Defects in macular-retinal layer analysis of glaucoma patients compared to normative database
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\textbf{Purpose:} Fast scanning high-resolution optical coherence tomography (HR-OCT) enables a quantitative analysis of the configuration of retinal layers. Aim of this study was to analyze the topographic distribution of pathologic thinning of specific macular retinal layers of glaucoma patients.

\textbf{Methods:} Macular 3D-scans were recorded with HR-OCT (Cirrus(R), Carl Zeiss Meditec). A proprietary software was developed in MatLab R2009b and used for automated retinal layer segmentation to detect the thickness of retinal nerve fiber layer (RNFL), retinal ganglion cell plus inner plexiform layer (RGIPL) and retina in total for each subject. The central 5 mm zone was divided into 65 segments in 4 concentric rings of 16 segments each plus a central segment. A normative database for the RNFL, RGIPL and retina within those 65 segments was created using healthy subjects (n = 42). 14 glaucoma patients were compared to the 95\% and 99\% confidence interval (CI) of the normative database using the thickness values of RNFL, RGIPL and retina within those 65 segments.

\textbf{Results:} The average mean deviation of visual field was -5.02dB for the glaucoma patients and -0.25dB for healthy subjects. The glaucoma patients showed for RNFL, RGIPL and retina on average 19.7, 33.6, and 32.2 pathologic segments (95\% CI), 14.5, 25.6, 23.4 pathologic segments (99\% CI). The minimum number of pathologic segments per patient was 6, 18 and 10 (95\% CI) and 4, 12 and 5 (99\% CI).

\textbf{Conclusions:} In our study quantitative analysis of retinal layer thickness based on macular HR-OCT showed a decrease of RNFL and RGIPL thickness in glaucoma patients. Within our sample all patients had several pathologic segments for all of the analyzed retinal layers. In most of the cases those segments were clustered. Further studies including larger numbers of patients to confirm our findings are advisable.

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