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Detecting Functional Loss in Glaucoma with the Performance Centered Portable Test (PERCEPT)

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Abstract

Purpose: To evaluate the ability of a tablet-enabled test (PERformance CEntered Portable Test - PERCEPT) to detect functional loss in glaucoma patients.

Methods: Cross-sectional study involving 35 eyes from 27 patients with glaucomatous visual field defects on standard automated perimetry (SAP) and 32 eyes from 21 control subjects without visual field defects. The PERCEPT was based on the concept of increasing visual task difficulty to improve detection of central visual field losses in glaucoma patients. Subjects had to perform a foveal 8-alternative-forced-choice orientation discrimination task, while detecting a simultaneously presented peripheral stimulus within a limited presentation time and under low contrast level. Higher values of the PERCEPT processing speed (PPS) test in milliseconds (ms) implies worse visual performance to detect the stimuli. Retinal nerve fiber layer (RNFL) thickness was assessed by spectral domain optical coherence tomography (SD-OCT). Areas under the receiver operating characteristic (ROC) curves were used to evaluate the ability of the different parameters to discriminate glaucomatous from control subjects.

Results: The PPS parameter showed significantly larger values in glaucoma (746.9 ms) compared to controls (258.3 ms) ($P < 0.001$). Areas under the ROC curves for the PPS parameter and average SD-OCT RNFL thickness were 0.83 ± 0.04 and 0.82 ± 0.04 , respectively ($P = 0.851$). For detection of moderate or severe glaucoma (mean deviation of SAP < -6 dB), ROC curve areas were 0.89 ± 0.03 and 0.92 ± 0.03 , respectively ($P = 0.471$).

Conclusions: The PERCEPT processing speed parameter was able to successfully discriminate eyes with and without visual field loss on SAP and performed similarly to the SD-OCT parameter average thickness. Due to its low-cost and portability, this tablet-enabled platform may be a feasible test for screening of visual impairment.