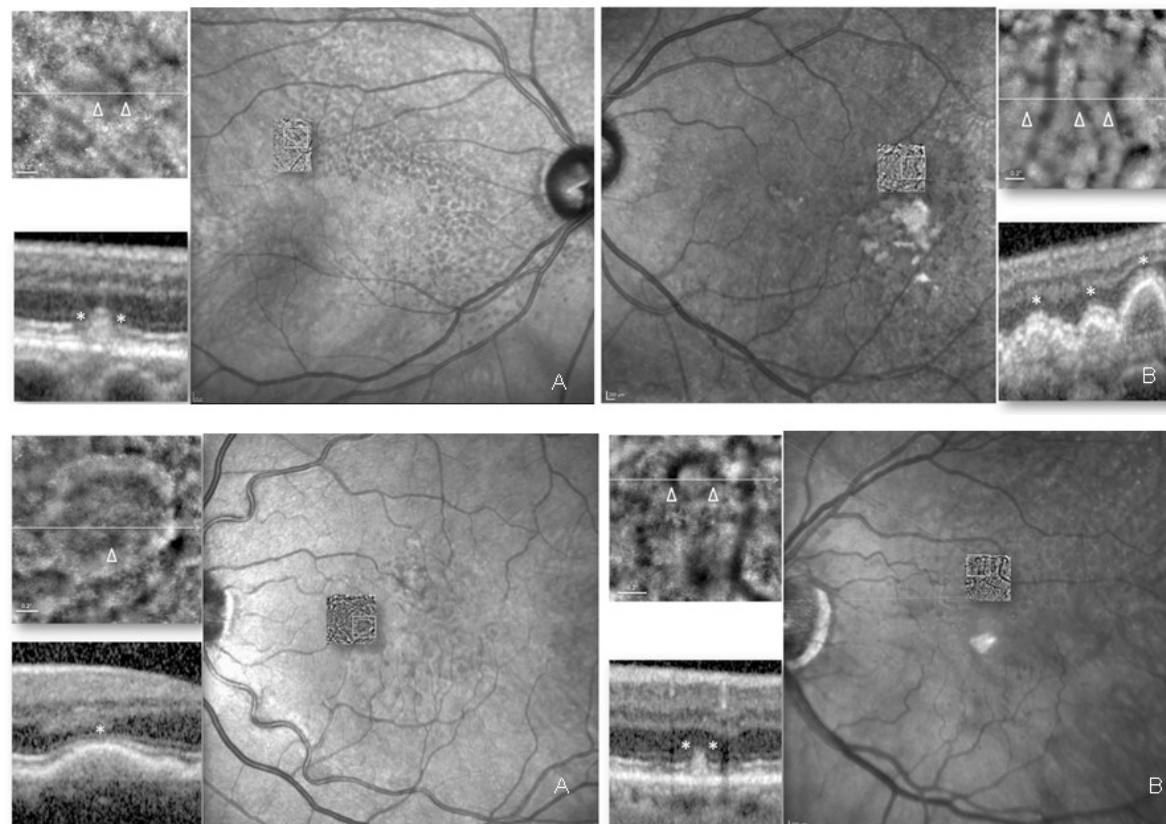
Figure 1. En face adaptive optics (AO) imaging overlaid with confocal scanning laser ophthalmoscope (cSLO) infrared (IR) reflectance, and cSLO IR-referenced spectral-domain optical coherence tomography (SD-OCT) scans in a patient (patient #7, right eye) with reticular pseudodrusen (A), and in a patient (patient #1, left eye) with medium large drusen (B)

Figure 2. En face adaptive optics (AO) imaging overlaid with confocal scanning laser ophthalmoscope (cSLO) nfrared (IR) reflectance, and cSLO IR-referenced spectral-domain optical coherence tomography (SD-OCT) scans in a patient (patient #6, left eye) with medium large drusen (B), and in a patient (patient #10, left eye) with reticular pseudodrusen (B).

Results: In 8 eyes of 6 patients (1 male and 5 female; mean age 65.3 ± 14.9 years) a total of 19 images, sized 4° x4°, of large drusen individuated on cSLO IR reflectance and SD-OCT were investigated by AO imaging. En face AO revealed large drusen as highly hyperreflective round/oval lesions, always centered and/or surrounded by a continuous/discontinuous hyporeflectivity. Interestingly, cone photoreceptors were detected overlying drusen, appearing either as continuous "bright" hyperreflective dots over a "dark" hyporeflective background, or as continuous "dark" hyporeflective dots over a "bright" hyperreflective background. In 8 eyes from 8 patients (all female; mean age 79.3 ± 6.6 years) a total of 14 images, sized 4° x4°, of pseudodrusen individuated on cSLO IR reflectance and SD-OCT were investigated by AO imaging. En face AO revealed reticular pseudodrusen as isoreflective lesions, always surrounded by a continuous/discontinuous hyporeflectivity. Interestingly, cone photoreceptors were detected overlying pseudodrusen, appearing as "bright" hyperreflective dots over either a hyporeflective or isoreflective background. No "dark" hyporeflective dots were detected in eyes with reticular pseudodrusen only. Cone photoreceptors were counted on the border of the drusen and pseudodrusen respectively, and in a visibly healthy zone in its absolute vicinity. A similar decrease in cone appearance could be observed for both drusen and pseudodrusen (15% versus 13%).

Conclusions

AO allows appreciating differences in reflectivity and cone photoreceptors appearance between large drusen and reticular pseudodrusen. These findings may give insight into the different pathophysiology of different non neovascular AMD phenotypes.