Lamina cribrosa-related parameters assessed by optical coherence tomography for prediction of future glaucoma progression

Ho Seok Chung, Kyung Rim Sung, Jong Rak Lee, Kyoung Sub Lee
Department of Ophthalmology, College of Medicine, University of Ulsan, Asan Medical Center, Seoul - South Korea

Purpose: To evaluate the value of lamina cribrosa (LC)-related parameters assessed by optical coherence tomography (OCT) in the future prediction of glaucomatous progression.

Methods: Glaucoma or glaucoma suspect eyes were followed up for more than 2 years. Glaucoma progression was defined by optic disc/retinal nerve fiber layer (RNFL) photographic assessment or serial visual field (VF) exams. LC thickness, anterior lamina cribrosa distance (ALD), and prelaminar tissue thickness were determined with optic disc images obtained by Spectralis OCT enhanced depth imaging. Kaplan-Meier life table analyses were carried out, and survival experience was compared between eyes with thicker baseline LC (HLC) and thinner baseline LC (LLC) by log rank test. Hazard ratios (HRs) of various risk factors, including LC-related parameters, for future glaucomatous progression, were determined using uni- and multi-variate Cox’s proportional hazard models.

Results: Among the 118 eyes, 33 showed progression during follow up period. The progression group had a significantly thinner average circumpapillary RNFL (p = 0.005), LC (p = 0.002), and prelaminar tissue (p = 0.020) than the non-progression group at baseline. The LLC group showed a greater cumulative probability of glaucoma progression than did the HLC group (p = 0.001). Average circumpapillary RNFL thickness (HR, 0.972, p = 0.007), prelaminar tissue thickness (0.991, p = 0.025), and LC thickness (0.973, p = 0.001) were significantly associated with progression of glaucoma. In multivariate analysis, only LC thickness (0.977, p = 0.014) showed significant association with progression.

Conclusion: Thinner baseline LC was independently associated with glaucoma progression in our study. LC thickness may be a risk factor for predicting future glaucoma progression.