Individual Macular Layer Evaluation with Spectral Domain Optical Coherence Tomography in Normal and Glaucoma Eyes.

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Footnotes

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Abstract

Purpose : The macular region is involved in the glaucomatous damage. Its parameters are useful for glaucoma diagnosis and monitoring. The aim of this study is to evaluate the individual macular layers using the automated segmentation of a commercially available device and its association with glaucoma and its severity.

Methods : Subjects with glaucoma presenting typical optic nerve head (ONH) findings, high intraocular pressure with or without visual field (VF) damage and normal controls were included. Patients underwent 24-2 perimetry (SITA standard; Humphrey Field Analyzer; Zeiss) and spectral-domain OCT (Spectralis; Heidelberg Engineering). Subjects were divided into three groups based on the severity (early, moderate and severe) of the mean deviation (MD) of the VF: ≥-6 dB; ≥-12 dB and <-12 dB, respectively; and a healthy control group. Automated individual layers and the summation of layers were checked for proper segmentation and plotted using the average of the sectors from the ETDRS Grid circles (diameters: center 1mm, inner circle 3mm, outer circle 6mm). Statistical analysis was performed using generalized estimating equations to allow for clustered observations.

Results : 109 eyes (67 subjects) qualified for the study. The mean age was 65.65±12.61. The number of eyes in each group was: 14 in the control group; 52, 18 and 25 in the early, moderate and severe glaucoma groups respectively. The overall difference between the groups was significant for the following parameters: MD; Visual Field Index (VFI); retinal nerve fiber layer (RNFL); and for both inner and outer circles of the ETDRS macular grid: total macular thickness, ganglion cell layer (GCL), inner plexiform layer (IPL), GCIPL, GCIPL+RNFL (table 1). The inner nuclear layer presented a significant difference between groups in both inner and outer circles. The outer nuclear layer differences were significant only in the inner circle (table 2).

Conclusions : Individual macular layer evaluation using the commercially available SD-OCT segmentation and the areas of the ETDRS grid could be used to evaluate different stages of glaucoma. Longitudinal studies of these parameters are needed to determine their usefulness for glaucoma monitoring.

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Table 1

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Table 2