

Impact of Posterior Sclera on Glaucoma Progression in Treated Myopic Normal-Tension Glaucoma Using Reconstructed Optical Coherence Tomographic Images

Kim YC¹, Koo YH², Jung KP³, Park CK³

1 Department of Ophthalmology, College of Medicine, Incheon St. Mary's Hospital, The Catholic University of Korea, Incheon, Republic of Korea.

2 Department of Ophthalmology, College of Medicine, Chuncheon Sacred Heart Hospital, Hallym University, Chuncheon-si, Gangwon-do, Republic of Korea.

3 Department of Ophthalmology, College of Medicine, Seoul St. Mary's Hospital, The Catholic University of Korea, Seoul, Republic of Korea.

PURPOSE: To investigate factors associated with visual field (VF) progression in treated myopic normal-tension glaucoma (NTG) using a novel posterior sclera reconstruction method involving swept-source optical coherence tomography (OCT).

METHODS: Fifty-six myopic patients on ocular hypotensive therapy with the diagnose NTG had five or more VF tests during a period of 72.63 ± 20.46 months in clinical follow-up. Glaucomatous VF progression was decided by the standards of Early Manifest Glaucoma Trial criteria. Coronally reconstructed OCT images were used to obtain the position of the deepest point of the eye (DPE), and parameterized the distance (Disc-DPE distance), depth (Disc-DPE depth) and angle (Disc-DPE angle) of the posterior sclera. The Cox proportional hazards model and Kaplan-Meier curves were used to determine the risk factors for VF progression.

RESULTS: Among 56 eyes, 28 showed VF progression. Eyes with progression had significantly different distance, depth, and angle of the DPE position ($P = 0.049$, $P = 0.032$, and $P = 0.006$, respectively). A multivariate Cox proportional hazard model revealed that the vertical tilt angle (hazard ratio [HR] 0.835, $P = 0.026$) and the DPE positioned temporal to fovea (HR 4.314, $P = 0.001$) were associated with VF progression. Among eyes with DPE positioned temporal to fovea, in addition to percentage reduction in IOP from baseline (HR 0.915, $P = 0.012$), shorter axial length (HR 0.542, $P = 0.044$) was found to be associated with VF progression.

CONCLUSIONS: Eyes with a particular posterior sclera structure are at increased risk for glaucoma progression in treated myopic NTG patients. This finding highlights the significance of investigating posterior sclera structure and its relevance to initiate or augment treatment for myopic glaucoma patients.

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