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Features of Surgical Treatment of Neovascular Glaucoma

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Annotation: Treatment of glaucoma has a pathogenetic focus and includes: reducing IOP to a tolerable (target) level; correction of metabolic disorders; use of cyto- and neuroprotectors to preserve cells in the anterior segment of the eye and (especially) the retina; treatment of concomitant diseases that negatively affect the course of the glaucomatous process.

The leading role in the treatment of glaucoma belongs to reducing IOP. Currently, three main methods of hypotensive treatment are used: drug, laser and surgical.

Modern ophthalmic hypotensive agents include miotics, adrenergic agonists (adrenaline and α 2 -adrenergic stimulators), (β-blockers, carbonic anhydrase inhibitors, some prostaglandins, agents that have an osmotic effect. The mechanism of their action on IOP is associated with improving the remorphological, remorphological outflow of the eye), secretion of intraocular fluid (α 2 -adrenergic agonists, (β-blockers, carbonic anhydrase inhibitors).

Keywords: Glaucoma, treatment, prevention, pathogenesis, prognosis and treatment.

Introduction: Cholinomimetics are used from miotic drugs: pilocarpine, carbacholine, benzamone and acetclidine. They act like acetylcholine, causing contraction of the pupil and ciliary muscle sphincter, promoting dilation of blood vessels and increasing their permeability. By narrowing the pupil and pulling the iris fold away from the anterior chamber, miotics improve the access of the cerebrovascular system to the drainage system of the eye. At the same time, due to the contraction of the ciliary muscle, the trabecular diaphragm stretches, the blockage of

Schlemm's canal is reduced, and the outflow of cerebrospinal fluid from the eye improves.

Pilocarpine hydrochloride is available in the form of eye drops and medicated eye films with concentrations of 1, 2 and 4%. Pilocarpine is instilled 2-4 times a day, and in acute glaucoma attacks, 8-10 times on the first day.

Carbacholine (1.5 and 3% solution) is prescribed 2-4 times a day.

Aceclidine (2, 3 and 5% solutions) is used in the form of eye drops 3-6 times a day.

Adrenaline dipivalate (dipivefrin 0.1% solution) reduces IOP by improving the outflow of EV from the eye. Dipivefrin causes pupil dilation and is therefore contraindicated in angle-closure glaucoma.

Clonidine (clonidine) - eye drops with a concentration of 0.125, 0.25 and 0.5%. With a single instillation, the drug reduces the production of EV by 20-30%, the duration of the hypotensive effect is about 8 hours.

β-adrenergic blockers play a leading role in the treatment of glaucoma. They are non-selective, blocking both β 1 and β 2 -adrenergic receptors, and selective, mainly blocking only β 1 receptors.

Research methods and materials: Timolol maleate (timoptic, oftan-timolol, arutimol, etc.) - eye drops with a concentration of 0.25 and 0.5% - non-selective (β-blockers. With a single use, IOP decreases by 6-12 mm Hg. Timolol is contraindicated in bronchial asthma and severe obstructive bronchial asthma. Severe cardiopathy for 2 days.

Timoptic-depot - eye drops of long-acting timolol maleate in concentrations of 0.25 and 0.5% - have the same hypotensive effect as aqueous solutions of this drug, but its duration is more than 24 hours. Instillations are carried out once a day.

Proxodolol is a local α- and β-adrenergic blocker. The drug, applied in the form of 1 and 2% eye drops twice a day, has a pronounced hypotensive effect.

Betaxalol hydrochloride (betoptic) is a selective β 1 adrenergic blocker. The hypotensive effect of the drug is slightly less pronounced than that of timolol, but it can be prescribed with caution to patients with bronchial asthma, as well as other broncho-obstructive lesions. Betaxalol eye drops are used in a concentration of 0.5% 2-3 times a day. Data have been obtained indicating that Betoptic not only reduces IOP, but also has a neuroprotective effect.

