Comparison of peripapillary retinal nerve fiber layer thickness in normal eyes, eyes with ocular hypertension and glaucomatous eyes using spectral domain OCT

P4.031

Urs Vossmerbaeumer1,2, Alexander K. Schuster1 and Joachim E. Fischer1

1Mannheim Institute of Public Health, University of Heidelberg, Germany; 2Department of Ophthalmology, Mainz University Hospitals, Germany

Purpose
To assess differences in peripapillary retinal nerve fiber layer (RNFL) thickness in healthy eyes, eyes with ocular hypertension and glaucomatous eyes using spectral domain OCT.

Methods
82 eyes of 48 subjects (38 healthy eyes, 31 eyes with ocular hypertension ≥21 mmHg, 13 eyes with glaucoma) were examined using the optic disc mode of a spectral-domain 3D OCT-2000 (Topcon Inc., Japan). Intraocular pressure was measured using non-contact tonometry (CT-80, Topcon Inc., Japan). Sectorial (12 sectors) peripapillary RNFL thickness was calculated with the Glaucoma Analysis with Disc Topography software of the 3D OCT-2000. Mean age of the subjects in the control group was 39.2 ± 9.6 (SD) years, in the ocular hypertension group 40.4 ± 12.8 years and in the glaucoma group 47.0 ± 11.9 years. The mean intraocular pressure in healthy eyes was 14.7 ± 1.9 mmHg, in the eyes with ocular hypertension 22.0 ± 1.2 mmHg and in the eyes with manifest glaucomatous damage of the optic disc 21.3 ± 4.1 mmHg. Values of peripapillary sectorial analysis were statistically compared with an ANOVA analysis with Bonferroni correction using SPSS 19.0 (Chicago, USA).

Results
Average peripapillary RNFL thickness in the healthy group was 111.5 ± 9.9 (SD) µm, in the ocular hypertension group 109.3 ± 10.8 µm and 104.0 ± 13.7 µm in the glaucomatous group. Sectorial analysis revealed a difference in peripapillary RNFL thickness in superior (p=0.03 (1h) and p<0.01 (11h)) and inferior sectors (p<0.01 (5h), p<0.01 (6h), p=0.01 (7h)), Nasal and temporal sectors were equivalent. In the 12 sector analysis, (3h equals nasal meridian), glaucoma eyes had significantly smaller RNFL thickness in the inferior quadrant (sectors 5h, 6h, 7h) and at 11h (p<0.05) compared to the normal/healthy eyes. Compared to the ocular hypertension group, RNFL thickness in the glaucoma group was smaller in the sectors 1h, 5h and 6h (p<0.05). The largest difference was seen in the inferior segments (Δ 12-17µm) with between 12µm and 17µm lower peripapillary RNFL thicknesses. There was no significant difference in RNFL between the ocular hypertension eyes and those in the control group.

Conclusion
Spectral domain analysis of the peripapillary RNFL thickness reveals a reduction in inferior and superior sectors in glaucoma patients. Ocular hypertension eyes were equal to non-glaucomatous eyes. This finding is conclusive with clinical observations where the superior and inferior nerve fiber rim of the optical disc is primarily affected in glaucomatous optic atrophy. Using spectral domain OCT for the assessment of the optic disc it may be possible to distinguish between glaucomatous and healthy eyes.

Commercial relationships: None.