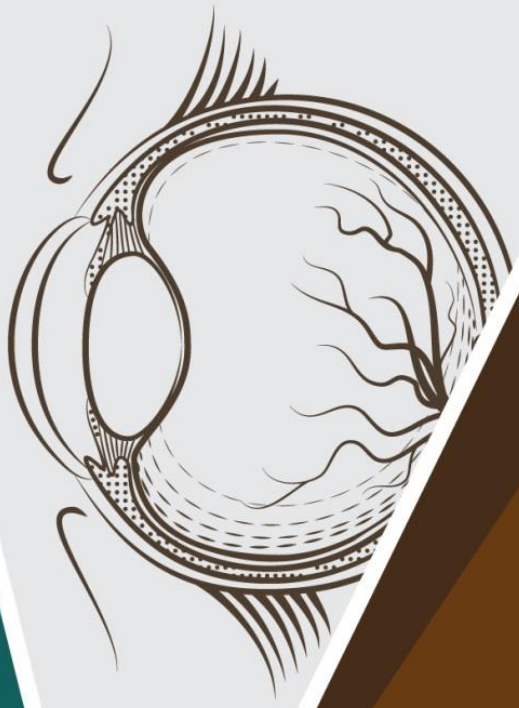

ALGORITHM FOR DIAGNOSING CHILDREN WITH PRIMARY CONGENITAL GLAUCOMA

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CONTENTS

LIST OF ABBREVIATIONS

AGO - anti-glaucoma surgery

IOP - intraocular pressure

intraocular fluid - intraocular fluid

CG - congenital glaucoma

optic disc - optic disc

KLO - coefficient of ease of outflow

MOF - minute volume of fluid

RG - refractory glaucoma

TA - trabecular apparatus

APC - anterior chamber angle

CNS - central nervous system

UBM - ultrasonic biomicroscopy

VEP - visually evoked potentials

SOUTH - juvenile glaucoma

OCT - optical coherence tomography

PZO - anterior and size of the eyeball

PVG - primary congenital glaucoma

CTR - central corneal thickness

NRP - neuroretinal girdle

CHO - ciliochoroidal detachment

INTRODUCTION

All over the world today, congenital eye pathologies remain the main cause of blindness and low vision in children, reducing the quality of life and to this day is considered the most serious health problem. According to epidemiological studies of the World Health Organization (WHO), "... 4.4% of cases of congenital glaucoma leads to blindness, and 2.2% of cases to low vision"[1]. According to some authors, "... congenital glaucoma in children from 1% to 10% of cases leads to blindness"[2]. The variety of clinical symptoms, the complexity of pathogenesis and the severity of the outcomes of the disease once again proves the feasibility of considering early diagnosis and improving the treatment of congenital glaucoma.

A lot of research is being done around the world to improve diagnosis and treatment, by studying clinical and immunogenetic properties to determine the incidence and development of genetic eye diseases. Thus, the priority direction in this area is the study of developmental factors leading to pathological changes in the child's body; development of a system for screening diagnostics in newborns; identify genetic and teratogenic factors of primary congenital glaucoma (PVG); to develop new improved methods of PVG surgery; to study the association of phenotype variants of alleles of the main and candidate genes in different populations in children with PVH; determine the cytokine status of the immune system in children with refractory glaucoma (RG); development of a protocol for the management of children with this pathology. Assessment of systemic and local immunity in children with WG, determination of gene polymorphisms leading to this disease, development of an algorithm for diagnosis, surgical treatment and prevention according to the degree of development is still considered an urgent problem among scientists in this field.

In our Republic, health care measures are being taken to reduce the percentage of disability, in particular, to reduce the number of children with PVH. Comprehensive measures planned in this area "the quality of medical care provided

[1] Отчет Всемирной организации здравоохранения, 2017.

[2] Страхов В.В., Алексеев В.В. Патогенез первичной глаукомы –«все или ничего» // Глаукома. 2009. № 2. С. 40–52.

to the population, improving the quality and accessibility, as well as the formation of a system of medical standardization, the introduction of high-tech methods of diagnosis and treatment, disease prevention and maintaining a healthy lifestyle through the creation of effective models of medical examination and patronage services»[3] these tasks were noted. The main task in this area is to improve the health of the child population, in particular, it is important to develop the latest methods for diagnosing and treating congenital eye diseases.

Decrees of the President of the Republic of Uzbekistan No. PP-4947 of February 7, 2017 “On the Strategy of actions for the further development of the Republic of Uzbekistan”, No. PP-5590 of December 7, 2018 “On comprehensive measures to radically improve the healthcare system of the Republic of Uzbekistan”, No. 3071 of 20 June 2017 "On measures for the further development of specialized medical care for the population of the Republic of Uzbekistan for 2017-2021", as well as other legal documents adopted in this area will help solve the research problems of this dissertation work.

Optimization of the methods of pathogenesis of surgical treatment of children with refractory glaucoma is carried out by leading medical research centers and medical universities of the world, including the University of Texas Health Science Center, Eye Care Center, University of Colombo (Columbia), Rehabilitation Institute of Neuromuscular Disease , Yonsei University College of Medicine (Korea), Pediatric Health Research Center, Tabriz University of Medical Sciences (Iran), Capital Institute of Pediatrics (China), Children's Hospital of Wisconsin (USA), Helmholtz Moscow Research Institute of Eye Diseases, VPO Russian State Medical University of Roszdrav (Russia) and Tashkent Pediatric Medical Institute (Uzbekistan).

In the world's leading foreign medical centers, scientific research has been conducted on optimizing the diagnosis and treatment of eye pathology in children, the following results have been obtained: clinical and immunological features, risk factors for the development of the disease and their course have been determined (Children's

[3] Постановления Президента Республики Узбекистан № ПП-5590 от 7 декабря2018 года «О комплексных мерах по коренному совершенствованию системы здравоохранения Республики Узбекистан»

Nutrition Research Center, Department of Pediatrics, Baylor College of Medicine, USA); determination of characteristic features of molecular genetic changes in a number of populations (Rehabilitation Institute of Neuromuscular Disease, Yonsei University College of Medicine, Korea); combined methods of surgery for refractory glaucoma were developed (Moscow Research Institute of Eye Diseases named after Helmholtz, Russia); the role of intrauterine infection in the development of the disease has been proven (Hacattepe University, Typkiya; University of British Columbia, Canada; The National Institute of Perinatology Isidro Espinosa de los Reyes, Mexico); a new system for the diagnosis and treatment of congenital glaucoma has been improved (Ohio State University, College of Medicine, University of North Carolina, USA).

Today, work is being carried out all over the world to improve the surgical treatment of refractory glaucoma in the pathogenetic aspect based on the following priority areas, such as: to develop new methods of surgery for refractory glaucoma; identify the features of the course of refractory glaucoma; determination of biochemical and immunological markers in the diagnosis of the disease; determination of genetic and teratogenic factors in PVH; to develop a new optimized method of PVG surgery; study of phenotypic variants of alleles of the main and candidate genes and molecular genetic factors in various PVG populations; development of a protocol for the management of children with this pathology.

In the pathogenesis of primary CH, the basis is genetic and teratogenic factors (exposure to radiation, viral diseases of the mother during gestation, alcohol and tobacco use during gestation, etc.). The main mechanism of SH is not resorption of the mesodermal tissue in the angle of the anterior chamber of the eye (goniodysgenesis) or developmental anomalies. SH is more severe and progresses faster and more frequently. VG is characterized by an autosomal dominant type of inheritance with a degree of penetrance of 60-80%, boys get sick more often (Egorov E.A. va boshkalar, 2016; Zavgorodnyaya N.G., Sarzhevskaya L.E., Ivakhnenko E.M., Tsybulskaya T. E., Kostrovskaya K.O., 2017).

And also, in children with PVG, there is a decrease in the activity of oxidation and phosphorization, a decrease in ATP synthesis, a number of mitochondrial DNA

diseases were found as a result of lipid peroxidation, and this in turn leads to the destruction and classification of tissues of the anterior chamber angle and the manifestation of glaucomatous changes. The results of surgical intervention are quite dependent on the early diagnosis of PVH. Treatment not started in a timely manner leads to the progression of the disease, and this, in turn, contributes to irreversible disorders of the eyeball (Khabibullina N.M., Galeeva G.Z., Rascheskov A.Yu. authorlar, 2016; Bahler C.K., Hann C.R., Fjield T. et al, 2015;).

Currently, the main methods for visualizing the structures of the fundus are ophthalmoscopy, biomicroscopy and photographic recording of the tissues of the eye fundus using a fundus camera, fluorescein angiography of the fundus with fluorescein and indocyanine green, optical coherence tomography (L. A. Katargina, E. V. Mazanova, Tarasenkov A. O., Ryabtsev D. I., 2017).

Currently, surgical methods with low trauma and without excessive scarring in the postoperative zone are being developed (Starostina A.V., 2017). More sparing pathogenetically oriented operations reduce the frequency of intraoperative complications. However, so far implantation of drains is the most effective method of treating glaucoma. Thus, it is considered relevant to study the diagnostic potential of immunological, molecular genetic studies in the surgical treatment of PVH. This, in turn, makes it possible to improve the algorithm for the management and treatment of children with PVH.

The purpose of the research is to optimize surgical methods for the treatment of children with refractory glaucoma based on pathogenesis.

Research objectives:

based on a prospective and retrospective analysis of case histories, to study the incidence and clinical and ophthalmological features of the course of refractory glaucoma in children;

to study indicators of corneal diameter in primary and re-operated children with glaucoma in order to develop the most reliable method for measuring the diameter of the cornea;

to conduct a retrospective analysis of the timing of the development of complications that led to repeated surgical intervention in children with refractory glaucoma;

to study the polymorphism of the cytokine gene TNFα (308G/A) and IL-10 (C-819T, G-1082A) and evaluate their role in the prognosis of the development of refractory glaucoma;

to conduct a comparative analysis of the results of surgical treatment of children with refractory glaucoma operated on in the traditional way and with the use of GLAUTEKS drainage;

to study the role of cytokine status in the immune system in children with refractory glaucoma;

develop and implement an algorithm for early diagnosis and treatment of children with primary congenital glaucoma.

In this study, general clinical, ophthalmological (visometry, ophthalmoscopy, biomicroscopy, gonioscopy, tonometry and tonography, ultrasound of the eyeball, keratometry), immunological, immunogenetic and statistical research methods were used.

The practical results of research are as follows:

developed a device for remote measurement of the diameter of the cornea in the form of "glasses";

for the first time for practical healthcare, a biodegradable GLAUTEKS drainage was proposed for AGO in WG, taking into account postoperative observations;

For the first time, the expediency of studying the pro-inflammatory genetic marker TNFα (308G/A) was proved for the first time in order to choose a surgical method and to predict the treatment of PVH

an algorithm for the management of children in RG was developed and implemented, taking into account clinical, immunological and molecular genetic studies;

The scientific significance of the results of the study serves as the basis for further in-depth research in the future in order to optimize the surgical treatment of

WG based on pathogenesis in our republic; changes in the parameters of cytokines (TNFα, IL-10) of the immune system during the development of the disease and their complications in children with PVH, pathogenesis of glaucoma development, identification of the relationship between repeated surgical interventions and TNFα (308G/A) gene polymorphism and IL-10 (C-819T) , G-1082A) makes it possible to study new aspects of the pathogenesis of this pathology.

The practical significance of the work lies in the fact that a device for remote measurement of the diameter of the cornea in the form of "glasses" has been developed, the use of biodegradable GLAUTEKS drainage in WG has been proposed, the role of the pro-inflammatory genetic marker TNFα (308G/A) has been proven in order to select a surgical method and to predict the treatment of PVH. , developed and implemented an algorithm for managing patients with WG to select treatment tactics and reduce complications.

Clinical and genetic correlation allowed to improve the tactics of managing patients with refractory glaucoma and to reduce repeated surgical interventions in children. Based on the results of our proposed special clinical, ophthalmological and statistical methods of research, the scheme of surgical treatment was optimized using biodegradable GLAUTEKS drainage in order to reduce the number of reoperations.

Chapter I. MODERN VIEW ON THE DIAGNOSTIC AND THERAPEUTIC TACTICS OF REFRACTORY GLAUCOMAS IN CHILDREN IN CONSIDERATION OF MEDICAL GENETIC COUNSELING (REVIEW OF LITERATURE)

§1.1. Refractory glaucoma in children. Etiology, pathogenesis, diagnosis.

Glaucoma is a group of eye diseases manifested by a constant or periodic increase in intraocular pressure (IOP) due to impaired outflow of aqueous humor from the eye, which causes visual impairment and optic nerve atrophy [1,2]. Glaucoma is one of the serious diseases in ophthalmology, especially in pediatrics, and occupies a leading position among the causes of blindness and visual impairment [73, 126]. In literary sources, glaucoma occurs in about 3% of the world's population (about 70 million people). Researchers point out that only half of all cases receive adequate treatment. Blindness in both eyes due to glaucoma affects less than 7 million patients, and their number is steadily increasing. The presented statistical data indicate that today there are still difficulties associated with both the diagnosis and treatment of this disease [170,242,245,276].

WHO believes that there are 70-100 million patients with glaucoma, and in ten years this number will be replenished by 10 million, in the world every minute 1 person goes blind from glaucoma and 1 child every 10 minutes [2]. It is believed that by 2030 the number of patients with glaucoma will double [190, 216, 233, 263].

Patients with newly diagnosed glaucoma have many advanced stages. In Europe, there are 160 thousand blinds from glaucoma, while in Denmark - 6.7%, and in Sweden - 20% [183, 209]. Glaucoma ranks second after cataracts and the first in terms of disability among permanent visual loss [67, 140, 221].

In modern ophthalmology, VG remains an urgent problem. A large number of such patients and the second place after congenital cataracts as causes of blindness dictates the need to study this problem [2, 143].

VG is the most common form of childhood glaucoma, occurs in 1 child per 10,000 newborns, 10% of childhood blindness is due to VG [3, 96, 97]. In the USA

and England, CH is observed more often in boys, while in Japan the opposite trend was noted. In Europe and North America, inheritance is considered polygenic or multifactorial [11, 261], and in the Middle East it is considered autosomal recessive [11, 52, 137].

In 60% of children, signs of CH are detected in the first six months, in 80% - in the first year of life. When screening newborns in maternity hospitals, 90% can be diagnosed with early signs of CH [1,132,138,139,163,278].

Recent studies have clearly shown that there is no single cause of the formation of glaucoma, but there are many "different glaucoma" [138, 142, 155, 169, 279]. Most authors are of the opinion that this disease is multifactorial with a complex etiopathogenesis, which is not fully understood [77, 111, 126, 127, 149, 236].

All researchers note the great importance in the occurrence of glaucoma of regulatory disorders from the central nervous system. It should be noted the theory of S.F.Kalf about the existence of a neuro-vascular apparatus that regulates the constancy of intraocular pressure. This local reflex, according to S.F. Kalf, is closely connected with the central nervous system. The first link of the reflex apparatus is a short arc, the receptors of which are located in the vessels (baroreceptors). The second link closes in the medulla oblongata in the spinal cord, the third - in the hypothalamus, and the fourth - in the cerebral cortex [25, 60, 85].

Morphological studies in combination with clinical studies have shown that in glaucoma, mainly the arterial, especially arteriolar and capillary, system inside the eye is affected. AL Prigozhena (1996), in connection with the changes found, believes that in the initial stage of glaucoma, the presence of angioedema should be assumed, leading to increased permeability of the walls of intraocular vessels. In the later stages of glaucoma, stenosing sclerosis of the vessels is much more common.

The relevance of glaucoma is confirmed by the fact that only half of patients with glaucoma in developed countries are aware of their diagnosis, of which 50% are not treated, and in less developed countries, 95% do not receive treatment; half of the world's population has never measured their intraocular pressure [286, 302, 324].

Recently, ophthalmologists began to distinguish a special clinical form of glaucoma, which includes various clinical types, and called it "refractory" glaucoma [38, 56, 93].

The group of patients with "refractory glaucoma" (French refractaire - non-responsive) includes patients with the most severe forms of glaucoma - primary operated glaucoma, but requiring repeated surgical intervention, pseudoexfoliative and pigmentary primary open-angle glaucoma, neovascular glaucoma of any origin, congenital, juvenile, and most types of secondary glaucoma (posttraumatic, phacogenous, glaucoma with aphakia and pseudophakia) [12, 29, 41, 120].

The main difference between refractory glaucoma (RG) is the malignant clinical course of the pathology in the form of resistance and resistance to traditional therapy and surgery. Surgery is ineffective due to a pathologically intense fibroplastic reaction, i.e. to rapid scarring and obliteration of the formed intraocular fluid outflow tracts, frequent IOP decompensation, rapid deterioration of vision and the onset of blindness [39, 45, 68, 115].

CH is also considered refractory, which is associated with the characteristics and specifics of the course of CH in children [17].

Bessmertny A.M. (2005) identifies 3 degrees of "refractory" glaucoma (Table 1.1).

Table 1.1

Degrees of refractoriness of glaucoma

Degrees of refractoriness		
1 degree	II degree	III degree
Advanced stage of primary glaucoma. Glaucoma in PES. POAG in people under 50 years of age. Surgery failure on fellow eye.	Previously operated glaucoma. Aphakic (pseudophakic) glaucoma. Juvenile glaucoma. Uveal (without manifestations of	Repeatedly operated glaucoma. neovascular glaucoma. Uveal glaucoma with neovascularization. iridocorneal syndrome.

	neovascularization) glaucoma.	

Surgical treatment is a priority for RG; however, it does not guarantee the achievement of long-term IOP compensation and vision stabilization. The effectiveness of traditional fistulizing surgical interventions is maximum 50%, which requires their further improvement. Risk factors for severe scarring include high IOP, duration of previous treatment, and the general condition of the patient [165, 187, 189, 257].

There are a number of standard methods for diagnosing congenital glaucoma. Of these, perimetry, tonometry, ophthalmoscopy, ultrasound studies are mandatory [1, 18, 19, 22, 33, 34]. But, like all branches of medicine, modern ophthalmology is also constantly being improved and new diagnostic methods are offered that complement standard studies and help diagnose in the early stages of the disease. One of such diagnostic methods is positron emission tomography (PET) [20,154,270]. An analysis of the data obtained from a pilot study on the possibilities of PET in studying the peculiarities of neurocyte metabolism in glaucoma revealed that neurodegenerative processes in the pathways of the visual analyzer are determined by zones of glucose hypometabolism (impaired energy metabolism). As is known, this state of cellular metabolism is usually called mitochondrial dysfunction [28,56].

Considering a single observation, it is impossible to judge the natural consequences of mitochondrial dysfunction in glaucoma. The issue of a study to further explore the use of PET in diagnosing metabolic changes in glaucoma is ongoing. According to the literature, at the present stage of development of high-tech methods of molecular neuroimaging, it is possible to study the characteristics of the metabolism of nerve cells of the visual analyzer in patients with glaucoma at various stages of the disease [1,3,29,58,156,195].

Tonometry is the standard for diagnosing glaucoma [79,192,193,194,208]. There are several types of tonometry. A comparison was made of the most commonly

used methods of tonometry according to Goldman, Maklakov and Rebound tonometry. When conducting a comparative analysis of three different types of tonometry to assess the level of IOP, a range of average differences in IOP levels (correction factors) between these methods was formed [27,32,228,241].

Many authors claim that the Goldmann and Maklakov tonometry methods are the “gold standard” for diagnosing glaucoma [1, 3, 16, 60, 119, 186, 200, 202, 205]. Tonometric studies according to Maklov with a weight of 10 g indicate an IOP level above the true value, while with Goldmann they average 4.59 ± 1.87 mm Hg. [37,192,196,199]. Although the range of "low" and "medium" IOP differences remain the same and reach 6 mm Hg. In connection with even, it is necessary to measure IOP in the range of the “high” norm from the position of the “starting concept”, while using accurate methods [210,211,212,230].

One of these techniques is Rebound tonometry (Icare), which determines the IOP level close to the true IOP (Po), however, there is a large deviation variability, which corresponds to a “high” norm, which does not allow us to classify this technique as precision, but allows this the technique is recommended for screening preventive examinations, regardless of the age of the patient, for daily monitoring of IOP using correction factors [49,55,82,118,191].

Thus, the analysis of new innovative diagnostic methods showed that modern ophthalmology is in search of early diagnostic as well as objective research methods that make it possible to study the first signs of congenital glaucoma. And this, in turn, allows the diagnosis to be made before the preperimetric stage [72,91,103,115,281,282].

Despite the frequent occurrence and prevalence of congenital glaucoma, this problem remains a global and rather unexplored aspect of pediatric ophthalmic surgery. As well as very scarce data in the literature on the incidence of women during pregnancy. In this regard, the study of relapses, repeated surgical interventions in congenital glaucoma is of particular relevance, which leads to a high frequency of diagnostic errors and unsatisfactory functional results of treatment.

§1.2. Classification and clinical and functional state of the organ of vision in children with congenital glaucoma

The first classification of glaucoma by A. Graefe in 1857 was based on clinical symptoms - acute, inflammatory and chronic with 4 stages: prodromal, advanced, absolute and degenerative. Graefe described amaurosis with optic nerve excavation, which Donders (1862) defined as simple glaucoma [96].

Pathogenetic classification of glaucoma was proposed by O. Barkan (1938) with two types of glaucoma according to gonioscopy: narrow-angle and wide-angle – prototypes of closed-angle and open-angle [96,126,187,188].

B. Becker and R. Shaffer (1961) classified glaucoma according to local mechanisms of increased IOP (primary and secondary) into 4 groups: closed-angle glaucoma, open-angle glaucoma, combined and congenital (with anterior chamber angle dysgenesis) [189].

In the classification of B.L. Polyak in 1952 divided glaucoma processes according to the clinical form (simple and congestive), according to the stages of development (changes in visual fields and optic disc) and IOP compensation. It made it possible to control the dynamics of glaucoma and correct therapeutic measures [7,57,11,120,167,168].

A.P. Nesterov and A.Ya. Bunin [127] developed a classification of primary glaucoma used by practical ophthalmologists in Russia and the CIS.

There is a pathogenetic classification of glaucoma M.M. Krasnov [111], classification of primary open-angle glaucoma by S.N. Fedorov [155] with division into ciliary, cilioveal and papillary.

R. Ritch, M.B. Shields and Th. Krupin [257] classify glaucoma into 8 groups and 5 stages. The European Glaucoma Society (EGS) proposed 5 main groups of glaucoma: congenital, primary and secondary open-angle glaucoma, primary and secondary angle-closure glaucoma [243, 252, 253, 258].

The proposed classification of congenital glaucoma according to N.A. Kachan, T.K. Toykuliev (2004) is currently considered the most popular and practically convenient, as well as more informative [7,99].

Classification of congenital glaucoma according to N.A. Kachan, T.K. Toykuliev (2004)

1. Origin

a. hereditary

b. Intrauterine

2. Shape

I. Pretrabecular

1) Lack of splitting of the angle of the anterior chamber

a) goniodysgenesis I degree

b) goniodysgenesis II degree

c) grade III goniodysgenesis

2) phakomatous

3) persistent dense pectinate ligament

II. Trabecular

1) Barkan membrane

2) Underdevelopment of the trabecula

c. muscular

1) Underdevelopment of the scleral spur

2) Abnormal attachment of the Brücke muscle

d. Abnormal development of the sinus

3. Stage

I. Initial (PZO is more than the age norm, the disk of the visual nerve (ON) is not changed).

II. Developed (PZO exceeds the age norm by 3-4 mm. OD with an excavation of 0.5-0.6 DP).

III. Far-reaching (PZO exceeds the age norm by 5 mm and more ONH with excavation of 0.7-0.8DP).

IV. Terminal (residual vision or blindness, optic disc with excavation of 0.8 DP or more).

4. IOP level

I. Normal (up to 23 mm Hg inclusive)

II. Subnormal (24-26 mmHg)

III. High (27-33 mm Hg)

IV. Very high (more than 33 mmHg)

5. Concomitant pathology of the eye

I. Dysplasia and hypoplasia of the iris

II.Aniridia

III.Colaboma of the iris and choroid

IV. Posterior embryotoxon

V. Microphthalmos

VI.Phakotopia

6. Current

I. Benign

II. Malignant

7. Dynamics

I. Progressive

II.Stable

III.Regressive

Primary congenital glaucoma (PVG or hydrophthalmos) appears in children of the first 3 years of life; primary infantile glaucoma (PIG) occurs from 3 to 10 years of age [98, 100].

For glaucoma, a symptom complex is characteristic: disturbances in the hydrodynamics of the eye, instability of IOP, increased ophthalmotonus, atrophy of the optic nerve with excavation, and decreased vision [235,273].

Violations of the hydrodynamics of the eye of a different nature lead to a decrease in the outflow of aqueous humor from the eye. Hypersecretion of aqueous humor leads only to temporary ocular hypertension and possibly triggers acute

glaucoma [3, 15, 17, 21, 141, 153, 227, 235, 273]. The average amplitude of daily fluctuations in IOP is normally 1.6 mm Hg, the maximum is 5.7 mm Hg. (with two-card measurement after 12 hours) [220, 221,226]. Elevated IOP may not be present in patients with normal pressure glaucoma [220].

Ophthalmotonus in glaucoma is expressed in increased IOP reactivity to loading and unloading tests due to increased resistance to the outflow of aqueous humor from the eye [128, 213, 218, 239, 244, 249, 277]. The mechanisms-regulators of ophthalmotonus and hemodynamics of the eye are also disturbed due to constant overstrain [38, 153, 165].

An increase in IOP gradually causes atrophy of the ONH - the number of nerve fibers decreases, the supporting structures of the ONH are deformed and shifted backwards, there is no proliferation of neuroglia and connective tissue, which is manifested in the clinic by blanching and excavation of the ONH [24, 25, 147, 231, 232]. Visual functions are impaired - dark adaptation, contrast and color sensitivity, visual acuity decrease, visual field defects appear in the paracentral and nasal sections [1, 3].

A child with CH has photophobia and lacrimation due to stretching and swelling of the cornea [9, 110, 236, 238, 250], and turns away from the light. Possible blepharospasm and red eye symptom. Changes in the cornea, PC, APC, iris and optic disc are noted [1, 14, 64, 108, 109, 201].

The horizontal diameter of the cornea in a healthy infant is 10 mm, increasing to 11.5 mm by 1 year and to 12 mm by 2 years. With SH, the diameter of the cornea up to 1 year reaches 12 mm or more, the thickness of the cornea is reduced and the radius of its curvature is increased. Corneal stretching is combined with edema of the stroma and epithelium, ruptures of the Descemet's membrane, scarring of the stroma, and persistent corneal opacities. In VH, deepening of the PC, atrophy of the stroma of the iris, exposure of radial blood vessels are revealed [59, 165, 203, 208, 215].

The length of the eye axis of an infant is 17–20 mm, increasing to 22 mm by the end of the 1st year of life [10, 23]. In PVG, the size of the eye is often enlarged,

but may remain normal. The diameter of the cornea is of greater importance than the length of the axis of the eye [15, 31, 38, 64, 71, 125, 166, 277].

In PVH, the cornea and eyeball are of normal size, there is no photophobia, lacrimation, and symptoms of corneal distension/edema, but the phenomenon of distension of the sclerochoroidal canal of the optic nerve is noted [106].

Thus, from the above classifications and functional conditions of the eye, we can conclude that medicine does not stand in one place and is periodically improved with the majority of the proposed various classifications of adult and pediatric glaucoma. In our work, we used the classification of congenital glaucoma proposed by the authors N.A. Kachan, T.K. Toykuliev (2004). This classification is more convenient to use, informative, covers the entire etiology and follow-up in dynamics, and most importantly, makes it possible to correctly pathogenetic approach to the surgical treatment of this pathology.

§1.3. The role of cytokine status in the development of refractory glaucoma

In the occurrence of congenital glaucoma, a certain role is played by a hereditary factor (specific weight 15%) with transmission predominantly by an autosomal recessive type (80%) [8, 78, 158, 254, 256]. Various anomalies of the eyeball, body and organ systems are ascertained. Eight genes responsible for the formation of 13 clinical forms of monogenic glaucoma have been identified [11, 51, 65, 101, 123, 157].

The study of the expression and role of cytokine isoforms will increase knowledge about the regulation of hematopoiesis and immunopoiesis, and develop specific biological preparations. The production of these isoforms in the cell population in parallel or after full-length forms regulates the biological activity of full-size forms on target cells [161].

Hereditary non-syndromic glaucomas have locus and allelic genetic heterogeneity. A number of pathologies, clinically separate nosological forms, are often allelic variants of one pathology due to mutations in one gene [55, 127, 173, 222, 247].

Many genes that potentially affect PVG have already been identified, which deepens the understanding of pathogenesis and the development of new effective molecular genetic methods for the early diagnosis of glaucoma [222, 247]

Molecular medicine is based on the study of the human genome and seeks to correct the pathology in each person according to the characteristics of his genome or prevent the development of pathology at the genetic level [1, 12]. The genetic code is implemented in interaction with the environment, which leads to the formation of a certain phenotype [4, 14].

The study of genes that regulate cytokines as inflammatory mediators makes it possible to predict the risk of pathology and its severity, as well as the individual selection of specific therapy for each patient due to the very high degree of polymorphism [21, 27].

TNF-α is synthesized by monocytes / macrophages, neutrophils, T-lymphocytes, natural killers, mast cells and plays a major role in the development of inflammation - it initiates the production of IL-1, IL-6, activates macrophages, proliferation of T- and B-lymphocytes, is a mediator reactions of innate immunity, may be the cause of septic shock and complications of acute inflammation [18]. The ratio of IFNγ/IL-10, reflecting the balance of Th1/Th2, ensures the balance of cellular immune responses [11].

Genetic diagnostics does not depend on physiological health, its results are not changeable, and once performed, it allows targeted prevention of pathologies on the "weak sides" of the patient, prescribing medications according to the individual characteristics of a person. The study of gene polymorphism will allow identifying risk groups and choosing the optimal therapy for each patient [326].

In Uzbekistan, as well as throughout the world, the issue of prevalence, clinical polymorphism, molecular genetic component of primary congenital glaucoma remains the most urgent problem of modern medicine and genetics. One of the most common and malignant diseases of the organ of vision, especially in children, with damage to the optic nerve is glaucoma.

Congenital eye pathology remains to this day the main cause of blindness and low vision in children, while congenital glaucoma (CH) reaches 10%, being the cause of 4.4% of cases of blindness and 2.2% of low vision [126,127,128]. The influence of immune reactions on the genesis of glaucoma has been proven [81,82], there is a hypothesis of autoimmune damage to the connective tissue structures of the eye in glaucoma [79,141,142]. In recent years, the influence of cytokines on the pathogenesis of glaucoma, the mechanisms of neurodegeneration, pathology of trabeculae, and the effect of pro-inflammatory reactions on apoptosis of optic nerve cells have been studied [111, 297, 298]. There is an opinion about the prognostically unfavorable role of long-term hyperproduction of immune mediators [1,45,191].

