

Glaucoma

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Early Diagnosis of Ocular Hypertension Using a Low-Intensity Laser Irradiation Test.

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Abstract Objective: We investigated the potential use of low-intensity laser irradiation (LILI) as a diagnostic tool for identifying hypertensive eyes at risk of glaucoma. **Background data:** The diagnosis of early-stage ocular hypertension is particularly difficult to establish. **Methods:** This study of a case series included 123 healthy subjects with normal vision. The intraocular pressure (IOP) was determined before (baseline) and 30 min after a 30-sec irradiation of the limbus area with laser light (780 nm; 7.5 mW; 292 Hz modulation). **Results:** Baseline IOP was >21 mm Hg in 44 of 211 eyes (20.9%), consistent with ocular hypertension. LILI decreased the mean IOP by 6.2 mm Hg (-25.7%; $p < 0.001$; paired t test) in these eyes. The remaining 167 eyes (79.1%) exhibited a normotensive IOP ≤ 21 mm Hg. LILI reduced the mean IOP by 2.9 mm Hg (-17.1%; $p < 0.001$) in these eyes, but there were different response patterns: 1) the IOP did not change (27.0%); 2) the IOP was reduced by the same extent in both eyes (32.3%); 3) initial IOP differences between left and right eyes became level and the absolute IOP was reduced to a lower level that was identical in both eyes (18.0%); and 4) the initial difference in IOP between the left and right eye persisted despite LILI (22.7%). **Conclusion:** LILI lowers IOP, even in normotensive eyes. This effect may be useful to determine the individual physiological IOP and to diagnose latent ocular hypertension in eyes with presumably normotensive IOP.

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Experimental study on low pulse energy processing with femtosecond lasers for glaucoma treatment.

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The feasibility of low energy processing in ocular tissues with femtosecond laser sources was investigated in this research. One laser source was a femtosecond amplifier, and the other was a femtosecond oscillator. The amplifier used in this experiment was a CPA-2001 (Clark-MXR, Inc), with 150 fs pulse duration and 1 kHz repetition rate. The femtosecond oscillator (model 900-B Mira) produced a 200 fs pulse duration and a 76 MHz repetition rate. Both these two laser systems operated at 800 nm wavelengths. Firstly, the pulse intensity thresholds in water produced by the two laser sources were compared. The optical breakdown probability analysis shows that the pulse energy threshold achieved by the oscillator was less than 10% of that achieved by the amplifier. Then, the non-linear propagation of the femtosecond pulses in the ocular tissues was studied with the femtosecond oscillator. The results showed a potential for pulse energy processing at the nanojoule level with a femtosecond oscillator in glaucoma treatment.

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[Heparin inhalations and laser exposure of blood in treatment of patients with open-angle glaucoma]

[Article in Russian]

Balashova LM, Listopadova NA, Zaitseva NS, Teplinaskaia LE, Efimov VS, Grishin VL, Kantarzhi EP.

Comparative assessment of methods aimed at amelioration of the immunohemostatic processes in patients with open-angle glaucoma suffering from chronic vascular diseases showed that the most remarkable improvement of the visual functions and decrease of the level of circulating immune complexes in the blood were attained in the patients treated by heparin inhalations combined with intravenous laser exposure of the blood as against patients treated by one of these methods alone or traditionally.

The comparative analysis of using lowpower laser radiation, magnetic therapy and electrical stimulation in stabilization of visual functions in primary open-angle glaucoma.

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127 men with a primary open-angle glaucoma(POAG) were treated with either L/LT, magnetic therapy or electrical stimulation. The examination included visus, visocontrastometry and automatic static perimetry. The field of sight at an initial stage of POAG was 56% of laser, 52 for magnetic therapy and 27 for electrical stimulation. In the advanced stage the figures were 39, 37 and 18, respectively.