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Choroidal Thickness Increase after Intraocular Pressure Change Measured with Swept-Source Optical Coherence Tomography

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Footnotes

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Abstract

Purpose : This study aims to evaluate the choroidal thickness change using swept-source optical coherence tomography (SS-OCT) after intraocular pressure (IOP) lowering surgical procedures to treat progressing glaucoma.

Methods : Subjects referred to IOP-lowering surgery due to progressing glaucoma presenting typical optic nerve head (ONH) and OCT findings, high IOP and visual field (VF) damage were included. Patients underwent 24-2 perimetry (SITA standard; Humphrey Field Analyzer; Zeiss) and SS-OCT with fundus picture (DRI-Triton; Topcon) using the wide-field 9mmx12mm and the peripapillary radial scans with the follow-up mode to measure at the same location. IOP and choroidal thicknesses (table 1) were taken before and 6 to 10 days after surgery. The automated segmentation from the commercially available SS-OCT software was used to obtain the measurements from the central 1mm circle from the wide-field and from the inferior, superior, nasal and temporal sectors at the 500 µm and 1000µm distance from the Bruch's membrane opening (BMO) from the radial scan. The caliper from the software Imagenet 6 (Topcon) was used to manually measure 500µm and 1000µm from the BMO and at this distance the automated measurement from the choroid segmentation was obtained. The statistical analysis was performed using Wilcoxon Signed Ranks Test.

Results : Ten eyes (10 subjects) were qualified for this study. The mean age was 61.30±14.4. The mean circumpapillary retinal nerve fiber layer (cpRNFL) and ganglion cell-inner plexiform layer (GCL+) inferior and superior sectors thicknesses were 49 ± 15.5 µm, 47.5±9.3 µm and 51±8.5µm, respectively. The mean IOP before and after the procedure was 20.30±5.3 mmHg and 12± 9.4 mmHg, respectively (p=0.012). The choroid thickness at the macular center and at the inferior, nasal and temporal peripapillary sectors measured 1000µm from the BMO increased significantly (table 1). The IOP change correlated significantly with change of the choroid thickness at the macular center (r= -0.811, p=0.004).

Conclusions : Choroidal thickness increased significantly after IOP-lowering surgery at the central macular region and in the inferior, nasal and temporal peripapillary sectors measured 1000 µm from the BMO. The effect of these findings on the perfusion of the optic nerve head and neuroprotection should be further studied.

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