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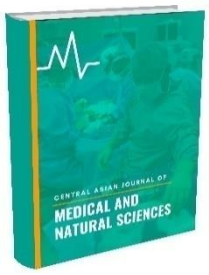

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Evaluation of Micro-Pulsed Diode Laser Trabeculoplasty for Unstable Open-Angle Glaucoma

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Abstract: To study the hypotensive efficacy of micropulse diode-laser trabeculoplasty (MDLLT) and to determine its place in the complex treatment of various primary open-angle glaucoma (POAG). MDLLT was performed in 22 patients (114 eyes) with various stages of POAG. The results showed that MDLLT is an effective and safe treatment modality, especially in the early stages of POAG[6].

Keywords: micropulsed diode laser trabeculoplasty, primary open-angle glaucoma, SIHAT KO`Z Eye Clinic

Introduction. MDLT involves applying laser light to the trabecular meshwork area of the canal. There is no coagulation effect on trabecular meshwork structures during MDLLT as the pulses pass the temperature into pigmented cells such that they return to their baseline and therefore do not cause cellular damage with a cumulative increase in temperature and a sharp rise in IOP in a sufficiently pigmented trabecular meshwork [1, 2]. This makes the method gentle and safe.

Although there have been a fair number of studies of MDLT in open angle glaucoma, there is no standard methodology, which is an obstacle to its widespread clinical use [4,7]. However, authors have a mixed assessment of the efficacy of MDLT [3,5]. In the immediate postoperative period, the results are consistently good; however, the hypotensive effect of the intervention is modest in the long term. However, MDLT has advantages over surgery. It can be performed on an outpatient basis and also in patients with various somatic conditions with contraindications for abdominal surgery [8].

Research objective: To determine the efficacy of MDLT in patients with primary open-angle glaucoma with a non-stabilized course over a long period of follow-up.

Material and Methods: A clinical study of 22 patients (36 eyes) with POAG with a follow-up period of 1 month to 1 year was conducted at SIHAT KO'Z Eye Clinic (Tashkent, Uzbekistan). All patients were diagnosed with unstable glaucoma on the background of local hypotensive therapy prior to the MDLT procedure. The distribution of glaucoma clinical stages was as follows: Stage I - 16 eyes, Stage II - 11 eyes, Stage III - 9 eyes. Tonometric pressure was 27-32mmHg (mean 28.8±0.5 mmHg). (mean

28.8±0.6 mmHg) - 22 eyes, from 33 mmHg and above (35.3±0.8 mmHg) - 12 eyes. The anterior chamber angle was open in all patients, pronounced pigmentation was noted in 19 eyes, in 17 eyes it was weak, but trabecula was sufficiently contoured. No MDLT was performed if the pigmentation of the trabecular area was not pronounced.

MDLT was performed on Easyret diode laser system (Quantel medical, France), wavelength 577 nm, power 1000 mW, spot size 300 μm, pulse packet duration 300 ms, duty cycle 10% in the 360° range. All surgeries proceeded without complications. After surgery, antibiotic and nonsteroidal anti-inflammatory eye drops were administered up to 4 times a day for 7 days and the previously prescribed hypotensive regimen was maintained. IOP was measured the next day, 10 days, 1, 3, 6 and 12 months later. It was a criterion for the effectiveness of MDLT.

Results of the study: An inflammatory reaction in the exposure area, manifested by local reddening of the limbus zone, was observed in 4 eyes (11.1%) and disappeared without additional treatment within 7-10 days. IOP measurement on day 10 after MDLT showed a significant decrease, by 9-10 mmHg (Table 1). (Table 1). This was about 30% of the baseline IOP and convincingly confirmed the hypotensive effect of laser treatment on the trabecular area.

In 3 eyes (8.3%), IOP reduction was insufficient. In these patients, the preoperative IOP was 33-35 mmHg. After MDLT it dropped to 30-31 mmHg, on average by 4 mmHg. In one eye IOP gradually reached 24 mmHg at 1 month follow-up. In 2 eyes IOP did not normalise during this period and they underwent non-penetrating deep sclerectomy with positive results.

Table 1

IOP dynamics in POAG patients before and after MDLT

Observation periods	Group of patients with baseline IOP 27-32 mmHg.	Group of patients with baseline IOP 33 < mmHg.
Before MDLT	28,8±0,9	35,3±1,1
After MDLT		
After 10 days	17,7±0,4**	22,4±0,7**
After 1 month	18,1±0,5**	23,1±0,8**
After 3 months	19,3±0,6*	24,2±0,8*
After 6 months	19,6±0,5*	24,7±0,9
After 12 months	21,5±0,9	26,1±1,0

Note. * – Level of significance compared to data before MDLT p≤0,05

** – Level of significance compared to data before MDLT p≤0,01

Control observations showed that after 3-6 months. IOP at 17-19 mmHg was in 29 eyes (80.5%) of those examined. However, patients with IOP of 21-25 mmHg appeared. (5 eyes, 13.9%).

One year after MDLT the number of eyes with an IOP of 17-19 mmHg was further reduced and the number of eyes with a high normal IOP (23-25 mmHg) almost doubled. Consequently, after MDLT, IOP gradually increased in some patients and microsurgical treatment was required in 6 eyes (16.7%). The results show that the immediate results of MDLT are good. Within 10 days of the procedure in 91.7% of cases the target pressure was achieved and a 30% decrease in IOP from the initial level was obtained. Further observations of the operated patients showed that the stable hypotensive effect of MDLLT remained up to 6 months in 80.5% of cases. By 1 year of follow-up, IOP begins to increase and reaches intolerant levels in 47.2% of patients against the background of local hypotensive therapy.

Conclusion: In summary, 360º DMLT with a 577 nm diodlaser is quite effective in the early post-intervention period, but there is a gradual increase in IOP thereafter. This is not the case in all patients, and further investigation of the indication for MDLLT to achieve a sustained hypotensive effect is clearly needed. Nevertheless, in all cases of unstable glaucoma, MDLT can be performed as a step to delay surgery, or in somatically severe patients, and in some cases achieve stable results indefinitely.

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