Rehabilitation treatment of patients with neovascular glaucoma

Abstract: An algorithm for the rehabilitation treatment of patients with neovascular glaucoma.

Keywords: neovascular glaucoma, antiglaucomatous operation.

Because byway pathogenesis of neovascular glaucoma (NVG) treatment of this prognostically unfavorable disease remains a serious problem in ophthalmology. The most frequent causes of neovascular glaucoma is retinal vascular lesions, such as proliferative diabetic retinopathy and retinal vein occlusion of the central or branch, as reasons for neovascular glaucoma may be inflammatory eye disease, trauma, retinal detachment. Pathognomonic symptom of neovascular glaucoma is the presence of newly formed blood vessels on the iris [4, 357]. One of the leading units in the pathogenesis of neovascular glaucoma is a chronic hypoxia of the retina, leading to the development of iris neovascularization. This progression of neovascularization of the iris creates especially difficult conditions for the normalization of IOP, leading to instability of the postoperative IOP reduction. However, underlying disease, which develops as a result of the disease process, largely determines the specificity and resistance to the disease to standard drug therapy. In addition, neovascularization of the iris and anterior chamber angle is a high risk factor for intraoperative and postoperative hemorrhage, which complicates surgery for glaucoma [3, 114]. This pathology is characterized by severe scarring process in the area of surgery, leading to a recurrence of elevated intraocular pressure. All this greatly complicates the treatment and makes the prognosis of neovascular glaucoma is extremely unfavorable [1, 10].

NVG treatment includes conservative, laser and surgical techniques [5]. According to the literature, at all stages of NVG shows intraretinal therapy, which comprises administering drugs angiogenesis inhibitors. Intravitreal injection of the drug leads to regression of vessels. The reduction or disappearance of the newly formed blood vessels after injection of angiogenesis inhibitors allows for operation with a lower risk of hemorrhagic complications. Using modifications fistulizing operations, the establishment of new operations, the use during glaucoma surgery antiproliferative drugs and modern models of shunting devices increases the efficiency of the treatment, patients with NVG [6, 214–220]. However, any of the methods inherent complications, which limit their use and require in each case specific balanced approach in the selection of the optimum tactics of the patient [7, 298–302]. The problem of choosing the method of NVG treatment depending on the results of a complex examination of patients in the literature covered enough. This makes the relevance of the application of optimization methods for the treatment of patients with NVG-based treatment algorithm taken into account the stage of the disease, and the objectification of evaluation of examination and treatment of patients. Low efficiency of traditional medical and surgical treatments, a high percentage of post-operative complications makes the treatment of neovascular glaucoma problem one of the most important problems in modern ophthalmology. In this regard, the development of the tactics of rehabilitation in patients with neovascular glaucoma is a timely and well-founded.

Purpose of the study
Optimization of rehabilitation of patients with NVG by applying rehabilitation treatment algorithm.

Material and Methods

In Joint Stock Company "Republican Specialized Center of Eye Microsurgery" developed and put into practice the methods of complex diagnostics and treatment of patients with NVG, the indications and contraindications for surgical, laser and conservative treatment of disease. Studies of patients carried out on the basis of informed consent in accordance with international ethical requirements of the WHO (Helsinki, 1975). Based on the innovative methods we were treated 60 patients with neovascular glaucoma, applied to Joint Stock Company "Republican Specialized Center of Eye Microsurgery" from 2009–2015. Mean follow-up of patients was 24 months. Of the patients examined 24 were men (40%), women — 36 (60%). The average age of patients was 60.7 ± 1.9 years.

To ensure the prevention of operational and postoperative complications of patients was found out the existence of cardiovascular, immunological, inflammatory and other bodily changes such as hypertension, atherosclerosis, diabetes, varicose veins, thrombophilia, blood disorders, vasculitis, uveitis, surgeries, acute disorders stroke, acute myocardial infarction, and others.

All patients underwent clinical examination, includes laboratory diagnostics, counseling therapist, otolaryngologist, dentist, according to testimony consulted an endocrinologist, cardiologist, neurologist. Further examination: molecular-genetic typing of the factors of the hemostatic system — analysis of polymorphic alleles G1691A FV–Leiden, G20210A, prothrombin, C677T-MTHFR, consulting hematologist (by prescription), medical consultation genetics (if indicated), Doppler of the brain blood vessels and the neck (on indications).

The cause of NVG in 30 (50%) cases is diabetic retinopathy, in 24 (40%) cases — postthrombotic retinopathy, the cause could not be detected in the remaining patients NVG. Longevity disease diabetes from 3 to 12 years. Diabetes type I — 10 (33%), diabetes type II — 20 (67%). Patients with post-thrombotic retinopathy term appearance of NVG amounted to 3–6 months after retinal vascular thrombosis. The cause of thrombosis were hypertension history. Among the examined patients with NVG, according to the classification M. Shields [8, 269–286], II stage was recorded of 13 patients, accounting for 16%, III stage — 26 patients (33%), IV stage — 41 (51%).

Eye diagnosis included a visometry, perimetry, tonometry, typography, biomicroscopy, gonioscopy, ophthalmoscopy, ultrasound A-, B-scan, ultrasound biomicroscopy, optical coherence tomography (if transparent eye fluids), fluorescent retinal angiography (if indicated).

