



Organ-Preserving Treatment of Neovascular Glaucoma

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Abstract: Neovascular glaucoma (NVG) is a severe form of secondary glaucoma, characterized by the development of new blood vessels in the iris and anterior chamber angle, often associated with systemic diseases. This study aimed to evaluate the effectiveness of transscleral cyclophotocoagulation using a diode laser in micro-pulse mode for treating painful NVG. Clinical observations were conducted on 30 patients with neovascular glaucoma, with assessments focusing on visual acuity, intraocular pressure (IOP), and pain reduction. Laser cyclophotocoagulation was performed using a micro-pulse diode laser, followed by anti-inflammatory and IOP-lowering treatments. Results demonstrated a significant reduction in IOP and pain relief, providing an effective organ-preserving alternative for managing NVG.

Key words: neovascular glaucoma, transscleral cyclophotocoagulation, micro-pulse diode laser, intraocular pressure, pain relief, ophthalmology, glaucoma treatment, laser therapy.

Relevance: Neovascular glaucoma (NVG) is one of the most severe forms of secondary glaucoma due to its complex systemic background and local changes, such as the presence of new blood vessels in the iris and the angle of the anterior chamber. A variety of diseases may contribute to the development of NVG. The treatment of glaucoma involves hypotensive therapy and surgical techniques. One of the most effective cyclodestructive interventions in the treatment of NVG is the use of a promising new technology—contact micro-pulse transscleral laser cyclophotocoagulation.

Aim of the Study: To assess the effectiveness of transscleral cyclophotocoagulation with a diode laser in micro-pulse mode and its impact on the clinical course of neovascular glaucoma.

Materials and Methods: Clinical studies were conducted at the Department of Eye Diseases at the multidisciplinary clinic of Samarkand State Medical University and the Eye Center of LLC "A.A. Yusupov" in Samarkand, involving 30 patients with neovascular painful glaucoma. Among them were 21 women and 9 men. These patients presented with ischemic heart disease, hypertension, and diabetes mellitus.

To assess the functional state of the eye, the following examinations were carried out: anterior segment examination using biomicroscopy, visual acuity assessment, peripheral field of vision testing with a perimeter, intraocular pressure (IOP) measurement with the Maklakov tonometer, funduscopy using both direct and indirect ophthalmoscopy, ultrasonography, and gonioscopy.

The loss of visual function and the presence of a strong pain syndrome had long been indications for enucleation in cases of terminal painful glaucoma. The attempt to preserve the eye as an organ laid the foundation for the use of laser cyclophotocoagulation.



Laser photocoagulation of the ciliary body using a micro-pulse diode laser ("SubCyclo Supra-810") was performed 4 mm from the limbus in the projection of the pars plana. The number of procedures for each patient was conducted 2–3 times with intervals of 3–4 days. After the procedure, to suppress the inflammatory process, a 1% solution of pred-forte was prescribed, 1 drop twice a day, as well as a solution of cupen-forte, 1 drop three times a day. To dilate the pupil, a 2.5% solution of midoptic was used, 1 drop twice a day for a week. In addition, to reduce IOP, 0.5% timolol solution was instilled, 1 drop twice a day.

Results and Discussion:

The effects of laser cyclophotocoagulation were assessed according to several criteria: corneal condition, the intensity of the pain syndrome, and intraocular pressure (IOP) levels. Prior to the procedure, corneal edema was observed in 24 eyes (80%). On the first day following laser photocoagulation of the ciliary body, the number of eyes with a clear cornea increased to 19 (63.33%), and after one week, this number rose to 26 eyes (86.6%).

Significant and moderate pain before treatment was reported in 18 eyes (60%). Immediately after the procedure, the number of eyes experiencing pain, regardless of IOP levels, decreased more than fourfold.

Before the surgery, 21 eyes (70%) had an IOP of 50 mmHg or higher. On the first day after surgery, the number of eyes with IOP reduced to 35 mmHg or below reached 23 (76.7%). By the end of the month, 24 eyes (80%) showed IOP levels not exceeding 32 mmHg. The exception was 2 eyes (6.6%) in patients with IOP levels between 40–45 mmHg, who later underwent trabeculectomy.

We did not observe any improvement in visual acuity as a result of this procedure, as prior to the surgery, visual acuity in patients with neovascular glaucoma was measured at 0 (zero).

Conclusions:

Laser transscleral cyclophotocoagulation of the ciliary body in micro-pulse mode in patients with painful neovascular glaucoma leads to a reduction in IOP, relief of pain syndrome, and is a pathogenetically sound method of treatment. It also serves as a preliminary stage before performing anti-glaucoma surgery.

This technique is organ-preserving in nature, with its primary aim being the achievement of an analgesic effect through the reduction of intraocular pressure and the preservation of the eyeball as an organ.

