Swept Source OCT Angiography of full thickness macular holes before and after surgery

Author(s): Zofia Michalewska, Jerzy Nawrocki
Affiliation(s): Ophthalmic Clinic Jasne Blonia, Lodz, Poland

Purpose
The aim of this study was to evaluate macular microcirculation with Swept Source OCT Angiography (SS-OCTA) in eyes with full-thickness macular holes before and after surgery and in fellow eyes. This is the first presentation of swept source OCT Angiography in a series of macular hole cases.

Methods
This was a retrospective, observational study. SS-OCTA was performed either before or after surgery of full-thickness macular hole. Vitrectomy with the "Temporal Inverted ILM flap" technique was used. We measured the diameter and areas of the fovea avascular zone and the deteriorated circulation zone in superficial and deep retina vasculature before and after surgery. Similar measurements were performed in the fellow eyes.

Results
We examined 88 patients; 33 eyes with idiopathic full-thickness macular holes, and 45 eyes of other patients after successful repair of full-thickness macular holes. Additionally, we examined 16 unaffected fellow eyes from the above-mentioned cohort. In cases of full-thickness macular holes if the hole size was small, the OCT angiography retina segmentation was correct. In cases of large, stage four macular holes with elevated margins, in the center we observed a hyperreflective circle in all layers, which corresponds to segmentation failure resulting from the segmentation line being automatically localized below the retinal pigment epithelium. Additionally, in cases with cystic spaces around the fovea, the detection of blood flow was only partially possible, showing artifactous defects of perifoveal vasculature, which were not found after surgery. A statistically significant correlation between the size of the zone of deteriorated vessels in deep retinal layers and postoperative central retinal thickness was observed ($P<0.05$).

Conclusions
In this paper, we present different artifacts occurring during the visualization of full-thickness macular holes with Swept Source OCT Angiography. Additionally, we confirm with SS-OCTA that blood flow in deep retinal layers might be altered in full-thickness macular holes. In eyes with a larger area of deteriorated vessels in their deep retinal layers, lower postoperative central retinal thickness was observed.

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