The content of pro-inflammatory and anti-inflammatory cytokines IL-10 and TNF-□ in patients with PVH, according to some data, increases tenfold [191,192]. Due to the low symptoms of the initial phase of PVG, this pathology is often diagnosed with already irreversible changes in the optic nerve, which dictates the need to search for effective methods for the early diagnosis of glaucoma [140].

The influence of immune mechanisms on glaucoma in the form of the role of immunocompetent cells, antigens (AG), antibodies (AT), regulatory proteins (cytokines, growth factors, etc.), immune responses has been studied for a century [275,278,299,313,314].

In publications of the 21st century, the authors note the significance of interleukins in the pathogenesis of glaucoma, discuss their involvement in neurodegeneration and trabecular damage, and the significance of pro-inflammatory cytokines in apoptosis of optic nerve cells [284, 287, 294, 300].

Cytokines are protein mediators that perform the regulatory function of humoral immunity, a protective inflammatory reaction, in plastic and reparative processes. [83, 149, 199]. The choroid of the eye contains most types of immune cells, such as macrophages, dendritic cells, and mast cells. Macrophages and other mononuclear phagocytes are found in all tissues of the eye from the cornea to the choroid and sclera [234, 306, 322, 330].

Tumor necrosis factor-alpha (TNF-α) is a protein that is a product of monocytes, macrophages, endothelial, in particular the endothelium of the cornea and conjunctiva, trabecular meshwork, basophils, mast and myeloid cells, neuroglial cells and has a wide spectrum of biological action. TNF-α is involved in the development of the inflammatory response: it activates the synthesis of IL-1, IL-6, stimulates the proliferation of T- and B-lymphocytes. [83; 138].

According to the literature, TNF-α plays a key role in damage to the optic nerve [238,300,303,313].

TNF-α directly indicates cell metabolism disorders and microcirculatory disorders in the visual analyzer, which, according to studies, the main effect of IL-10 is anti-inflammatory. It is implemented through the suppression of the activity of macrophages and T-lymphocytes, and also suppresses the production of all pro-inflammatory cytokines, interferon, and the proliferative response of T-cells to antigens and mitogens [111; 198]. Producers in the tissues of the eye are the epithelium of the conjunctiva and cornea, Th2 cells, monocytes, and macrophages [83].

Acting as a Th2-cytokine and due to its ability to suppress the production of cytokines in monocytes and Th1-lymphocytes and inhibit the antigen-presenting ability of monocytes, IL-10 inhibits the cellular immune response, while stimulating the proliferation of B-lymphocytes and the humoral immune response [157; 198].

It should be emphasized that a number of immunological mechanisms are involved in the pathogenesis of glaucoma, and the identified significant changes allow us to consider congenital glaucoma as a disease characterized by the development of a systemic inflammatory response, which confirms the vascular and metabolic theory of the pathogenesis of glaucoma [236].

Surgery is the main treatment for PVH and is more effective in reducing and normalizing IOP in children [123].

Any surgical intervention causes an increase in the concentration of TNF-α, the primary postoperative immune response consists of pro-inflammatory cytokines, in particular TNF-α due to the accumulation of a huge number of lymphocytes,

macrophages and neutrophils in the inflammatory focus, as one of the leading producers of TNF-α [286].

According to the studies of Sato Y., Ohshima T. (2000), in the first minutes and hours after wounding, the production of pro-inflammatory cytokines in the wound site increases sharply, thereby stimulating the development of an inflammatory response. This fact is explained by the accumulation in the focus of inflammation of a huge number of lymphocytes, macrophages and neutrophils, as one of the leading producers of TNF-α. A similar picture is observed in long-term non-healing wounds of various origins in humans [325].

Normally, the production of TNF-α increases significantly in the first few hours to several days after surgery, then decreases to the initial level, but in our case, increased expression before surgery, relatively increased synthesis and a pronounced slight decrease indicate an initial pathological condition, which is probably genetically conditioned [286].

Macrophages play a key role in the regulation of wound healing. Macrophages are an important source of growth factors, cytokines, and metalloproteinases involved in the scarring process. According to studies by Martinez F.O et al., macrophages exhibit two polarized phenotypes, M1 and M2, depending on microarmament factors. M1 macrophages are induced by IFN-γ alone or 37 in combination with microbial factors such as LPS or cytokines including TNF-α and GM-CSF (Martinez F.O. et al., 2006). The alternative M2 form of macrophage activation is mediated by various factors, including immune complexes and IL-10. M1 macrophages maintain the Th1 mediated response and are producers of effector molecules and inflammatory cytokines (IL-1β, TNF-α, IL-6), while M2 cells maintain Th2 effector functions and are also thought to play a role in cell growth and deposition control. collagen [321].

Tumor necrosis factor (TNF) belongs to the class of cytokines - proteins (protein-oligosaccharide complex) that are produced by various cells of the immune system to regulate the complex of intercellular interactions during the immune response. The name of the protein reflects only one of its biological effects, found in experiments on mice, after which TNF was discovered. However, the role of this

cytokine is not limited to the destruction of tumor cells; in addition, TNF plays a key role in the regulation of the immune response [331].

TNF is actively involved in the immune response, its concentration is related to the intensity of inflammation, for example, in direct proportion to the severity of chronic heart failure and bronchial asthma. At low concentrations, TNF exposure occurs at the site of production, while at high concentrations it hyperactivates the cytokine and leads to inadequate inflammation and immune response [329].

Understanding the mechanisms by which TNF interacts with cells and tissues will lead to more effective treatments for autoimmune diseases. However, the study of TNF must be combined with general clinical blood tests, instrumental research methods (ultrasound, CT, radiography, ECG) [321, 329].

Interleukin 10 is a cytokine with a pronounced anti-inflammatory effect, produced by T-cells and monocytes. IL-10 inhibits the production of cytokines by T cells, the activity of macrophages, i.e. opposite to the main cytokines, reduces the production of interferons, TNF, IL-6, IL-1 [307].

By regulating the biological activity of macrophages, IL-10 reduces the production of cytokines by TH1 cells (IFN-g, IL-2, etc.). IL-10 plays a major role in the regulation of the cell's immune response, control of inflammatory responses, and autoimmune reactive diseases [296, 305].

Based on a deep analysis of the data of modern scientific literature, we consider it necessary to conduct a study to identify the features of clinical and phenotypic manifestations and molecular genetic aspects in patients with refractory glaucoma among the regions of our republic, which will further develop a regional system of medical genetic counseling for those disease families who are burdened by this disease [42, 51]. In connection with the foregoing, it is advisable to analyze the results obtained to determine the cytokine status of patients and healthy individuals in a comparative aspect, which will expand the understanding of the immune mechanisms of refractory glaucoma.

§1.4. Development stages of drainage surgery for glaucoma in children

As is known, PVG in children is a surgical pathology of the organ of vision, and surgical treatment methods are carried out in two directions - surgical and conservative. Conservative treatment in children with PVH is carried out not only at the stages of preparing patients for surgery, but also in the postoperative period [4, 93, 160, 271].

Attempts to medically reduce IOP in children lead to a short-term and unstable hypotensive effect. The greater elasticity of the children's sclera with an increase in IOP quickly causes severe deformation and stretching (buphthalmos and staphylomas). Therefore, the basis of the treatment of VH is the surgical method [125, 149, 150, 213]. However, surgical treatment in children is significantly less effective than in adult patients and ranges from 92.3% in the early postoperative period to 46% in follow-up [24, 39, 45].

Pathology of IOP in children is rare, but its treatment is very difficult. Serious anatomical changes in the APC in VH lead to difficulties in normalizing IOP with both therapy and surgery. Based on the anatomical features of the eyes of children with IOP pathology and healing features, surgery was chosen as the main method of treating VH. [134].

Treatment of PVH is only surgical, therapy is almost ineffective [3,7,41,53,54]. Medications reduce ophthalmotonus before surgery and during glaucoma attacks, or when parents refuse surgery [7,148,162,273].

The choice of surgery depends on the stage of the disease, structural features of the APC and the experience of the surgeon [66,134,107,163,272]. In the early stages of the disease, goniotomy or trabeculotomy is more commonly performed [275,280]. In the late stages of primary congenital glaucoma, fistulizing operations and destructive interventions on the ciliary body are more effective [30,81,92,94,151,152].

Surgical treatment of VH is carried out taking into account the pathogenesis - an obstacle is removed in the corner of the SC and the outflow of aqueous humor is restored along the natural pathways of the drainage system of the eye [125, 202, 212].

In recent years, various methods of surgery for congenital glaucoma - goniotomy, trabeculotomy, trabeculectomy - have been actively discussed [30,92,93,217,219].

If the cornea is slightly enlarged (up to 3 mm), transparent, an operation is possible - goniotomy or goniotomy with goniopuncture. The effectiveness of goniotomy and goniopuncture varies from 60% to 80% and depends on the pathogenetic development of glaucoma in each specific case [151, 161].

Unfortunately, the late appeal of children for specialized care (terminal and advanced stages of CH) makes it impossible to perform such surgical interventions as goniotomy and hopiopuncture due to corneal opacity, which led to the development of newer and more modern AGO methods. One of these methods is fistilizing surgery, which was developed specifically for use in pediatrics in the treatment of refractory glaucoma and is performed ab externo. These types of operations include diathermopunctures and microdiathermogoniopunctures, as well as ab externo trabeculotomy [85, 88, 206, 207, 262].

Some researchers have found that after the use of trabiculotomy, normalization of the ophthalmotonus is observed in almost every second case. The authors note that the effectiveness of surgical intervention in these operations is proportional to the degree of goniodysgenesis and the number of ophthalmic interventions in history [84, 86, 87, 141].

According to other authors, goniodialysis with trabeculotomy ab externo gives positive results in 33% of patients with PVH [116, 117, 269]. Drainage of the anterior chamber of the eye in PVG is also highly effective. This surgical intervention consists in the formation of a rather wide passage into the suprachoroidal space with simultaneous invagination of the ciliary body with a microexplant [145, 149].

Long-term follow-up, for 3-15 years, of children diagnosed with PVH after AGO by creating three outflow tracts in combination with autoscleral drainage showed the following positive results:

1. Preservation of visual functions for a long time.

2. Maintaining IOP at the “target” level for a long time.

3. Correspondence of the size of the eyeball with age dynamics.

Excessive scarring in PVG can only be avoided by creating drains and shunts that can ensure the outflow of aqueous humor under the conjunctiva and reduce ophthalmotonus by preserving the newly created pathways for the outflow of intraocular fluid, which will be the prevention of the process of rapid scarring [13, 35, 41, 44, 46, 95, 151].

When analyzing the scientific literature, we came to the conclusion that the majority of authors consider drainage surgery for RG to be one of the most effective ones, in which a higher number of positive results were obtained in relation to the implementation of fistulizing surgical interventions in this pathology. According to the authors, fistulizing surgery in children with WG is the operation of choice [26, 62, 63, 68, 83, 150, 159].

Also, many authors note that the number of reoperations for RG in children with trabeculectomy averages 29%, which is 3.2 times higher in relation to drainage surgery (average 9%) [229, 266, 267].

Microinvasive surgical interventions for WG in children have two directions - firstly, improving the outflow of intraocular fluid based on the elimination of trabecular retention, and secondly, creating alternative pathways for the circulation of aqueous humor in the suprachoroidal or subconjunctival space [80, 132]

For effective surgical treatment of PVH in order to restore the outflow of aqueous humor, pediatric valve drains such as Ahmed have been developed and introduced into clinical practice [76, 112, 121, 129, 130]. The implantation of such a drain is a technically simple surgical intervention and is similar to that in adults, which has been proven in clinical practice in many studies [135, 136, 144, 145, 264]. Many authors note that the Ahmed “baby” valve implanted can maintain

ophthalmotonus within the normal range for a long time and prevents its sharp fluctuations in the early postoperative period [131, 150, 204, 248, 265].

The Ahmed valve was developed in 1993 and is the first drainage device with a unidirectional valve mechanism, which is placed in the drain body, which in turn helps to prevent hypotension in the early postoperative period [43, 45, 182, 198, 204]. In WG, the use of this valve is considered one of the effective methods, and positive results, according to different authors, fluctuate in a wide range from 43% to 94% [13, 172, 171, 206, 219, 246].

However, a number of authors note that despite the high effect of using the Ahmed valve in the surgical treatment of PVH in children, undesirable complications occur from 23% to 40% [131, 172, 198, 240, 255, 271].

The analysis of the frequency of complications both in the early and late postoperative period given in the scientific literature is controversial, and therefore questions about the development of undesirable effects from drainage surgery in pediatric practice during the surgical treatment of PVH remain debatable. Also, technical approaches with an assessment of the quality of the resulting filtration cushions over a long period of observation are not fully reflected [40, 47, 133, 177].

The most frequent severe complications during valve implantation, regardless of the sector of operation, according to Bikbov M.M. and Khusnitdinova I.I. are [43]:

- detachment of the choroid;
- small anterior chamber;
- transscleral tube eruption;
- dislocation of the valve;
- development of hypotension;
- diplopia;
- corneal decompensation;
- cataract;
- intraocular hemorrhages;
- retinal detachment and endophthalmitis [43].

With the development of these complications in RG in children with the use of the Ahmed valve, dystrophic processes in the tissues covering the valve and the severe condition of the operated eye have a direct effect, since any drainage is a foreign body for the body. However, despite the development of a high percentage of complications after surgical interventions, the use of the Ahmed valve is still an effective method of stabilizing intraocular pressure in patients with HR [32, 39, 66].

The iStent G1 drain is an alternative to the Ahmed drain, made of titanium and coated with a heparin sheath, located in a special injector for perpendicular implantation of the drain through the trabecular meshwork into the SC cavity without hypotension and hemoreflux from the intrascleral canals [185]. Studies over the course of a year have shown that iStent is safe and effective in the treatment of patients with secondary glaucoma [57, 61, 197].

Thus, the analysis of various types of surgical treatment of primary congenital glaucoma showed that in all modifications of surgery, the efficiency ranges from 50% to 95%. An ophthalmic surgeon has a large arsenal of choice of AGO, which has been much improved over the past decade [12, 102, 104, 105].

§1.5. The effectiveness of surgical treatment of glaucoma with the use of various types of drainage "Glautex"

Analysis of literature sources indicates that drainage surgery for glaucoma is effective from 65.0% to 85.0% [5–8]. Many authors point out that the main disadvantages of drainage surgery in the late postoperative period are: the formation of a connective tissue capsule around its outer end, obliteration of the drainage lumen, deviation of the eyeball, cystic degeneration of the filtration pad, the development of epithelial-endothelial corneal dystrophy, rhegmatogenous retinal detachment, all these complications lead to the fact that it becomes necessary to remove the drainage [9, 10, 21, 33, 45].

Currently, one of the controversial issues is which drainage is more effective and safer for the eye - permanent or biodegradable [16, 17].

According to Erichev V.P. (2001) and Slonimsky A.Yu. (2012) with a group of authors for drainage in glaucoma surgery, it is relevant to use new polymeric materials that combine biocompatibility, elasticity, stability and moisture permeability. The invaluable advantage of biodegradable material is that it has the ability to completely absorb, which in turn minimizes pathological reactions. Currently, one of these drainages is Glautex, which is used for the stable functioning of the created outflow tracts [83, 162].

This drainage was developed in 2012 to prevent the development of scarring in the postoperative period [123]. It consists of a composition of polylactic acid and polyethylene glycol. Glautex is a porous, bioresorbable white film with a filtering effect with a pore diameter of 30-50 microns. Represents a rectangular sleeve with a thickness of 80 microns. Another property of this drainage is that it does not swell and, in turn, does not create compression on the tissues surrounding it.

Drainage is implanted on a superficial scleral flap, between the conjunctiva and sclera, thereby preventing scarring in the intrascleral space. Glautex is biologically inert, safe for eye tissues, does not cause allergic reactions and resolves within 6 months.

The effectiveness of the Glautex drainage was studied in POAG, RG, previously operated uncompensated glaucoma, post-traumatic glaucoma in combination with fistulizing operations, and in non-penetrating hypotensive operations [15, 17, 122, 123].

A.Yu. Slonimsky et al (2012) studied "...152 patients (158 eyes) who underwent antiglaucoma surgery in combination with Glautex drainage. Depending on the type of glaucoma and surgery, all patients were divided into three groups: the 1st group included patients with POAG, after STE with Glautex drainage, the 2nd group consisted of patients with previously unsuccessfully operated glaucoma, neovascular and uveal glaucoma, volume surgical intervention was the same as in patients in the 1st group. In the 3rd group, NGSE was performed with Glautex drainage. The maximum follow-up period was 18 months. In all three groups, the postoperative period in all cases proceeded smoothly. As a result of the surgical

treatment, a decrease in IOP was noted. In the 1st group, the IOP level decreased and averaged 14.1 mm Hg, in the 2nd group, the IOP averaged 14.5 mm Hg, in patients of the 3rd group, the IOP was an average of 13.9 mm Hg. Among the complications after surgery, the development of CHO was noted. CHO was noted in the 1st group in 7 (7.5%) eyes, in the 2nd group - in 3 (8.6%) eyes. Hyphema occurred in 5 eyes of patients of the 1st group, in 8 eyes of the 2nd and 3 eyes of the 3rd group" [162].

M.M. Bikbov et al. studied "... the effectiveness of fistulizing operations in combination with Glautex drainage in patients with previously operated 35 refractory glaucoma. 36 patients (36 eyes) were operated on, the patients were divided into two groups: in the 1st group there were patients who had previously undergone a fistulizing operation (GSE or TE) using the Glautex drainage, in the 2nd group the implantation of the Glautex drainage and drainage device was performed Ex-PRESS. The maximum follow-up period was 1.5 years. The postoperative period was unreactive. In both groups, there was a decrease in IOP to 14.6 ± 1.5 mm Hg. in the 1st group and up to 13.4 ± 1.9 mm Hg. in patients of the 2nd group. Of the early postoperative complications, the development of CHO should be noted in 6.9% of cases in the 1st group and in 14.3% in the 2nd group" [44, 45].

N.S. Kryachko et al. studied "…patients with neovascular glaucoma who underwent simultaneous implantation of a Glautex drain and Ex-PRESS. On the 2-3rd day after the operation, hyphema of 1-2 mm level developed in 3 patients, which was stopped within 3 days. Hypotension with the formation of CHO was observed in one patient, however, after drug treatment, the detachment regressed. The authors concluded that the combination of the Glautex drainage and the Ex-PRESS device in patients with CVH reduces IOP and contributes to the preservation of visual functions" [123].

A.M. Khakimov (2013) et al. assessed "...the effectiveness of Glautex drainage in non-penetrating hypotensive operations. At stage I, NGSE was performed using drainage, on days 7-14 - stage II, laser goniopuncture. The results of drain implantation were compared with patients who underwent standard NGSE followed by laser goniopuncture. After the operation, a decrease in the level of IOP was noted

during all periods of observation. In 9 (39%) eyes, the development of CHO was observed after laser trabeculopuncture, in connection with which two patients underwent posterior scleral trepanation (PTS) in order to release suprachoroidal fluid (CLF). In two cases, blockade of the trabeculopuncture zone was noted, which required laser iridotomy" [184].

A.A. Stepanov et al. (2015) developed "…a method of surgical treatment of post-traumatic glaucoma by activating the uveoscleral outflow using a Glautex drainage. The operation was performed in 16 patients, of which 8 eyes had aniridia and aphakia with MIOLRepper implanted in 7 eyes. In 15 cases, a hypotensive effect was achieved: the IOP was 15.32±2.67 mm Hg, the outflow easiness coefficient was 0.21±0.093 mm³/min/mm Hg. According to ultrasonic biomicroscopy, the formation of newly formed outflow tracts in the form of slit-like spaces was revealed at the site of the resorbed drainage. The authors established complete drainage resorption by 6 months after surgery" [165].

Summary

According to the course of glaucoma, IOP indicators, as well as the number of previous operations, the surgeon will be able to choose the most optimal method of treatment for each patient individually. Different types of laser surgery are used both in the initial and in the terminal stages of congenital glaucoma and give a positive effect. A significant number of works devoted to the treatment of congenital glaucoma indicate the relevance of improving new methods of its treatment.

A number of authors draw attention to the need to identify risk factors that contribute to ophthalmotonus decompensation in the early and late periods after AGO.

Despite the deep study of this nosology in the analyzed literature, there are no clear criteria for choosing one or another method of treatment proposed by the authors for any one specific form of the disease. At the same time, there is an obvious need to develop a pathogenetically substantiated method of treatment and tactics for choosing a surgical intervention, taking into account the anatomical features in the

most complex forms of primary congenital glaucoma. But the problem remains relevant, since the literature does not describe data on long-term results after surgery for congenital glaucoma, but only describes the data of the first five years after AGO. And also, there are no data on the results after each repeated surgery and on the number of operations performed. There are very scarce data on the surgical treatment of refractory glaucoma with the use of various types of drainage.

The influence of immune mechanisms on glaucoma in the form of the role of immunocompetent cells, antigens (AG), antibodies (AT), regulatory proteins (cytokines, growth factors, etc.), immune reactions has been studied for a century. In publications of the 21st century, the authors note the importance of interleukins in the pathogenesis of glaucoma, discuss their involvement in neurodegeneration and trabecular damage, and the significance of pro-inflammatory cytokines in apoptosis of optic nerve cells.

It should be emphasized that a number of immunological mechanisms are involved in the pathogenesis of glaucoma, and the identified significant changes allow us to consider congenital glaucoma as a disease characterized by the development of a systemic inflammatory response, which confirms the vascular and metabolic theory of the pathogenesis of glaucoma. Detected statistically significant disorders indicate the presence of pronounced shifts in the cytokine system at the system level.

Chapter II. MATERIAL AND RESEARCH METHODS

§ 2.1. Characteristics of the examined children and the scope of the study

The study consisted of 3 stages. At the first stage, a retrospective and prospective analysis of 5367 patients admitted to the eye department of the TashPMI clinic (Fig. 2.1).

When making a diagnosis, we used the ICD-10 classification and the A.P. Nesterova and E.A. Egorova (2001). For a detailed description of the pathological process in congenital glaucoma, we used the classification of N.A. Kachan, T.K. Toykuliev (2004).

The inclusion criteria for the study were children with PVH aged 0 to 14 years with a history of high IOP episodes, asymmetry of physiological optic disc excavation (OND), megalocornea, and progressive myopia.

The exclusion criteria from the study were children with secondary glaucoma, with syndromic pathology, as well as with concomitant diseases of the organ of vision.

The collection of material was carried out in the period from 2016 to 2020, for the period from 2016 to 2018, a retrospective analysis of the case histories of patients with PVH hospitalized in the eye department of the TashPMI clinic was carried out. From 2019 to 2020, a prospective analysis of the examination and surgical treatment of patients with PVH was carried out (Table 2.1).

Our prospective and retrospective analysis for the period from 2016 to 2020 showed that the incidence of patients with PVH is multidirectional. The largest number of children with PVH was observed in 2017 and 2019 (22.8% and 26.8%, respectively), the smallest number of patients was observed in 2018 (14.3%). So, for 5 years, the frequency of PVH in children had a wave-like character, however, in 2020, there is an increase in the incidence of this pathology in relation to 2016 (17.6% vs. 18.5%) by 0.9%.

Fig. 2.1. Study design

Table 2.1.

The frequency of occurrence of HSV among children in the period from 2016 to 2020 (n=448)

Years	Total number of patients		Number of operated patients **		Suspicion of glaucoma ***			
					Total		Operated	
	Abs.	%	Abs.	%	Abs.	%	Abs.	%
2016	79	17,6	75	17,8	5	13,5	1	9,1
2017	102	22,8	94	22,3	11	29,7	3	27,3
2018	64	14,3	61	14,5	4	10,8	1	9,1
2019	120	26,8	112	26,5	12	32,4	4	36,4
2020	83	18,5	80	19,0	5	13,5	2	18,2
Total *	448	100,0	422	94,2	37	8,3	11	2,5

Note: ** - percentage of the number of operated patients; * - percentage of the total number of examined patients

The number of operated children over the past 5 years was 94.2% of all examined children with PVH. The frequency of AGO depended on the frequency of detection of PVH, so the largest number of surgical interventions performed occurred in 2017 and 2019 (22.3% and 26.5%, respectively), the smallest in 2018 (14.5%).

Suspicion of primary congenital glaucoma was noted in 30 children (8.2%) out of 478 children, subsequently in 11 children (29.7%) the diagnosis of PVG was confirmed. These children underwent AGO. In other cases (26 children), the diagnosis of PVH was not established, these children were discharged home under the supervision of an ophthalmologist at the place of residence.

The distribution of examined patients with PVH by sex and age is presented in Table 2.2.

Table 2.2

Age gradation and gender of children with congenital glaucoma included in the study (n=448)

Age	Abs	%	Girls		Boys	
			abs	%	abs	%
From 0-3 years congenital glaucoma	326	72,7**	145	44,5	181	55,5
from 3-10 years Infantile glaucoma	26	5,8	8	31,0*	18	69,0
from 11 -14 years old Juvenile glaucoma	59	13,3	18	30,5*	41	69,5
Suspicion of congenital glaucoma	37	8,2	16	43,0	21	57,0
Total	448	100	187	41,8	261	58,2

Note: * - reliability of data between girls and boys (P<0.05); ** - reliability of data depending on the amount of congenital glaucoma (P <0.05)

As can be seen from the table, the largest number of children at the time of diagnosis was aged 0 to 3 years (72.7%), the smallest group consisted of 26 children with infantile glaucoma (5.8%) aged 3 to 11 years (P<0.01). Juvenile glaucoma was observed in 13.3% of cases (59 children), whose age was 1-18 years.

Of these, girls accounted for 41.8% (187 children), boys 58.2% (261 children). A significant predominance of boys in the age group from 3 to 14 years old (69.0% vs. 31.0%; P <0.05) and aged 11 to 18 years old (69.5% vs. 30.5%; P<0.05)

Depending on the gender in our study, boys predominated in all age groups, the ratio was 1.4:1.

At the 2nd stage of the study, we carried out a prospective study including the study of the immunogenetic role of TNFα-308G/A, IL-10 C-819T and G-1082A cytokine gene polymorphisms in the development of refractory glaucoma. Also, at this stage, the effectiveness of the use of special “glasses” developed by us for measuring the diameter of the cornea was evaluated in comparison with traditional

methods, such as measurements using a regular school ruler and a surgical compass.

The 3rd stage of the study consisted in evaluating the effectiveness of surgical treatment of children with refractory glaucoma using Glautex biodegradable drainage (21 children) in a comparative aspect with traditional fistulizing AGO (44 children).

§ 2.2. Ophthalmic research methods

In the study, all patients underwent ophthalmic standard diagnostic methods:

1) in order to establish the subjective symptoms of the disease (photophobia, lacrimation, decreased visual acuity, pain in the eye), complaints were analyzed;

2) when collecting an anamnesis, the duration of the disease, the treatment being carried out and its effectiveness were established;

3) external examination of the eye was carried out according to generally accepted methods;

4) visual acuity was studied taking into account age using visometry on the M110 projector (Carl Zeiss Jena)

The presence of vision in a newborn was judged by the direct and friendly reaction of the pupils to light, as well as by the appearance of the Peiper phenomenon with sharp and sudden illumination of the eyes.

The approximate visual acuity of the child was checked by tracking the movement of a hand, a bright-colored object, or an ophthalmoscope. In older children, if development and intelligence allowed, visual acuity was determined using the Orlova table. Accordingly, for children older than 7 years, visual acuity was determined according to the table D.A. Sivtsev.

5) Inspection under focal illumination was carried out using a magnifying glass 13.0 D from OR-3 (LOMO).

6) biomicroscopic studies were performed using a slit lamp with a M211 photo attachment (Carl Zeiss Jena).

5. Examination of the fundus was carried out by several research methods. Direct ophthalmoscopy was performed using an ophthalmoscope. Indirect binocular ophthalmoscopy was performed using a Skepens head ophthalmoscope.

Photographing of the fundus was carried out using a fundus camera TOPCON TRC-500DX retinal camera, which allows you to capture the picture of the fundus on electronic and paper media. The method is especially important when observing patients in dynamics (Fig. 2.2).

6. The study of the angle of the anterior chamber was carried out using a three-mirror Goldmann goniolens (Fig. 2.3 and 2.4).

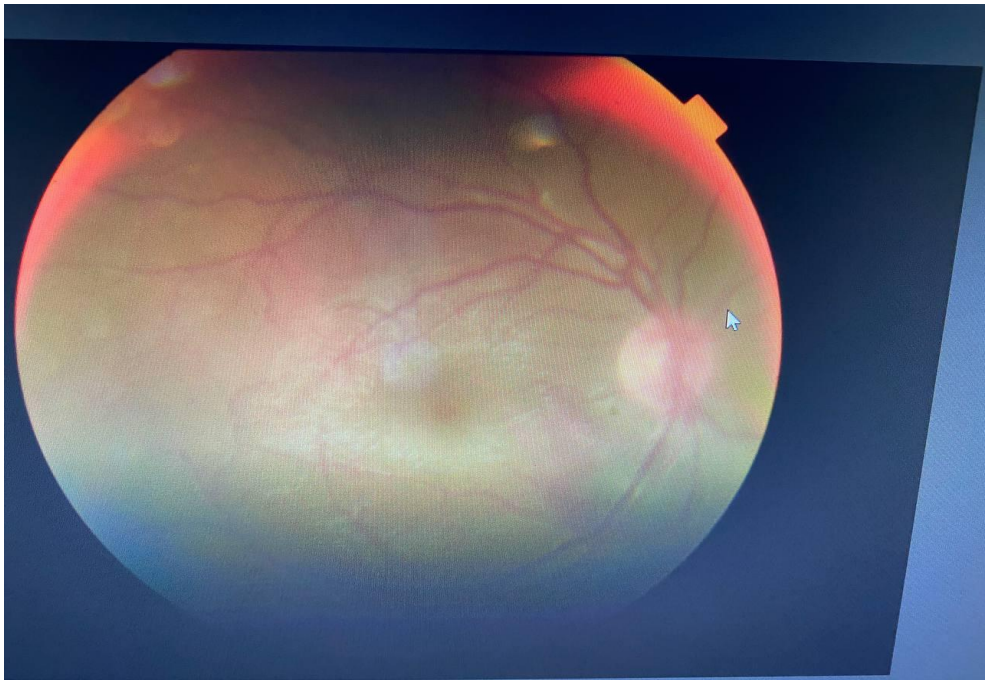


Fig. 2.2. Fundus image taken with a fundus camera TOPCON TRC-500DX retinal camera (Japan).

