



Results of Staged Combined Laser Treatment of Neovascular Glaucoma

1. Boboev Saidavzal
Abdurakhmanovich
2. Yusupov Amin Abduazizovich
3. Boboev Siyovush Saidavzalovich

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Abstract: Relevance. Secondary neovascular glaucoma is often accompanied by gross visual function disorders and severe pain in the eye and head. The pathogenetic reasonable method of treatment in these diseases is laser coagulation of peripheral retinal sections. However, with high pressure in the eye, the transparency of the optical system of the eye is disturbed, which prevents laser coagulation of the retina.

Key words: neovascular glaucoma, intraocular pressure, micropulse cyclophotocoagulation + panretinal retinal laser photocoagulation

¹ Candidate of medical sciences,
Department of Ophthalmology
Samarkand State Medical University

² Doctor of medical sciences,
professor Department of
Ophthalmology
Samarkand State Medical University

³ Basic doctoral student of 2nd year of
training, Department of Ophthalmology
Samarkand State Medical University

Introduction: Secondary neovascular glaucoma (SNG) is one of the severe forms of ocular pathology [1,3]. This pathology can be caused by complications of many primary eye diseases that have not received timely proper treatment or whose treatment has been unsuccessful. The most common of these are central retinal vein thrombosis and diabetic retinopathy [2,9]. GNH is manifested by significant loss of visual function, often to the point of complete loss, and is accompanied by severe pain in the eye and the corresponding side of the head. It leads to significant deterioration of general condition and loss

of sleep in patients[5,10]. Medication methods of treatment do not give the desired result. One of the effective ways to prevent VNH is the timely use of vascular endothelial growth factor (anti-VEGF) inhibitors and laser treatment[6,13,14]. However, in severe cases, these methods are difficult to apply and marginally effective. In such cases, laser ciliary body destruction method[7,11] is currently more effective and the most available method for pain control and eye pressure reduction. Until recently, laser sources with continuous action were used for this purpose. Due to some complications that appeared after the use of these lasers, new micro-pulsed lasers have been proposed for the treatment of IOP. At present, there are quite a few reports regarding the favourable use of the new laser. However, the use of these lasers is not always satisfactory, especially when the ocular pressure is significantly elevated. We have obtained better results with two methods of laser treatment of the eye[1,12]. Namely, in cases when the transparency of the optical media of the eye was restored after the performed mTSC, LCS of the peripheral retina was performed simultaneously.

Aim of the study: To investigate the possibility of combined treatment of neovascular painful glaucoma by preliminary application of micropulse transscleral cyclophotocoagulation in order to restore the transparency of the optical system of the eye and immediately after that to perform retinal laser photocoagulation.

Materials and Methods: 36 patients (17 women, 19 men) with various forms of neovascular glaucoma, aged 50 to 63 years (56.5 ± 5.3 years) were included in the study. All patients received maximum combined drug therapy before surgery, 9 patients had previously undergone fistulising antiglaucoma surgeries, 6 patients had a history of posterior segment interventions. Patient examination included determination of visual acuity, IOP level, biomicroscopy, gonioscopy, ophthalmoscopy, ultrasound biomicroscopy. The course of the early postoperative period was evaluated on a four-point scale: 0 - no reaction, 1 - mild uveal reaction (tindal 0-1), 2 - marked uveal reaction (tindal 2-3, fibrin loss), 3 - panuveitis. IOP control was performed 1 month and 6 months after surgery. On average, the preoperative IOP level was 34.79 ± 7.3 mm Hg, visual acuity in 20 patients was determined from 0 to p.l.segtae, in 11 patients - from 0.005 to 0.08, in 5 patients - from 0.1 to 0.5. All patients underwent combined treatment including LCS of peripheral retinal sections and laser transscleral cyclocoagulation in micro-pulse mode. The distinctive feature from other treatment methods was individual intraoperative selection of laser energy. The main factors determining the laser coagulation power in each individual case are the thickness of the fibrous membrane and the degree of ciliary body pigmentation. Результаты многочисленных зарубежных и отечественных исследований показали, что критерием передозировки энергии является появление т. н. симптома щелчка [15,16]. The essence of this phenomenon is the instantaneous transformation of water into vapour by laser energy, which, in addition to increasing the volume of the substance, leads to the formation of shock and sound waves and indicates mechanical rupture of tissues. This may lead to the formation of intraocular haemorrhages and complicate the course of the postoperative period, thus limiting the use of this method in seeing eyes [1,7]. The criterion of incorrect performance of the operation can also be changes in the pupil shape, eversion of the pigment border, destruction of the iris pigment epithelium, which occurs at limbal location of the tip [2,8]. Thus, energy selection was performed as follows. The initial energy is 1300 mW, the power of each subsequent exposure is increased by 100 mW until a light acoustic clap appears, after which the power is reduced by 100 mW and further coagulation is carried out at the set parameters.

After retrobulbar anaesthesia, 4 mm away from the limbus in the projection of the flat part, laser photocoagulation of the ciliary body with micropulse diode laser ("SubCyclo Supra - 810") is performed. The energy level varies from 1600 mW to 2000 mW. The tip is moved along the upper and lower limbus along the 180° or 360° meridian, avoiding positions at 3 and 9 o'clock. The duration of one session varies from 100 to 360 sec. Sites of previously performed fistulising surgeries are excluded from the treatment area, as weakening of the sclera may lead to the formation of staphylomas. In the second stage, the patients underwent LCS of the peripheral retina after achieving transparency of the cornea in four quadrants in 9 mm from the limbus with application of 3 rows of coagulates, 5 coagulates per row with 4 s exposure.

RESULTS: The majority of patients had significant reduction of IOP and pain syndrome already on the first day after the operation. The level of postoperative inflammatory reaction did not exceed 1 degree. In 1 month after surgery in all cases there was a significant decrease in vascularisation of the anterior segment of the eye. The average IOP level was 19.79 ± 7.27 mmHg and remained stable after 6 months of follow-up. In 47.2 % of cases (17 cases) patients did not need additional hypotensive therapy, in 38.9 % of patients (14 cases) were on minimal drug regimen (timolol 0.5 % 2 p/day), in 5 cases (13.88 %) hypotensive effect was not achieved, which required repeated intervention. It should be noted that in patients with high visual functions (VIS from 0.1 to 0.5) in the postoperative period visual acuity not only did not deteriorate, but in 2 cases against the background of corneal oedema reduction there was an improvement in quality and visual acuity increase by 1-2 lines.

CONCLUSIONS 1. Isolated fistulising antiglaucoma surgeries, intraocular administration of Lucentis and retinal laser photocoagulation have a short-term therapeutic effect, as they affect only one of the links of the pathological process of neovascular glaucoma.

2 The efficiency of the proposed method of treatment is 94.4 %, at that subatrophy of the eyeball developed in 3.3 % of cases (1 eye), hypotensive effect was not obtained in 3.3 % (1 eye).

3. micropulse cyclophotocoagulation in combination with LCS of peripheral retinal sections is an effective, pathogenetically justified method of treatment of refractory glaucomas of different genesis, especially in combination with neovascular component.

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