Literature

1. Abduazizovich, Y. A., Abdurakhmanovich, B. S., Bakhodirovna, S. D., Batirovich, K. S., & Erkinovich, K. R. (2022). Interrelation of functional and anatomical and optical parameters of the eye in congenital myopia. *Web of Scientist: International Scientific Research Journal*, 3(4), 582-590.
2. Abdurakhmanovich, B. S., Muratovna, K. A., Azizovich, Y. A., & Botirovich, K. S. (2020). Effectiveness of surgical treatment of high myopia by implantation of phakic intraocular lenses. *European Journal of Molecular & Clinical Medicine*, 7(03).
3. Babaev, S. A., Kadirova, A. M., Yusupov, A. A., Bekturdiev, Sh. S., & Sabirova, D. B. (2016). Our experience of surgical correction of secondary divergent strabismus in children. *Tochka Zreniya. Vostok–Zapad*, (3), 124-126.
4. Babaev, S. A., Kadirova, A. M., Sadullaev, A. B., Bekturdiev, Sh. S., Salahiddinova, F. O., & Khamrokulov, S. B. (2017). Effectiveness of phacoemulsification with intraocular lens implantation in mature senile cataracts. *Vestnik Vracha*, (3), 23.
5. Babaev, S. A., Kadirova, A. M., & Oripova, E. Ch. (2020). Effectiveness of premilene suture material in congenital blepharoptosis surgery. *Vestnik Vracha*.



6. Boboev, S. A., Kadirova, A. M., Ismoilov, J. J., Kosimov, R. E., & Boboev, S. S. (2021). Experience of transscleral laser photocoagulation of the ciliary body in patients with neovascular glaucoma. In *VolgaMedScience*, (pp. 430-432).
7. Doliev, M. N., Tulakova, G. E., Kadirova, A. M., Yusupov, Z. A., & Jalalova, D. Z. (2016). Effectiveness of combined treatment in patients with central serous chorioretinopathy. *Vestnik Bashkirskogo Gosudarstvennogo Meditsinskogo Universiteta*, (2), 64-66.
8. Jalalova, D. Z., Kadirova, A. M., & Khamrokulov, S. B. (2021). Outcomes of herpetic keratouveitis treatment with "Oftalmoferon" depending on the immune status of patients. In *Interdisciplinary Approach to Diseases of the Head and Neck*, 103.
9. Jalalova, D. Z. (2009). A method of combined treatment for diabetic retinopathy. *Vrach-Aspirant*, 37(10), 864-868.
10. Kadirova, A. M., Boboev, S. A., & Khakimova, M. Sh. (2021). Early detection and treatment of accommodation spasm in children. *Forum Molodykh Uchenykh*, (5), 191-196.
11. Kadirova, A. M., Boboev, S. A., & Khamrokulov, S. B. (2021). Effectiveness of retinalamin in the treatment of congenital myopia. In *VolgaMedScience*, (pp. 429-430).
12. Kadirova, A. M., Ruziyev, T. Kh., & Khamrokulov, S. B. (2019). Long-term results of conjunctival autografting in patients with pterygium. *Tom-I*, 235.
13. Kadirova, A. M., Babaev, S. A., Kalandarov, F. U., & Gaffarov, G. K. (2013). Effectiveness of dacryocystorhinostomy with bicanalicular intubation of the tear ducts with silicone tubular pathways. In *Proceedings of the Scientific-Practical Conference of Young Scientists*, April 9, Tashkent Highway, pp. 231.
14. Kadirova, A. M., Khamrokulov, S. B., & Khakimova, M. Sh. (2021). Treatment of accommodation spasm in children. In *Modern Science: Current Issues and Prospects for Development*, pp. 231-236.
15. Mukhamadiev, R. O., Dekhkanov, T. D., Blinova, S. A., Yusupov, A. A., & Khamidova, F. M. (n.d.). Age features of tear crystallization in healthy individuals. *Vestnik Vracha*, 26.
16. Mukhamadiev, R. O., Rakhimova, L. D., Kadirova, A. M., & Khamidova, F. M. (n.d.). Crystallography of tears in various eye diseases. In *Interdisciplinary Approach to Diseases of the Head and Neck*, 123.
17. Sabirova, D. B., Yusupov, A. A., Iskandarov, Sh. Kh., Kadirova, A. M., & Tulakova, G. E. (2016). Clinical evaluation of ozone therapy and cryopexy in patients with herpetic keratitis. *Tochka Zreniya. Vostok-Zapad*, (1), 147-149.
18. Sabirova, D. B., Tulakova, G. E., & Ergashieva, D. S. (2017). Complex treatment of diabetic maculopathy using the peptide bioregulator "Retinalamin" and retinal laser photocoagulation. *Tochka Zreniya. Vostok-Zapad*, (2), 114-116.
19. Sabirova, D. B., Iskandarov, Sh. Kh., Kosimov, R. E., Ergashieva, D. S., & Yusupov, A. A. (2015). Improvement in the treatment of herpetic keratitis using ozone gas through the "Orion-Si" glasses device. In *Russian National Ophthalmological Forum*, 1, 159-163.
20. Sabirova, D. B., Obloyorov, I. Kh., & Khazratova, D. F. (2019). Clinical-epidemiological features of vernal keratoconjunctivitis and its treatment with immunocorrecting agents. *Nauchnye Issledovaniya*, 52.
21. Sattarova, Kh. S., Jalalova, D. Z., & Bekturdiyev, Sh. S. (2011). Causes of blindness and low vision in diabetes mellitus. *Akademicheskyy Zhurnal Zapadnoy Sibiri*, (6), 27-28.
22. Tulakova, G. E., Sabirova, D. B., Khamrokulov, S. B., & Ergashieva, D. S. (2018). Long-term results of xenoplastic surgery in high myopia. *Nauchny Forum. Sibir*, 4(1), 80-80.