7. Carrying out tonometry and tonography is recommended for all patients to study the level of IOP and eye hydrodynamics. To control IOP, a Maklakov tonometer was used, which, despite the latest developments in the field of medicine, today remains the gold standard in the diagnosis of various forms of

glaucoma, including PVG. Tonometry and tonography were performed under anesthesia. And also we determined the target pressure (norm P - the value of the tension of the membranes of the eye, not more than 200)

Fig. 2.3. Goldmann's three-mirror goniolens

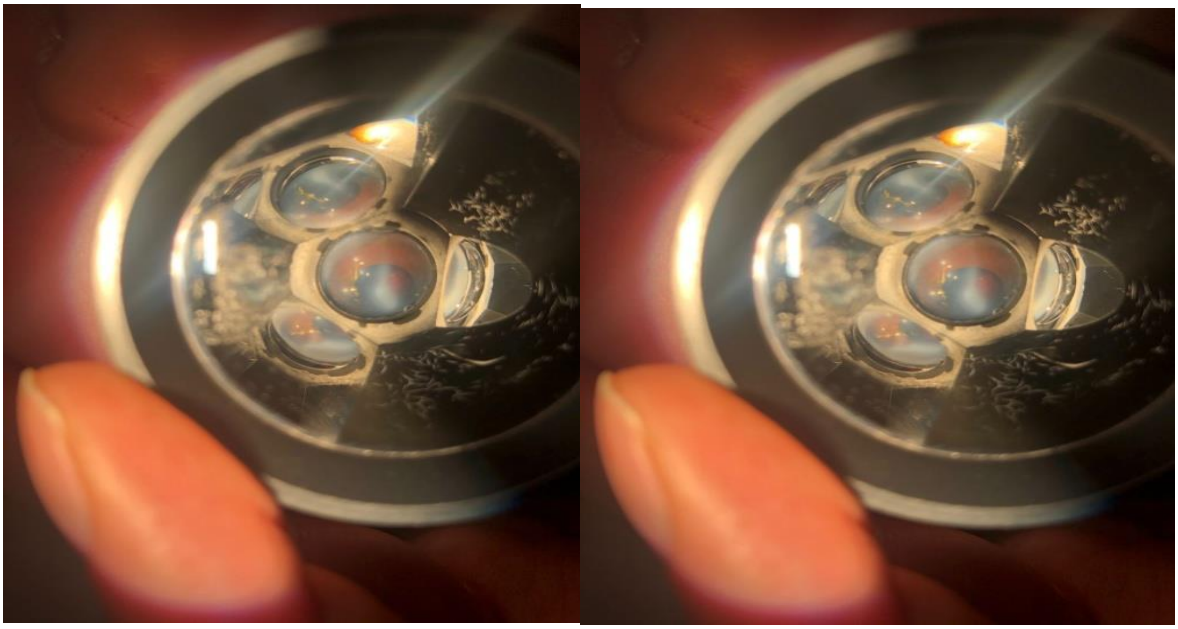


Fig. 2.4. Image of the CPC with a Goldman goniolens

8. Ultrasound of the eye was performed using the UD-6000 ophthalmic ultrasound diagnostic system (TomeyCo., Japan) with a nominal sensor generator frequency of 10 MHz (Fig. 2.5).

8. Keratometry was performed by several methods:

The first method is to measure the diameter of the cornea using an ordinary school ruler (Fig. 2.6).

Fig. 2.5. Carrying out an ultrasound examination of the eyeball

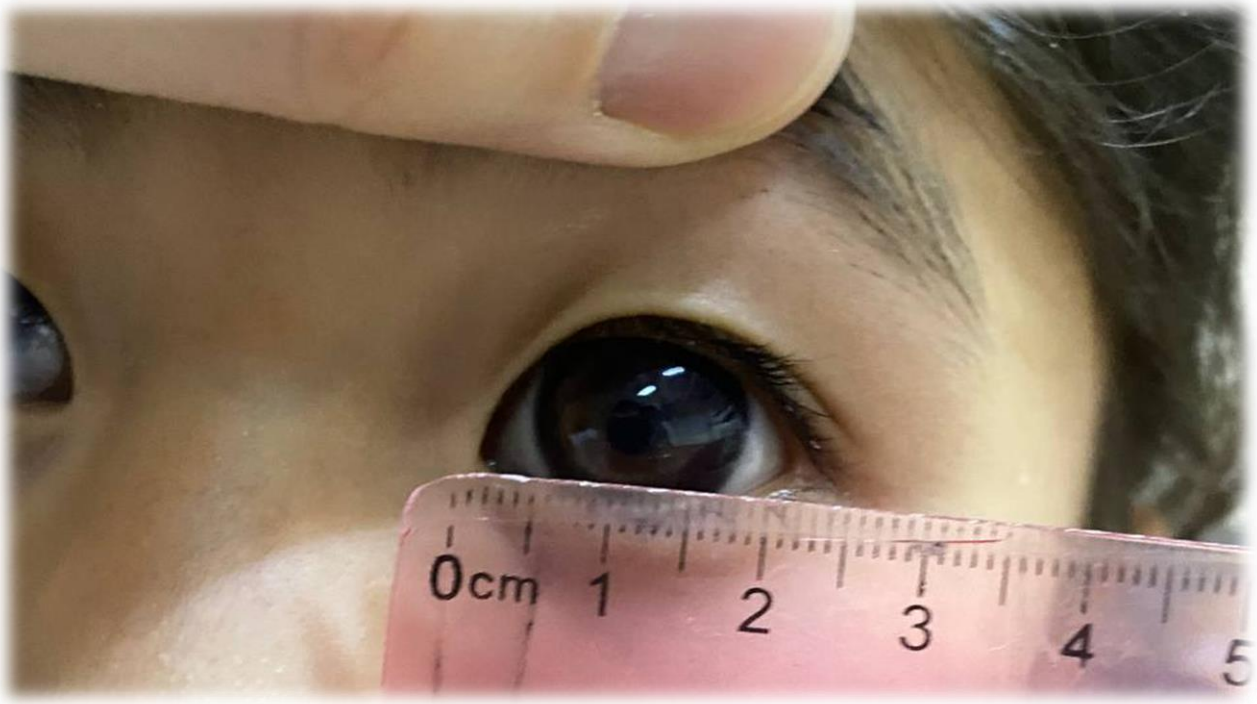


Fig. 2.6. Method for measuring the diameter of the cornea with a regular school ruler

The algorithm for measuring the diameter of the cornea using a regular school ruler is as follows:

1. Place the ruler in front of the cornea under examination at a distance of several millimeters, avoiding contact with it.

2. Measure the distance from the inner to the outer limb - the horizontal diameter (the measurement must be carried out with the patient looking straight ahead).

Criteria for evaluating this method: normally, the horizontal diameter of the cornea of a newborn child is 9-10 mm, by the year it increases to 11.0 mm. Including megalocornea - an increase in the horizontal diameter of the cornea by more than 1-2 mm compared to the norm; microcornea - a decrease in the horizontal diameter of the cornea by more than 1-2 mm in comparison.

The second method is to measure the diameter of the cornea using a surgical caliper under anesthesia. Determination of the size of the cornea and limbus was carried out using a surgical compass. The horizontal and vertical dimensions of the cornea and limbus width were measured. The data were evaluated according to the following parameters: the diameter of the cornea in normal newborns is 9-9.5 mm, at 1 year 10-10.5 mm, at 2-3 years 10.5-11 mm. (Sidorenko E.I., 2001).

It is known that this is one of the subjective methods widely used in practice for measuring the diameter of the cornea in children with corneal pathologies, including PVH. It looks like an ordinary iron compass, in the form of a surgical measuring compass with sharp ends (Fig. 2.7).

When measuring the diameter of the cornea with a measuring surgical compass, the cornea is measured at two points, which gives a more objective result when determining the size of the cornea diameter in two mutually perpendicular directions. The method provides the universality of measuring the diameter of the cornea both in adults and in children with different face shapes. Measuring the diameter of the cornea using a measuring surgical compass makes it possible to promptly detect pathological deviations of the cornea in terms of diameter.

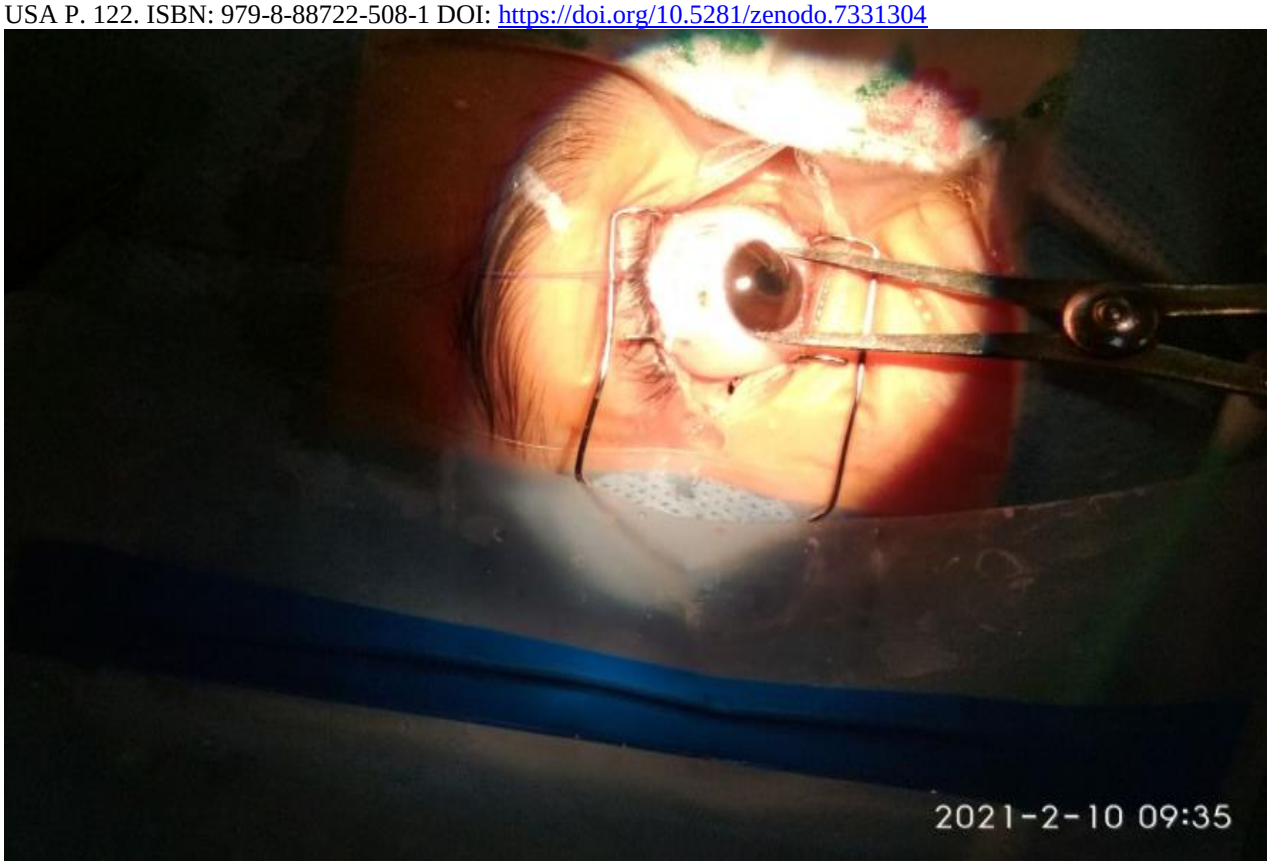


Fig. 2.7 Measurement of corneal diameter with a surgical caliper under anesthesia

The effectiveness of this technique lies in the fact that it is possible to achieve an accurate measurement of the diameter of the cornea with the compass as close as possible to the eye. However, in young children, this device does not give accurate results and can be traumatic.

In this connection, we have developed a new method for measuring the diameter of the cornea. A new device for measuring the diameter of the cornea has been proposed, which can be used in the follow-up of children with primary congenital glaucoma at an early age.

The developed device allows to achieve a higher technical result, which is to increase the efficiency of the measurement performed in a simple, reliable and fast way, and is not traumatic.

Necessary accessories for remote measurement of the cornea diameter:

1. a device in the form of special "glasses" - invented by us to measure the diameter of the cornea.

2. phone, tablet, any gadget for photographing the eye (Figure 2.8).

3. a computer with a downloaded special AutoCAD program for accurate calculation of the corneal diameter indicator.

Fig. 2.8. Device for remote measurement of the diameter of the cornea (invention)

A device for measuring the diameter of the cornea of the eye is used as follows (Fig. 2.9):

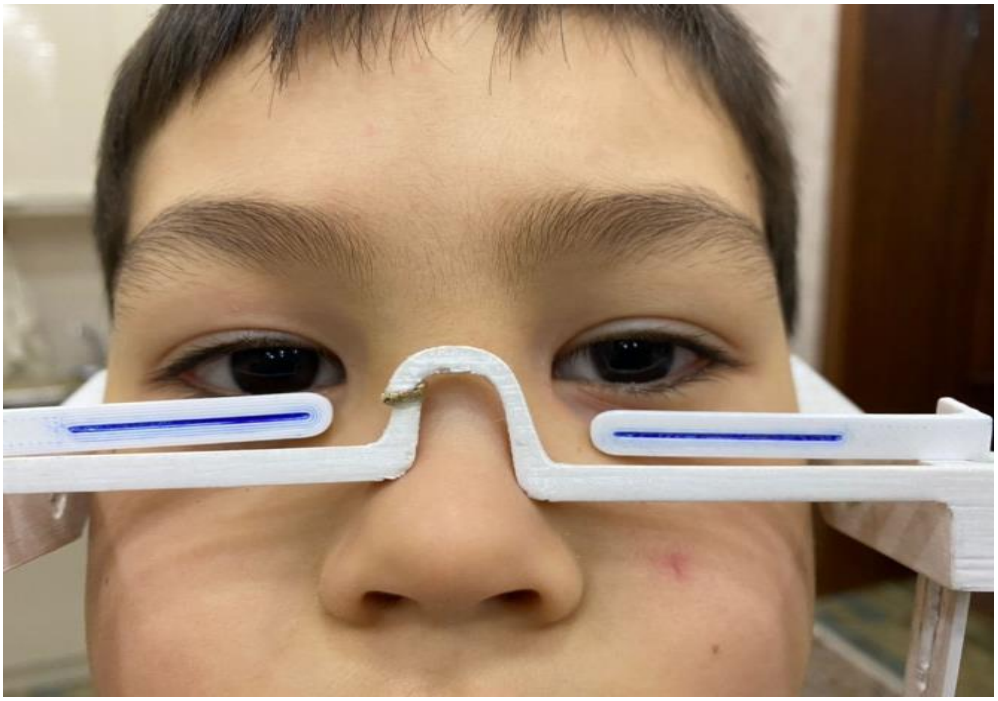


Fig. 2.9. Corneal diameter measurement step

Children from 0 to 3 years old are asked the child's parent to fix the patient's head and show an object with a bright color to fix the gaze.

A child from 3 years old and above is seated in a chair with a back, so that he does not move as much as possible. Then put on special glasses with an open semi-frame and a 3 cm tap at the bottom of the frame to match the size of the cornea diameter with it.

Next, the patient is asked to open his eyes as much as possible and fix his gaze on the object. Then, photographs are taken with a digital camera. This concludes the survey.

Then the obtained digital photo is placed into the program for measuring the diameter of the cornea. The program calculates the size of the diameter of the cornea of the eye, comparing it with the size of a 3x cm tap placed on special half-frame glasses in the lower part, which is right under the eye, and with an increase

in the size of the cornea in dynamics or different from the age norm, the presence of the disease or its progression is judged (Fig. 2.10).

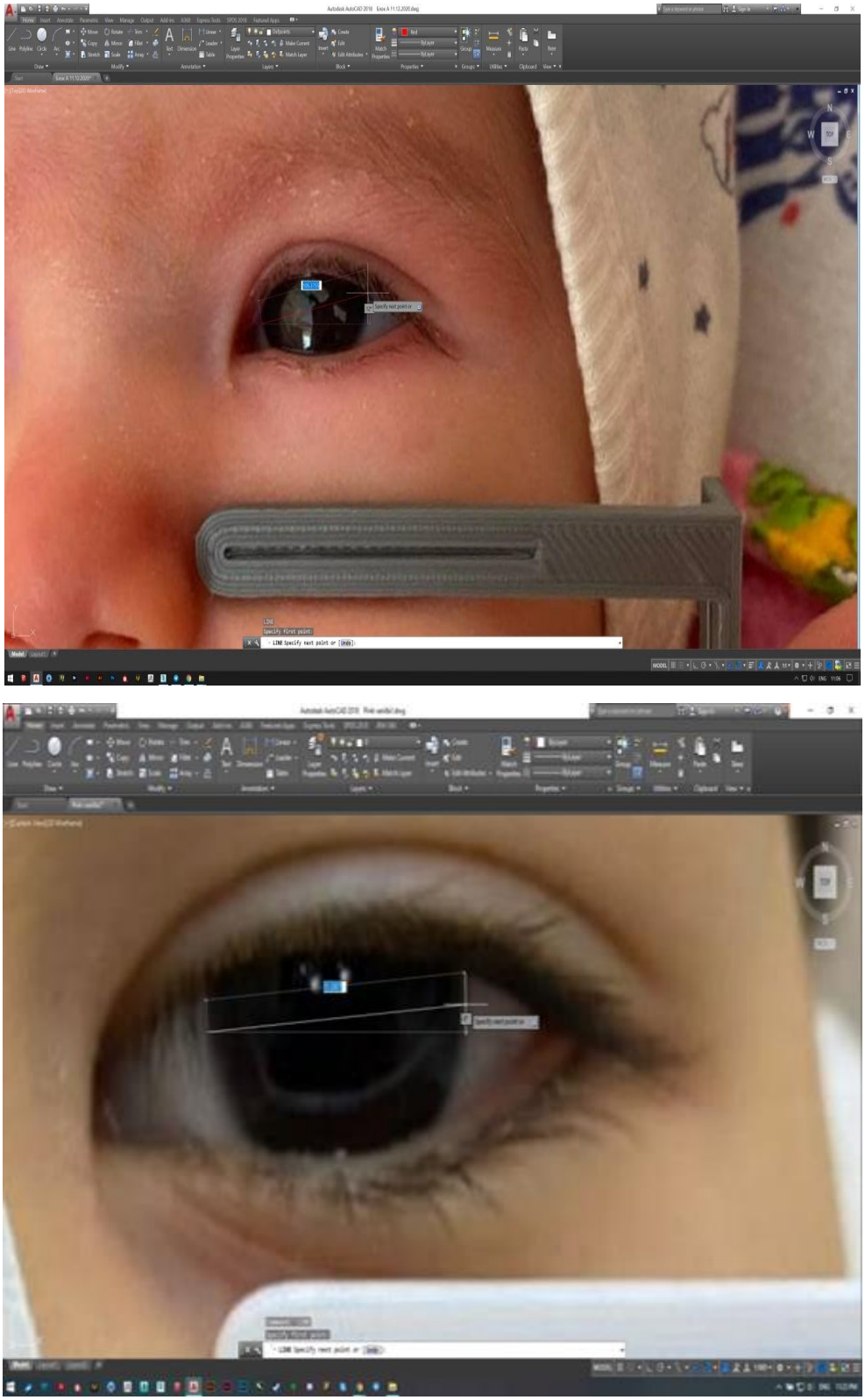


Fig. 2.10. Measurement of corneal diameter using a special program

Stages of measuring the diameter of the cornea using the proposed device:

Glasses are put on (a device for measuring the diameter of the cornea is placed as close as possible to the patient's cornea, the child looks at the camera for several seconds).

The eye being examined is photographed using gadgets, for example, a regular phone. In children over 3 years of age, measurements are carried out with the help of special glasses with a corneal diameter meter that we have proposed.

In children under 3 years old, it is possible to measure the diameter of the cornea using the tap itself, apply it to the lower eyelid, bringing the measuring ruler as close as possible to the cornea, which is considered the main part of special glasses.

3. Using a 2D or 3D computer-aided design and drafting system, AutoCAD measures the corneal diameter. AutoCAD and its special applications, on the basis of which they are widely used in mechanical engineering, architecture, as well as in various branches of medicine, include a complete set of tools for complex three-dimensional modeling and allow you to get high-quality visualization of models using the mental ray rendering system. This program has a special application that is used to vectorize images. Supporting optical character recognition, as well as the ability to accurately calculate more than 700 thousand elements, allows you to get the most optimal calculation options, respectively, also the corneal diameter indicator with minimal errors.

Studies of the first and third methods were performed on an outpatient basis, the second method of measuring the diameter of the cornea using a surgical compass was performed under anesthesia before AGO in children diagnosed with PVH.

9. All patients diagnosed with suspected PVG underwent OCT (circular scanning of 3.4 mm around the optic disc to measure the thickness of the nerve fiber layer, to measure the thickness of the nerve fiber layer in the macular area). As a result of the examination, we obtained a graph of the thickness of the nerve fiber layer.

The use of the method of optical coherence tomography of the optic disc and retina in the early diagnosis of primary congenital glaucoma makes it possible to identify the initial stage of this disease.

§ 2.3. Special research methods

2.3.1 Determination of tumor necrosis factor (protein-oligosaccharide complex) and interleukin - 10 to assess the cytokine status in children with PVH

115 pediatric patients with primary congenital glaucoma participated in the cytokine status study. Of these, the comparison group consisted of 50 children with PVH and 65 children with WG - the main group. As well as a control group with 32 healthy children without ocular pathology.

Linked immunosorbent assay. The TNF norm is 0-50 pg / l (picograms per liter), the reference level is up to 8.2 pg / ml.

We have studied these cytokines in the venous blood of children with PVH in the laboratory of immunoregulation of the Institute of Immunology under the Academy of Sciences of the Republic of Uzbekistan.

2.3.2 Determination of TNFα-308G/A, IL-10 C-819T and G-1082A gene polymorphism by immuno-genetic method

The material for DNA extraction was 3-5 ml venous blood from the cubital vein (Beckton-Dickinson vacutainers were used for blood sampling) with an anticoagulant/preservative 15% tripotassium EDTA (Ethilendianin-tetraaceticacid). Blood for further processing could be stored up to 24 hours at a temperature not higher than +4°C.

To obtain genomic DNA, a two-stage method of lysis of blood cells was used. By double centrifugation of the entire volume of whole blood in RCLB buffer (Redcellslysisbuffer - erythrocyte lysis buffer) at a speed of 1500 rpm for

15-20 minutes, erythrocyte lysis was carried out. The use of RCLB causes an osmotic shock of the erythrocytes, leading to their swelling and further destruction.

The supernatant containing destroyed erythrocytes was carefully poured out of the tube, the rest of the supernatant was aspirated. The clot of the leukocyte mixture remaining at the bottom was lysed in the leukocyte lysis buffer WCLB (Whitecells lysis buffer, white blood cell lysis buffer) in an amount depending on the volume of the leukocyte mixture. WCLB is also a preservative for the storage of leukocyte mass lysates even at room temperature. In this state, the lysates could be stored indefinitely.

Lysis Buffer Prescriptions:

RCLB WCLB

1 mM NH4HCO3 100mM Tris-Cl (pH 7.6)

115 mM NH4Cl 40 mM EDTA (pH 8.0)

Autoclave 50 mMNaCl 0.05% Sodiumacide

After autoclaving 0.2% SDS

Further purification of leukocyte mass lysates is based on the alcohol-salt treatment method according to S. Miller et al. (1988) in a modification proposed by the laboratory of Stanford University.

To 400 µl of the leukocyte mass add 150 µl of 5M NaCl, mix on a shaker and place on ice for 10-20 minutes, then centrifuge at 1200 rpm for 15 minutes.

The supernatant is taken into another Eppendorf tube and 100% ice-cold ethanol is added. With gentle shaking, a quaternary strand of the DNA molecule appears in the mixture; the mixture is centrifuged at 1200 rpm for 15 minutes; the supernatant is removed, and the whitish spot remaining at the bottom of the tube is washed again in 80% ethanol at 1200 rpm for 10 minutes. The supernatant is drained, the remaining alcohol is carefully removed, the tube is left open until the alcohol has completely evaporated (for 12 hours at room temperature or in a thermostat at a temperature of 40-45°C for 2 hours).

After the alcohol has evaporated, a solution of TE (Tris-EDTA) diluted with distilled water in a ratio of 1:3 (TE: water) pH 8.0 is added to the test tube with dried DNA. DNA was stored at –20 0C.

Methods for identifying allelic variations of polymorphic loci of patient genes. Polymerase chain reaction (PCR) was carried out on a Rotor-Gene-2000 thermocycler from CorbettResearch with the use of appropriate primers and 10 μl of a PCR mixture (manufactured by NPO Litekh) containing 2 mMMgCl2, Taq DNA polymerase, and Cresol Red dye.

Visualization of the results was carried out by electrophoresis in 2% agarose gel with ethidium bromide at 150 V and 290 mA.

Conducting a polymerase chain reaction (PCR). To detect the studied polymorphisms, amplification of certain sections of the corresponding genes was carried out.

To determine the polymorphic alleles of cytokine genes, the allele-specific PCR method was used.

§2.4. Characteristics of methods of surgical treatment of refractory glaucoma

2.4.1. Technique for fistulizing antiglaucoma surgery using autoscleral drainage

Patients underwent the following AGO:

1. Traditional method - 44 children with RG: sinus trabeculotomy and sclertrabeculectomy.

2. Combined method of surgical treatment of PVH with implantation of autoscleral drainage with the creation of three ways of outflow of intraocular fluid.

3. Deep sclerectomy.

4. Basal iridectomy.

The AGO method using an autoscleral stem has several advantages:

Simultaneous impact on the outflow path in 3 directions:

1. Sinus trabeculotomy ab externo according to Burian - into the scleral sinus.

2. Cyclodialysis - cycloretraction with autoscleral drainage into the suprachoroidal space.

Basal iridectomy with sclerectomy - under the scleral flap into the episcleral venous system.

A method of surgical treatment of primary congenital glaucoma proposed by the authors Buzrukov B.T., Levchenko O.G., Khamroeva Yu.A. (Patent for invention Republic of Uzbekistan No. IAP04890 dated May 12, 2014). Under general intubation anesthesia produced:

1. Treatment of the surgical field is normal.

2. Blephorostat

3. Within 11 to 1 hours, the conjunctiva is separated from the limbus.

4. Diathermocoagulation of scleral vessels is performed.

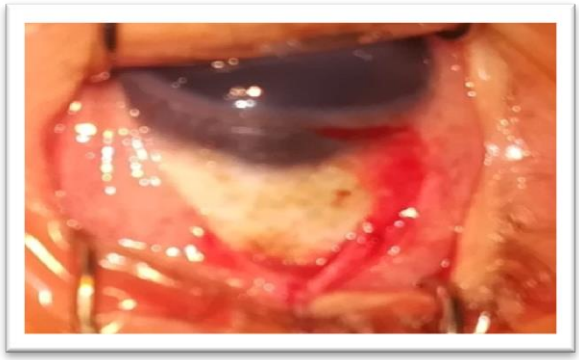
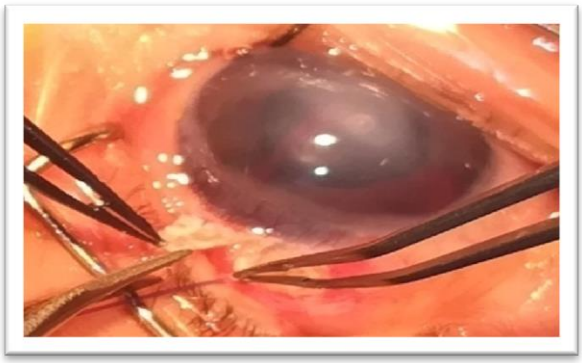
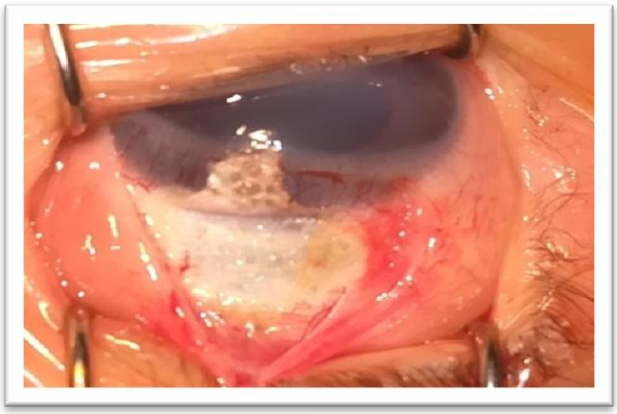
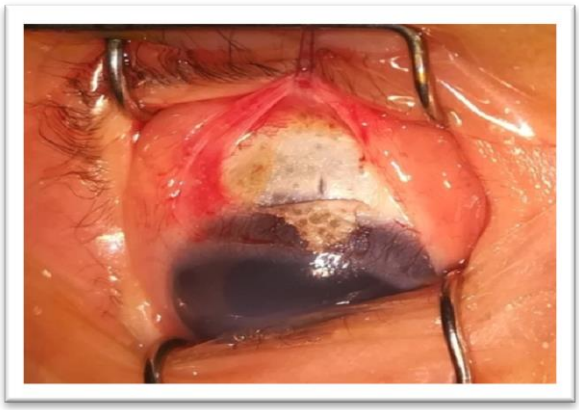
5. A “P”-shaped scleral flap is created with the base to the limbus, 5x4 mm in size and ½ of the sclera part thick. Then strips are cut out with a thickness of ½ of the sclera, 1x4 mm in size, on both sides of the scleral flap.

6. Under the “P”-shaped scleral flap in ½ of the sclera, 3 mm away from the limbus, two through cuts are made parallel to the limbus in the projection of the flat part of the ciliary body: left and right, 1.5 mm long. In this case, the left incision starts from the projection of the face of the "P"-shaped scleral flap, and the right incision - from the projection of the right side of the "P"-shaped scleral flap.

7. Between the incisions to the supraciliary space, a tunnel is formed through which the scleral strips cut and rolled for 1800 are placed in the anterior chamber, followed by cycloretraction. In this case, an outflow of aqueous humor occurs through the superficial scleral pathways.

8. The projection of the venous sinus is located, sinus trabeculotomy is performed, using the introduction of Kharms' trabeculotome. Then the trabecula is dissected by turning the trabeculotome, first to the right, then to the left. In this case, the outflow of intraocular fluid occurs through natural trabecular pathways.

9. Basal iridectomy with trabeculectomy is performed, in which the outflow of aqueous humor occurs through the subconjunctival tract.