Carbonic anhydrase inhibitors suppress its activity, reduce carbonic anhydrase secretion by 30-40% and reduce IOP. The hypotensive effect lasts for 6-8 hours. The most effective drugs in this group are acetazolamide and dorzolamide hydrochloride.

Acetazolamide (diamox, diacarb) is produced in the form of tablets containing 0.25 g of the active substance. The drug is taken orally 2-4 times a day, 0.125-0.25 g. During treatment with acetazolamide, potassium-containing preparations should be prescribed.

Dorzolamide hydrochloride (Trusopt), Azopt - eye drops with the same effect as acetazolamide. The drug is used 3 times a day, in combination with timolol - 2 times.

Synthetic analogues of prostaglandin F 2a - latanoprost (xalatan), travoprost (travatan) - eye drops. They have a pronounced and long-lasting hypotensive effect, which is explained by the improvement of uveoscleral outflow of vesicles from the eye. The drugs are used once a day.

Timpilo, Fotil and Fotil-forte - 0.5% solution of timolol maleate and 2% or 4% solution of pilocarpine. The indication for their use is the insufficiently established hypotensive effect of each component separately. The drugs are prescribed 2 times a day.

Halocom is a combination of latanoprost 0.005% and timolol 0.5%. Dosage - once a day, in the evening.

Proxofylline contains a 2% solution of proxodolol and a 0.25% solution of clonidine. Means with

an osmotic effect. Drugs in this group increase the osmotic pressure of the blood, drawing fluid from all structures of the eye, mainly from the vitreous body. The osmotic effect is the main mechanism for reducing IOP.

Glycerin is administered orally in the form of a 50% solution at a dose of 1-1.5 g of glycerol per 1 kg of body weight. The hypotensive effect reaches its maximum intensity 1-2 hours after taking the drug and stops after 5-8 hours.

Mannitol, a hexavalent alcohol, is administered intravenously as a 20% solution at a dose of 2-2.5 g/kg at a rate of 10 ml/min. IOP decreases within 30-45 minutes, with a duration of action of 2-4 hours.

Initially, one antihypertensive drug is prescribed. More than two drugs are used temporarily before the proposed surgery or in cases where the surgery is associated with high risk, as well as when the patient refuses surgery.

Antihypertensive treatment of glaucoma is aimed at reducing IOP to the "target" level. This term refers to the estimated level of IOP that is tolerated individually. In this case, the patient's age, systemic arterial pressure, stage of glaucoma and other individual characteristics are taken into account. The value of the "target" pressure is adjusted in the process of dynamic monitoring of the patient.

Conclusions: Antihypertensive therapy begins with the appointment of one of the first drugs, which includes β-blockers, xalatan and pilocarpine. If the hypotensive effect of the first drug is not sufficiently pronounced, the second is added. The most commonly used combination of drugs is timolol (or betaxalol) and pilocarpine. Instead of instilling these agents separately, you can use a combined drug - Fotil.

All other antihypertensive drugs are considered second-line or additional drugs. Indications for the use of second-line drugs; There are contraindications to the use of first-line drugs, their individual tolerance or insufficient effectiveness.

To eliminate the phenomenon of addiction, it is recommended to change medications every 2-3 months.

Treatment of an acute attack of glaucoma, which is considered an emergency, includes the following actions.

In the first hour, pilocarpine is instilled every 15 minutes, then every 30 minutes (2-4 times), then every hour until the attack is relieved. At the same time, a small amount of β-blocker is instilled into the affected eye. The patient takes acetazolamide and glycerin orally. Hirudotherapy and distracting measures are prescribed - warm foot baths. If there is no effect within 1-2 hours, sedatives, antihistamines and painkillers in the form of a lytic mixture are used under the control of blood pressure.

The operation is also recommended in cases of successful drug treatment of an acute attack of glaucoma, but at a later stage. For prophylactic purposes, iridectomy is also performed in the second eye.

