OCT Imaging in Patients with History of Retinopathy of Prematurity

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Purpose: To evaluate retinal anatomy and segmentation errors from spectral domain optical coherence tomography (SD-OCT) imaging (MM5 protocol of RTVue-100; Optovue, Inc., Fremont, CA) in school-aged children.

Design: A prospective cohort study in a referral medical center.

Methods: 133 eyes of 133 patients were enrolled. Patients were grouped as those who were treated for retinopathy of prematurity (ROP) (ROP-Tx-group); those with spontaneously-regressed ROP (ROP-non-Tx-group); other premature patients (premature group); and full-term age-matched children (full-term group). Anatomy and segmentation errors of retina were evaluated by SD-OCT.

Results: The mean age at assessment was 9.5 years (range 4 - 16 years). The incidence of abnormal foveal contours among patients in ROP-Tx-group was significantly higher than among the rest of the patients. Patients in the ROP-Tx-group group had a significantly thinner choroidal thickness than the patients in the nontreated group after adjusting for age, axial length, and spherical power. The external limiting membrane (ELM) and the cone outer segment tips (COST) line were least frequently identified in patients of the ROP-Tx-group (65.2% and 47.8%, P = .002 and P < .001, respectively). The visual acuity of the patients did not correlate significantly with the absence of COST line (P = .140) but correlated with the absence of ELM (P < .001). The presence of artifacts, including misidentification of the inner retina, misidentification of the outer retina, out of register artifacts, off-center scans, and degraded scan images, was observed to range from 0.6% to 50.0% in 4 groups of patients. All types of errors occurred more frequently in the ROP-Tx-group than the full-term group (all P < .05).

Conclusions: Lack of foveal depression, thinner choroid, and outer retinal abnormalities were commonly observed in the ROP-Tx-group. The higher segmentation errors in the ROP-Tx-group might be related to fine structural abnormalities in the outer retina. Future studies are needed to investigate the mechanisms for these structural changes.