Comparison between Peripapillary Retinal Nerve Fiber Layer and Perifoveal Inner Macular thickness in Early Diagnosis of Primary Open Angle Glaucoma Using Angiovue OCT

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Introduction: Retinal ganglion cells (RGC) damage with a subsequent retinal nerve fiber (RNF) loss is considered an important step in the pathogenesis of glaucomatous optic neuropathy (GON). The death of the RGC leads to the atrophy of the axons that form the retina nerve fiber layer (RNFL). This is revealed as thinning of the RNFL by optical coherence tomography (OCT) imaging.[1] The aim of this study was to evaluate the peripapillary retinal nerve fibers layer (pRNFL) thickness and perifoveal inner macular thickness in early detection of glaucomatous optic neuropathy (GON) using the optical coherence tomomgraphy Angiography (Angiovue OCT).

Methods: Included in our study were 40 eyes of 23 patients with early stage primary open angle glaucoma (POAG) {early glaucoma (EG) group}, 30 eyes of 17 glaucoma suspects (GS) and 20 eyes of 10 healthy subjects {normal (N) group}. The median ages of the respective groups were 64.0 (58.0 - 74.0), 57.5 (44.0 - 60.0), 52.0 (51.0 - 53.0). All subjects underwent Angiovue OCT scanning ('ONH scan' and 'Retina Thickness Map 5mm x 5mm' scan for the pRNFL and perifoveal inner macular regions respectively) using RTVue100 "Optovue". Parameters analyzed were average total, superior, inferior, temporal and nasal thicknesses of both regions

Results: The EG group were noticed to have significant decrease in all parameters of both pRNFL and perifoveal inner macular thickness as compared to the N group. Inter-group analysis using the Mann-Whitney criteria revealed statistically significant differences between the EG and the N groups in only the superior (P=0.0012) and inferior (P=0.0078) pRNFL thickness. In the macular region, statistically significant differences between the EG and healthy individuals were identified in total average (P=0.0000), temporal (P=0.0000) and nasal (P=0.0000) perifoveal inner macular thickness. Similar findings were observed for comparisons between the EG and GS groups. The temporal perifoveal inner macular thickness has the highest Areas under the receiver operating characteristic curve (0.965).

Discussion: Results of research have shown limitations of the macular thickness parameters in early diagnosis of glaucoma[2], these may be related to the software and the OCT technology used as the OCT has continued to evolve since it first clinical application in 1991.[3] Using the Angiovue OCT, our study was able to demonstrate the involvement of the macular in early stage of glaucoma and this is comparable with some previous studies.[4]

Conclusion: In early detection of glaucomatous optic neuropathy in primary open-angle glaucoma, parameters of the perifoveal inner macular thickness are diagnostically more significant as compared to those of peripapillary RNFL thickness using the Angiovue OCT.

References

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