American Journal of Biomedicine and Pharmacy
https://biojournals.us/index.php/AJBP
ISSN: 2997-7177

Efficiency of Transscleral Laser Cytophotocoagulation in Patients with Neovascular Glaucoma

Ismoilov Jasur Jamshedovich
Assistant at the Department of Ophthalmology, Samarkand State Medical University

Received: 2024, 15, Feb
Accepted: 2025, 21, Mar
Published: 2025, 09, Apr

Annotation: The effect of transscleral diode laser cyclophotocoagulation on intraocular pressure and visual function in patients with normal-tension glaucoma Transscleral diode laser cyclophotocoagulation (TDLCC) is a well-known effective method for reducing IOP. The modified method of TDLCC has a positive effect on visual function due to coagulation not only of the corona ciliary, but also of the pars plana. Due to this modification of the technique, the biologically active substances of the laser burn penetrate into the vitreous body, and with its flow into the retina and optic nerve head, exerting a vasoactive effect.

Keywords: NGT, diagnostics, pathogenesis, prognosis and prevention.

Introduction: 30 eyes of 17 patients with normal tension glaucoma (NTG) were operated on. No intraoperative or postoperative complications were noted. In all cases, postoperative IOP was reduced to a tolerable level (average 10.6 mm Hg). During the first month of observation, the rheographic coefficient increased by 35%. At the end of the first month, rheographic changes decreased, but continued to increase by 12% compared to the initial level. In 25 cases (83%), positive dynamics of the visual field were noted. The amount of scotomas decreased by an average of 26%. Visual acuity was stable throughout the entire observation period. The new method of TDLCC can be recommended as part of the rehabilitation program for NTG patients. Transscleral diode laser cyclocoagulation (TLDC) is well known in ophthalmology as an effective method for reducing elevated IOP caused by disorders of the ciliary body processes.

Research methods and materials: The advantage of TLCC using a diode laser (wavelength 810 nm) over other cyclodestructive operations is the absorption of energy mainly in the area of the pigment epithelium of the ciliary body with good preservation of other structures through which the laser beam passes. However, in recent years, due to changes in the method of laser exposure to the ciliary body, in addition to the hypotensive effect, it has been possible to achieve a

significant positive effect on the state of visual functions [3]. The change in technique is achieved by shifting the place of application of coagulators back, not only to the projection area of the crown, but also to the flat part of the ciliary body [2]. This is of fundamental importance. As a result of laser exposure, biologically active substances with vasodilating properties, inflammatory mediators are formed. These substances penetrate the vitreous body and, with its flow, reach the retina and optic nerve, having a beneficial effect on the metabolism of these structures, which helps to optimize visual functions. In the treatment of patients with low-tension glaucoma (LPG), the problem of achieving a tolerable level of ophthalmotonus and increasing the resistance of the optic nerve to the effects of IOP comes to the fore.

We conducted a study of the effectiveness of using TLCK in such patients to stabilize and improve visual functions.

Results: 17 patients (30 eyes) with NDH were observed. At the initial visit, ophthalmotonus values were in the range of 17-21 mmHg. (mean 18.6 mm Hg) IOP measurements were performed in the morning before instillation of antihypertensive drugs using a Goldman tonometer. All patients received maximally tolerated antihypertensive treatment: 10 patients (18 eyes) were given 1% pilocarpine solution 3 times a day and 0.25% timolol solution 2 times a day; 3 people (6 eyes) used 0.5% betaxolol solution instead of timolol according to the same scheme; 3 patients (4 eyes) received only 0.25% timolol solution 2 times a day; 1 patient did not use antihypertensive drugs due to intolerance to the available drugs. Visual fields and the state of the optic nerve allowed us to classify the stage of glaucoma as advanced. Data from previous examinations showed a lack of stabilization of visual functions. Visual acuity with correction before the intervention ranged from 0.4 to 1.0, with 7 people (10 eyes) having the most pronounced visual acuity with eccentric fixation of the eye due to pathological changes in the central areas of the visual field. All patients showed a decrease in the rheographic index to an average of 0.65.

Before performing diode laser cyclocoagulation, all patients underwent biomicroscopy, ophthalmoscopy, visometry, rheography, static perimetry using Pericom computer perigraphy (Glaucoma software) and Goldman tonometry.

Patients were invited for a re-examination on the first, third, and fifth day after laser exposure, as well as 1 and 3 months after the intervention. To apply laser patches, we used an Alkom-6000 diode quantum generator, which allows generating radiation in the infrared region of the spectrum and is equipped with a tip for contact coagulation.

Discussion: Patients were given parabulbar anesthesia and akinesia with 2% lidocaine hydrochloride solution, a blepharostat was installed, and then 20-25 laser coagulations were applied concentrically at 270-300 degrees 3-5 mm from the limbus. The laser operating mode was as follows: power from 0.7 to 1.2 W, exposure time 3 sec. Radiation wavelength 810 nm, focal spot diameter 500 μm. After surgery, the patient was given a parabulbar injection of antibiotics.

As a result of using the described technique, we did not observe any complications in the postoperative period.

In the postoperative period, on the 3rd day, ophthalmotonus indicators in all patients decreased by 7-13 mm Hg. (average value 10.6 mm Hg)

One month after coagulation, the average IOP was 14.9 mmHg. 10 patients were able to reduce the amount and frequency of antihypertensive medication while maintaining low intraocular pressure levels.

During the first month of follow-up, there was a 35% increase in the mean rheographic coefficient in the group. These levels gradually decreased again by the end of the first month of follow-up, but nevertheless remained on average 12% higher than the baseline level.

Positive dynamics in the state of visual fields was noted in 25 cases (83%). When examining visual fields using computerized static perimetry, an average decrease in the number of relative and absolute scotomas by 26% was noted. Visual acuity remained stable during the observation period.

Conclusion

Thus, the proposed technique allows to reduce intraocular pressure in patients with low-tension glaucoma, as well as to optimize metabolic processes in the optic nerve and retina, thereby increasing the likelihood of a favorable prognosis for stabilizing visual functions in patients with reduced resistance of the optic nerve to stress. The proposed method can be part of a comprehensive rehabilitation program for such patients.

List of used literature:

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