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ALGORITHM FOR MANAGEMENT OF CHILDREN AFTER ANTI-GLAUCOMATOSUS SURGERY

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Summary

The prevalence of glaucoma in children is 1:10000-1:12000. In the structure of blindness in children, the proportion of the pathology under consideration ranges from 2 to 15 %. The goal of surgical treatment of glaucoma is to achieve the target elevated intraocular pressure (IOP) without the use of medications. Early complications include shallow anterior chamber syndrome, hyphema, ciliochoroidal detachment, excessive hypotension and hypertension. The probability of these complications is quite high: according to some data it can reach 50 %, which shows the relevance of this problem.

Aims. *To study the frequency and nature of early postoperative complications and to analyze the results of treatment in children with primary congenital glaucoma.*

Material and methods. *The total number of children was 50 (91 eyes) who underwent anti-glaucomatous surgery and early postoperative complications were revealed.*

Results. *Analysis of the structure of early postoperative complications after anti-glaucoma surgery showed that on the first day, the total number of patients with complications was 61.54 %. On the third day, the total number of patients with complications decreased to 39.56 %. Of these patients, the largest number were patients with hypotension with CCO 32.97 %, hyphema was -19.78 % in the early postoperative period and ophthalmohypertension was -17.58 %. On the seventh day, the number of complications was 9.9 % of patients who were recommended to continue conservative treatment in inpatient conditions.*

Conclusion. *In the early postoperative period after conservative treatment, the number of complications decreased to 90.1 %. None of these patients required repeat surgery. Patients were discharged home under the supervision of a local ophthalmologist.*

Key words: *Primary Congenital Glaucoma; Anti-glaucomatous surgery; Early Postoperative Complications.*

Introduction

The most important medical and social problem in modern ophthalmology is the early diagnosis and treatment of glaucoma. Despite advances in the diagnosis and treatment of this disease, glaucoma remains one of the leading causes of irreversible vision loss in people worldwide [1-6]. Glaucoma is the leading cause of blindness and primary visual impairment. The underlying pathomechanism of primary congenital glaucoma is anterior chamber angle dysgenesis and elevated intraocular pressure. Pediatric glaucoma is one of the most challenging diseases to treat. This is because the patient is a child with a long life expectancy, the disease is potentially sight-threatening, and treatment, especially surgery, is often disappointing. The term pediatric glaucoma encompasses a variety of conditions. Primary congenital glaucoma is the most common form and is considered the second leading cause of preventable blindness in children [7,8]. Other forms of pediatric glaucoma include juvenile glaucoma, with onset between 4 and 16 years of age, and secondary forms of glaucoma, including pseudophakic glaucoma, which occurs in children who have undergone surgery for pediatric cataract, glaucoma due to systemic disease, as in Sturge Weber patients; glaucoma due to ocular anomalies, as in aniridia and Peter's anomaly; and glaucoma associated with acquired conditions, such as steroid, traumatic, and uveitic glaucoma. Clinical symptoms include photophobia, lacrimation, blepharospasm, increased globe size, corneal edema and enlargement, and RPE excavation [9-12].

Intraocular pressure (IOP) elevation, axial length increase, optic nerve cupping, and corneal changes, including corneal edema and Haab's striae, are the clinical hallmarks of pediatric glaucoma. Retinal ganglion cell loss

occurs as a consequence of IOP elevation. The modifiable risk factor for glaucoma progression is considered to be elevated intraocular pressure (IOP). Therefore, the main principle of glaucoma treatment is to systematically lower the IOP to a safe level. The main goal of glaucoma surgery is to achieve an individualized target IOP without the use of additional medications [13-17]. Sinusotrabeulotomy is considered the gold standard of congenital glaucoma surgery. In addition, in pediatric patients undergoing trabeculectomy, mitomycin C (MMC) may increase the rate of complications, including avascular, thin blebs and endophthalmitis, which have been reported at a rate as high as 6.7 %. Although GDD implantation in children is more challenging than in adults, GDD may be an appropriate option for IOP control in children, especially when initial angle surgery has failed, and may be considered a viable alternative to trabeculectomy. The valved Ahmed GDD is more commonly used than the non-valved Baerveldt GDD for the treatment of pediatric glaucoma [18-20]. Both the Ahmed and Baerveldt GDD are effective in lowering IOP, with final IOP ranging from 12.27 to 21.3 (42-59) and 13.8-18 in studies using the Ahmed and Baerveldt GDD, respectively. At one year, the success rate has been reported to range from 50-94.7 % and 72-94.5 % for the Ahmed and Baerveldt GDD, respectively. Although GDDs are considered the best option for the treatment of refractory, uncontrolled pediatric glaucoma, it is important to note that they can lead to several complications [21, 22].

