Correlation between optic nerve head retinal nerve fibre layer thickness and posterior pole retinal thickness in Asians

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Purpose: To evaluate the correlation between optic nerve head retinal nerve fibre layer (RNFL) thickness and posterior pole retinal thickness in Asian patients with glaucoma and controls.

Methods: Patients with moderate to severe primary glaucoma and controls were enrolled from a clinic population. All participants underwent complete ophthalmic examination, circular peri-papillary optic nerve head (ONH) scans to measure RNFL thickness and posterior pole scans to measure retinal thickness with the Spectralis SD-OCT.

Results: The study comprised 96 subjects with glaucoma and 92 controls. Mean age was 65 ± 10.3 years among glaucoma subjects and 58.8 ± 9.7 years among controls (p < 0.001). Males comprised 69.8% of glaucoma subjects and 35.9% of controls (p < 0.001). Ethnic composition was similar in both groups. Mean vertical optic cup-disc ratio was 0.84 ± 0.11 in glaucoma subjects and 0.4 ± 0.17 in controls (p < 0.001). Mean Humphrey visual field mean deviation (HVF MD) was -13.7 ± 7.1 dB in glaucoma subjects and -2.9 ± 3.2 dB in controls (p < 0.001). ONH RNFL and posterior pole retinal thickness was significantly reduced in all quadrants and sectors in glaucoma subjects compared to controls (p < 0.001) Posterior pole average retinal thickness correlated well with global ONH RNFL thickness in glaucoma subjects, controls and both groups combined (R² = 0.231, 0.225, 0.495 respectively; β coefficient = 0.480, 0.480, 0.703 respectively, p < 0.001). HVF MD correlated with ONH RNFL global thickness in glaucoma subjects, controls and both groups combined (R² = 0.212, 0.239, 0.535; β coefficient = 0.460, 0.489, 0.732 respectively, p < 0.001). HVF MD had a weaker correlation with posterior pole average retinal thickness in glaucoma subjects, controls and both groups combined (R² = 0.094, 0.070, 0.342; β coefficient = 0.306, 0.286, 0.585, p < 0.01).

Conclusion: ONH RNFL thickness and posterior pole retinal thickness is significantly reduced in moderate to severe glaucoma. There is moderate correlation between RNFL thickness of different sectors and quadrants of the ONH and retinal thickness of the corresponding region in the posterior pole. Visual field loss also correlated with ONH RNFL and posterior pole retinal thickness.