Treatment of a subacute attack depends on its severity. In mild cases, it is enough to additionally instill 3-4 instillations of pilocarpine, timolol and take acetazolamide. Later, iridectomy should be performed.

Discussion: Miotics are contraindicated in such cases, as they relax the ligaments of Zinn and contribute to the development of vitreocrystalline lens block. Patients are prescribed cycloplegic mydriatics (1% atropine solution) 3-4 times a day, timolol 2 times a day, diacarb and glycerin orally. Corticosteroids are used to eliminate inflammatory phenomena in the eye. If it is possible to stop the attack, then all drugs, except timolol and atropine, are gradually discontinued. Discontinuation of atropine can lead to a relapse of the attack. If drug treatment is ineffective,

surgery is performed (lens removal, vitrectomy).

Laser surgery is primarily aimed at eliminating intraocular blocks in the path of PV movement from the posterior chamber of the eye to the episcleral vessels.

Laser iridectomy involves creating a small hole in the peripheral part of the iris.

The operation is indicated for functional or organic pupillary block. It leads to equalization of pressure in the posterior and anterior chambers of the eye and opening of the anterior chamber of the eye. For prophylactic purposes, the operation is performed in all cases of closed-angle glaucoma and open-angle glaucoma with narrow-angle attack.

Laser trabeculoplasty involves applying a series of cauterizations to the inner surface of the trabecular meshwork, which improves its permeability to EVs and reduces the risk of blockage of Schlemm's canal.

The indication for surgery is POAG that cannot be controlled with medication. Other surgical interventions can also be performed using lasers, in particular, microsurgery aimed at correcting "knife" operations.

There is a wide variety of surgical interventions, which can be divided into 4 main groups.

Surgeries that improve intraocular circulation include iridectomy (removal of the pupil blockage) and iridocycloextraction (expansion of the anterior chamber). The indication for these surgeries is primary or secondary angle-closure glaucoma.

Fistulization operations create a new path for fluid to drain from the anterior chamber into the subconjunctival space, from where the fluid can drain into the surrounding vessels. The most common operations of this type are trabeculectomy and sinustrabeculectomy.

Fistulization surgery can be performed for chronic open-angle and closed-angle glaucoma.

Non-penetrating filtration operations (NFO) are based on subscleral incision of the outer wall of the scleral sinus combined with stretching of the trabecular wall using microcautery.

According to one modification of the operation (non-perforating deep sclerectomy), the deep plate of limboscleral tissue is cut not only above Schlemm's canal, but also in front of it, to Descemet's membrane.

The effectiveness of NFO is increased by the use of antimetabolites during or after surgery. A decrease in the severity of the hypotensive effect of NFO in the postoperative period serves as an indication for laser perforation of the trabecular diaphragm in the surgical field.

Cyclodestructive operations are based on damage and subsequent atrophy of part of the ciliary muscle processes, which leads to a decrease in the production of EV. Among the modifications of this operation, cyclocryodestruction is the most common. During the operation, several cryodestructions are applied to the sclera in the area of the ciliary crown. With sufficient intensity and duration of cryotherapy, a significant decrease in IOP can be achieved. The length of the impact zone should not exceed 180-200 ° to prevent hypotension and atrophy of the eyeball. Recently, transscleral diode laser cyclocoagulation and endolaser technologies, which are characterized by greater safety and high efficiency, have become increasingly widespread. Cyclodestructive operations are indicated for advanced glaucoma in case of unsuccessful results or incomplete effect of a previously performed fistulization operation, and as an additional intervention for glaucoma accompanied by pain syndrome.

Surgery for refractory glaucoma. The main reason for the unsuccessful results of filtering operations is fibrous degeneration of the newly created outflow tracts. It is especially difficult to achieve stable results in "refractory" (from the English word "refractory" - stubborn, persistent) glaucoma. This group includes neovascular, aphakic and juvenile glaucoma, as well as primary and secondary glaucoma in patients hospitalized for reoperation. In such cases, cytostatics

(fluorouracil, mitomycin) or drains connecting the anterior chamber of the eye with the subconjunctival space are used when performing repeated interventions.