23. Khamidova, F. M., Amriddinova, Sh. A., & Ochilova, N. N. (2012). Retinalamin in the complex treatment of patients with complicated progressive myopia. *Otvetstvenny Redaktor*, 3, 727.
24. Yusupov, A. A., Boboev, S. A., Khamrokulov, S. B., Sabirova, D. B., & Kosimov, R. E. (2020). Relationship between functional and anatomical-optical parameters of the eye in congenital myopia. *Voprosy Nauki i Obrazovaniya*, (22(106)), 44-53.
25. Yusupov, A., Khamrokulov, S., Boboev, S., Kadirova, A., Yusupova, N., & Yusupova, M. (2021). Correction of ametropia with intraocular phakic lenses. *Zhurnal Stomatologii i Kraniotsifalnykh Issledovaniy*, 2(1), 13-17.
26. Yusupov, A. A., Yusupova, N. K., & Khamrokulov, S. B. (2020). Intraocular correction of high anisometropia in strabismus. *Sovremennye Tekhnologii v Oftalmologii*, (4), 251-252.
27. Yusupov, A. A., Kadirova, A. M., Babaev, S. A., Ochilova, N. N., Kosimov, R. E., & Salahiddinova, F. O. (2015). Cryope
28. Yusupov, A. A., Yusupova, N. K., & Khamrakulov, S. B. Intraocular correction of high anisometropia in strabismus. // *Modern Technologies in Ophthalmology*, (2020). (4), 251-252.
29. Yusupov, A. A., Kadirova, A. M., Babaev, S. A., Ochilova, N. N., Kosimov, R. E., & Salahiddinova, F. O. Cryopexy in the complex therapy of patients with neovascular painful glaucoma. // *Russian National Ophthalmology Forum*, (2015). 1, 196-198.
30. Yusupov, A. Yu., Saliev, M. S., Zakirova, Z. I., & Vasilenko, A. V. (1988). Some features of the clinical manifestations of glaucoma with relatively low intraocular pressure and various levels of arterial pressure. *Vestnik of Ophthalmology*, 104(5), 6-8.
31. Yusupov, A. Yu., Zakirova, Z. I., Vasilenko, A. V. The intolerance index as a prognostic marker in the drug treatment of low intraocular pressure glaucoma. In *International Conference, dedic.* (pp. 121-122).
32. Yusupov, A. A., Yusupova, M. A., Yusupova, N. A., & Vasilenko, A. V. (2020). Microimpulse transscleral cyclophotocoagulation (MITSCPC) in the treatment of refractory glaucoma: Preliminary results. In *World Economy. Problems, Prospects, Innovations* (pp. 42-49).
33. Yusupov, A., Khamidova, F., & Vasilenko, A. (2022). Our experience of combined application of Virgan gel and parabolbar injections of Cycloferon in superficial forms of herpetic keratitis. *The Doctor's Herald Journal*, 1(1), 215–216. Retrieved from https://inlibrary.uz/index.php/doctors_herald/article/view/9103.
34. Yusupov A. A., Yusupova M. A., Yusupova N. A., Nasretidinova M. T., Vasilenko A. V., Babaev S. S. Results of the treatment of terminal painful glaucoma using the microimpulse transscleral cyclophotocoagulation method. *Ophthalmology. Eastern Europe*, 2023, Vol. 13, No. 1 (pp. 16-29). <https://doi.org/10.34883/PI.2023.13.1.013> UDC 617.7-007.681.
35. Boboev S. S., Kadirova A. M., Boboev S. A. Treatment of neovascular glaucoma using microimpulse transscleral cyclophotocoagulation. *Advanced Ophthalmology Volume 1 / Issue 1 / 2023*. DOI: <https://doi.org/10.57231/j.ao.2023.1.1.010> (pp. 45-48).
36. Boboev S. A., Kadirova A. M., Boboev S. S. Transscleral diode laser cyclophotocoagulation in microimpulse mode in patients with refractory glaucoma. DOI: <https://doi.org/10.25276/2312-4911-2023-1-192-198>. *Modern Technologies in Ophthalmology*, Issue No. 2 (48), 2023. 2 Fedorov Readings. Electronic version www.eyepress.ru (pp. 192-198).
37. Yusupov A. A., Boboev S. A., Boboev S. S., Kadirova A. M. Immediate and long-term results of diode laser cyclophotocoagulation in microimpulse mode in patients with refractory glaucoma. *Actual Issues of Ophthalmology in Tajikistan. Materials of the Second Congress of Ophthalmologists of the Republic of Tajikistan with international participation: Collection of scientific articles.* – Dushanbe: 2023. - 400 p.