As with any surgical procedure, sinusotrabeulotomy has the potential for a number of complications, which can be divided into intraoperative, early, and late postoperative complications [23]. Early complications include shallow anterior chamber syndrome, hyphema,

ciliochorioid detachment (CCD), excessive hypotension, and hypertension. The probability of these complications is quite high: according to some data, it can reach up to 50 %, which shows the relevance of this problem [24-27].

Aim of the research. To study the incidence and nature of early postoperative complications in children with primary congenital glaucoma in order to analyze treatment outcomes.

Materials and Methods. From 2021 to 2023, 50 children (91 eyes) aged from 20 days to 3 years were operated on at the Eye Department of the TashPMI Clinic. Children with secondary, combined glaucoma and children with systemic diseases were not included in the group. All children were hospitalized on an emergency basis. After thorough preparation, all patients underwent antiglaucomatous surgery. Of the children examined, 56 % (28) were boys and 44 % (22) were girls.

Results and Discussion. The distribution of the patients according to the stage of the disease showed that 12 eyes (13.19 %) were in the initial stage, 18 eyes (19.78 %) in the advanced stage, 50 eyes (54.95 %) in the very advanced stage and 11 eyes (12.08 %) in the terminal stage.

Visual acuity in patients varied from light perception with correct/incorrect projection to 0.09. Tonometric intraocular pressure (IOP) ranged from 28 to 44 mm Hg, depending on the stage of VH, with a mean value of 36.26 ± 1.2 mm Hg. The size of the patients' eyes exceeded the age norm and ranged from 22 to 28 mm (mean 25.7 ± 1.8 mm).

A study of the hydrodynamic parameters of the children's eyes showed that the mean true IOP (P0) was 23.7 ± 1.0 mmHg. The coefficient of ease of outflow of intraocular fluid (C) averaged 0.11 ± 0.02 mm³/min/mmHg, the minute volume of aqueous humor was 2.5 ± 0.5 mm³/min, the Becker coefficient was 194 ± 5.0 .

Ophthalmoscopy of the fundus revealed the following changes: enlargement of the optic nerve head (ONH) in 21 (23 %) cases, oblique optic nerve head in 24 (26 %) cases, vertically oval optic nerve head in 15 (16 %) cases, pallor of the optic nerve head in 32 (35 %) cases. The ratio of excavation to disc area (E/D) was on average 0.64 ± 0.04 : in patients with advanced stage of E/D – on average 0.42 ± 0.01 ; in advanced stage these indicators were 0.62 ± 0.03 ; in terminal stage – 0.8 ± 0.02 . In 17 (34 %) cases fundus details could not be examined due to the presence of keratopathy.

Gonioscopy revealed the following changes in the patients: in advanced stage, grade I goniodysgenesis was observed in 2 (10 %) cases, grade II – in 10 (50 %), grade III – in 7 (35 %). In advanced stage, grade II goniodysgenesis was observed in 7 (31 %) cases, grade III – in 3 (14 %). In the terminal stage, grade II goniodysgenesis was observed in 1 (13 %) case, grade III – in 3 (38 %). In the remaining 17 (34 %) cases the UPC could not be visualized due to the presence of keratopathy.

Intraocular pressure examination was performed before surgery under intubation anesthesia. The results of this examination showed that all children had elevated intraocular pressure with a mean of 30 mmHg. Gonioscopy

revealed the presence of mesenchymal tissue in the corner of the anterior chamber, attachment of the iris to the posterior third of the trabecular meshwork. All children underwent antiglaucomatous surgery, which included a one-stage effect on the outflow pathway in 3 directions: Burian sinus trabeculotomy into the scleral sinus, cyclodialysis-cycloretraction with autoscleral pedicle into the suprachoroidal space, basal iridectomy with sclerectomy under the scleral flap into the episcleral venous system.

The most common complications in the early postoperative period (up to 7 days) were CCHO, hyphema, IOP elevation, small anterior chamber syndrome and hypotony. On the first postoperative day hypotony – (–)1.0 and chorioidal edema were diagnosed in 40 (43.96 %) eyes with a typical clinical picture for such a complication. IOP elevation up to (+)1.0 was detected in 16 eyes in 17.58 % of cases. The probable cause of IOP elevation after surgery was viscoelastic and the presence of sterile air introduced into the anterior chamber to restore it in the final stage of surgery. As it was resorbed, the IOP returned to the planned level. Normal IOP was observed in 35 eyes (38.46 %).