Treatment of chronic glaucoma usually begins with conservative therapy. If it is not sufficiently effective, surgical intervention is indicated. The concept of “sufficiently effective” includes increased IOP, progressive deterioration of the visual field, or an optic disc with ophthalmotonus at the upper limit of the norm. Surgery is also indicated in cases where the patient, for some reason, does not follow the doctor's instructions or is unable to regularly monitor intraocular pressure, as well as the condition of the optic disc and visual functions. However, surgical treatment may be the method of choice immediately after the diagnosis, with the patient's consent. Indications for surgical treatment of acute glaucoma are described above.

To correct hemodynamic and metabolic disorders, general and local drug treatment, physiotherapy, surgical interventions on the blood vessels and optic nerve are performed. The complex of drugs includes vasodilators, antiplatelet agents, angio- and neuroprotectors, antioxidants, vitamins and drugs that have a positive effect on blood circulation and metabolic processes. Physiotherapy includes electrical stimulation of the retina and optic nerve, treatment with an alternating magnetic field, and low-energy laser irradiation of the light-sensing apparatus of the eye. Treatment is carried out in courses, the duration of which, as well as the selection of procedures and drugs, is individual in each specific case.

An important factor in treatment should be recognized as the patient's attitude to his illness and the prescribed treatment, as well as the correct work and lifestyle regimen.

Medical examination of patients with glaucoma includes the following main activities: periodic examination of the population at risk for early detection of glaucoma; systematic monitoring of the condition of patients with glaucoma and their rational treatment; teaching patients self-control methods and the correct implementation of treatment prescriptions.

When choosing a rational treatment for a patient, great attention is paid to maintaining a satisfactory quality of life. The patient's quality of life largely depends on the patient and his family members being well informed and on rational treatment recommendations taking into account the patient's condition, his professional, family and financial capabilities.

Work and lifestyle habits are of great importance for maintaining a satisfactory quality of life for a glaucoma patient. Restrictions apply only to heavy physical exertion, high nervous tension, prolonged work with the head tilted, and hot workshops.

Avoid drinking large amounts of fluids at one time. Of course, smoking should be avoided.

Conclusion: Ocular hypotension (OH) occurs as a result of other eye diseases or diseases of the whole body. In this case, the true IOP decreases to 7-8 mm Hg. Art. and below. The direct causes of hypotension are increased or impaired secretion of cerebrospinal fluid from the eye. GG is especially often observed after antiglaucoma operations and penetrating wounds with fistula formation. Hyposecretion of EV is associated with damage to the ciliary body: inflammation, degeneration, atrophy or detachment from the sclera. Blunt eye injury can lead to temporary suppression of EV secretion.

The causes of HG can be acidosis, disruption of the osmotic balance between blood plasma and tissues, and a significant decrease in blood pressure. This explains the development of HG in diabetic and uremic coma and cases of collapse.

With slowly developing and mild hypotension, the functions of the eye are preserved. Significantly expressed and especially acute hypotension leads to a sharp expansion of blood vessels, venous stasis and increased capillary permeability. As a result, conditions are created for the development of hypoxia, acidosis, microthrombosis, plasmoid fluid enters the tissues, enhancing dystrophic processes in them.

The clinical picture of acute HT may include: swelling and opacification of the cornea,

opacification of the vitreous body, retinal maculopathy, formation of retinal folds, swelling of the optic disc with subsequent atrophy. The size of the eyeball decreases (subatrophy of the eye), and in severe cases, due to the development of cicatricial processes, it shrinks to the size of a pea (ocular atrophy).

Treatment of hypotension is aimed at eliminating the main causes of its occurrence. It consists in closing the fistula, opening the ciliochoroidal space if fluid accumulates there, and treating inflammatory and degenerative processes in the choroid membrane of the eye.

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