

Functional parameters in patients with ocular hypertension and primary open-angle glaucoma

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Investigative Ophthalmology & Visual Science April 2014, Vol.55, 5624. doi:



Abstract

Purpose: To evaluate the efficacy of psychophysical tests to differentiate patients with ocular hypertension (OHT) and those with primary open-angle glaucoma (POAG) in relation to the data of the Visual Field (VF) and mean Retinal nerve fiber layer (RNFL) by OCT.

Methods: We enrolled 60 patients, 32 male and 28 females, aged between 39 and 65 years (mean age 50.2 ± 7.3), with 115 eyes, 40 patients with OHT (IOP > 21 mmHg) and 20 patients with POAG in hypotonic treatment with IOP < 20 mmHg. All patients had a best corrected visual acuity (BCVA) $\geq 20/40$. We excluded patients with diabetes, vitreoretinal diseases, media opacities, primary closed angle glaucoma. All patients were submitted to: measurement of intraocular pressure (IOP), fundus examination, Visual Field Humphrey 30-2, optical coherence tomography (OCT), with the study of the RNFL by SD-OCT (Heidelberg Engineering). The psychophysical tests are: Contrast sensitivity (CS), static and dynamic, Glare Test at 2.5 meters, using the device MonPack One (Metrovision), questionnaire NEI-VFQ 25 items. P-value obtained was considering as statistically significant for $P \leq 0.05$. The study was conducted from July 2011 to December 2013.

Results: Our results showed a statistically significant correlation between the Glare Test and Static CS for the spatial frequency (SF) of 3.5 cycles per degree (cpg) ($P = 0.048$), a positive and statistically significant correlation between SD-OCT RNFL mean and Static CS at SF of 3.5 cpg ($P = 0.017$) and SF of 7 cpg ($P = 0.002$), statistically significant differences between SD-OCT RNFL mean and Dynamic CS at SF of 0.5 cpg ($P = 0.034$) and SF of 15 cpg (0.039). The analysis of Static CS between POAG and OHT showed a statistically significant difference in SF of 3.5 cpg ($P = 0.02$). The analysis of the NEI VFQ-25 showed statistically significant difference in the questions 6,9,11,21,A11a ($P = 0.02$).

Conclusions: The analysis of CS provides information on the status of the photoreceptors and on the integrity of the bipolar cells and ganglion cells (magnocellular and parvocellular). The magnocellular pathway (MP) has high CS, while the parvocellular is sensitive to the colors. Glaucoma is characterized by an early reduction in MP. Our study shows a clear correlation between CS, static and dynamic, at the SF of 3.5 cpd with mean RNFL by OCT. The CS is a fast, accurate and reliable device for the early diagnosis of patients at risk of developing POAG (OHT group).