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Correlation between optical coherence tomography for optic nerve head parameters and pattern electroretinogram in primary open angle glaucoma and ocular hypertension

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Purpose: The PERG can help in decision making in cases of OHT, in the absence of visual field and OCT abnormalities, and select cases showing RGC dysfunction in which treatment should start. This cross section study was designed to detect RGC dysfunction in early glaucoma and OHT, correlate between PERG wave amplitudes changes and OCT (optical head criteria and RNFL thickness).

Methods: The study included 90 eyes of 90 participants. The participants were divided into three groups. Control Group included 30 normal eyes. Primary open-angle glaucoma (POAG) group included 30 eyes with mild to moderate glaucoma controlled with medical treatment. Ocular hypertension group (OHT) included 30 eyes having IOP>21 mmhg. All cases undergone ophthalmic examination including: intraocular pressure measurement, slit lamp biomicroscopy, anterior chamber angle assessment using a gonio-3 mirror lens. Visual field examination was done using automated perimetry(Humphrey), optical coherent tomography (OCT) to assess the optic nerve head criteria including neuroretinal rim area in mm², vertical C/D ratio and average superior and inferior retinal nerve fiber layer (RNFL) thickness in μ m, pattern electroretinogram(PERG) was recorded

binocularly. PERG measurements using Dawson-Trick-Litzkow (DTL) electrodes. A checkerboard pattern of 95% contrast black and white was used with reversing checkerboard with 40-minute checks in a 10-16 degree field for PERG measurements. Stimulus frequency was 2 Hz, and the analogue filter was between 0.03 and 100 Hz. All electrophysiology traces were characterized by two negative and one positive deflection in the order N35, P50, and N95. Amplitude and latency of P50 and N95 were recorded.

Results: The mean P50 and N95 latency were significantly higher in the POAG group and the OHT group compared to the control group ($p < 0.001$, < 0.001 , respectively). Also, the mean P50 and N95 amplitude were significantly lower in the POAG group and the OHT group compared to the control group ($p < 0.001$, < 0.001 , respectively). However, there was no significant correlation between PERG parameters and OCT parameters.

Conclusions: PERG can detect the dysfunctional but still viable ganglion cell earlier than OCT in OHT cases allowing the early start of treatment that can restore the ganglion cell function before irreversible damage occurs.

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