In carrying out the scientific studies used clinical, mathematical, statistical, and ultrasound biomicroscopy and medical-statistical methods.

For the medical-statistical analysis of the results of treatment of patients used the technique of selection of the data, which were recorded in a thematic map we developed examination of the patient with neovascular glaucoma.

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Statistical analysis of data from clinical studies carried out by the method of variation statistics using Microsoft Excel software package, including the use of built-in statistical processing functions with the calculation of the arithmetic mean of the studied index (the M), SEM (m), relative values (frequency, %). Significant differences between the groups studied traits was performed using Student’s t test with the calculation of error probability (p). Authentic considered differences in the probability of coincidence of at least p < 0.05.

Based on our analysis and diagnosis of patients with neovascular glaucoma, we have developed a computer program for the rehabilitation treatment of patients with neovascular glaucoma [2] reg. Number DGU 02641, issued by the Agency for Intellectual Property of Uzbekistan in 2012. Programming Language — Delphi 7, the operating environment — Microsoft Windows XP and later. The program consists of 6 modules. Rehabilitation treatment algorithm of patients with NVG is shown in Fig. 1.

The purpose of this innovative method is to make the computer functional state of the patient data with neovascular glaucoma, taking into account characteristics of the course and stage of the disease to determine the indications for conservative, laser, surgical treatment of neovascular glaucoma, which allows for the reduction of intraocular pressure and stabilization of visual function.

Results and discussion

NVG treatment involves, first of all, correction and treatment of common diseases, ophthalmological treatment includes conservative, laser and surgical techniques NVG, drug therapy: ineffective at all stages.

![Rehabilitation treatment of patients with NVG](image)

**Fig. 1. Algorithm rehabilitation treatment of patients with NVG**
The appearance of effective anti-angiogenic agents such as monoclonal antibodies against vascular endothelial growth factor (VEGF) has made possible a direct effect on growth of abnormal blood vessels in the anterior segment. After ocular administration of these drugs is very rapid disappearance of the newly formed blood vessels visible iris and angle of the anterior chamber. This avoids the serious complications of cataract surgery and glaucoma patients with NVG.

To reduce IOP recommended to use β — blockers and carbonic anhydrase inhibitors which reduce intraocular pressure but not enough to efficiently. In the case of severe pain syndrome is recommended to use atropine, corticosteroids and diuretic drugs, which have a temporary analgesic and hypotensive effects are only effective as a preparatory stage for surgical treatment.

Laser treatment: The prerubeotic stage, preglaukomy stage, the stage of open-angle glaucoma and in the presence of clear eyes environments in vascular diseases of the retina we carried out short-term medical therapy (10–12 days), at the earliest stages of the disease, as a stage of preparation for the laser coagulation of the retina, given the the pathogenesis of vascular diseases of the eye. Drug therapy was conducted against the background of the correction included angioprotectors, absorbable, decongestants. Early laser retinal photocoagulation prevents the development of secondary glaucoma as prevents compression of posterior long ciliary arteries. Laser treatment of diabetic retinopathy begins with the appearance of the stromal edema, according to optical coherence tomography. The indication for laser treatment is the height of the stromal edema from 270 microns.

Laser treatment was conducted in a coagulation subthreshold 2–3 OCT stage under control. At the same time requires the payment of blood sugar and blood pressure. In the case of focal or diffuse retinal edema was performed subthreshold or threshold laser photocoagulation as a focal, sectoral, restrictive or “lattice”.

When thrombosis retinal vein laser treatment started immediately after the medical therapy and was carried out in 2–3 stages. The first phase — careful coagulation multiple hemorrhages. The second stage (2 weeks), the threshold paravasal laser coagulation of the retina and macular area barrage. The third stage (one month after the second) restrictive retinal laser photocoagulation.

In the terminal stage of NVG in the absence of visual functions and expressed pain syndrome cyclophotocoagulation used.

Under open-and-closure NVG recommended antiglaucomatous operation — for our proposed original method — deep sclerectomy implantation xenokollagen drainage (GSE with ICD) (patent number 04336 issued by the IAP State Patent Office of the Republic of Uzbekistan in 2011), which allows to achieve the normalization of IOP.

To check the status of retina and pathogenetic treatment of patients with neovascular glaucoma is important to have transparency in the eyes of media, which makes it necessary to early cataract surgery in these patients, and therefore the presence of patients with complicated cataract at an early stage, phacoemulsification with intraocular lens implantation.

Conclusions
1. Taking into account the initial state of the eyes and the whole body approach to treatment of patients with neovascular glaucoma must be individualized.
2. Using the algorithm we developed rehabilitation treatment NVG allows you to select the optimal pathogenetically oriented approach to the treatment of NVG, depending on the stage of the disease, thereby increasing medical and social effect and improve the quality of life of patients.

References:
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Assessment of results of autodermoplastiks with application of biosynthetic wound coverings of “Biokol” and “Parapan” in patients with deep burns

Abstract: Authors analyse results of researches of 42 patients, with deep extensive ambustions III of stage. The comparative analysis of the complex approach in treatment of patients with application combined autodermoplastics — biosynthetic...