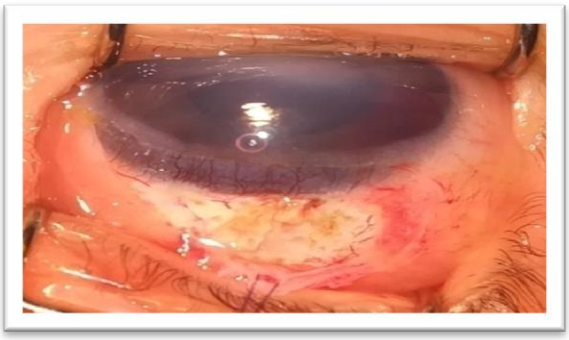
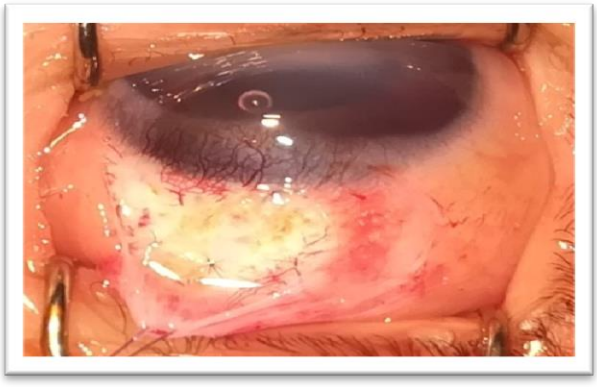
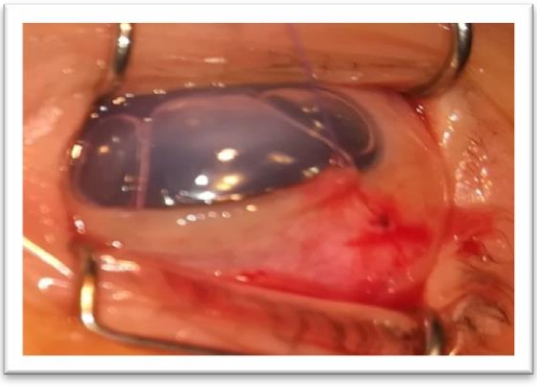




Fig.2.12. Method for surgical treatment of congenital glaucoma using autoscleral drainage

10. The superficial scleral flap is placed in place and sutured with two interrupted sutures 10:00

11. 2 sutures are applied to the conjunctiva at 6:00 at 11:00 and at 13:00 at the limbus.

12. A monocular aseptic dressing is applied.

2.4.2. Technique for fistulizing antiglaucoma surgery using biodegradable drainage Glautex

The most optimal TDA and TMA models of antiglaucoma resorbable drainage "GLAUTEX" were selected for use in sick children with refractory glaucoma and a registration certificate was obtained for the use of this drainage in all regions of Uzbekistan.

There are several models of drainage "Glautex". Drainage antiglaucomatous resorbable "Glautex" model TDA is recommended for children older than 3 years. Designed to be placed around the scleral flap during antiglaucomatous operations of penetrating type in order to prevent the formation of adhesions in the postoperative zone and stabilize intraocular pressure within the normal range.

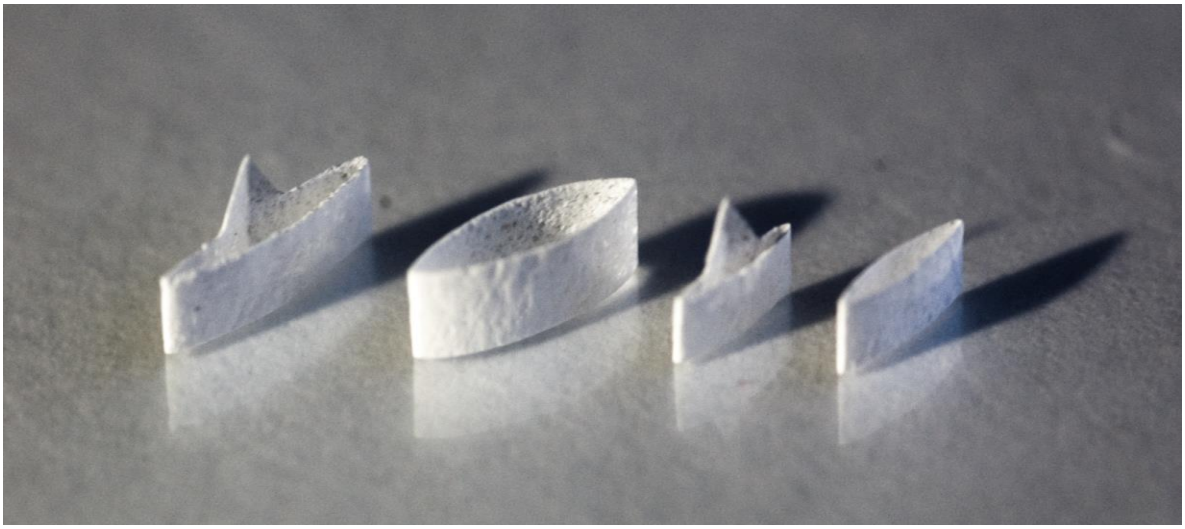
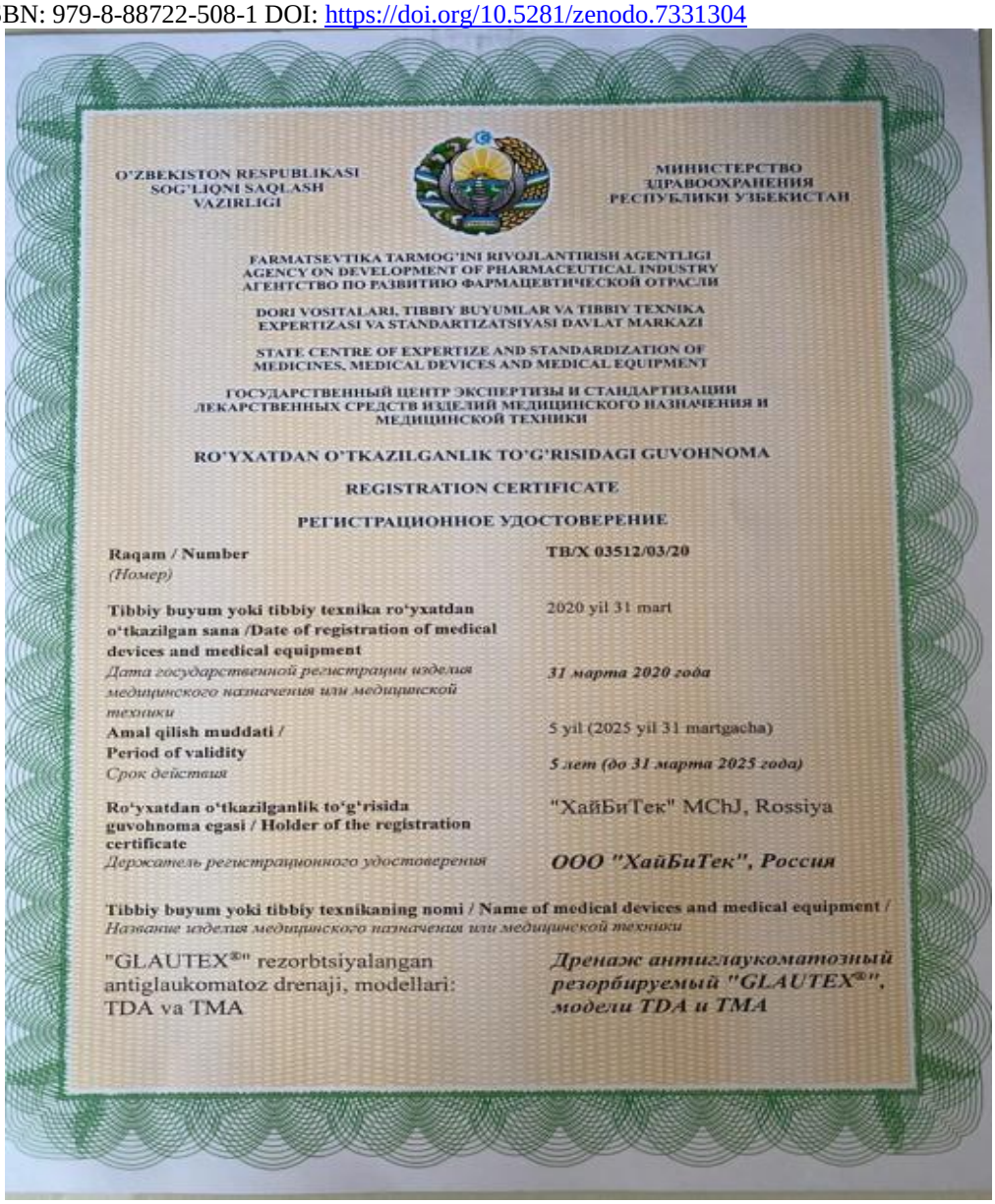


Fig. 2.13. A kind of drainage "Glautex"



O'ZBEKISTON RESPUBLIKASI SOG'LIQNI SAQLASH VAZIRLIGI

МИНИСТЕРСТВО ЗДРАВООХРАНЕНИЯ РЕСПУБЛИКИ УЗБЕКИСТАН

FARMATSEVTIKA TARMOG'INI RIVOJLANTIRISH AGENTLIGI
AGENCY ON DEVELOPMENT OF PHARMACEUTICAL INDUSTRY
АГЕНТСТВО ПО РАЗВИТИЮ ФАРМАЦЕВТИЧЕСКОЙ ОТРАСЛИ

DORI VOSITALARI, TIBBIY BUYUMLAR VA TIBBIY TEXNIKA EXPERTIZASI VA STANDARTIZATSIYASI DAVLAT MARKAZI

STATE CENTRE OF EXPERTIZE AND STANDARDIZATION OF MEDICINES, MEDICAL DEVICES AND MEDICAL EQUIPMENT

ГОСУДАРСТВЕННЫЙ ЦЕНТР ЭКСПЕРТИЗЫ И СТАНДАРТИЗАЦИИ ЛЕКАРСТВЕННЫХ СРЕДСТВ ИЗДЕЛИЙ МЕДИЦИНСКОГО НАЗНАЧЕНИЯ И МЕДИЦИНСКОЙ ТЕХНИКИ

RO'YXATDAN O'TKAZILGANLIK TO'G'RISIDAGI GUVOHNOMA

REGISTRATION CERTIFICATE

РЕГИСТРАЦИОННОЕ УДОСТОВЕРЕНИЕ

Raqam / Number *(Номер)*	**TB/X 03512/03/20**
Tibbiy buyum yoki tibbiy texnika ro'yxatdan o'tkazilgan sana /Date of registration of medical devices and medical equipment *Дата государственной регистрации изделия медицинского назначения или медицинской техники*	2020 yil 31 mart ***31 марта 2020 года***
Amal qilish muddati / Period of validity *Срок действия*	5 yil (2025 yil 31 martgacha) ***5 лет (до 31 марта 2025 года)***
Ro'yxatdan o'tkazilganlik to'g'risida guvohnoma egasi / Holder of the registration certificate *Держатель регистрационного удостоверения*	"ХайБиТек" MChJ, Rossiya ***ООО "ХайБиТек", Россия***

Tibbiy buyum yoki tibbiy texnikaning nomi / Name of medical devices and medical equipment / *Название изделия медицинского назначения или медицинской техники*

"GLAUTEX®" rezorbtsiyalangan antiglaukomatoz drenaji, modellari: TDA va TMA	***Дренаж антиглаукоматозный резорбируемый "GLAUTEX®", модели TDA и TMA***

Fig. 2.14. Registration certificate for drainage «Glautex»

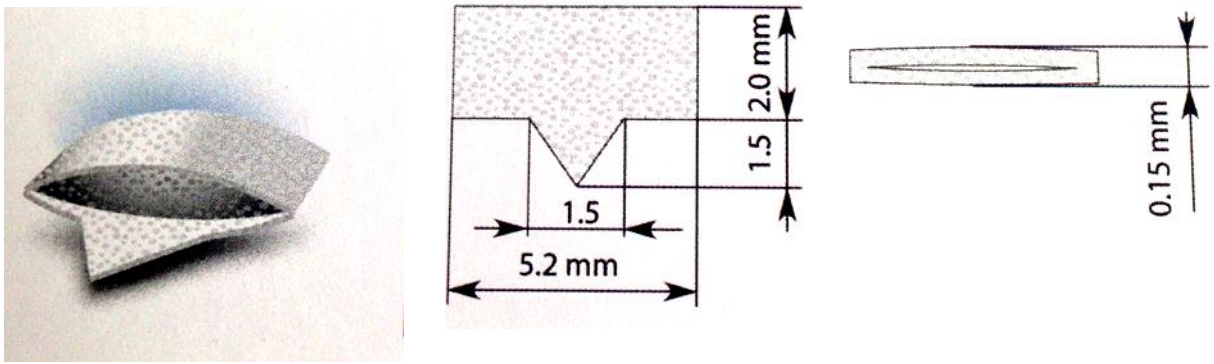


Fig. 2.15. Drainage model TDA

Table 2.3

Characteristics of Glautex drainage model TDA

Characteristics	model
Material	Composite material based on polylactic acid (polylactide) and polyethylene glycol
Structure	Porous
Terms of resorption	4-8 months
Thickness	0.15mm
Width	2.0mm (+/- 0.2mm)
Length	5.2mm (+/- 0.2mm)
Remaining shelf life	10 months (80%)
Country of origin	Russian Federation
Code in the nomenclature classification of medical devices by type	343450

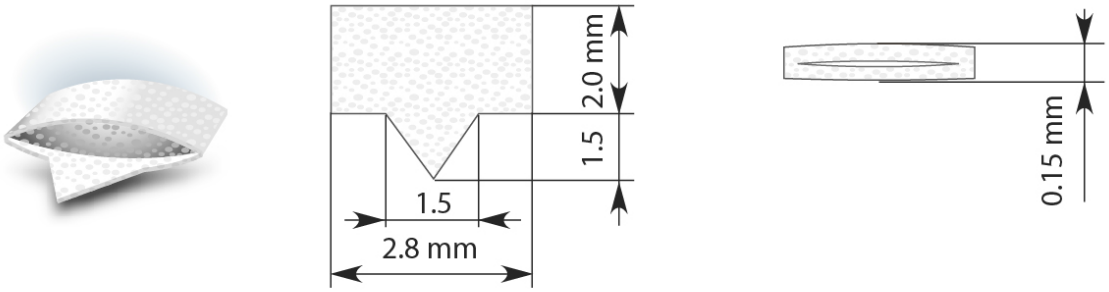


Fig. 2.16. TMA Model Drainage Image

Drainage antiglaucomatous resorbable "Glautex" model TMA is recommended for children from 0 to 3 years.

Designed to be placed around the scleral flap during antiglaucomatous operations of penetrating type in order to prevent the formation of adhesions in the postoperative zone and stabilize intraocular pressure within the normal range.

Table 2.4

Characteristics of Glautex drainage model TMA

Characteristics	Model TMA
Material	Composite material based on polylactic acid (polylactide) and polyethylene glycol
Structure	Porous
Terms of resorption	4-8 months
Thickness	0.15mm
Width	2.0mm (+/- 0.2mm)
Length	5.2mm (+/- 0.2mm)
Remaining shelf life	10 months (80%)
Country of origin	Russian Federation
Code in the nomenclature classification of medical devices by type	343450

The technique of the proposed method of fistulizing antiglaucomatous surgery using biodegradable drainage "Glautex" was carried out in 21 children with WG:

1. Treatment of the surgical field is normal.

2. Blephorostat.

3. within 11 to 1 o'clock in the upper segment of the eyeball from the limbus, an incision and separation of the "P" shaped conjunctiva is performed.

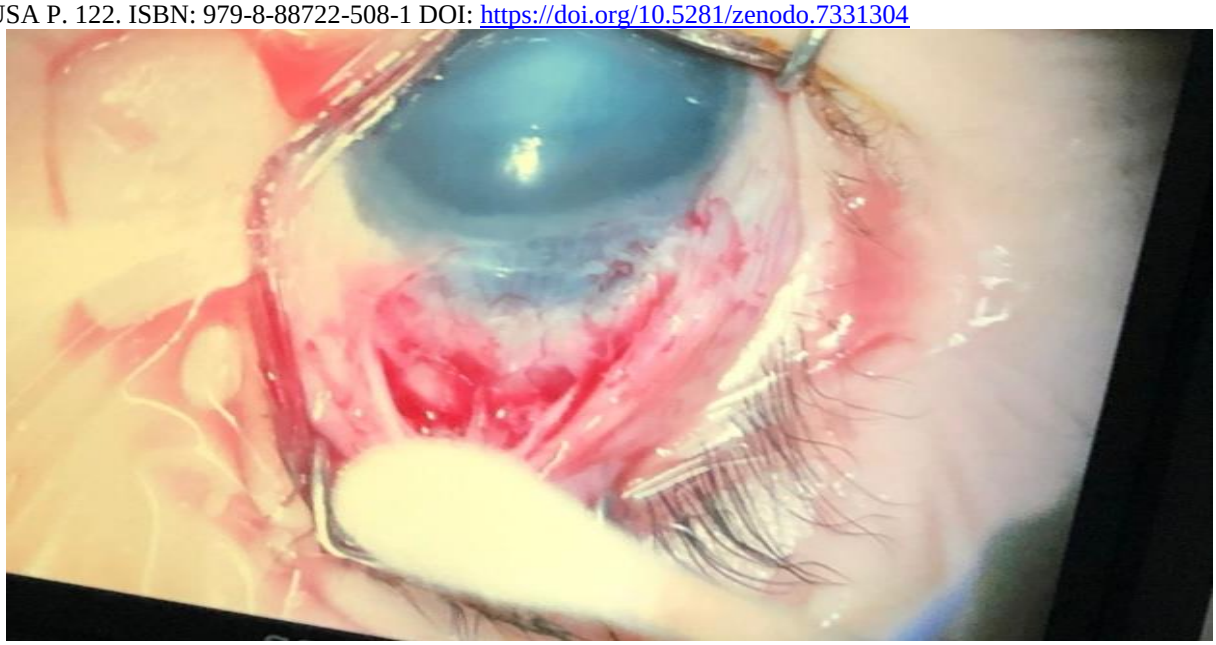


Fig. 2.17. Incision and separation of the conjunctiva "P" shaped.

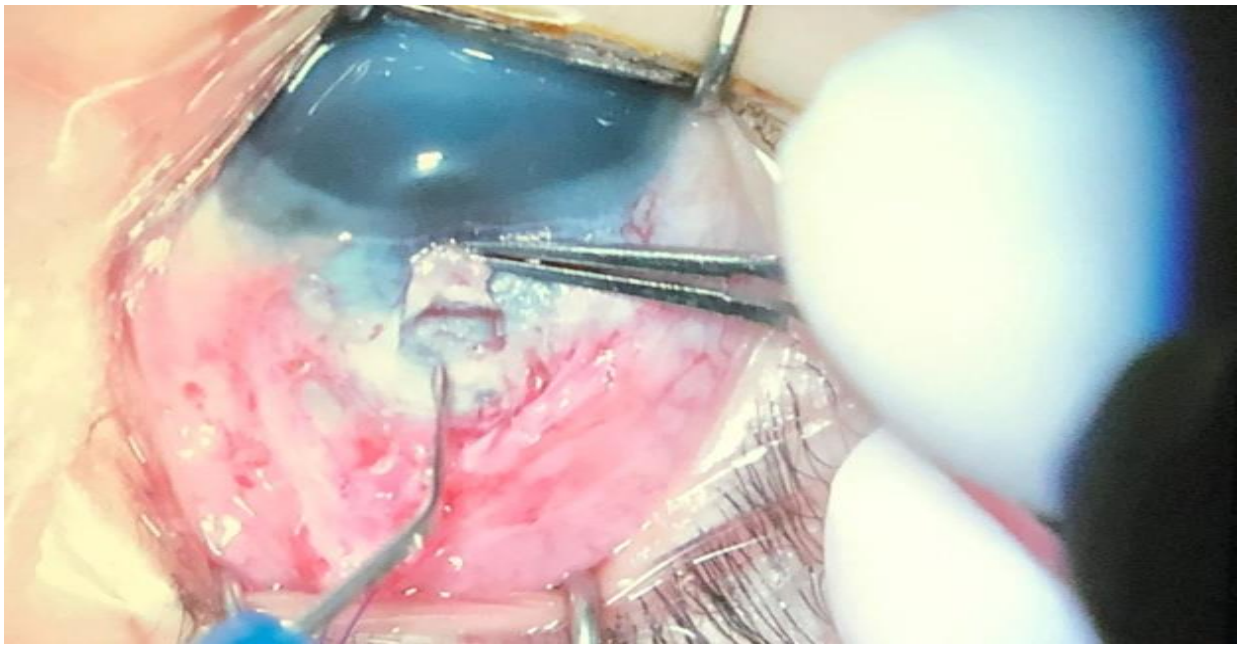


Fig. 2.18. Cutting out the scleral flap

4. A frenulum suture is applied to the superior rectus muscle.

5. Perform diathermocoagulation of scleral vessels.

6. In the form of a trapezoid, a superficial scleral flap is created for 1/2–1/3 of the thickness of the sclera.

7. Through cuts of the remaining layers of the sclera are made along the anterior border of the stratification 4 mm from the limbus, a spatula is

used to exfoliate the ciliary body and the iris from the filtering sections of the sclera (cyclodialysis).

8. The projection of the venous sinus is located, sinus trabeculotomy is performed, using the introduction of Kharms' trabeculotome. Then the trabecula is dissected by turning the trabeculotome, first to the right, then to the left. In this case, the outflow of intraocular fluid occurs through natural trabecular pathways.

9. Then a basal iridectomy with trabeculectomy is performed, in which the outflow of aqueous humor occurs through the subconjunctival tract. (trabeculectomy)

10. Capture and incision of the peripheral part of the iris to form a hole in order to improve the outflow of intraocular fluid from the posterior chamber to the anterior.

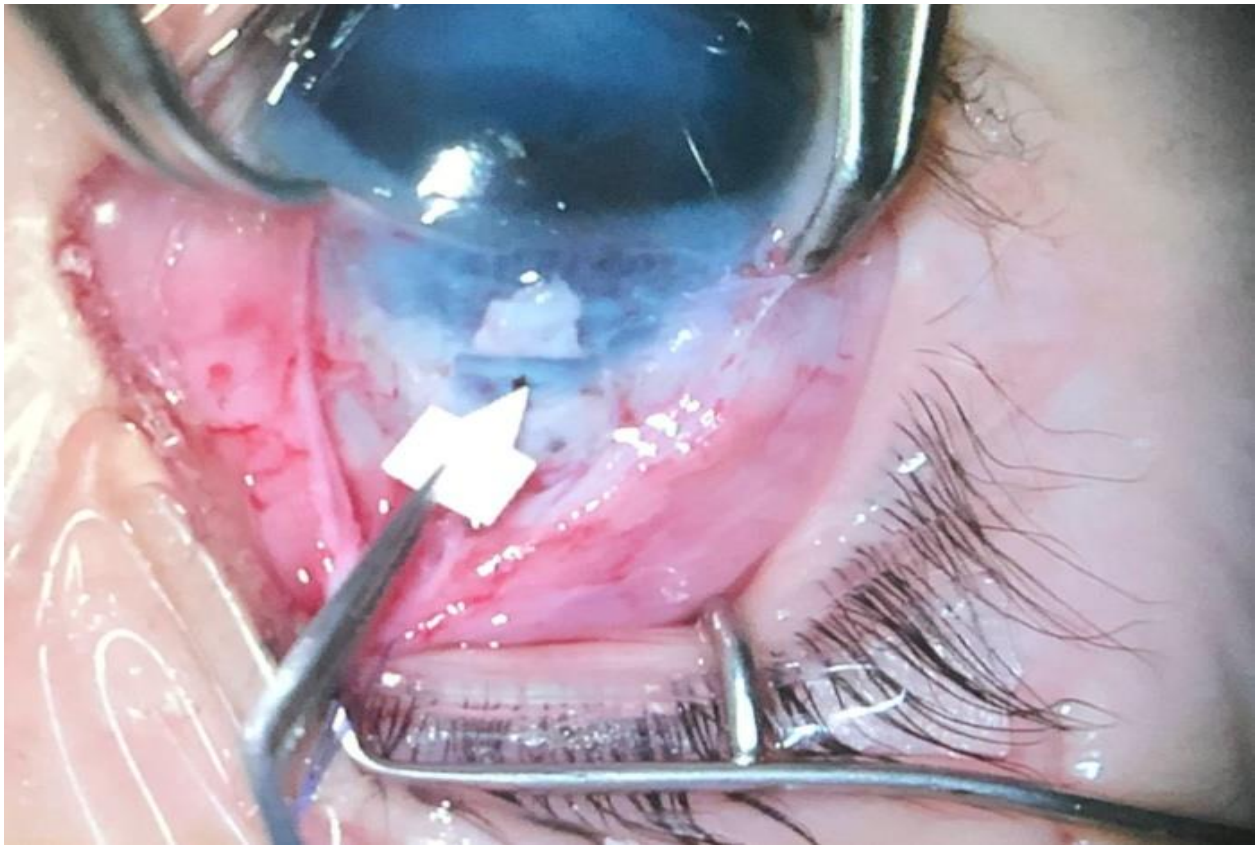


Fig. 2.19. Putting on the drainage sleeve on the scleral flap

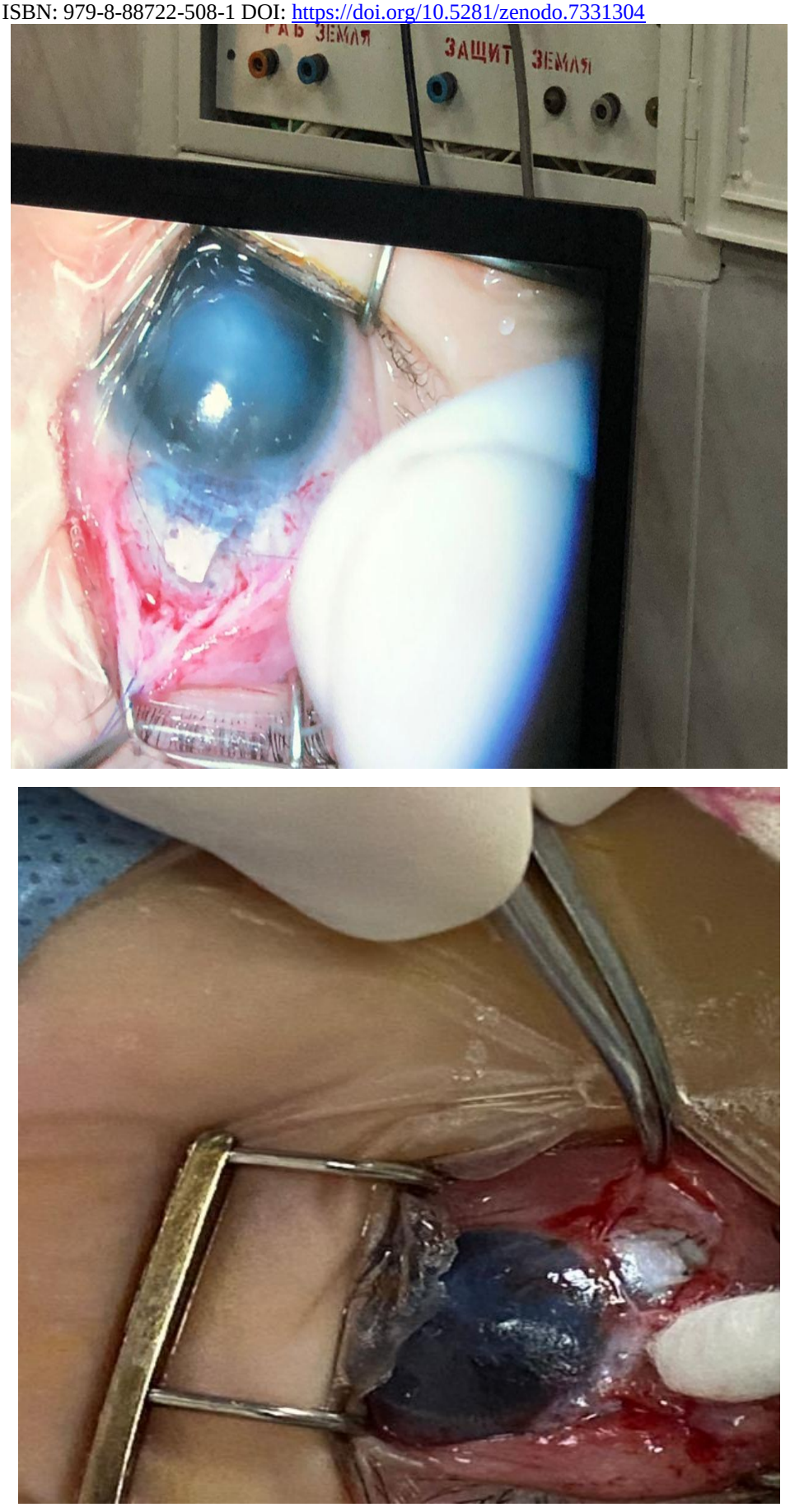


Fig. 2.20. Fixation of the scleral flap and suturing the conjunctiva

11. A Glautex drainage sleeve is put on the scleral flap.

12. The scleral flap with drainage is placed in place, it is repositioned and fixed with 1 or 2 sutures in the apex area.

13. The conjunctival incision is sutured with an interrupted suture.

14. Dexamethasone 0.4% 0.3 ml and ceftriaxone 0.3 ml are injected under the conjunctiva to prevent secondary infection.

15. A monocular aseptic dressing is applied.

Causes of CHO in AGO:

1. during the opening of the fibrous capsule of the eye, a sharp decompression develops, leading to a violation of the anatomical relationship;

2. Traction displacement of the ciliary body and iridolenticular diaphragm anteriorly with the formation of negative pressure in the suprachoroidal space and extravasation of the liquid part of the blood into it;

3. Hypotension that occurs during surgery due to excessive external filtration of the intraocular fluid with inadequate antiglaucomatous fistula or insufficient sealing of the surgical wound;

4. Violations in the hemodynamics of the fluid of the suprachoroidal space.

In the postoperative period, local therapy is prescribed:

1. Antibacterial drugs;

2. Anti-inflammatory drugs;

3. Local metabolic preparations;

However, I would like to note that despite the development of possible complications, the most effective method of treating various types of glaucoma is the implantation of drains. Biodegradable drainage Glautex, according to the literature data, as well as according to its own research, showed the ability to long-term and stable IOP normalization compared to other drains used in AGO in children with refractory glaucoma.

Benefits of biodegradable drainage "Glautex":

1. When installing drainage "Glautex" no complex and time-consuming manipulations are required, the correct position of the implant in the postoperative period is guaranteed due to its simple and reliable fixation.

2. The use of "Glautex" without exerting excessive pressure on the surrounding tissue, has a small thickness and does not swell.

3. Complete resorption of the drain within 6 months allows the formation of aqueous humor outflow tracts and eliminates long-term adverse reactions that may occur with non-resorbable material.

5. "Glautex" can be combined with any other methods of preventing excessive scarring.

6. "Glautex" is practically invisible the next day after the operation.

7. "Glautex" drainage makes it possible to obtain a stable and long-term hypotensive effect, which reduces the likelihood of repeated surgical interventions.

§2.5. Statistical processing methods

The data obtained by us in the study of children diagnosed with PCV were subjected to statistical processing using the Microsoft Office Excel - 2016 software package. We used the methods of variational non-parametric and parametric statistics with the calculation of the arithmetic mean (M), standard deviation (σ), standard error of the mean (m), relative values (frequency, %). Statistical significance was determined by Student's t-test (t) with the calculation of the error probability (P) when checking the normality of distribution (according to the kurtosis test) and the equality of general variances (Fisher's F-test). A significance level of $P < 0.05$ was taken as a statistically significant change. Statistical significance for qualitative values was calculated using the χ^2 test (chi-square) and z-test (Glantz) using the following formula:

$$z = (p_1 - p_2)\sqrt{\frac{n_1 \cdot n_2}{p(1-p) \cdot (n_1 + n_2)}}$$

Where $p_1 = \mu_1 / n_1$ and $p_2 = \mu_2 / n_2$ are compared experimental frequencies, and $p = (\mu_1 + \mu_2)/(n_1 + n_2)$ average frequency of occurrence of the feature in both groups.

2.5.1. Statistical processing of medical genetic results

Statistical processing of medical genetic results was carried out using statistical software packages Arlequin 2006 (version 3.5.2.2.), Excel 2003, SISA and a number of formulas below.

The following indicators are generally accepted in medical statistics:

1. The calculation of gene frequency in healthy and sick people is carried out according to the formula of the ratio of the number of a certain allele to twice the total number of individuals in the sample:

(2.1)

where: a is the number of alleles in the study,

n is the number of individuals in whose phenotype the gene variant is present.

2. To conduct statistical analysis for haplotypes, the 2x2 table contains slightly different data, however, it is also based on typing data.

		allele i		
		Availability i	**Absence j**	Sum in rows
allele j	**Availability j**	**a (+/+)**	**в (+/-)**	a + b
	Absence i	**c (-/+)**	**d (-/-)**	c + d
	Sum in columns	a + c	b + d	**N** = a+b+c+d

where a are individuals who have a haplotype with alleles i and j,

b - individuals who do not have allele j in haplotypes,

c - persons in whom only the j allele is present in the haplotypes,

d - persons who do not have a haplotype consisting of alleles i and j,

N - The total number of examined in both groups.

The value of Δij is calculated according to the formula proposed by J.G. Bodmer and W.F. Bodmer (1970) [81].

$$\Delta_{ij} = (d/N)^{1/2} - [((b+d)/N) \cdot ((c+d)/N)]^{1/2} \qquad (2.2)$$

The value obtained from this formula is important for determining the measure of not only the participation of alleles in the haplotype, but also the frequency of this haplotype (Haplotypefrequency - HPij). Haplotype frequency is calculated using the Matius formula:

$$HP_{ij} = GF_i \cdot GF_j + \Delta_{ij}$$

Where: The GF for each allele is calculated using the above formula.

3. Gene frequency is determined taking into account the Hardy-Weinberg law for a biallelic system according to the formula: P=1- (2.3)

Where: P is the frequency of the gene, A is the frequency of the corresponding antigen (phenotype) [140].

Reliability (p) of compared values. It is determined from the table of factorials using the criterion $\chi 2$ calculated by the Holdene formula [113]: $\chi 2$= Wy2c taking into account one degree of freedom – df=1 , where:

$$W=\frac{y}{v},\ V=\frac{1}{a}+\frac{1}{b}+\frac{1}{c}+\frac{1}{d} \text{ и } y=1nRR$$

After transformation, the final formula takes the following form:

$$\chi^2=\frac{\left[\frac{((a+0.5)x(d+0.5)^2}{(b+0.5)x(c+0.5)}\right]}{\frac{1}{a}+\frac{1}{b}+\frac{1}{c}+\frac{1}{d}}$$

If at least one of the values a, b, c, d is equal to 1, then the significance of differences in the frequency of occurrence of genes and haplotypes is calculated using $\chi 2$ adjusted for Yates for sample continuity:

$$\chi^2=\frac{(axb+bxc)^2\ xN}{(a+b)x(c+d)x(a+c)x(b+d)}$$

The value of $\chi 2$, exceeding 3.841 (corresponding to $p<0.05$), is considered as an indicator of a significant difference between the frequency characteristics in the compared groups.

The odds ratio (OR) was defined as the ratio of the probability that an event will occur to the probability that the event will not occur. The chance in each group of patients was the probability of the presence of the studied sign to the probability of its absence.

A binary logistic regression model was used to construct 95% confidence intervals (CI) and a point estimate of the odds ratio (OR). The reliability of the models was assessed using the maximum likelihood method. The odds ratio calculated for different groups with pathology is statistically significant if the 95% confidence interval for the odds ratio does not include one, therefore, to identify statistically significant differences, it is sufficient to present the OR and its 95% CI.

Chapter III. CLINICAL AND FUNCTIONAL CHARACTERISTICS OF THE ORGAN OF VISION IN CHILDREN WITH REFRACTORY GLAUCOMA ACCORDING TO RETROSPECTIVE AND PROSPECTIVE ANALYSIS DATA FOR THE PERIOD 2016-2020

3.1. Clinical and ophthalmological characteristics of children with refractory glaucoma and primary congenital glaucoma

We analyzed 448 patients (896 eyes) who were treated and examined in the eye department of the clinic of the Tashkent Pediatric Medical Institute with a diagnosis of primary congenital glaucoma and suspected PVG for the period from 2016 to 2020.

All children with primary treatment were hospitalized on an emergency basis. Sick children who applied for hospitalization for the second time were examined and prepared for surgical treatment by an ophthalmologist at the polyclinic at the place of residence. Patients under the age of 1 month were prepared for surgical treatment in the intensive care unit.

Prior to hospitalization for surgical treatment of PVH and suspected PVH, all children were seen by an onco-ophthalmologist at the Republican Research Institute of Oncology, and Doppler ultrasound was performed to rule out oncopathology.

The following conclusion was obtained: during an objective examination of sick children with a diagnosis of PVH and suspicion of PVH with the inclusion of Doppler ultrasound, in all cases (100%), an increase in the PZO of the eyeball was found in comparison with the age norm, the vitreous body is homogeneous, the retina is adjacent, the vascular pattern of the retina not deformed, not depleted. Retrobulbar thickness of the optic nerve 3.5 mm, homogeneous structure. Pathological vascularization at the level of the choroid is not observed. There are no data for intraocular mass formation. After exclusion of neoplasms of the eyeball, additional examination and surgical treatment in the eye department of the TashPMI clinic was recommended.

In the admission department of the TashPMI clinic, all the patients examined by us were consulted by related specialists: a neuropathologist, a pediatrician, an otorhinolaryngologist.

In order to assess the somatic status of the children, additional research methods were prescribed: laboratory (general blood count, urine, feces, biochemical studies), ECG, EEG (neurosonography depending on age).

Of all 448 patients analyzed, 32 (7.2%) patients were found to have a contraindication to anesthesia due to their somatic condition. Of the 32 sick children, 15 (47%) patients were diagnosed with acute respiratory disease, 5 (16%) were diagnosed with nasopharyngitis, 2 (6%) had gastrointestinal dysfunction, one child had secondary fermentopathy, 6 (19%) children exhibited icteric syndrome and 4 (13%) revealed bradyarrhythmia. All patients were discharged home for further examination and treatment by a pediatrician, a cardiologist at the place of residence, with a recommendation to instill drugs that reduce IOP.

Interpreting the obtained laboratory data, no pathological changes were found in the rest of the children, all indicators were within the reference values. ECG examination revealed no pathological disorders in all cases (100%).

The data of ultrasound examination of the structure of the brain - neurosonography showed that in 65.2% of children there were signs of posthypoxic changes in the brain (without dilatation of the CSF pathways). The results of the study of electrical summation and filtration of processes in neurons - EEG revealed that 74.2% of children had diffuse changes in the brain.

As a result of neurophysiological studies and interpretation of the data obtained by a pediatric neurologist, it was shown that 75% (213 patients) were diagnosed as a consequence of perinatal pathology of the nervous system.

After establishing the above changes in the somatic status, all children were re-examined by a pediatrician and a neuropathologist, with a combination of the results of laboratory and instrumental studies and clinical data, no contraindications to surgical intervention for PVH were found.

For children under 3 years of age, conventional ophthalmological research methods for PVH were performed under general anesthesia. For relaxation, the muscle relaxant seofluran was used, which also had a hypotensive effect on IOP.

Thus, in preparation for surgical treatment, all 448 children with a diagnosis of PVH and suspicion of PVH underwent generally accepted standard diagnostic methods, and of these, 32 (7.2%) had a contraindication to anesthesia due to somatic status, 37 (8.2%)) children had a dubious diagnosis, in connection with which a diagnosis of suspicion of PVH was made. Children with changes in somatic status were sent home for treatment at their place of residence. Naturally, they are advised to take eye drops to lower IOP and receive appropriate treatment from an allied health professional.

The remaining 390 children (87%) underwent examination and AGO under anesthesia. In connection with the correct preparation for anesthesia of children with PVH and suspicion of PVH, not a single lethal outcome was observed for the period 2016 to 2020.

Surgical treatment was performed in 390 patients, among which 265 children were initially operated and 125 children were re-operated, these children were diagnosed with refractory glaucoma (Fig. 3.1).

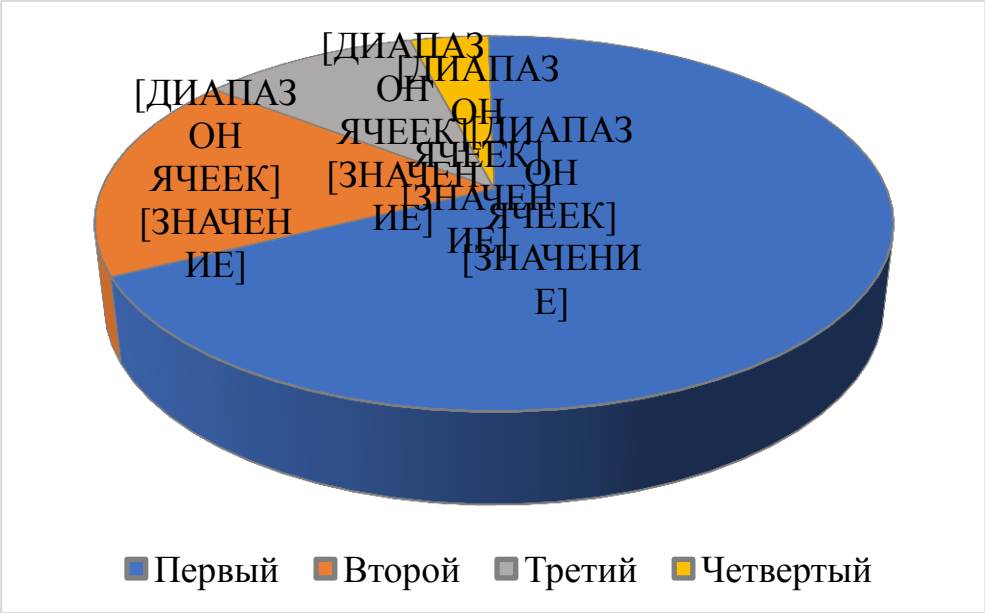


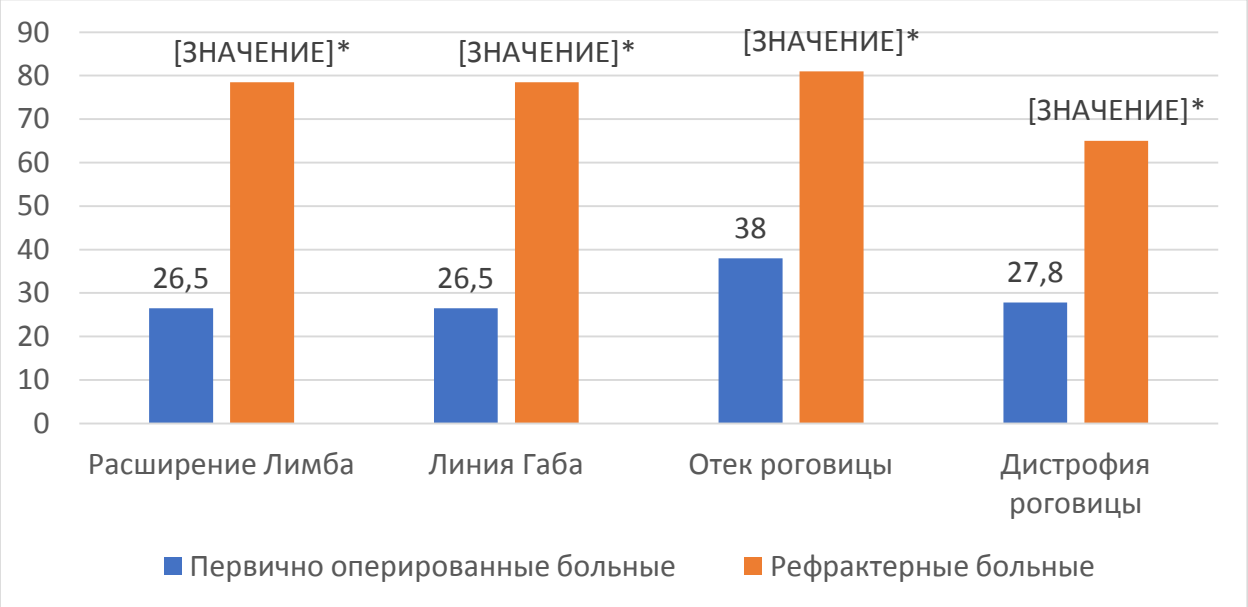
Fig. 3.1. Multiplicity of AGO operations for the period from 2016 to 2020

The study of the multiplicity of AGO showed that the largest percentage was primarily operated children - 68%, and patients operated on 2 or more times, that is, patients with WG - 32%.

All patients underwent biomicroscopy, which showed that patients with RG are admitted with severe keratopathy and dystrophic changes in the cornea (Fig. 3.2).

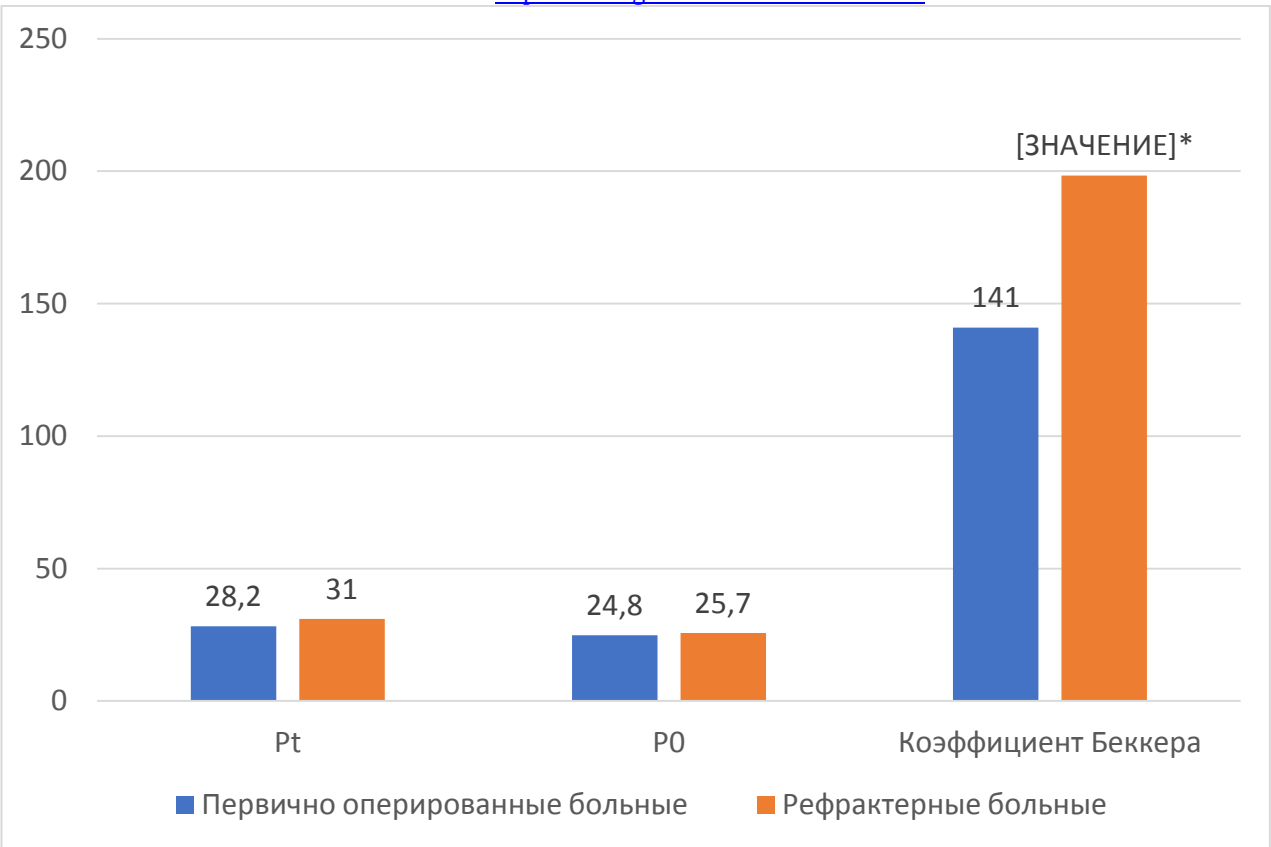
The results of the study of tonometric and tonographic parameters in the studied groups showed that patients with HR have significantly higher rates of both true and tonometric IOP compared with the initially operated patients (Fig. 3.3).

An analysis of the PZO parameters in the studied groups compared with the age norm showed that in patients with HR, the PZO indicators exceeded the age norm by an average of 4.6 mm, while in primary operated patients it exceeded the average by 3.3 mm (Fig. 3.4).



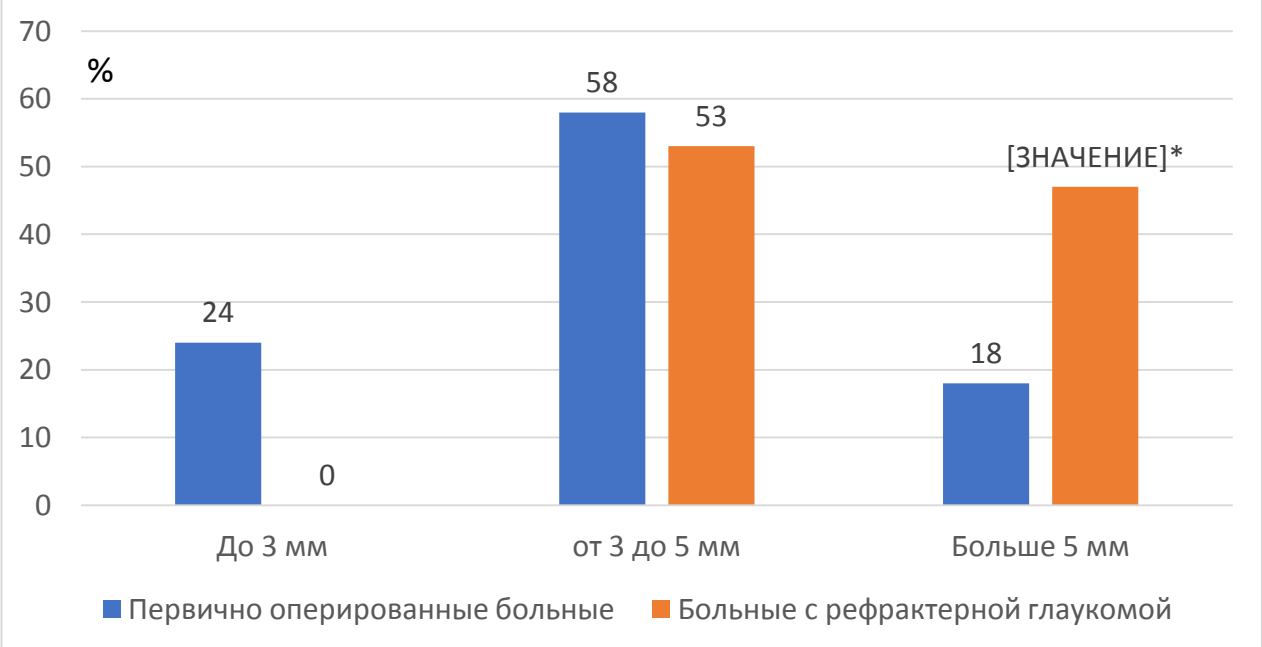
* Reliability of data between groups (p<0,01)

Fig. 3.2. Biomicroscopic parameters of the anterior segment of the eye in the studied groups



* Reliability of data between groups (p<0,05)

Fig. 3.3. Indicators of tonometry and tonography in the studied groups



* Reliability of data between groups (p<0,05)

Fig. 3.4. PZO parameters depending on the age norm in the studied groups

As can be seen from the diagram, 47% of sick children with WG have PZO values of more than 5.0 mm (4.5±0.02 mm), while with primary operated PVH, only 18% (P<0.05).

In patients with WG in 50% of cases (every fifth child), the need for repeated surgical intervention develops 12-24 months after the primary surgical intervention, the smallest percentage occurs in the first 12 months (12.8%) after the primary AGO (Fig. 3.5).

Thus, in a retrospective study, it was found that refractory glaucoma occurred in 32.11% of cases after traditional operations, was characterized by a lack of stabilization of the glaucoma process, which was manifested by an increase in the diameter of the cornea, the posterior eye of the eye, tonometric and tonographic parameters and a deterioration in the clinical and functional parameters of the organ of vision.

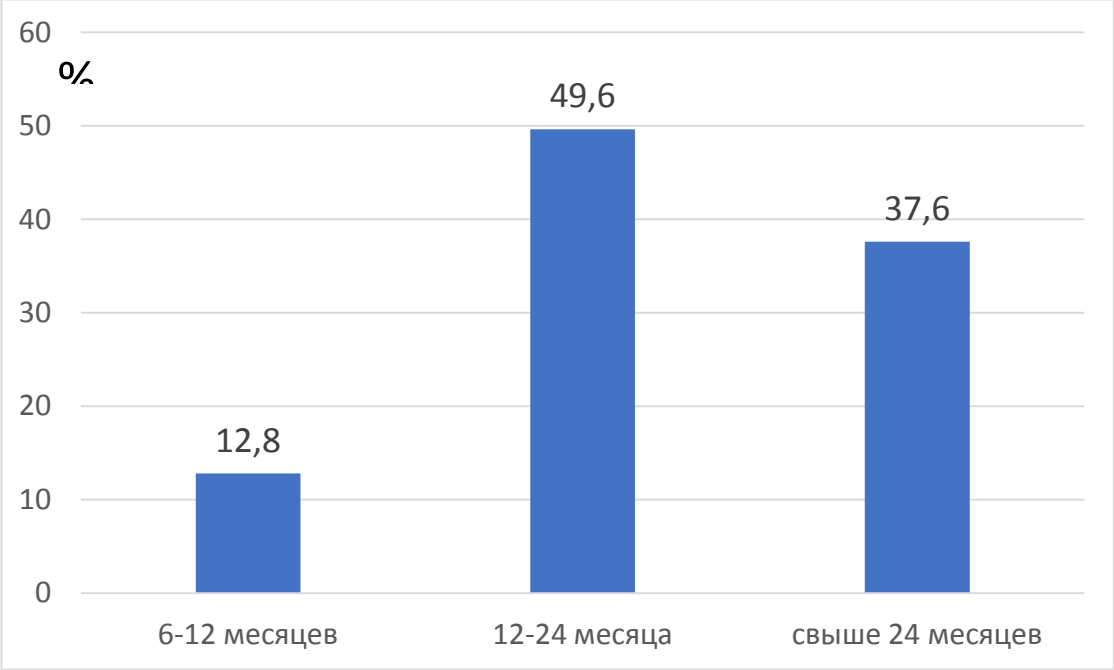


Fig. 3.5. Terms of development of complications leading to the development of refractory glaucoma in children (n=125)

§3.2. Algorithm for diagnosing children with suspected congenital glaucoma

We examined 37 children (74 eyes) aged 2 to 18 years with a diagnosis of suspected primary congenital glaucoma, who applied to the consultative and diagnostic clinic at the clinic of the Tashkent Pediatric Medical Institute. All these children were urgently hospitalized in the eye department of the clinic of the Tashkent Pediatric Medical Institute for the purpose of examination and clarification of the diagnosis of PVH.

On the part of the organ of vision in the children examined by us with a diagnosis of suspected PVH, the following pathologies were identified: ametropia - myopia in 19 (48.4%) cases; diseases of the anterior segment of the eyeball-megalocornea were detected in 6 children, sclerocornea was detected in 2 children (23.6%); diseases of the posterior segment of the eyeball - in 10 children (28%).

Analysis of the results of gonioscopy of 37 children (74 eyes) showed that the majority were found - 26 (52 eyes) patients had an anterior chamber angle open. Out of 11 (22 eyes) operated children in whom the diagnosis of PVH was confirmed, goniodysgenesis grade I was observed in 5 eyes (22.7%), grade II – in 2 (9%), grade III – 4 eyes (18.2%) (Fig. .3.6).

In 70% of cases (52 eyes) of children, P10 is within the normal range (19.6 ± 0.03), and in 30% of cases, 22 eyes are above the norm.

An increase in P0 was observed (26.17±0.03 mmHg) in 26 eyes (35%), within the normal range (19.63±0.03 mmHg) in 48 eyes (65%) parameters were within the normal range.

The Becker coefficient was increased in 5 eyes (6.7%) and amounted to 141.33 ± 2.5 and in other cases the indicator was 65.5 ± 1.3.

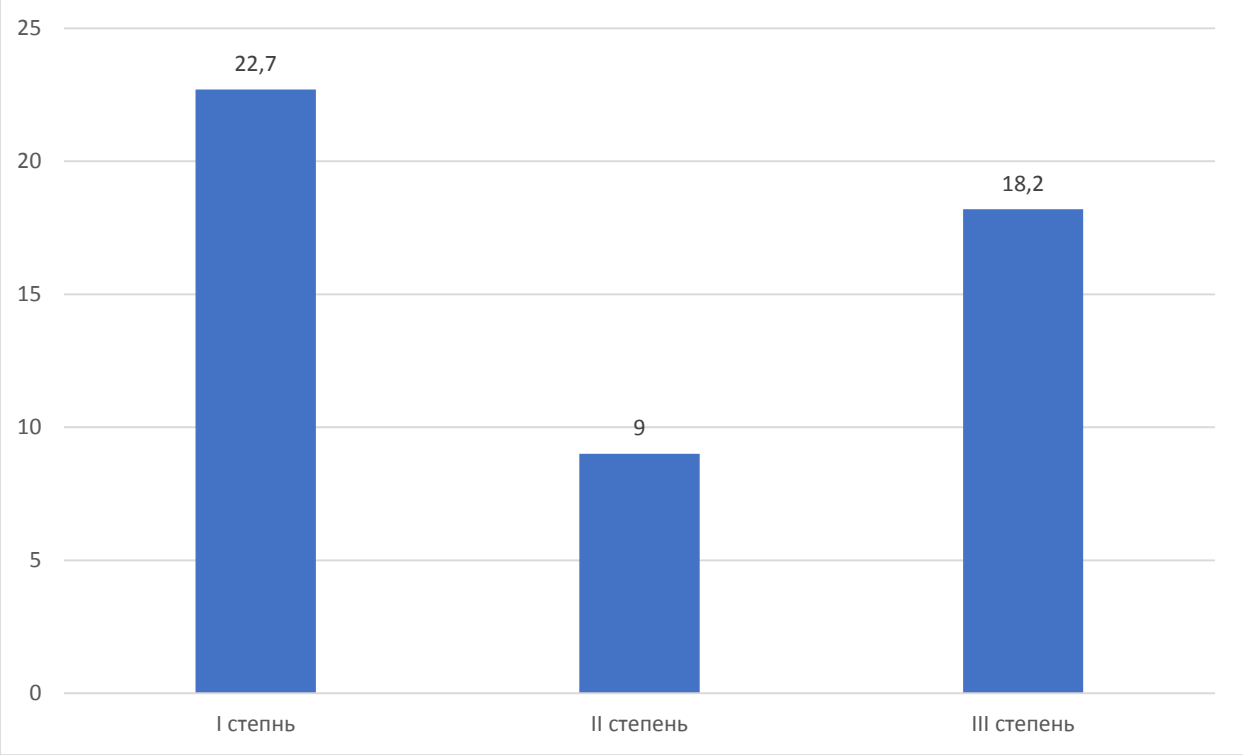


Fig. 3.6. Distribution of examined patients depending on the degree of goniodysgenesis

When performing A-scanning, the indicators of PZO in children in 13 eyes amounted to 26.50±1.3 mm and significantly exceeded the age norm (23.18±0.2 mm); in 51 eyes, the indicators of PZO were significantly close to those of the age norm; at the age of over 12 years, the PZO parameters in 10 eyes were 24.56±2.7 mm, which was significantly higher than the age norm (23.55±0.3 mm).

All patients diagnosed with suspected PVH underwent pachymetry to determine the CTR (normal values ranging from 538±40 to 548±40 μm). Pachymetry data: in the eyes was 539±2.5 μm (normal), in 27 eyes 653±3.3 (thick cornea), 495±2.5 μm (thin) in 9 eyes.

The data of the results of the study of a comparative analysis of the morphometric parameters of the ONH in the children examined by us with a diagnosis of suspected PVH are presented in Table 3.1.

Table 3.1

Comparative analysis of the morphometric parameters of the optic disc

Morphometric parameter	Children		Normal indicators (according to O.V. Fenkova)
	parameters	Number of eyes	
OD size (Disc area) mm2	2,18± 0,18 2,64±1,2*	22 (76%) 7 (24%)	2,34±0,27
cup volume mm2	0,18±1,8 0,45±0,22*	24 (83%) 5 (17%)	0,17±0,11
area of the neuroretinal rim (Rim volume) mm2	1,71±0,21 1,32±1,2*	21 (72%) 8 (28%)	1,87±0,15
ratio of the excavation area to the ONH (cup/disc area)	0,59±0,28* 0,31±1,22	7 (24%) 22 (76%)	0,27±0,16
RNFL thickness (Mean RNFL thickness temporal, µm)	101±8,5 69,5±8,1*	21 (72%) 8 (28%)	114,50±6,11

Note: * - reliability of data to the indicators of the control group (P <0,05).

In patients in 23 eyes P averaged 236±1.3, in 51 eyes the average was within 175±3.5.

In 26 children (52 eyes), the diagnosis of primary congenital glaucoma was not confirmed. In these children, the RRP was uniform over the entire circumference, the shape of the RRP was associated with the diameter of the retinal arterioles, which are significantly wider in the lower temporal segment than in the upper temporal segment. In addition, all segments corresponded to the morphological features of a cribriform plate with large pores and a relatively smaller amount of intermediate connective tissue in the lower and upper quadrants compared to the temporal and nasal sectors.

Thus, the main criteria for the diagnosis of primary congenital glaucoma in children diagnosed with suspected primary congenital glaucoma are indicators of

daily tonometry and indicators of eye hydrodynamics, the state of the angle of the anterior chamber (narrow or closed) and the fundus (the ratio of the area of the neuroretinal rim to the area of excavation) .

Based on all studies, the diagnosis of primary congenital glaucoma was confirmed in 11 children (30%).

Our thorough analysis of the study of the clinical and functional state and the use of an algorithm for diagnosing children with suspected primary congenital glaucoma and with the initial stages of primary congenital glaucoma should include, in addition to standard ophthalmological methods, mandatory OCT to determine the morphometric parameters of the ONH, pachymetry to determine the CTR and subsequent determination tension of the membranes of the eye.

Of all 37 children (74 eyes) examined by us with a diagnosis of suspected PVH, this pathology was not confirmed in 70% of patients (26 children).

To determine the effectiveness of the proposed mandatory diagnostic methods, the examined children first underwent only standard research methods (control group), then standard + additional research methods (main group), which showed that the use of optical coherence tomography of the optic disc and retina, pachymetry, in the early diagnosis of primary open-angle glaucoma allows diagnosing the initial stage of pathology in 74% of patients, which, in general, increases the efficiency of diagnosing congenital glaucoma and reduces the number of bed days in the hospital by 2.3 times (Fig. 3.7).

When using the proposed algorithm, the time spent by an ophthalmologist in interpreting all the obtained clinical, instrumental and laboratory results is reduced.

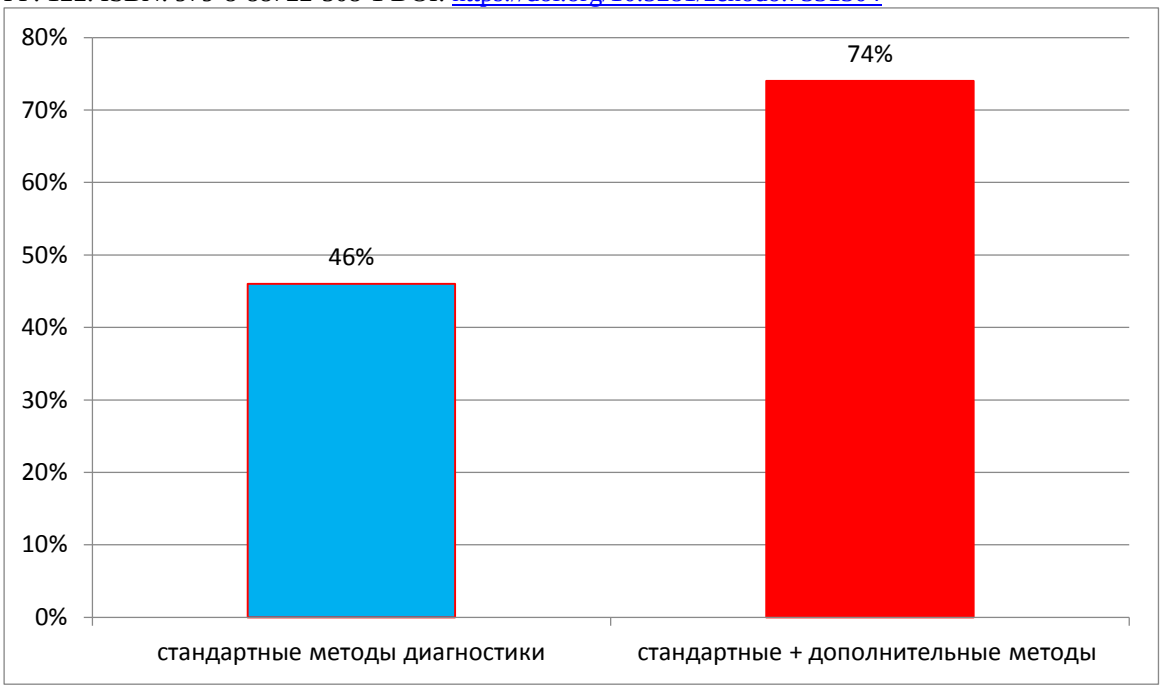


Fig. 3.7 Percentage of detection of primary congenital glaucoma in children using standard and standard + proposed diagnostic methods

Assessment of sensitivity and specificity of traditional methods and diagnostic methods with the inclusion of an algorithm is presented in Table 3.2.

The algorithm for diagnosing children with suspected primary congenital glaucoma and with the initial stages of primary congenital glaucoma should include, in addition to standard ophthalmological methods, an obligatory OCT study to determine the morphometric parameters of the ONH, pachymetry to determine the CTR and subsequent determination of the tension of the membranes of the eye.

Table 3.2

Informativeness of the application of the diagnostic method in case of suspected PVG

Diagnostic methods	1 group	2 group
Sensitivity	80%	90%
Specificity	70%	90%
Accuracy	80%	80%

Positive predictive value (+VP, positivepredictivevalue),	70%	90%
Negative predictive value (-VP, negative predictive value)	80%	80%
Average	76%	86%

Thus, when applying the proposed algorithm, in 74% of cases, it was possible to start adequate early treatment, which contributed to the achievement of the desired results in the treatment of this pathology, and, taking into account the social significance, to improve the quality of life of children.

Evaluation of the economic efficiency of the proposed algorithm.

The use of the proposed algorithm has a significant impact on cost savings for the state.

The definition of economic efficiency (Eust) is as follows:

1. First, we determine the cost of traditional diagnostics ($S_{скл}$):

$$S_{скл}=A_б*(T_м+Z_{зп})=50*(78\ 000+12000)=4\ 500\ 000 \text{ сум}$$

$$T_м= B_O*C_O+M_T=(B_1*C_1+ B_2*C_2 +B_3*C_3) +M_T=78000 \text{ сум}$$

D_J - Quantity by type of consumables used for clinical diagnosis of one patient (J = 1,2,.....,N);

C_J - Cost by type of consumables used for clinical diagnosis of one patient;

$T_м$ – The cost of complex clinical diagnosis of one patient.

$Z_{зп}$ - The cost of paying a specialist to process the results of diagnosis:

$$Z_{зп} = Z_{вро} + Z_{зпсм}= 9000+3000=12000 \text{ сум}$$

$Z_{вро}$ – salary of an ophthalmologist per unit of time;

$Z_{зпсм}$ - medical staff salary;

2. Now we determine the cost of diagnostics:

$$S_{прд}=A_б*T_м=50*78\ 000=3\ 900\ 000 \text{ soum}$$

In this case, the economic effect (E_{prog}) due to the application of the diagnostic algorithm proposed by us is determined:

$$Э_{прог} = S_{скл} - S_{прд}=4\ 500\ 000 - 3\ 900\ 000 \text{ сум} = \mathbf{600\ 000} \text{ сум}$$

Thus, the overall economic efficiency from the introduction of the proposed algorithm is **600,000** soums per patient, for our study - **10,200,000**.

Based on the foregoing, it can be concluded that the proposed algorithm for diagnosing children with suspected congenital glaucoma is effective, and its implementation in practice is expedient.

Conclusions on Chapter III

In preparation for surgical treatment, all 448 children with a diagnosis of PVH and suspicion of PVH underwent generally accepted standard diagnostic methods, and of these, 32 (7.2%) children had a contraindication to anesthesia due to their somatic status, 37 (8.2%) children had doubtful diagnosis, in connection with which the diagnosis of suspicion of PVG was made.

Children with changes in somatic status were sent home for treatment at their place of residence. Naturally, they are advised to take eye drops to lower IOP and receive appropriate treatment from an allied health professional. The remaining 390 children (87%) underwent examination and AGO under anesthesia. In connection with the correct preparation for anesthesia of children with PVH and suspicion of PVH, not a single lethal outcome was observed for the period 2016 to 2020. The frequency of refractory glaucoma is 32.1% of the total number of operated patients (390 patients).

The main criteria for the diagnosis of primary congenital glaucoma in children diagnosed with suspected primary congenital glaucoma are daily tonometry and eye hydrodynamic indicators, the state of the anterior chamber angle (narrow or closed) and the fundus (the ratio of the area of the neuroretinal

rim to the area of excavation). Based on all studies, the diagnosis of primary congenital glaucoma was confirmed in 11 children (30%).

Our thorough analysis of the study of the clinical and functional status and the use of an algorithm for diagnosing children with suspected primary congenital glaucoma and with the initial stages of primary congenital glaucoma should include, in addition to standard ophthalmological methods, mandatory OCT to determine the morphometric parameters of the ONH, pachymetry to determine the CTR and subsequent determination tension of the membranes of the eye.

Thus, in a retrospective study, it was found that refractory glaucoma occurred in 32.11% of cases after traditional operations, was characterized by a lack of stabilization of the glaucoma process, which was manifested by an increase in the diameter of the cornea, the posterior eye of the eye, tonometric and tonographic parameters and a deterioration in the clinical and functional parameters of the organ of vision.

CONCLUSION

Glaucoma is one of the most severe forms of ophthalmopathology, occupying a leading position among the causes of blindness and low vision [73, 126]. Congenital eye pathology remains to this day the main cause of blindness and low vision in children, while congenital glaucoma (CH) reaches 10%, causing 4.4% of cases of blindness and 2.2% of low vision.

VH is characterized by a wide variety of clinical symptoms, the complexity of pathogenesis and the severity of outcomes. The modern classifications of VG used are based on structural and anatomical changes in the eyes due to high intraocular pressure (IOP) and do not cover visual functions depending on the age of children and the form of pathology.

Signs of PVH disease in 60% of children can be detected already in the first 6 months of their life, in 80% - in the first year of life [188]. When examining newborns in maternity hospitals, in 90% of them the disease can be diagnosed with early signs.

A carefully collected history, correct and in-depth early diagnosis in PVH reduces the risk of early disability by 34%. When conducting a complete examination of infants and children under 3 years of age, it is usually performed in the operating room, under the influence of sedative drugs. The check includes:

Examination of the anterior segment of the eye: to assess the condition of the cornea and angle and, in accordance with this, the choice of the appropriate method of surgical intervention for each individual case of congenital glaucoma.

Fundus examination: after dilating the pupils with special eye drops, the ophthalmologist, using a special magnifying glass, examines the retina and optic nerve for damage. In glaucoma, the optic nerve loses its fibers, leaving a void (notch) that increases as the disease progresses. Measurement of the corneal diameter in children with PVH is one of the important indicators for diagnosis and further dynamic monitoring of the progression of this pathology. Especially children with PVH after surgery for PVH, who are far from medical institutions,

including Republican clinics, often cannot visit these medical centers every month for dynamic monitoring of indicators in this pathology. Parents often complain about an increase in the cornea and eyeball, but these are subjective data.

However, surgical treatment in children is significantly less effective than in adult patients and ranges from 92.3% in the early postoperative period to 46% in follow-up [24, 39, 45].

This work is devoted to the development and evaluation of the effectiveness of surgical treatment of refractory glaucoma using biodegradable Glautex drainage.

Based on the foregoing, the purpose of this study was to substantiate the pathogenetic criteria for the development of refractory glaucoma in children on the basis of molecular genetic and immunological studies and to optimize the methods of surgical treatment.

At the first stage, a retrospective and prospective analysis of 5367 patients admitted to the eye department of the TashPMI clinic.

The exclusion criteria from the study were children with secondary glaucoma, with syndromic pathology, as well as with concomitant diseases of the organ of vision.

Among 478 children with primary congenital glaucoma (PVG), according to the selection criteria, 448 children with primary congenital glaucoma (PVG) were selected. Surgical treatment was done in 390 patients, among which 265 children were initially operated and 125 children were re-operated, these children were diagnosed with refractory glaucoma.

At the 2nd stage of the study, we conducted a prospective study including the study of the immunogenetic role of TNFα-308G/A, IL-10 C-819T and G-1082A cytokine gene polymorphisms in the development of refractory glaucoma. Also at this stage, the effectiveness of the use of special "glasses" for measuring the cornea of the eye in diameter was evaluated in comparison with traditional methods, such as measurements using a regular school ruler and a surgical compass.

The 3rd stage of the study consisted in evaluating the effectiveness of surgical treatment of children with refractory glaucoma using biodegradable Glautex drainage (21 children) in a comparative aspect with traditional AGO (44 children).

The study of the multiplicity of AGO showed that patients operated on 2 or more times, that is, patients with WG, accounted for 32%. The distribution of children depending on the stage of the disease showed that the largest percentage of children with WG were children with terminal and advanced stages. And in the group of primary operated patients, there is a far-reaching and advanced stage.

All patients underwent biomicroscopy, which showed that patients with RG are admitted with severe keratopathy and degenerative changes in the cornea.

The results of the study of tonometric and tonographic parameters in the studied groups showed that patients with HR have significantly higher rates of both true and tonometric IOP compared with initially operated patients.

An analysis of the PZO parameters in the studied groups compared with the age norm showed that in patients with RG, the PZO indicators exceeded the age norm by an average of 4.6 mm, while in those initially operated on, it exceeded the average by 3.3 mm.

In 47% of sick children with WG, PZO values of more than 5.0 mm (4.5±0.02 mm) are noted, while in primary operated PVH, only 18% ($P<0.05$).

In patients with WG in 50% of cases (every fifth child), the need for repeated surgical intervention develops 12-24 months after the primary surgical intervention, the smallest percentage occurs in the first 12 months (12.8%) after the primary AGO.

Thus, in a retrospective study, it was found that refractory glaucoma occurred in 32.11% of cases after traditional operations, was characterized by a lack of stabilization of the glaucoma process, which was manifested by an increase in the diameter of the cornea, anterior eye area, tonometric and tonographic parameters and a deterioration in the clinical and functional parameters of the organ of vision.

In the course of the study, a method of special "glasses" was developed to measure the diameter of the cornea. This method was used in the dynamic observation of children with PVH, it is a simple, fast, reliable and non-traumatic method. The resulting technical result has a sufficient degree of accuracy.

All patients were measured the diameter of the cornea using three methods and obtained the following results. In order to study the reliability of the data obtained by us, a comparative analysis of these methods was carried out. The measurement was carried out on 65 patients (130 eyes) diagnosed with WG.

The indicators obtained by measuring the diameter of the cornea with a compass were taken as the basis by us as the most objective method of remote measurement of the diameter of the cornea. The mean value was 12.48±0.97 mm. The table shows that when comparing the indicators obtained using a compass and a ruler (12.48±0.97 and 12.74±1.0, respectively), the difference in the average values did not differ statistically (t= 4.3 p≤0.05 "critical value: 2.02"). When comparing the indicators obtained using a compass and glasses (12.48±0.97 and 12.38±0.98, respectively), the difference in the average values was not significant (t=1.4 p>0.05 "critical value: 2 .02").

This confirms that no difference was found in the indicators obtained when measuring with compasses and glasses, which says the method of measuring the diameter of the cornea using special "glasses" is quite accurate, convenient and can be used in pediatric practice for all eye pathologies accompanied by a change in diameter. cornea.

Measuring the diameter of the cornea with the help of special "glasses" contributes to the early diagnosis of pathological deviations of the cornea in diameter, which is very important in the dynamic monitoring of children with RG. The sensitivity and specificity of this method was 90.5% and 85.7%, respectively.

The study of the diameter of the cornea in the examined patients showed that in patients with RG the average size of the cornea was 14.5±0.5 mm. While in the group of primary operated patients, the diameter of the cornea varied within 13.0 ±

0.4 mm. Corneal diameter over 15.0 mm was registered in 47% of sick children with WG and in 14% of children with PVH, which is significant (P<0.05).

Thus, the special “glasses” proposed by us for measuring the diameter of the cornea provide reliably accurate indicators, are safe and convenient for use in pediatric ophthalmology. And also, they make it possible to dynamically monitor the progression of the process and archive the data obtained.

BIBLIOGRAPHY

1. Абдуразакова Л.А., Ковалевская И.С., Рудницкая Я.Л. Применение Ксалатана при врожденной глаукоме. Материалы научной конференции «Современные проблемы детской офтальмологии» 7-8 октября. М. –2005. – С. 59.

2. Аванесова Т.А., Гурьева Н.В., Жаворонков С.А. и др. Опыт применения дренажей Ahmed в хирургическом лечении рефрактерной глаукомы. РМЖ. Клиническая офтальмология. 2010. № 2. С. 55–58

3. Аветисов С.Э., Бубнова И.А., Антонов А.А. Биомеханические свойства роговицы: клиническое значение, методы исследования, возможности систематизации подходов к изучению. Вестник офтальмологии-2010.-Том 126. .6: 3-7.

4. Аветисов С.Э., Бубнова И.А., Антонов А.А. Ещё один раз о диагностических возможностях эластотонометрии. Вестник офтальмологии – 2008.Том 124.–№5.–С. 19-22.

5. Аветисов С.Э., Бубнова И.А., Антонов А.А. Клинико-экспериментальные аспекты изучения биомеханических свойств фиброзной оболочки глаза. Вестник офтальмологии–2013.–№5.–С 82-89.

6. Аветисов С.Э., Киселева Т.Н., Харлап С.И., Кравчук Е.А. Ультразвуковые методы исследования в диагностике окклюзионных поражений сосудов. Сборник "Лучевая диагностика и лучевая терапия в клинической медицине". М -2004: 26-27.

7. Аветисов С.Э., Мамиконян В.Р. Казарян Э.Э., Шмелева-Демир О.А. и др. Результаты клинической оценки нового скринингового метода определения индивидуальной нормы внутриглазного давления. Вестник офтальмологии-2010.2: 5-8.

8. Аветисов С.Э., Мамиконян В.Р., Казарян Э.Э., Шмелева-Демир О.А. и др. Новый скрининговый метод определения толерантного внутриглазного давления. Вестник офтальмологии-2009. 5: 3-7.

9. Азнабаев Б.М. Отдаленные результаты эндоскопической циклолазеркоагуляции / Азнабаев Б.М., Кригер Г.С., Кидралеева С.Р. // Съезд офтальмологов России, 7-ой: Тез. докл. М., 2000,- 4.1.- С.93.

10. Азовский А.С. Фитулизирующие операции с использованием аллодренажей при вторичной посттравматической глаукоме / Азовский А.С., Марков Е.Н. // Съезд офтальмологов России, 7-ой: Тез. докл. М., 2000,- Ч.1.- С.93-94.

11. Акопян А И, Еричев В П, Иомдина Е Н. Ценность биомеханических параметров глаза в трактовке развития глаукомы, миопии и сочетанной патологии. Глаукома- 2008 - № 1 - С 9-14.

12. Акопян А И, Еричев В П, Тарутта Е П, Маркосян Г А Стереометрические параметры диска зрительного нерва в ранней диагностике глаукомы в миопических глазах. В кн «Актуальные проблемы офтальмологии» -Матер 8-й науч-практ Конф - М, 2005 -С 6-9

13. Акопян А И, Маркосян Г А, Еричев В П , Тарутта Е П Параметры диска зрительного нерва при миопии и глаукоме . Актуальные проблемы офтальмологии - Матер 1-й науч-практ. Конф Офтальмологов Южного Федерального округа - Ростов-на-Дону, 2005 -С 65-73

14. Акопян А И, Маркосян Г А, Еричев В П, Тарутта Е П Особенности зрительного нерва при глаукоме и миопии. Глаукома - 2005. 4 - С 57-62.

15. Ал Немер Д.М. Результаты комбинированной дренажной хирургии рефрактерных глауком. Медицинский вестник Башкортостана - 2014.-Т. 9. №2:28-30.

16. Алексеев В.Н. Осложнения и причины неуспеха антиглаукоматозных операций: Дис. … д-ра.мед.наук.–Л.,1986.–341с.

17. Алексеев В.Н., Левко М.А., Хамед С.М., Ессам Т. Хирургическое лечение рефрактерной глаукомы // Офтальмологические ведомости. – 2011. – Т. 4, № 3. – С. 65-69

18. Алексеев В.Н., Лобова Т.Г. К вопросу о методах определения давления цели . Глаукома: проблемы и решения: Сб. науч. ст. М., –2004. –С. 19-21.

19. Алексеев В.Н., Мартынова Е.Б. и др. Значение митохондриальной патологии в медицине и в офтальмологии (обзор) .Российская глаукомная школа. Конференция «Глаукома: теория и практика», сб. науч. трудов. Санкт-Петербург. –2011.–С.5-11.

20. Алексеев В.Н., Мартынова Е.Б., Николаева Е.Б., Газазова И.Р. К вопросу об оценке микроциркуляции глаза при первичной открытоугольной глаукоме . Глаукома–2011.–№4.–С.11-13.

21. Амирова Ф.С. Патогенез и патогенетически направленное лечение вторичной глаукомы при тяжелых воспалительных заболеваниях роговицы / Амирова Ф.С., Хасанова Н.Х. // Съезд офтальмологов России, 7-ой: Тез. докл. М., 2000.- 4.1 -С.94.

22. Андреева М.Г., Латфуллин И.А., Аскарова А.Н., Мухамадиева Р.Г. Влияние генотипа на выбор терапии при артериальной гипертонии // Врач. 2002. № 9. С. 27–28.

23. Анисимова С.Ю. Новые подходы к амбулаторному хирургическому лечению открытоугольной глаукомы и сочетания ее с катарактой // Автореф.дис. . докт.мед.наук. М., 2006 - 56 с.

24. Арестов Д.О. Ультразвуковая трабекулэктомия в хирургическом лечении врожденной глаукомы у детей .Дисс. …канд. мед.наук. Москва. – 2014.–С. 10-16.

25. Арутюнян Л.Л., Еричев В.П., Филиппова ОМ, Акопян А И Вязко-эластические свойства роговицы при первичной открытоугольной глаукоме . Глаукома - 2007 - № 2 - С 14-19

26. Арутюнян Л.Л. Роль вязко-эластических свойств глаза в определения цели и оценке развития глаукоматозного процесса . Автореф. дис. …к . мед. наук. Москва. –2009. –С. 20-26.

27. Арутюнян Н.А. Реактивная гипертензия после факоэмульсификации катаракты и методы ее лечения //Автореф.дис. . канд.мед.наук.-М., 2006.- С.-3-5.

28. Асланова В.С. Врожденные аномалии зрительного нерва и отслойка сетчатки. . X Всероссийская научно-практическая конференция с международ- ным участием «Федоровские чтения—2012». — М., 2012. — С. 89

29. Астахов С.Ю. Хирургия рефрактерной глаукомы: что мы можем предложить? /Астахов С.Ю., Астахов Ю.С., Брезель Ю.А. // Глаукома: теории, тенденции, технологии *HRT КЛУБ РОССИЯ 2006: международная конференция, 4-ая: Сб.науч ст. - М,, 2006. - С. 24-29.

30. Астахов Ю. С., Рахманов В. В. Наследственность и глаукома. Офтальмологические ведомости.2012. 4 (5): 51-56.

31. Аубакирова А.Ж. Циклокриопексия в лечении глаукомы детского возраста / Аубакирова А.Ж., Тарасенко Т.В., Кенжебаева К.С., Тлеубае Н.Т. // Всероссийская школа офтальмолога, 3-я:- Сб. научн.тр.- М., 2004. С.52-55.

32. Аубакирова А.Ж., Утельбаева З.Т., Бердишева А.А. и соавт. Лечение врожденной глаукомы с помощью дренажной хирургии . Офтальмология.Вестник КазНМУ,–2015.–№1.–С.63-64.

33. Бабушкин А.Э. Оптимизация гипотензивного эффекта трабекулэктомии при открытоугольной глаукоме//Дис. . канд.мед.наук. М., 1988,- 156 с.

34. Багров С.Н. Экспериментальное обоснование применения сополимера коллагена в хирургическом лечении глаукомы / Багров С.Н., Могилевцев В.В., Перова Н.В., Маклакова И.А. // Офтальмохирургия. -2001. № 3. -С.- 24-29.

35. Бакшинский П.П., Шашминова А.М., Дроздова Г.А. Глазная гемо-и микрогемодинамика у больных первичной открытоугольной глаукомой с нормализованным офтальмотонусом. Российский офтальмологический журнал–2009.–№2.–С.9-17.

36. Балалин С.В., Фокин В.П. О толерантном и целевом внутриглазном давлении при первичной открытоугольной глаукоме. Клиническая офтальмология -2008.-Т.9. .4:117-119.

37. Балашевич Л.И., Качанов А.Б., Никулин С.А., Головатенко С.П., с соавт. Влияние толщины роговицы на пневмотонометрические показатели внутриглазного давления . Офтальмохирургия–2005.–№1.–С. 31-33.

38. Басинский С.Н., Красноярская В.Н., Басинский А.С. Методы введения лекарственных препаратов к заднему отрезку глаза . Клиническая офтальмология–2008.Т.9.–№2.–С. 68-70.

39. Батманов Ю.Е., Евграфов, Гулиев Ф.В. . Проблемы современной хирургии глаукомы. Вестник офтальмологии –2008. –№4. –С. 53-55.

40. Бахритдинова Ф.А., Билалов Б.Э., Миррахимова С.Ш. Эффективность модифицированной антиглаукоматозной операции с аутодренированием зоны фильтрации при терминальной глаукоме с болевым синдромом . XI Российский общенациональный офтальмологический форм: Сб.науч.трудов –Москва ,–2018–С. 291-292.

41. Бахритдинова Ф.А., Набиев А.М. Исследование токсичности камерной влаги больных первичной закрытоугольной глаукомой . III Всероссийская школа офтальмолога: сб. науч. тр. –М. –2004. –С. 57-61.

42. Бениова С.Н., Маркелова Е.В. Иммунопатогенетические аспекты псевдотуберкулеза у детей // Медицинская иммунология. 2003. Т. 5, № 1–2. С. 49–56.

43. Бикбов М.М., Хуснитдинов И.И. Послеоперационные осложнения имплантации клапана Ahmed. Клиническая Офтальмология. 2016; 2:103-107.

44. Бикбов М.М., А.Э. Бабушкин, О.И. Оренбуркина, Р.Р. Хисматуллин, И.И. Хуснитдинов, О.В. Чайка. Наш опыт применения дренажа «GLAUTEX» в хирургии глаукомы. Конференция глаукома: теория и практика. Российская школа офтальмолога – Москва, –2013.–С.175-176.

45. Бикбов М.М., Оренбуркина О.И., Абсалямов М.Ш., Хуснитдинов И.И. с соавт. Наш опыт применения шунта EX-PRESS в хирургии глаукомы . Сб. науч. трудов XI Всероссийская школа офтальмолога – Москва.–2012.–С.37-39.

46. Бикбов М.М., Суркова В.К., Хуснитдинов И.И. и др. Результаты применения дренажа Ahmed при рефрактерной глаукоме . РМЖ. Клиническая офтальмология. 2013. № 3. С. 98–101

47. Бикмаева А.Р., Сибиряк С.В., Валиахметова Д.Х., Хуснутдинова Е.К. Полиморфизм гена фактора некроза опухолей альфа у больных инфильтративным туберкулезом легких в Башкирии // Молекулярная биология. 2002. Т. 36, № 5. С. 784–787.

48. Боброва Н. Ф., Т. А. Сорочинская, Н. Б. Кузьмина. Способ хирургического лечения врождённой глаукомы с использованием жидкого импланта. Кубанский научный медицинский вестник.2011. 1 (124), 10-13.

49. Бойко Э.В., Позняк А.Л., Якушев Д.Ю., Сидорчук С.Н. и др. Хроническая инфекция как один из возможных факторов риска развития открытоугольной глаукомы // Журнал инфектологии. 2011. № 1. С. 14–19.

50. Борзунов О.И., Коротких С.А. Патогенетическое комбинированное лечение первичной открытоугольной глаукомы . Сб. науч. трудов XI Всероссийская школа офтальмолога – Москва, –2012.–С.40-41.

51. Братко О.В. Клиническая оценка биомеханических особенностей фиброзной оболочки глаза у больных глаукомой в сочетании с миопической рефракцией. Автореф. дисс. …канд. мед.наук. Самара. –2010. –С. 21-26.

52. Будчанов Ю.И. Генетика бронхиальной астмы // Практическая медицина. 2010. Т. 6, № 45. С. 19–21.

53. Бузркуков Б.Т., Левченко О.Г., Хамроева Ю.А. Первичная глаукома (современные аспекты этиопатогенеза, клиники, диагностики и лечения) “ILM ZIYO”, 2015 С. 65-78.

54. Бузруков Б.Т., Хамроева Ю.А. Хирургическое лечение врожденной глаукомы путем создания трех путей оттока внутриглазной жидкости в комбинации с аутосклеральным дренажом. Глаукома. 2012; 4:60-64.

55. Бузруков Б.Т. Клинико-генеалогическое исследование первичной глаукомы в узбекской популяции . Неврология. – М.– 2006. –№4. – С. 48-50.

56. Бунин А.Я., Яковлев А.А. К проблеме патогенеза и лечения разновидностей первичной открытоугольной глаукомы. Глаукома. –2003. –№3. –С.3-5.

57. Висонг, Торонто. Проблемы лечения глаукомы у детей . Новое в офтальмол. –2007. –№2. –С. 50-52.

58. Волик С.А. Эффективность комбинированного хирургического лечения катаракты и глаукомы у пациентов с псевдоэксфолиативным синдромом. . Сборник научных статей. Глаукома: современные подходы к диагностике и лечению– г. Краснодар, –2015.–С.640-643.

59. Волков В.В., Глаукома при псевдонормальном давлении., Рук-во для врачей., М.: Медицина.-2001; 25-28.

60. Газизова И.Р. Митохондриальная патология и глаукома . Глаукома – 2011–№4.–С.58-64.

61. Гамзаев М.Г., О.Н. Зубань. Хирургическое лечение вторичной глаукомы при активном туберкулёзном увеите (клинический случай). Офтальмохирургия-2013.2:50-52.

62. Гареев Е. М., Артамонова Е. А., Юнусов Б. Р.3. Локальные модификации пространства состояний зрительной системы . Сенсорные системы. — 2002. — Т. 16, № 3. — С. 202–210

63. Гасанова Н. А. Распространенность и методы лечения врожденной глаукомы (обзор литературы). Вісник проблем біології і медицини. 2013. 2(101); 16-19.

64. Гвоздюк Н А, Катаргина ЛА , Денисова Е В, Акопян А И Роль инструментальной диагностики в оценке глаукомного процесса при эндогенных увеитах у детей . Сборник тезисов Всероссийской научной конференции молодых ученых «Актуальные проблемы офтальмологии» - М, 2006 - стр 420

65. Говард Ларкин, Чикаго. Диагностика прогрессирования глаукомного процесса: клинические симптомы или анализ изображений . Новое в офтальмологии –2009.–№1. –С.38.

66. Говард Ларкин, Чикаго. Результаты имплантации антиглаукомных дренажей различного дизайна и принципа действия . Новое в офтальмологии –2009.–№1. –С. 33-36.

67. Губаренкова В.С. Аллодренирование как способ активации супрахориоидального пространства при рефракторной глаукоме . Автореф. дисс. …канд. мед.наук. Москва.–2009.–С. 20-25.

68. Гусаревич О.Г., Фурсова А.Ж., Фенькова О.Г. Центральная толщина роговицы при врожденной глаукоме, подозрении на глаукому . Сборник научных трудов научно-практической конференции с международным участием, посвященной 110-летнему юбилею МНИИ ГБ им. Гельмгольца. - Москва, 2010. - Том 2. - С. 267-273.

69. Джаббарова А.Н., Ефимик М.В. Генетические аспекты глаукомы. Вестник совета молодых учёных и специалистов Челябинской области. 2017. №4 (19) Т. 3. 39-41.

70. Должич Г.И., Нестерова Е.Е. Клинико-анатомическая классификация иридоциллиарной зон глаза у здоровых лиц .Вестник офтальмологии–2009.–№5.–С. 18-21.

71. Дронов М.М., Коровенков Р.И., Алексанин С.С. Медицинская, социальная и экономическая значимость заболевания с названием глаукома. Медико-биологические и социально-психологические проблемы безопасности в чрезвычайных ситуациях. 2011. № 1. С. 42-49.

72. Евстигнеева Ю.В. Коллагенодренирование в хирургии рефракторной глаукомы . Вестник офтальмологии, –2011.–№1–С. 36-38.

73. Егоров В.В., Сорокин Е.Л., Марченко А.Н., Бачалдин И.Л. Эффективность применения транссклеральной диодлазеркоагуляции цилиарного тела в лечении терминальной болящей глаукомы . Глаукома.— 2009.— № 2.— С. 33-36.

74. Егоров Е.А., Астахов Ю.С., Щуко А.Г. Национальное руководство по глаукоме // М.:ГЭОТАР-Медиа, -2008. 125-138.

75. Еременко А.И., Стеблюк А.Н. Оперированная некомпенсированная глаукома . Российский офтальмологический журнал–2011.–№2.–С.14-19.

76. Еремина М.В., Киселева О.А., Якубова Л.В. Влияние биомеханических показателей роговицы на результаты измерения внутриглазного давления аппланационными методами при первичной открытоугольной глаукоме . Российский офтальмологический журнал–2009.–№4.–С.4-7.

77. Еричев В П, Акопян А И Корреляционные взаимоотношения основных параметров головки зрительного нерва у больных глаукомой и миопией . Вестник Смоленской Медицинской академии - 2005 - № 2 -С 64-67

78. Еричев В.П. Качество жизни больного глаукомой право выбора / В.П. Еричев, Дж.Н. Ловпаче . «Глаукома: проблемы и решения»: сб. науч. ст. -2004: 403-406.

79. Еричев В.П., Бессмертный А.М., Червяков А.Ю. Полностью фистулизирующая операция, как способ повышения эффективности хирургического лечения рефрактерной глаукомы . Клинич. Офтальмология – 2002.–№ 2.–С. 59-60.

80. Еричев В.П., БессмертныйА.М., Робустова О.В. Хирургическая профилактика склеро-склеральных сращений у больных рефрактерной глаукомой . Актуальные проблемы офтальмологии: Сб. науч. тр. –М.–2003. – С. 214-215.

81. Еричев В.П., Ганковская Л.В., Ковальчук Л.В. Интерлейкин-17 и его возможное участие в репаративных процессах при глаукоме // Глаукома. 2009. № 1. С. 23–26.

82. Еричев В.П., и др. Новая фиксированная комбинированная форма для гипотензивной терапии глаукомы . Глаукома–2011.–№4.–С.22-27.

83. Еричев В.П., Слепова О.С., Ловпаче Дж.Н. Цитокиновый скрининг при первичной открытоугольной и вторичной постувеальной глаукоме как иммунологическое прогнозирование избыточного рубцевания после антиглаукоматозных операций // Глаукома. 2001. № 1. С. 11–15

84. Еричев В.П., Петров С.Ю., Суббот А.М. и др. Роль цитокинов в патогенезе глазных болезней// Национальный журнал глаукома - 2017, Т. 16, № 1, стр. 85-99

85. Ермолаев А.П. Механизм возникновения гипертензионного болевого синдрома . Вестник офтальмологии–2011.–№3.–С.12-16.

86. Загидуллина А.Ш. О фенотипах первичной глаукомы. Медицинский вестник Башкортостана. – 2015. – №2, Т. 10. – С. 162-165.

87. Зайдуллин И.С. Исследование ригидности склеры в здоровых и глаукомных глазах . Автореф. дисс. …канд. мед.наук. Санкт-Петербург. – 2009.–С. 6-7.

88. Зубарева Л.Н., Овчинникова А.В., Зелянина Е.В. Применение Цитостатика митомицина С в хирургии рефракторной глаукомы у детей . М.– 2005.–С.16.

89. Иванов Д.И., Никулин М.Е. Трабекулотомия ab interno в комбинированной хирургии катаракты и глаукомы. Пути оптимизации. Национальный журнал глаукома. 2020;19(4):21-32

90. Иомдина Е.Н. Биомеханические свойства роговицы и склеры глаза . Современные методы диагностики и лечения заболеваний роговицы и склеры: Научно-практ. конф.: Материалы.–2007.Том. 2.–С. 271-279.

91. Кадымова Ф.Э. Дренаж из гидрогеля в лечении детей с врожденной глаукомой . Актуальные вопросы детской офтальмологии: материалы науч.- практич.конф.–М.–1997.–С. 70-71.

92. Казарян Э.Э. Современные мотоды мониторинга первичной открытоугольной глаукомы . Вестник офтальмологии. –2009.–№4.–С. 40-44.

93. Каменских Т.Г. и др. Эффективность комплексного лечения первичной открытоугольной глаукомы . Сборник научных трудов XI Всероссийская школа офтальмолога – Москва.–2012.–С.70-72.

94. Камилов Х.М., Акрамов А.А., Хаитов Ф.Н. Пути дальнейшего улучшения диспансеризации больных глаукомой с использованием ЭВМ . 6-й Всесоюзный съезд офтальмологов: Тез.докл.–М.1985.С.68.

95. Камилов Х.М., Мухамадиев Р.О., Сайдалиев У.Т., Аллаяров Т.Я. Применение аллопластических материалов в офтальмохирургии . «Журнал теоретической и клинической медицины».– Узбекистан.–2003.–№1.–С.46-48.

96. Камилов Х.М., Синева О.В., Раббимов М.Т. Прогнозирование зрительных функций при хирургическом лечении открытоугольной глаукомы . VIII-съезда офтальмологов УССР:Тез.докл.Одесса, 1990.С.361-362.

97. Катаргина Л А , Денисова Е В , Гвоздюк Н А , Акопян А И Функциональная и топографическая диагностика оптической нейропатии у детей с постувеальной глаукомой и гииертензией . «Актуальные вопросы нейроофтальмологии» Материалы 9 научно-практической нейроофтальмологической конференции - Москва.- 2007 - С 35

98. Катаргина Л А, Гвоздкж Н А, Акопян А И Опыт применения ретинального лазерного томографа в диагностике вторичной постувеальной глаукомы и гипертензии . Сборник статей IV Международной конференции «Глаукома теории, тенденции, технологии HRT Клуб России 2006» - М, 2006 - стр 144

99. Катаргина Л.А, Мазанова Е.В., Тарасенков А.О. и сооавт. Федеральные клинические рекомендации "Диагностика, медикаментозное и хирургическое лечение детей с врожденной глаукомой" // Российская педиатрическая офтальмология-2016.1: 33-51.

100. Катаргина Л.А. и др. Значение современных методов визуализации при аномалиях переднего сегмента глаза и врожденной глаукомы у детей . Российский офтальмологический журнал-2012.2:7-11.

101. Катаргина Л.А., Арестова Н.Н., Денисова Е.В., Ибейд Б.Н.А. ИАГ-лазерная рефистулизация внутренней фистулы после синустрабекулэктомии у детей с постувеальной глаукомой. Офтальмохирургия. 2019, 1: 57-61

102. Катаргина Л.А., Денисова Е.В., Ибейд Б.Н., Арестова Н.Н. Эффективность композитного дренажа у детей с постувеальной глаукомой. Национальный журнал глаукома. 2018;17(3):34-39.

103. Катаргина Л.А., и др. Эффективность трабекулэктомии с применением цитостатиков в лечении постувеальной глаукомы у детей . Офтальмохирургия –2002. –№3. –С. 37-40.

104. Катаргина Л.А., Мазанова Е.В., Плескова А.В., Денисова Е.В. Результаты применения дренажа ксенопласт в хирургии глаукомы у детей. Российская педиатрическая офтальмология. 2015; 1:18-21.

105. Катаргина Л.А., Мазанова Е.В., Плескова А.В., Тарасенков А.О. Результаты применения дренажа Глаутекс у детей с врождённой глаукомой// Сборник научных статей. Раздел 4. Врождённые и приобретённые заболевания глаз у детей. Москва-2015.- С.559-562.

106. Катаргина Л.А., Тарасенков А.О., Мазанова Е.В. К вопросу о классификации врожденной глаукомы по стадиям . Российская педиатрическая офтальмология.-2016.-11.4: 179-182.

107. Катаргина Л.А., Тарасенков А.О., Мазанова Е.В. Технология оценки зрительных функций у детей с врожденной глаукомой с целью прогнозирования и коррекция лечения . В кн. Медицинская технология. М.: МНИИГБ им. Гельмгольца; –2009.–С. 22-34.

108. Качан Н.А. Отдаленные результаты хирургического лечения врожденной глаукомы. . Российская педиатрическая офтальмологи–2011.–№1.–С.41-43.

109. Качан Н.А., Тойкулиев Т.К. Классификация врожденной глаукомы . Глаукома–2004.–№4.–С.46-47.

110. Качан Н.А., Тойкулиев Т.К. Хирургическое лечение врожденной глаукомы в раннем младенческом возрасте. 7-й съезд офтальмологов России: тез. докл. –М.–2000.–С.355.

111. Кетлинский С.А., Симбирцев А.С. Цитокины. С.-Пб. ООО Изд-во «Фолиант», 2008. 552 с.

112. Кирковский Л.В., Акалович С.Т., Чалый Ю.В., Кирковский В.В. Роль интерлейкина-8, дефензинов, фактора некроза опухоли и его рецепторов в процессе реализации воспаления. Медицинский журнал: научно-практический рецензируемый журнал. 2008; 3: 8-12.

113. Киселева О.А. и др. Роль оптической когерентной томографии переднего отдела глаза в контроле и коррекции послеоперационного периода у больных глаукомой . Российский офтальмологический журнал–2009.–№4.–С.15-19.

114. Киселева О.А., Филиппова О.М., Бессмертный А.М. Минишунт. Ex- PRESS – новые возможности микроинвазивной хирургии глаукомы . Российский офтальмологический журнал–2010.–№4.–С.19-24.

115. Комаровских Е.Н. Некоторые вопросы глаукомы . Сборник научных трудов. XI Всероссийская школа офтальмолога – Москва.–2012.–С.78-84.

116. Коновалова О.С. Критерии раннего выявления ювенильной глаукомы у детей с прогрессирующей миопией. Медицинская наука и образование урала.2010 11-4 (64): 67-69.

117. Корнилаева Г.Г. Хирургическая активизация переднего и заднего пути оттока при первичной глаукоме . Вестник офтальмологии –2000. –№1. –С.42-45.

118. Котляр К.Е., Кошиц И.Н. Ригидность глаза. Биомеханические и клинические аспекты . Научн. практ. конф. «Биомеханика глаза 2009» МНИИ ГБ им. Гельмгольца: Сб. тр.–М.–2009.–С. 121-126.

119. Кошиц И.Н., Светлова О.В., Засеева М.В., Макаров Ф.Н. Ригидность и эластичность фиброзной оболочки глаза. Биомеханические и клинические аспекты . Научн. практ. конф. «Биомеханика глаза 2009» МНИИ ГБ им. Гельмгольца: Сб. тр.–М.–2009.–С.126-133.

120. Кошиц И.Н., Светлова О.В., Котляр К.Е. и др. Биохимический анализ традиционных и современных представлений о патогенезе первичной открытоугольной глаукомы . Глаукома.–2005.–№1.–С. 41-62.

121. Краснов М.М. Материалы симпозиума по вопросам патогенеза первичной глаукомы. – М. – 1970. – С. 47–53.

122. Красюк Е. Ю., Носкова О. Г., Акулов С. И., Стрельникова Н. В. Опыт применения биодеградируемого дренажа в комбинации с традиционной синустрабекулэктомией. Саратовский научно-медицинский журнал 2018; 14 (4): 633–638.

123. Крячко Н.С., Пурескин Н.П., Мигаль С.Ф., Мигаль Д.С. Результаты применения шунта Ex-Press и дренажа «Глаутекс» в комплексном лечении вторичной глаукомы. Сборник научных трудов. выпуск№3– г. Красногорск, –2015.–С.88-89.

124. Кумар В., Фролов М.А., Душина Г.Н. и др. Результаты снижения внутриглазного давления у пациентов с открытоугольной глаукомой при сегментарном расширении шлеммова канала с помощью интраканального экспандера второго поколения собственной конструкции. Альманах клинической медицины. 2015; 36:29-33.

125. Курышева Н.И. Механизмы повреждения зрительного нерва при первичной открытоугольной глаукоме // Глаукома. 2001. № 1. С. 38–43.

126. Курышева Н.И. Офтальмоскопическая характеристика диска зрительного нерва и ретинального слоя нервных волокон сетчатки при глаукоме . Вестник офтальмологии–2005.–№4.–С.46-49.

127. Курышева Н.И., Киселева Т.И., Иртегова Е.Ю. Сравнительная характеристика показателей глазного кровотока при глаукоме нормального давления и первичной открытоугольной глаукоме с повышенным офтальмотонусом . Сборник научных трудов XI Всероссийская школа офтальмолога – Москва.–2012.–С.89-91.

128. Лебедев О.И., Молчанова Е.В., Ковалевский В.В., Калижникова Е.А. Методика оптимизации непроникающей глубокой склерэктомии: предварительные результаты . Офтальмохирургия–2011.–№2.–С.30-33.

129. Лоскутов И.А. Моделирование фильтрационных подушек . Глаукома. – 2010.–№2. –С. 30-37.

130. Любимов Г А, Еричев В П , Акопян А И, Иомдина Е Н, Моисеева И Н, Штейн А. А. Математическое моделирование тонографического метода исследования глаза с учетом упругих характеристик и возможные пути повышения его информативности . Сборник научных статей научно-практической конференции «Современные методы диагностики и лечения заболеваний роговицы и склеры» - М, 2007 - стр 279-282

131. Любимова Д. Аппланационная тонометрия и биомеханические свойства роговицы . Биомеханика глаза: Сб. тр. конф. М.–2007. –С. 134-138.

132. Маркосян Г.А , Тарутта Е П , Еричев В П, Акопян А И Состояние глазного дна у детей и подростков с врожденной миопией . Сб тезисов

Общероссийской научно-практической конференции молодых ученых «Актуальные проблемы офтальмологии» - М, 2007 - С 62-65

133. Мачехин В.А., Кузьмин С.И. Дренажная система «Ahmed Glaucoma valve» в лечении рефрактерных глауком . Новости глаукомы.– 2008.–№1.– С.26-27.

134. Молоткова И.А., Белый Ю.А., Евсигнеева Е.М. Дренажная хирургия глаукомы у детей // Вестник ОГУ. – 2012. – № 12. – С. 133-135.

135. Мосин И.М. Врожденные аномалии зрительного нерва. . В кн.: Зрительные функции и их коррек- ция у детей. Под ред. Аветисова С.Э., Кащенко Т.П., Шамшиновой А.М. — М.: «Медицина», 2005. — С. 687–752.

136. Мотущук А. Е., Рахманов В. В., Мандельштам М. Ю. Молекулярно-генетические основы первичной врожденной глаукомы. Офтальмологические ведомости.2008. 1(4): 44-51.

137. Мулдашев Э.Р., Корнилаева Г.Г., Полякова Е.Ю. Реконструктивные подходы к хирургическому лечению врожденной глаукомы на основе губчатого биоматериала Аллоплант .VIII Съезд офтальмологов России. Тезисы докладов –М.–2005. –С. 202-203.

138. Недоспасов С.А. Фактор некроза опухолей и лимфотоксин: молекулярная генетика, регуляция и физиологическая роль. Генетика. 2003; 39: 207-214

139. Нероев В.В., Ханджян А.Т., Зайцева О.В. Новое возможности в оценке биомеханических свойств роговицы и измерении внутриглазного давления . Глаукома. –2006.–№1.–С.51-56.

140. Нестеров А.П. Глаукома. МИА, 2008. 360 с.

141. Нестеров А.П. Глаукома: этапы ее развития, лечение и роль диспансеризации . Сборник научных трудов.–2007. –№1. –С. 17-21.

142. Нестеров А.П., Егоров Е.А. Классификация глаукомы . EyeNews. – 2004.–№1.–С. 3.

143. Нестеров А.П.,Пилецкий Г.К., Пилецкий Н.Г. Транспальпебральный тонометр для измерения внутриглазного давления . Вестник офтальмологии -2003. .1. -С.3-5.

144. Новикова Е.Г., Баранов В.И. Восстановление дренажной системы глаза у больных с первичной глаукомой в начальной стадии с помощью ультразвуковой терапии . Российский офтальмологический журнал–2011.–№2.–С.38-45

145. Овчинникова А.В. Особенности хирургически сформированной дренажной зоны у детей с глаукомой после интраоперационного применения митомицина С по данным ультразвуковых методов исследования . Вестник офтальмологии –2011.–№1.–С. 25-29.

146. Павлова О.Г., Николаенко В.П., Константинова Л.М. Инкапсуляция клапана Ahmed как основная причина неудач его имплантации . Офтальмологические ведомости. 2014. № 2(7). С. 18–22

147. Петров С. Ю, Фокина Н. Д., Шерстнева Л. В., Вострухин С. В., Сафонова Д. М. Этиология первичной глаукомы: Современные теории и исследования. Офтальмологические ведомости.2015 2 (8). 47-56.

148. Петров С.Ю., Вострухин С.В., Асламазова А.Э. Современная микроинвазивная хирургия глауком. Вестник офтальмологии. – 2016; 3: - С. 96-102.

149. Полякова Е.Ю. Хирургическое лечение врожденной глаукомы с использованием биоматериала Аллоплант . Дисс. …канд. мед. наук. – Челябинск: ФГУ.–2009. –С. 20-23.

150. Расческов А.Ю., Лоскутов И. А. Оценка эффективности клинического применения дренажной системы Ahmed при рефрактервюй глаукоме . Офтальмология. - 2011. - Т. 8, № 4. - С. 23-26.

151. Расческов А.Ю., Лоскутов И.А. Современные технологии хирургического лечения рефрактерной глаукомы. Обзор литературы. Офтальмология. - 2012. — Т. 9, № 1: 4-10.

152. Рыдловская А.В., Симбирцев А.С. Функциональный полиморфизм гена TNF-αи патология // Цитокины и воспаление. - 2005. - № 3. - С. 4-10.;

153. Светлова О.В., Дроздова Г.А., Балашевич Л.И. и др. Морфофизиологические особенности склеры глаза человека как ключевого звена в формировании уровня внутриглазного давления в норме и при глаукоме . Морфология–2009.–№5.–С. 5-10.

154. Светлова О.В., Засева М.В., Суржиков А.В. и Кошиц И.Н. Развитие теории оттока водянистой влаги и перспективные гипотензивные воздействия . Глаукома–2003.–№1.–С. 51-59.

155. Сидоренко Е.И. Доклад по охране зрения детей. Проблемы и перспективы детской офтальмологии . Вестник офтальмологии –2006. –№1. – С.41-42.

156. Сидоров Э.Г., Мирзаянц М.Г. Врожденная глаукома и ее лечение. – М. –1991.–С. 17-27.

157. Симбирцев А.С. Цитокины в патогенезе инфекционных и неинфекционных заболеваний человека. Медицинский академический журнал. 2013;13(3):18-41

158. Симбирцев А.С. Цитокины: классификация и биологические функции // Цитокины и воспаление. - 2004. - Т. 3, № 2.- С. 16-21;

159. Синеок А.Е., Золотарев А.В. и Карлова Е.В. К вопросу об эластичности и гистерезисе склеры в кн. Труды науч.-прак. конф. «Биомеханика глаза–2007» МНИИ глазных болезней им. Гельмгольца. М.– 2007. –С.106-111.

160. Система цитокинов. Теоретические и клинические аспекты. / Под ред. акад. РАМН В.А. Козлова и д.м.н. С.В. Сенникова. – Новосибирск: «Наука» 2004. - 344 с.

161. Слонимский А.Ю., Алексеев И.Б., Долгий С.С. Новые возможности профилактики избыточного рубцевания в хирургии глауком. Офтальмология. 2012; 9(3): 36-40.

162. Слонимский А.Ю., Алексеев И.Б., Долгий С.С., Коригодский А.Р. Новый биодеградируемый дренаж «Глаутекс» в хирургическом лечении глаукомы. Глаукома. 2012; 4: 55-59.

163. Соколов В.А., Мкхинини Науфель, Никифоров А.А., Никифорова Л.В. Цитокины при первичной открытоугольной глаукоме // Глаукома. 2011. № 3. С. 21–23.

164. Сон И.М., Калиниская А.А., Сергеева Е.С., Черненко Е.Г. Глаукома и мероприятия после профилактики // Здравоохранение Российской Федерации – М.–2009.–С. 55.

165. Степанов А.В., Н.Р. Теденоева, У.Ш. Гамзаева, К.В. Луговкина. Новая дренажная операция для лечения рефрактерной посттравматической глаукомы. Российский офтальмологический журнал -2015.- №2:54-58.

166. Степанов А.В., У.Ш. Гамзаева, Кравчук С.Ю., Н.Р. Тедеева. Разработка новых дренажных операций для лечения рефрактерной посттравматической глаукомы. Сборник научных статей. Раздел1. Новые технологии в диагностике и лечении заболеваний глаз. Москва-2015.- С.173-176.

167. Столяров Г.М., Лебедев О.И. Гидродинамика и гемодинамика глаукомных глаз под влиянием различных гипотензивных препаратов// Сборник научных трудов XI. Всероссийская школа офтальмолога – Москва, – 2012.–С.99-102.

168. Страхов В.В., Алексеев В.В. Патогенез первичной глаукомы – «все или ничего» // Глаукома. 2009. № 2. С. 40–52.

169. Тарутта Е П, Маркосян Г А, Еричев В П, Акопян А.И Морфометрические особенности диска зрительного нерва у детей с врожденной миопией // Труды международной конференции «Рефракционные и глазодвигательные нарушения», Москва, 2007 - С 169-171

170. Тедеев Н.С., Мельников В.Я. Комплексное лечение первичной глаукомы в раннем послеоперационном периоде // Сб. науч. Трудов XI Всероссийская школа офтальмолога – Москва.–2012.–С.103-109.

171. Теплинская Л.Е., Хватова А.В., Мазанова Е.В. Врожденная глаукома и тимомегалии: клинико-иммунологическая характеристика . Вестник офтальмологии –2009. –№3. –С. 18-21.

172. Терещенко А.В., Молоткова И.А., Белый Ю.А. Особенности имплантации дренажной системы Ahmed Glaucoma Valve у детей с врожденной глаукомой. Российская детская офтальмология. 2012. 1-2, 37 с.

173. Терещенко А.В., Молоткова И.А., Белый Ю.А., Ерохина Е.В. Модификация современной микроинвазивной непроникающей хирургии глаукомы с применением Т-образного дренажа . Офтальмохирургия–2011.–№2.–С.38-42.

174. Тойкулиев Т.К. Сравнительная оценка различных методов хирургического лечения врожденной глаукомы в возрастном аспекте // Казанский медицинский журнал.–2013.–№6.–Т.19.–С.847-850.

175. Трубилин В.Н., Мамедзаде М.А., Трубилин А.В. Каналопластика с формированием увеосклерального пути оттока . Сб. науч. Трудов XI Всероссийская школа офтальмолога – Москва.–2012.–С.109-110.

176. Тугеева Э.Э., Воронцова Т.Н., Бржеский В.В., Зайцева М.В. Влияние основных параметров фиброзной капсулы на результаты различных способов офтальмотонометрии у детей. Рос. педиатр. офтальмол. 2015; 2: 38-40.

177. Фатуллоева Н Ф , Арутюнян Л Л , Акопян А И , Бессмертный А М Биомеханические свойства глаза у больных с псевдоэксфолиативным синдромом, псевдоэксфолиативной глаукомой и первичной открытоугольной глаукомой . Сб научных трудов 7-ой Всероссийской школы офтальмологов - М, 2008- С 183-189

178. Федоров С.Н. Вопросы патогенеза и лечения глаукомы. М. 1981. – С. 3–7.

179. Фенькова О. Г. Врожденная глаукома: перинатальные факторы риска, клинико-функциональные особенности. Автореф. и дисс. . … канд.мед наук. Красноярск 2012.28 с.

180. Фенькова О.Г., Фурсова А.Ж., Гусаревич О.Г. Значимость биометрических и клинико-морфологических параметров при определении степени компенсации врожденной глаукомы . Глаукома. Журнал НИИ глазных болезней РАМН. - 2011 г. - № 4. -С. 14-18.

181. Фенькова О.Г., Фурсова А.Ж., Гусаревич О.Г. Клинико-морфологические и функциональные критерии оценки степени тяжести врожденной глаукомы . РМЖ. Клиническая офтальмология. - 2011 г. -Том 12,№2: 56-58.

182. Фенькова О.Г., Фурсова А.Ж., Гусаревич О.Г. Склероангулореконструкция с использованием коллагенового аллодренажа в лечении врожденной глаукомы . Актуальные вопросы офтальмологии: Материалы межрегиональной научно-практической конференции офтальмологов, посвященной 125-летию офтальмологической помощи населению Красноярского края. –Красноярск: –2011.–С.201-204.

183. Хабибуллина Н.М., Галеева Г.З., Расческов А.Ю. Внутриглазное давление у детей раннего возраста без признаков глаукомы. Практическая медицина. 2016. том 1, 2 (94), 101-103.

184. Хакимов А.М., Даутова З.А., Митрофанова Н.В. Опыт применения дренажа «Глаутекс» в хирургии глаукомы. Конференция глаукома теория и практика. Российская школа офтальмолога – Москва, – 2013.–С.123-125.

185. Хамидов Э.Г. Фистулизирующая хирургия глаукомы с применением аутоткани . Автореф. дисс. …канд. мед.наук. Москва. –2011. – С.15.

186. Хамроева Ю.А. Бузруков Б.Т. Сравнительный анализ размера передне–задних осей глаз с врожденной глаукомой и здоровых глаз в возрастном аспекте. Клиническая офтальмология. 2013;1: 17

187. Хамроева Ю.А., Хамраева Л.С. Роль биомеханических параметров глаза в развитии врожденной глаукомы у детей. Российская педиатрическая офтальмология, 2014, №2, С.30-31.

188. Хватова А.В., Теплинская Л.Е., Мазанова Е.В. Осложнения трабекулэктомиипри врожденной глаукоме у детей // Вестник офтальмологии–2003 –№1 –С. 16-19.

189. Хуснитдинов И.И., Бабушкин А.Э. Эффективность хирургического лечения глаукомы с применением различных видов дренажа «Глаутекс». Офтальмология. 2019;16(1S):91–95.

190. Черных В.В., Ходжаев Н.С., Тахчиди Е.Х. и др. Особенности патогенеза начальной стадии первичной открытоугольной глаукомы, значимость иммуновоспалительного процесса // Офтальмохирургия. 2011. № 2. С. 50–53.

191. Шаимова В.А. Роль провоспалительных цитокинов при заболеваниях глаз // Офтальмохирургия и терапия. 2004. № 3. С. 30–32.

192. Шевченко М.В., Братко О.В. Эластотонометрия как метод оценки биомеханических особенностей фиброзной оболочки глаза . Сборник научных трудов IX Всероссийской школы офтальмолога. –М.–2010.–С. 183-189.

193. Шкребец Г.В., Осипова Е.Н., Садовниченко Е.О. О влиянии толщины роговицы на показатели внутриглазного давления при измерении ВГД аппланационными методами . Федоровские чтения – 2013: материалы науч.-практ. конф. – Москва. –2013.–С. 202.

194. Шпак А.А., Севостьянова М.К., Огородникова С.Н. Изменения размеров диска зрительного нерва у больных с начальной глаукомой и подозрением на глаукому. Офтальмохирургия.– 2014.– № 2.– С. 57-60.

195. Юрьева Т.Н. Механизмы формирования глауком, ассоциированных с альтерацией радужки: Автореф. дис. … д-ра мед. наук – Иркутск, 2011. 42 с.

196. Юрьева Т.Н., Помкина И.В., Гребенюк Т.Н. и др. Особенности формирования врожденной глаукомы, ассоциированной с патологией радужки . Бюллетень ВСНЦ СО РАМН. – 2009. – № 5-6. – С. 59-63.

197. Яворский А.Е., О.И. Лебедев, Е.А. Калижникова. Генетические аспекты развития врожденной глаукомы. Клиническая офтальмология. Том 12, № 4, 2010. 109-11.

198. Ярилин А.А. Иммунология: учебник. М.: ГЭОТАР-Медиа 2010; 752 с.

199. Ярцев А.В., Страхов В.В., Алексеев В.В., Хляф В.Б. Исследование наружных слоев сетчатки у пациентов с первичной глаукомой . Сб. науч. Трудов XI Всероссийская школа офтальмолога – Москва.–2012.– С.117-124.

200. Abdulrahman H., Badawi Ahmed A.Al-Muhaylib, Adi MohammedAl Primary congenital glaucoma: An updated review. Saudi Journal of Ophthalmology Volume 33, Issue 4, October–December 2019, Pages 382-388.

201. Abe R., Tavares C., Schimiti R. et al. Ahmed Glaucoma Valve Implantation for Refractory Glaucoma in a Tertiary Hospital in Brazil . Ophthalmology. 2015. Vol. 2015. P. 780–785.

202. Abu-Amero K.K. , E.A. Osman, A. Mousa, *et al.*Screening of CYP1B1 and LTBP2 genes in Saudi families with primary congenital glaucoma: genotype-phenotype correlation. Mol Vis, 17 (2011), pp. 2911-2919

203. Akopyan AI, V P Erichev, E P Tarutta, G A Markossian Correlation of retinal tomography parameters . Book of abstracts «6™ International Glaucoma Symposium», 2007 -P 148

204. Alanazi F. F, J.C. Song, A. Mousa, *et al.*Primary and secondary congenital glaucoma: baseline features from a registry at King Khaled Eye Specialist Hospital, Riyadh, Saudi Arabia. Am J Ophthalmol, 155 (2013), pp. 882-889

205. Al-Ghamdi S.,Al-Obeidan., TomeyK.F., Al-JadaanI. Transscleral neodymium YAG laser cyclophotocoagulation for end stage glaucoma, refractory glaucoma, and painful blind eyes . Ophthalmic Surg. –2003.Vol. 24. –P. 526.

206. Al-Hazmi A, Awad A, Zwaan J, Al-Mesfer S, Al-Jadaan I, Al-Mohammed A. Correlation between surgical success rate and severity of congenital glaucoma. Br J Ophthalmol. 2005;89:449–453.

207. Allingham R. R. Congenital glaucoma. In. – R. R. Allingham, K. F. Damji, S. Freedman, S. E. Mori, G. Shafranov editor(s). Shield's textbook of glaucoma. 5th Edition / R. R. Allingham. – Philadelphia, Lippincott Williams and Wilkins, 2005. – P. 235 – 252.

208. Al-Obeidan, Osman Eel-D S.A., Dewedar A.S., Kestelyn P., Mousa A. Efficacy and safety of deep sclerectomy in childhood glaucoma in Saudi Arabia. Acta Ophthalmol, 92 (1) (2014), pp. 65-70.

209. Alper M.J. Ciliary body detachment for control and glaucoma surgery. Se . Am. J. Ophthalmology. –2002.Vol. 118.–N 34. –P. 2311-2318.

210. Alsheikheh A, Klink J, Klink T, Steffen H, Grehn F. Graefes Long-term results of surgery in childhood glaucoma Arch Clin Exp Ophthalmol. 2007;245:195–203.

211. Alvarado J. A., Hollander D.A., Juster R.P., Lee L.C. Ahmed valve implantation with adjunctive mytomycin C and 5- Fluorouracil: long-term outcomes . Am. J. Ophtalm.–2008.Vol. 11.–N 34. –P. 122-126.

212. Amadi-Obi A., Yu C. R., Liu X., Mahdi R. M., Clarke G. L., Nussenblatt R. B. et al. TH17 cells contribute to uveitis and scleritis and are expanded by IL-2 and inhibited by IL-27/STAT1 // Nat. med. – 2007. – Vol. 13. – P. 711–718

213. Asman P. Computer-assisted interpretation of visual fields in glaucoma. Acta Ophthalmol Suppl 1992; 206:1-47.

214. Autoreactive antibodies and loss of retinal ganglion cells in rats induced by immunization with ocular antigens / P. Laspas et al. // Invest. Ophthalmol. Vis .Sci. — 2011. — Vol. 52. — P. 8835-8848.

215. Badeeb OM, Micheal S, Koenekoop RK, den Hollander AI, Hedrawi MT. CYP1B1 mutations in patients with primary congenital glaucoma from Saudi Arabia. BMC Med Genet. 2014;15:109.

216. Bahler C.K., Hann C.R., Fjield T. et al. Second-generation trabecular meshwork bypass stent (iStent inject) increases outflow facility in cultured human anterior segments. Am J Ophthalmol. 2012; 6 (153): 1206-1213.

217. Baily C, Dooley I, Collins N, Hickey-Dwyer M. The difference in intraocular pressure readings between 3 applanation tonometers is independent of central corneal thickness, in glaucomatous and nonglaucomatous eyes. J Glaucoma. 2014Dec;23(9):620-3.

218. Barkan O. Amer. J. Ophthalmol. – 1998. – Vol. 21. – P. 1099 –1007

219. Baudouin C., Hammaro P., Liang H. et al. Conjunctival epithelial cell expression of interleukins and inflammatory markers in glaucoma patients treated over the long term // Ophthalmology. 2004. N 12. P. 2186–2192.

220. Bayoumi NH. Deep sclerectomy in pediatric glaucoma filtering surgery. *Eye (Lond.).* 2012; 26(12): 1548–53.

221. Becker B., Shaffer R.N. Diagnosis and Therapy of Glaucoma. Mosby – St. Louis. – 1961: 335-340

222. Ben-Zion I, Tomkins O, Moore DB, Helveston EM. Surgical results in the management of advanced primary congenital glaucoma in a rural pediatric population. Ophthalmology. 2011;118:231–235.

223. Berg C, Doniger SJ, Zaia B, Williams SR. Change in intraocular pressure during point-of-care ultrasound. West J Emerg Med. 2015 Mar;16(2):263-8.

224. Billy A, David PE, Mahabir AK, Seerattan CP, Street JM, Walcott VD, Yarna RJ, Murray DC, Maharaj RG. Utility of the Tono-Pen in Measuring Intraocular Pressure in Trinidad: A Cross-sectional Study. West Indian Med J. 2015 Sep;64(4):367-71.

225. Borrego Sanz L, Morales-Fernandez L, Martínez de-la-Casa JM, Sáenz-Francés F, Fuentes M, García-Feijóo J. The Icare-Pro rebound tonometer versus the hand-held applanation tonometer in congenital glaucoma. J Glaucoma. 2016;25(2):149-54

226. Bowman R.J. , M. Dickerson, J. Mwende, P.T. KhawOutcomes of goniotomy for primary congenital glaucoma in East Africa. Ophthalmology, 118 (2011), pp. 236-240

227. Bradfield YS, Kaminski BM, Repka MX, Melia M; Pediatric Eye Disease Investigator Group., Davitt BV, Johnson DA, Kraker RT, Manny RE, Matta NS, Schloff S, Weise KK. Comparison of Tono-Pen and Goldmann applanation tonometers for measurement of intraocular pressure in healthy children. J AAPOS. 2012 Jun;16(3):242-8.

228. Bresson-Dumont H. Intraocular pressure measurement in children. J Fr Ophtalmol. 2009 Mar;32(3):176-81.

229. Buchacra O., Duch S., Milla E. et al. One-year analysis of the iStent trabecular microbypass in secondary glaucoma . Clin Ophthalmol. 2011; 5: 321-326.

230. Budenz D., Barton K., Feuer W. et al. Treatment outcomes in the Ahmed Baerveldt Comparison Study after 1 year of follow-up . Ophthalmology. 2011. Vol. 118. P. 443–452.

231. Carrim ZI, Lavy TE. Goldmann tonometry versus the Tono-Pen XL for intraocular pressure measurement: an evaluation of the potential impact on clinical decision making in glaucoma. Ophthalmic Physiol Opt. 2009 Nov;29(6):648-51.

232. Chan WH, Lloyd IC, Symes RJ, Ashworth JL, Cosgrove E, Pilling R, Biswas S. Accuracy of Intraocular Pressure Measurement With the Icare Tonometer in Children. Asia Pac J Ophthalmol (Phila). 2015 Nov-Dec;4(6):357-9.

233. Chinnery H. R., McMenamin P. G., Dando S. J, 2017;

234. Chiu T.Y., Fan D.S., Chu W.C. Ocular manifestations and surgical management of lid coloboma in a Chinese infant with linear nevus sebaceous syndrome. . J. Pediatr. Ophthalmol. Strab. — 2004. — Vol. 41, N 5.— P. 312–314.

235. Chua J. Expression profi le of infl ammatory cytokines in aqueous from glaucomatous eyes / Chua J., Vania M., Cheung C.M.G.et al. // Molecular Vision. – 2012. – Vol.18. – P. 431–438.

236. Chung I, Bartolone A, Swanson WH, Thau AP. A clinical evaluation of proview pressure phosphene tonometry in children. Optom Vis Sci. 2006 Nov;83(11):817-22.

237. Colás-Tomás T, Gutiérrez-Díaz E, Tejada-Palacios P, BarcelóMendiguchía A, Mencía-Gutiérrez E. Intermediate results on the use of drainage devices for paediatric glaucoma. *Arch. Soc. Esp. Oftal.* 2012; 87(2): 38–43.

238. Coleman A.L., Giaconi J.A. (2007) Aqueous shunts. Atlas of Glaucoma. Second Edition. Informa Healthcare, pp. 297-312.

239. Coleman A.L., Hill R., Wilson M.R. et al. Initial clinical experience with the Ahmed glaucoma valve implant . Am J Ophthalmol. 1995. Vol. 120. P. 23–31.

240. Creuzot-Garcher C. et al. Flow cytometric analysis of HLA-DR, IL-6 and IL-8 expression by conjunctival epithelial cells from patients with prolonged topical antiglaucoma treatments // J. Fr. Ophthalmol. 2003. N 8. P. 782–789.

241. Cronemberger S, Calixto N, Milhomens TGA, Gama PO, Milhomens EG, Rolim H, Mendonça SC.Effect of intraocular pressure control on central corneal thickness, horizontal corneal diameter, and axial length in primary congenital glaucoma J AAPOS. 2014;18:433–436.

242. Dave P., S. Senthil, N. Choudhari, G.C. SekharOutcomes of Ahmed valve implant following a failed initial trabeculotomy and trabeculectomy in refractory primary congenital glaucoma. Middle East Afr J Ophthalmol, 22 (1) (2015), pp. 64-68.

243. Davis R, Jiramongkolchai K, Silverstein E, Freedman SF. Rebound tonometry over an air-filled anterior chamber in the supine child after intraocular surgery. J AAPOS. 2016 Apr;20(2):159-64.

244. Da-Wen Lu, Yi-Hao Chen, Charn-Jung Chang, Chiao-Hsi Chiang ,Hsin-Yu Yao Nitric oxide levels in the aqueous humor vary in different ocular hypertension experimental models Kaohsiung Journal of Medical Sciences (2014) 30, 593-598

245. Demailly P., Barrault O. Quantitative perimetry and glaucoma. J Fr Ophtalmol 1986; 9(3):211-216.

246. Denis D, Pommier S, Coste R, Fogliarini C, Benso C, Cornand E. Deep sclerectomy in congenital glaucoma: results of a study lasting more than 3 years. (Article in French) J Fr Ophtalmol. 2008; 31: 173–179.

247. Dietlein T.S., Jordan J., Lueke C., Krieglstein G.K. (2008) Modern concepts in antiglaucomatous implant surgery. Graefes Arch Clin Exp Ophthalmol, vol. 246, pp. 1653-1664.

248. Doering CJ, Feldman E, Bdolah-Abram T, Merideth RE, Ofri R. Mathematical Discrepancies of the Tono-Pen Applanation Tonometer. J Glaucoma. 2017 Feb;26(2): 30-36.

249. Dora H AlHarkan , Fatemah T Al-Shamlan , Deepak P Edward , Arif O Khan. A Comparison of Rebound to Indentation Tonometry in Supine Sedated Children with Glaucoma Middle East Afr J Ophthalmol. 2016;23(2):183-6.

250. Dosunmu EO, Marcus I, Tung I, Thiamthat W, Freedman SF. Intraocular pressure in children: the effect of body position as assessed by Icare and Tono-Pen tonometers. Am J Ophthalmol. 2014 Dec;158(6):1348-1352.

251. Dubey S, Agrawal A, Chauhan L, Mukherjee S, Douglas G. Nepal Combined trabeculotomy-trabeculectomy with antimetabolite and releasable suture: outcome with primary congenital glaucoma in a north Indian population. J Ophthalmol. 2015;7:16–25.

252. Ehrlich J. R., Peterson J., Parlitsis G. et al. Peripapillary choroidal thickness in glaucoma measured with optical coherence tomography . Exp. Eye Res. – 2011. – Vol. 92, N 3. – P. 189–194.

253. Eid TM, el-Hawary I, el-Menawy W. Prevalence of glaucoma types and legal blindness from glaucoma in the western region of Saudi Arabia: a hospital-based study. Int Ophthalmol. 2009;29:477.

254. El Sayed Y, Esmael A, Mettias N, El Sanabary Z, Gawdat G. Factors influencing the outcome of goniotomy and trabeculotomy in primary congenital glaucoma. Br J Ophthalmol. 2019;2018:313-387.

255. Elbay A, Celik U, Celik B, Ozer OF, Kilic G, Akkan JC, Bayraktar BT, Kaymak NZ. Intraocular pressure in infants and its association with hormonal changes with vaginal birth versus cesarean section. Int Ophthalmol. 2016 Dec;36(6):855-860.

256. Elwehidy AS, Badawi AE, Hagras SM, Bayoumi NH. Ahmed glaucoma valve revision versus visco-trabeculotomy after failed Ahmed glaucoma valve in refractory pediatric glaucoma. J Glaucoma. 2019;28:307–312.

257. Erginturk Acar D, Acar U, Ozdemir O, Tunay ZO. Determination of normal values of intraocular pressure and central corneal thickness in healthy premature infants-a prospective longitudinal study. J AAPOS. 2016 Jun;20(3):239-42.

258. Estrovich IE, Shen C, Chu Y, Downs JC, Gardiner S, Straiko M, Mansberger SL. Schiotz tonometry accurately measures intraocular pressure in Boston type 1 keratoprosthesis eyes. Cornea. 2015 Jun;34(6):682-5.

259. Expression profile of inflammatory cytokines in aqueous from glaucomatous eyes / C. Jocelyn // Mol. Vis. – 2012. – Vol. 18. – P. 431–438

260. Fan B.J., J.L. WiggsGlaucoma: genes, phenotypes, and new directions for therapy. J Clin Invest, 120 (2010), pp. 3064-3072

261. Fas ligand-induced apoptosis as a mechanism of immune privilege / T.S. Griffith et al. // Science. — 1995. — Vol. 270. —P. 1189-1192

262. Fea A.M., Belda J.I., et al. Prospective unmasked randomized evaluation of the iStent inject versus two ocular hypotensive agents in patients with primary open-angle glaucoma. Clin Ophthalmol. 2014. P. 875-882.

263. Flemmons MS, Hsiao YC, Dzau J, Asrani S, Jones S, Freedman SF. Icare rebound tonometry in children with known and suspected glaucoma. J AAPOS. 2011 Apr;15(2):153-7.

264. Freedman S.F., Johnston S.C. (2009) Glaucoma in infancy and early childhood. Pediatric Ophthalmology. Chapter, pp. 345-374. doi: 10.1007/978-3-540-68632-34

265. Fuchs C., Forster V., Balse E. et al. Retinal-cell-conditioned medium prevents TNF-alpha-induced apoptosis of purified ganglion cells // Invest Ophthalmol. Vis. Sci. 2005. N 8. P. 2983–2991.

266. FungD.S., Roensch M.A., Kooner K.S. , Cavanagh H.D. , Whitson J.T. Epidemiology and characteristics of childhood glaucoma: results from the Dallas Glaucoma Registry. Clin Ophthalmol, 7 (2013), pp. 1739-1746

267. Galgauskas S, Strupaite R, Strelkauskaite E, Asoklis R. Comparison of intraocular pressure measurements with different contact tonometers in young healthy persons. Int J Ophthalmol. 2016 Jan 18;9(1):76-80.

268. Ganekal S, Dorairaj S, Jhanji V, Kudlu K. Effect of Topical Calcium Channel Blockers on Intraocular Pressure in Steroid-induced Glaucoma. J Curr Glaucoma Pract. 2014 Jan-Apr;8(1):15-9.

269. García-Resúa C, González-Meijome JM, Gilino J, Yebra-Pimentel E. Accuracy of the new ICare rebound tonometer vs. other portable tonometers in healthy eyes. Optom Vis Sci. 2006 Feb;83(2):102-7.

270. Gedde S.J., Schiffman J.C., Feuer W.J. et al. Tube versus Trabeculectomy Study Group Treatment outcomes in the Tube Versus Trabeculectomy (TVT) study after five years of follow-up . Am J Ophthalmol. - 2012. - Vol. 153. - P. 789-803.

271. Georgalas I., Ladas I., Georgopoulos G., Petrou P., Optic disc pit: a review . Graefes Arch. Clin. Exp. Ophthalmol. – 2011. – Aug. – 249 (8). – 1113-1122.

272. Gery I. Recoverin is highly uveitogenic in Lewis rats / I. Gery, N.P. Chanaud, E. Anglade // Invest Ophthalmol. Vis. Sci. — 1994. — Vol. 35, №8. — P. 3342-3345

273. Gharaei H, Kargozar A, Raygan F, Daneshvar R. Comparison of Perkins, Tono-Pen and Schiøtz tonometers in paediatric patients under general anaesthesia. East Mediterr Health J. 2008 Nov-Dec;14(6):1365-71.

274. Giaconi JA, Coleman AL. Pearls of Glaucoma Management. Berlin, Heidelberg: Springer; 2010. Pediatric glaucoma: IOP, axial length, and surgery indications; pp. 389–396.

275. Goldberg I. Glaucoma in the 21st Century / I. Goldberg . Hartcourt. Health Communication / London: Mosby Int., 2000. — P. 4 —8.

276. Gorsler I, Thieme H, Meltendorf C. Graefes Arch Cyclophotocoagulation and cyclocryocoagulation as primary surgical procedures for open-angle glaucoma. Clin Exp Ophthalmol. 2015;253:2273–2237

277. Grigorian F, Grigorian AP, Olitsky SE. The use of the iCare tonometer reduced the need for anesthesia to measure intraocular pressure in children. J AAPOS. 2012 Dec;16(6):508-10.

278. Gupta V, Jha R, Srinivasan G, Dada T, Sihota R. Ultrasound biomicroscopic characteristics of the anterior segment in primary congenital glaucoma. J AAPOS. 2007 Dec;11(6):546-50.

279. Heidary R, Heidary F, Rahimi A, Gharebaghi R. An innovative educational model in intraocular pressure measurement. Med Hypothesis Discov Innov Ophthalmol. 2012 Fall;1(3):50-1.

280. Ho CL, Walton DS.Primary congenital glaucoma: 2004 update. J Pediatr Ophthalmol Strabismus. 2004;41:271–288.

281. Holló G. Influence of Large Intraocular Pressure Reduction on Peripapillary OCT Vessel Density in Ocular Hypertensive and Glaucoma Eyes. J Glaucoma. 2017 Jan;26(1): 7-10.

282. Hong C.H., Arosemena A., Zurakowski D., Ayyala R.S. Glaucoma drainage devices: a systematic literature review and current controversies . Surv. Ophthalmol. 2005. Vol. 50 (1). P. 48–60.

283. Huang P. [et al.] Serum cytokine alteration is associated with optic neuropathy in human primary open angle glaucoma // J. Glaucoma. – 2010. – Vol. 19 (5). – P. 324–330

284. Immunohistochemical assessment of the glial mitogen-activated protein kinase activation in glaucoma / G. Tezel et al. // Invest. Ophthalmol. Vis. Sci. — 2003. — Vol. 44. — P. 3025-3033

285. Ishikawa, M. Perioperative immune responses in cancer patients undergoing digestive surgeries [Text] / M. Ishikawa, M. Nishioka, N. Hanaki, T. Miyauchi, Y. Kashiwagi, H. Ioki et. al. // World Journal of Surgical Oncology. – 2009. – Vol. 7, Issue 1. – P. 7. doi: 10.1186/1477-7819-7-7

286. Jablonski KS, Rosentreter A, Gaki S, Lappas A, Dietlein TS. Clinical use of a new position-independent rebound tonometer. J Glaucoma. 2013 Dec;22(9):763-7.

287. Kalpana S, Balaji BS. Aspiration of Rear End of Pen in Children, Management Issues. Indian Pediatr. 2016 Oct 8;53(10):936.

288. Kanadani FN, Moreira T, Campos LF, Vianello MP, Corradi J, Dorairaj SK, Freitas A, Ritch R. A New Provocative Test for Glaucoma. J Curr Glaucoma Pract.2016 Jan-Apr;10(1):1-3.

289. Karadag R, Sen A, Golemez H, Basmak H, Yildirim N, Karadurmus N, Koseoglu E, Akin A. The effect of short-term hypobaric hypoxic exposure on intraocular pressure. Curr Eye Res. 2008 Oct;33(10):864-7.

290. Kaur K. , A.K. Mandal, S. Chakrabari Primary congenital glaucoma and the involvement of CYP1B1. MEAJO, 18 (2011), pp. 7-16

291. Khan AO, Al-Mobarak F, Almobarak FA. Comparison of polypropylene and silicone Ahmed valve survival 2 years following implantation in first 2 years of life. Br. J. Ophthal. 2009; 93(6): 791–794.

292. Khan AO. Genetics of primary glaucoma. Curr Opin Ophthalmol 2011;22:347-55.

293. Kimura A., Kishimoto T.. Th17 cells in inflammation // International Immunopharmacology.– 2011. – Vol. 11. – Iss. 3. – P. 319–322

294. Kirwan C, O'Keefe M, Lanigan B, Mahmood U. Ahmed valve drainage implant surgery in the management of paediatric aphakic glaucoma. *Br. J. Ophthal.* 2005; 89(7): 855–858.

295. Lee TE, Yoo C, Kim YY. Effects of different sleeping postures on intraocular pressure and ocular perfusion pressure in healthy young subjects. Ophthalmology 2013;120:1565-70.

296. Lin H.J. et al. Association of interleukin l-beta and receptor antagonist gene polymorphisms with primary open-angle glaucoma // Ophthalmologica. 2003. N 5. P. 358–364.

297. Liton P. B. et al. Induction of IL-6 expression by mechanical stress in the trabecular meshwork // Biochem Biophys Res Commun. 2005. N 4. P. 1229–1236.

298. Lopes JE, Wilson RR, Alvim HS, et al. Central corneal thickness in pediatric glaucoma. J Pediatr Ophthalmol Strabismus. 2007;44:112–117.

299. Luo C. et. al. Glaucomatous tissue stress and the regulation of immune response through glial Toll-like receptor signaling // Inves.t Ophthalmol. Vis. Sci. – 2010. – Vol. 51 (11). – P. 5697–5707;

300. Lydia Lehmann-Clarkea, Yalda Sadeghib, Adriano Guarnieria, Eamon Sharkawi. Gonioscopy-assisted transluminal trabeculotomy using an illuminated catheter for infantile primary congenital glaucoma. Case series. American Journal of Ophthalmology Case Reports. 2020.19. 1-4.

301. Mandal A.K., Netland A.N. The pediatric glaycomas.– India, 2006.– P. 1-17, 65-75

302. Mandal AK, Bhatia PG, Bhaskar A, Nutheti R. Long-term surgical and visual outcomes in Indian children with developmental glaucoma operated on within 6 months of birth. Ophthalmology. 2004;111:283–290.

303. Markossian GA, V Erichev, E Tarutta, A Akopyan Differential diagnostic criteria of optic nerve head changes m the onset of glaucoma in patients with high complicated myopia . Book of abstracts «11™ International Myopia Conference», Singapore, 2006-Vol 26-P 44

304. McKusic V. A. Mendelian inheritance in man. Catalog of autosomal dominant, autosomal-recessive and X-linked phenotypes. 3rd ed.-London.: Baltimore, 1971.- P.738.

305. McMenamin P. G., Saban D. R., Dando S. J. Immune cells in the retina and choroid: Two different tissue environments that require different defenses and surveillance // Progress in Retinal and Eye Research. — 2018. // https://doi.org/10.1016/ j.preteyeres.2018.12.002.

306. Minckler D., Francis B., Hodapp E. et al. Aqueous shunts in glaucoma. A report by the American Academy of Ophthalmology . Ophthalmology. 2008. Vol. 115. P. 1089–1098.

307. Mohammed Dibajia, Amjad Al Harbib, Rizwan Malika Successful needling of previous failed deep-sclerectomy in a child with primary congenital glaucoma. American Journal of Ophthalmology Case Reports. 2020. 19. 1-4

308. Monemi, S.; Spaeth, G.; DaSilva, A.; Popinchalk, S.; Ilitchev, E.; Liebmann, J.; Ritch, R.; Heon, E.; Crick, R. P.; Child, A.; Sarfarazi, M. : Identification of a novel adult-onset primary open-angle glaucoma (POAG) gene on 5q22.1. Hum. Molec. Genet. 2005; 14: 725-733.

309. Moreno M.C., Campanelli J., Sande P. Retinal oxidative stress induced by high intraocular pressure // Free Radic. Biol. Med. 2004. N 6. P. 3803–3812.

310. Mwanza J.-C., Oakley J.D., Budenz D.L., Anderson D.R. Ability of Cirrus HDOCT optic nerve head parameters to discriminate normal from glaucomatous eyes . Ophthalmology. – 2011. – Vol. 118, № 2. – P. 241-248.

311. Niederkorn J.Y. The immune privilege of corneal grafts / J.Y. Niederkorn // J. Leukoc. Biol. — 2003. — Vol. 74, №2. — P. 167-171

312. Nishimura D., Searby C., Alward W. et al. A spectrum of FOXC1 mutations suggests gene dosage as a mechanism for developmental defects of the anterior chamber of the eye. Am. J. Hum. Genet.- 2001.- Vol. 68.- P. 364-372.

313. Panarelli J.F. , Banitt M.R. , Gedde S.J. , Shi W., Schiffman J.C. , Feuer W.J. A retrospective comparison of primary baerveldt implantation versus trabeculectomy with mitomycin C. Ophthalmology, 123 (4) (2016), pp. 789-795

314. Papadopoulos M, Cable N, Rahi J, Khaw PT.The British infantile and childhood glaucoma (BIG) eye study. Investig Ophthalmol Visual Sci. 2007;48:4100–4106.

315. Poulsen E.J., Allingham R.R. Characteristics and risk factors of infections after glaucoma filtering surgery . J. Glaucoma. –2010.Vol.9, N6.–P. 438-443.

316. Quigley H. A., Broman A.T. The number of people with glaucoma worldwide in 2010 and 2020 / H. A. Quigley, A.T. Broman. Br. J. Ophthalmol. — 2006. — Vol. 90. — P.262-267.

317. Ramkrishanan R, Mitra A, Kader MA. Asia Pac Surgical and visual outcomes of childhood glaucoma at a tertiary eye care center in South India. J Ophthalmol. 2015;4:250–258.

318. Razeghinejad MR, Kaffashan S, Nowroozzadeh MH. Results of Ahmed glaucoma valve implantation in primary congenital glaucoma. J AAPOS. 2014;18:590–595.

319. Recoverin: a potent uveitogen for the induction of photoreceptor degeneration in Lewis rats / G. Adamus et al. // Exp. Eye Res. — 1994. — Vol. 59, №4. — P. 447-455.

320. Resch H., Deak G., Pereira I., Vass C. Comparison of optic disc parameters using spectral domain Cirrus high-definition optical coherence tomography and confocal scanning laser ophthalmoscopy in normal eyes. Acta Ophthalmol. 2012; 90(3): 225-e229.

321. Reyes. N.J., O'Koren EG., and Saban D.R. (2017). New insights into mononuclear phagocyte b.ology from the visual system. Nat. Rev. Immunol. 17. 322-332.

322. Rezaie T., Child A., Hitchings R., et al. Adult-onset primary open-angle glaucoma caused by mutations in optineurin. Science.- 2002.- Vol. 295.- P. 1077-1079.

323. Rockwood E.J. Parrish R.K., Heuer D.K. Glaucoma filtering surgery with 5-fluorouracil . Ophthalmology. –2007.Vol. 94. N9. –P. 1071-1078.

324. Sampaolesi R., Zarate J., Sampaolesi J.R. Pediatric Glaucomas . Berlin; Heidelberg: Springer; –2009.Vol. 1.–P. 34-43.

325. Sato S., Hirooka K., Baba T., Shiraga F. Comparison of optic nerve head parameters using Heidelberg Retina Tomograph 3 and spectral-domain optical coherence tomography . Clin. Experiment. Ophthalmol. – 2012. – Vol. 40, № 7. – P. 721-726.

326. Schwartz K., Lee R., Gedde S. Glaucoma drainage implants: a critical comparison of types . Curr Opin Ophthalmol. 2006. Vol. 17. P. 181–189

327. Shakir M, Bokhari A, Kamil Z, Zafar S. Combined trabeculotomy and augmented trabeculectomy in primary congenital glaucoma. *J. Coll. Physicians Surg. Pak.* 2013; 23(2): 116–119.

328. Sharaawy T., S. BhartiyaSurgical management of glaucoma: evolving paradigms. Indian J Ophthalmol, 59 (2011), pp. 123-130.

329. Sharma S., Sharma A., Kumar S., Sharma S.K., Ghosh B. Association of TNF haplotypes with asthma, serumIgE levels, and correlation with serum TNF-(alpha) levels. Am. J. Respir. Cell Mol. Biol., 2006, Vol. 35, pp. 488-495

330. Sood D, Rathore A, Sood I, Singh G, Sood N. Long-term outcome of combined trabeculotomy-trabeculectomy by a single surgeon in patients with primary congenital glaucoma. Eye. 2018;32:426–432.

331. Streilein J.W. Ocular immune privilege: therapeutic opportunities from an experiment of nature / J.W. Streilein // Nat. Rev. Immunol. — 2003. — №3. — P. 879-8897-9

332. Suominen SM, Harju MP, Vesti ET. Deep sclerectomy in primary open-angle glaucoma and exfoliative glaucoma. Eur J Ophthalmol. 2016;26:568–574.

333. Takai Y. Multiplex cytokine analysis of aqueous humor in eyes with primary open-angle glaucoma, exfoliation glaucoma, and cataract /Y. Takai, M. Tanito, A. Ohira // Invest Ophthalmol. Vis. Sci. — 2012. — Vol. 53. — P. 241-247

334. Tamcelik N., Atalay E., Bolukbasi S., Capar O. , Ozkok A. Demographic features of subjects with congenital glaucoma. Indian J Ophthalmol, 62 (5) (2014), pp. 565-569

335. Tezel G., Wax M. Glial modulation of retinal ganglion cell death in glaucoma // J. Glaucoma. 2003. V. 12. P. 63–68.].

336. Tonnu P. A. The influence of central corneal thickness and age on intraocular pressure measured by pneumotonometry, noncontact tonometry, the Tono – Pen XL, and Goldmann applanation tonometry / P. A. Tonnu, T. Ho, T. Newson, A. El Sheikh [et al.] . British Journal of Ophthalmology. – 2005. – Vol. 89(7). – P. 851 -854.

337. Van Overdam KA, De Faber JT, Lemij HG, De Waard PW. Baerveldt glaucoma implant in paediatric patients. *Br. J. Ophthal.* 2006; 90(3): 328–32.

338. Yang B., Ye C., Yu M. et al. Optic disc imaging with spectral-domain optical coherence tomography: variability and agreement study with Heidelberg retinal tomograph . Ophthalmology. – 2012. – Vol. 119, № 9. – P. 1852-1857.

339. Yassin SA, Al-Tamimi ER. Surgical outcomes in children with primary congenital glaucoma: a 20-year experience. Eur J Ophthalmol. 2016;26:581–587.

340. Zagora SL, Funnell CL, Martin FJ, et al. Primary congenital glaucoma outcomes: lessons from 23 years of follow-up. Am J Ophthalmol. 2015;159:788–796.

341. Zhang X, Du S, Fan Q, Peng S, Yu M, Ge. Long-term surgical outcomes of primary congenital glaucoma in China. J. Clinics. 2009;64:543–551.

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