Vertical macular ganglion cell-inner plexiform layer thickness ratio as a diagnostic parameter in early glaucomatous damage
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Purpose: To evaluate the diagnostic validity of temporal to nasal macular ganglion cell–inner plexiform layer thickness ratio using Cirrus high-definition optical coherence tomography (HD-OCT) according to the pattern of visual field (VF) loss in patients with early glaucomatous damage.

Methods: Eighty-seven normal controls, 54 patients with preperimetric glaucoma and 63 patients with early glaucoma were enrolled. The patients with early glaucoma were classified into 2 groups according to the pattern of VF loss: paracentral scotoma group (PCS, n = 31); peripheral scotoma group (PPS, n = 32). Macular ganglion cell-inner plexiform layer (mGCIPL) thickness and peripapillary retinal nerve fiber layer (pRNFL) thickness were measured by Cirrus HD-OCT. Temporal to nasal mGCIPL thickness ratio were calculated. The area under the receiver operating characteristic curves (AROC) of each parameter were estimated and compared between each of the two groups. The correlation between the perimetry global indices and various mGCIPL/pRNFL parameters was evaluated.

Results: The AROCs of temporal to nasal ratio, average and minimum mGCIPL of PCS group (0.982, 0.929 and 0.966) were significantly higher than those of PPS group (0.780, 0.819 and 0.885, p < 0.001, 0.018 and 0.017, respectively). However, the AROCs of average [0.951 (PCS), 0.960 (PPS), p = 0.944] and inferior [0.966 (PCS), 0.961 (PPS), p = 0.378] pRNFL thickness between two groups did not show statistically significant differences. Parameter with the best AROC was the ratio of temporal to nasal mGCIPL in PCS group and inferior pRNFL in PPS group. There was a linear relationship between the ratio of temporal to nasal mGCIPL and perimetry global indices in PCS group.

Conclusions: The ratio of temporal to nasal mGCIPL represented the best diagnostic and predictable ability for detecting paracentral scotoma in early glaucoma patients. The vertical mGCIPL asymmetry could be an important parameter in the diagnosis of early glaucoma with central VF loss.