On the third postoperative day, 6 (6.59 %) eyes still had high intraocular pressure. In 30 (32.97 %) eyes the intraocular pressure was in the normal range and in 25 (27.47 %) eyes it decreased to (–)0.5. 30 (32.97 %) eyes showed marked hypotony less than (–)1.0 and these children were found to have CCHO on B-scan. Therefore, they were prescribed conservative treatment (atropine, caffeine, dexamethasone in age-appropriate doses).

On the seventh postoperative day, ocular hypertension persisted in 3 (3.30 %) eyes and IOP lowering medication was recommended. In 25 (27.47 %) eyes IOP was normal, in 57 (62.64 %) eyes IOP was (–)0.5 and these children were discharged home under the supervision of the local ophthalmologist. Hypotony was pronounced in 6 (6.59 %) eyes. It developed against the background of small anterior chamber syndrome and unsuccessful conservative treatment. They were recommended to continue inpatient conservative treatment.

Thus, the total number of patients with CCHO was 32.97 % on the third day after surgery, which decreased to 6.59 % on the seventh day after conservative treatment.

Any manifestation of blood in the anterior chamber from the formation to the level was considered as hyphema. A total of 18 eyes (19.78 %) had hyphema on the first day, 12 (13.18 %) had hyphema on the third day, and 6 (6.59 %) had hyphema with marked hypotony on the seventh day.

Conclusion. Analysis of the structure of early postoperative complications showed that the largest number of patients with hypotension with CCHO 32.97 %, hyphema was noted in the early postoperative period – 19.78 % of patients and ocular hypertension in 17.58 % of cases.

After antiglaucoma surgery, early postoperative complications such as hyphema, CCHO and ocular hypertension occurred in 61.53 % of patients. On the third day, the number of complications decreased to –39.56 %. On the seventh day, 9.9 % of eyes had complications and were recommended to continue conservative treatment in the hospital.

In the early postoperative period after conservative treatment, the number of complications decreased to 90.1 %. These patients did not require repeat surgery. Patients were discharged home under the supervision of a local ophthalmologist.

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АЛГОРИТМ ВЕДЕННЯ ДІТЕЙ ПІСЛЯ АНТИГЛАУКОМАТОЗНОЇ ХІРУРГІЇ

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Поширеність глаукоми у дітей віком коливається не більше 1:10000-1:12000. У структурі сліпоти у дітей питома вага даної патології коливається від 2 до 15 %. Мета хірургічного лікування глаукоми – досягнення цільового внутрішньоочного тиску без використання лікарських засобів. До ранніх ускладнень відносять синдром дрібної передньої камери, гіфему, циліохороїдальне відшарування, надмірну гіпотонію та гіпертензію. Імовірність виникнення цих ускладнень досить висока – за деякими даними, вона може сягати понад 50 %, що показує актуальність цієї проблеми.

Мета дослідження. Вивчити частоту народження та характер ранніх післяопераційних ускладнень для проведення аналізу результатів лікування у дітей з первинною вродженою глаукомою.

Методи дослідження. Загальна кількість склали 50 дітей (91 очей), яким проведено антиглаукоматозна операція та виявлено ранні післяопераційні ускладнення.

Результати дослідження. Аналіз структури ранніх післяопераційних ускладнень після антиглаукоматозних операцій показав, що на перший день загальна кількість пацієнтів із ускладненнями становила 61,54 %. На третій день пацієнти з ранніми післяопераційними ускладненнями становили до 39,56 % випадків. Найбільшу кількість склали пацієнти з гіпотонією при ССО – 32,97 %, гіфема у ранньому післяопераційному періоді зустрічалася у 19,78 % та офтальмогіпертензія – у 17,58 %. На сьомий день у 9,9 % пацієнтів відзначали ранні післяопераційні ускладнення, яким було рекомендовано продовжити консервативне лікування в стаціонарних умовах.

Висновок. У ранньому післяопераційному періоді після проведення консервативного лікування кількість ускладнень зменшилась до 90,1 %. Ці пацієнти не потребували повторного хірургічного втручання. Хворих було виписано додому під наглядом офтальмолога за місцем проживання.

Ключові слова: первинна вроджена глаукома; антиглаукоматозна операція; ранні післяопераційні ускладнення.

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