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17th International Conference on

Clinical and Experimental Ophthalmology

October 01-03, 2018 | Moscow, Russia

The impact of complex-structured optical signals on color perception and light sensitivity in patients with suspicion of glaucoma and primary open-angle glaucoma

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Purpose: To evaluate the effect of photo-stimulation with complex-structured optical signals of low-intensity on the color perception and light sensitivity in patients with suspicion of glaucoma and primary open-angle glaucoma (POAG), using the data of the Farnsworth-Munsell 100 Hue Test and Short Wavelength Automated Perimetry (SITA-SWAP).

Methods: 150 persons (50 per group, 40-75ys) were examined in the groups of suspicion of glaucoma, the 1st stage of POAG, and healthy control. Perimetry with the SITA-Standard and SITA-SWAP programs and the color test were conducted before and after the course of 10 séances of photo-stimulation (10 minutes daily) with the permission of the local Ethical Committee and with the informed consent of patients. LED Stimulator formed complex-structured optical signals (10-12 Lx at the cornea) with a given fractal dimension.

Results: Before the fractal stimulation, the SITA-SWAP testing in the 1st group showed: mean deviation (MD) =-2.55 \pm 0.7dB, pattern standard deviation (PSD) =2.46 \pm 1.15dB; and after the treatment: MD=-1.55 \pm 0.6dB, PSD=2.34 \pm 1.3dB. Results in the 2nd group, were MD=-5.13 \pm 1.3dB, PSD=2.58 \pm 0.9dB and, respectively, MD=-4.36 \pm 1.2dB, PSD=2.27 \pm 0.79dB. The color perception data before and after the treatment were in the 1st group: TES=58.6 \pm 18.7 (p<0.05) and 46 \pm 14.7 (p<0.05); in the second group: TES=86.9 \pm 21.8 and 76.9 \pm 2.3.

Conclusion: The most significant impact of fractal optical stimulation in the early glaucoma was revealed for the MD data. After the treatment, the average visual field defect significantly decreased (by 0.77-1.0 dB). In the color vision test, after the treatment, a significant reduction in the number of errors (10-12) was found; however, the color perception defects persisted.

Notes: