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## Refractometric value and echobiometric researches in progressive myopia

**Abstract:** we observed 507 patients (1002 eyes) with various degrees of progressive myopia. Echobiometric studies were supplemented by tonographic methods. The integrated study revealed discrepancy of clinical refraction and the size of the eyeball in 30 % of the patients. 42.4 % of the patients had clinical signs of juvenile glaucoma. Clinical manifestations of juvenile glaucoma with progressive myopia require detailed study of pathology and selection of medical therapy.

**Keywords:** juvenile glaucoma, progressing myopia.

The study of myopia pathogenesis, working out the methods of prevention of its progressing is still one of actual problems of the modern ophthalmology. According to the modern data the leading place in children and teenager's morbidity is taken by refraction abnormalities (33–75 % of detected pathologies); among the refraction abnormalities about 80 % is myopia [10]. Besides that, myopia is one of the main reasons in the nosologic structure of invalidity of vision, taking the third place in the structure of invalidity of vision and the second place in the structure of pediatric invalidity [8].

According to various authors, the spread of myopic refraction in patients with glaucoma varies from 6 to 34 % [5, 11]. It is notable, that the risk of glaucoma appearance increases with intensification of refraction from hyper metropia to myopia high degree [1, 7].

Juvenile glaucoma as one of clinical types of congenital glaucoma and its pathogenesis is conditioned by congenital defects of UPK or drainage system of the eye in the period of embryonic development. In spite of the relatively low frequency of morbidity among other eye pathologies in children (0.1 %) in the structure of blindness the congenital glaucoma is a factor of invalidity in 2.5–7 % cases.

Clinical aspects of progressing myopia and congenital glaucoma are presented in literature detail enough [9]. The unit — weakened sclera, hydro dynamic disorders, internal eye pressure — one of the basic segments in the mechanism of myopia development [6]. But the complexity of early diagnosis of glaucoma with myopia is conditioned, as a rule, by decreased ophthalmic tension in case of myopia [3].

Studying the literature dedicated to glaucoma in people with progressing high degree myopia, we were confirmed that polymorphism of anatomical-physiologic alterations, absence of differential-diagnostic criteria and serious prognosis of glaucoma with progressing myopia are not described clearly [4].

**The aim of the research:** is to detect clinical importance of refraction metering and echobiometric studies of progressing myopia for improvement of the efficiency of the existing diagnostic and therapeutic methods.

**The materials and methods.** We performed examination of 507 patients (1002 eyes) with various degrees of progressing myopia. The age of the patients was from 15 to 32 ( $24.8 \pm 3.5$  years), among them 155 men and 352 girls. There were 135 patients with light degree myopia (266 eyes), among them 36 (70 eyes) with astigmatism component; 264 with mild degree myopia (522 eyes) — 148 patients with astigmatism (293 eyes) and 108 patients with high degree (214 eyes), among which 85 (169 eyes) with astigmatism.

Some of these patient were supervised before by oculist-doctors in their residence districts with various degrees of myopia and they received ambulatory treatment several times.

We performed the checking of the patients using traditional ophthalmologic methods (visometering, tonometering, tonography, static and kinetic perimetering, biomicroscopy, gonioscopy with the help of three-mirror Goldman's gonioscope). Clinical refraction was detected with the help of Huvitz 3100 refractometer (South Korea). The examination of optic nerve disk was performed with the help of direct ophthalmoscopy and estimation of its parameters according

to A. P. Nesterov's classification. Ultra-sound echobiometry was done with the help of Oftascan mini B («Alcon»), computer perimetry (Peritest-300, Russia).

### The results and discussion

At the primary check-up 507 patients (1002 eyes) complained worsening of far vision (100%), manifestations of visual discomfort (81.9%), visual fatigue (34.9%), worsening of twilight vision (31.9%) and progressing of myopia (38.1%).

Besides the aforesaid methods of patients' checking we compared compliance of echobiometric values of eye-ball to clinical refraction, paying special attention to the correspondence of the received data in the calculation of prolongation of sagittal axis of the eye 1,00 mm. equal to 3,00 d [1].

On the basis of the performed studies, dependently on the correspondence of the results of clinical refraction and eye anterior-posterior axis (APA) examination the patients were divided to two groups.

The first group included 355 (703 eyes) patients with corresponding clinical refraction and the size of APA. Among the examined patients we detected: 99 (196 eyes) with light myopia, 184 (364 eyes) mild and 72 (143 eyes) with severe myopia. We detected astigmatism in 24 patients (47 eyes) with light myopia (24.2%), 94 (187 eyes) with mild form (50.5%), and 53 (106 eyes) patients with severe myopia (74.3%).

The second group included the results of examination of 152 patients (299 eyes) with discrepancy of the data of refraction and APA. Among them, there were 36 people with slight myopia (70 eyes), 80 with mild form (158 eyes) and 36 with severe myopia (71 eyes). Astigmatism of various degrees was detected in 12 cases of light degree myopia (23 eyes) or 33.3%, 54 cases (106 eyes) or 67.9% with mild form, and 32 (63 eyes) or 87.7% cases with severe myopia.

The values of visometry, clinical refraction, APA of the eye ball in these groups according to the degrees of myopia are presented in Table 1.

Table 1. – The values of clinical studies in the research groups

Values	I-group Myopia degree n = 703 eyes			II-group Myopia degree n = 299 eyes		
	light n = 196	mild n = 364	severe n = 143	light n = 70	mild n = 158	severe n = 71
Acuity of vision	0.61 ± 0.002	0.23 ± 0.004	0.09 ± 0.002	0.42 ± 0.004	0.18 ± 0.002	0.06 ± 0.002
Astigmatism, %	24.1 %	51.3 %	74.5 %	32.4 %	67.8 %	87.9 %
Refraction, M	1.65 ± 0.12	4.01 ± 0.82	9.81 ± 2.72	1.71 ± 0.14	4.12 ± 0.81	9.91 ± 2.82
APA, mm.	23.3 ± 0.5	24.5 ± 1.1	27.2 ± 1.1	23.9 ± 0.6	25.2 ± 1.1	28.5 ± 1.1

Note: n — number of eyes

We selected maximal glass correction for the examined patients on the basis of the achieved data of visometry, clinical refraction and presence of astigmatism of various degree and angles.

The patients of the first group corrected the values to 0.8–1.0 by means of glass correction, anisometropia (18.7%) was not explicit. Examination of the second group showed anisometropia in 47.8% cases and it was more explicit dependently on the degree of myopia in one of the eyes. On the basis of clinical refraction data 38.3% of the patients had intolerance in the selection of maximal improving glass correction.

Tonometric values in the second group of the patients were higher, and internal eye pressure (IEP) was at the average level of 21.5 ± 0.19 mm. mercury column, while in the first group the values of IEP were at the average level of 17.5 ± 0.13 mm. mercury column.

In relation with echobiometric values and APA sizes discrepancy with the data of clinical refraction and higher values of IEP in the second group we decided to check glaucoma. The patients of the first group were also checked for comparison.

The patients had day tonometry, tonography, static and kinetic perimetry, biomicroscopy, gonioscopy with the help of three-mirror Goldman's gonioscope, direct and reverse ophthalmoscopy, loading and unloading tests.

Among the examined patients of the first group with progressing myopia in 12.6% cases juvenile glaucoma was

diagnosed (JG). The representatives of the second group with discrepancies of APA data and clinical refraction had JG in 42.4% cases. The results of these patients' examination served the subject of our other articles.

According to some authors' opinion [4, 6] discrepancy of clinical refraction and APA values is linked with the growth of sagittal size of eye-ball and enlargement of its volume. That manifestation is a result of chronic disorder of internal eye liquor (IEL) flow, linked with retardation of anterior chamber angle development. According to the data provided by various authors [2; 5; 6], biochemical and morphologic checking of sclera in that age category show that the number of elastic fibers prevail collagen ones. In relation to that, the structure of the eye-ball becomes more elastic, pliant, and subject to extension. The rise of IEL amount can be the reason of enlargement of the eye-ball. In our opinion, progressing of myopia is secondary in relation to IEL volume increase appearing consequently to the disorder of outflow caused by retardation of development of the structures of drainage zone — goniodysgenesis. That disorder leads to the rise of IEP. The extension of fibrous membrane of the eye-ball is accompanied by extension of the vascular membrane and retina, causing worsening of the trophics of nerve cells and optic nerve. Apparently, the rise of IEP in that group of the patients can be trigger mechanism in the etiology and pathogenesis of juvenile glaucoma.

**Conclusions:**

Discrepancies of the values of clinical refraction and APA sizes of the eye-ball in 30 % of the patients with progressing myopia.

Among the patients with progressing myopia with discrepant values of clinical refraction and APA sizes of the

eye-ball in 42.4 % cases juvenile glaucoma was diagnosed, while in 12.6 % patients glaucoma was detected with the corresponding aforesaid data.

Discrepancy of the clinical refraction values with the sizes APA of the eye-ball in the patients with progressing myopia can be one of the criteria to suppose juvenile glaucoma.

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## Optimization of the therapy for children with allergic diseases of eyes

**Abstract:** a special pathogenetic complex therapy provides multi-level protection of intestine, stimulating immune response and activating non-specific factors of protection.

**Key words:** allergic diseases of eyes, children, therapy.

**Topicality.** In the whole world allergic diseases of eyes are urgent problems of ophthalmology: from 4% to 32% of population suffer these diseases and it tends to increase, first of all explained by worsening of ecologic conditions in industrially developed countries. The frequency of allergic damages of eyes is conditioned by the fact that in its tissues and structures there is significant amount of all components compulsory for allergic reactions' progress [1; 2; 3].

Disorders in the immune system of an organism effect the progress of almost all nosologic forms of ophthalmologic diseases. The part of immunologic drifts can vary: leading —

etiopathogenetic (i. e. it is the main reason of ophthalmic pathology development, for example autoimmune uveitis, sympathetic ophthalmia), complicating (complicate the progress of a pathologic process caused by other factors, such as infection or trauma in an eye) and asso ciated (without significant effect on the development of ophthalmic diseases, but can lead to the worsening of the therapy results, as in case of post traumatic cataracts, separation of retina, complicated short sight) [4, 7].

Micro flora of gastro-intestinal tract of an organism is interrelated with its immune system. Endogenic flora of intestine,