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FUNCTIONAL FEATURES OF SURGICAL TREATMENT OF CATARACTS IN CHILDREN WITH HIGH MYOPIA (Literature review)

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Abstract: Congenital myopia detected in children of the first three years of life is usually characterized by a high degree (55-91% of cases), an increase in the length of the anterior-posterior axis (APA), anisometropia (45-55%), astigmatism (40%), a decrease in the corrected acuity vision (over 90%), changes in the fundus associated with abnormal development of the optic nerve (atypical form, oblique entry into the sclera, the symptom of bindweed, pseudo-congestive nipple, coloboma, atypical cones) and macular region (hyperpigmentation hypoplasia, "parquet" or, on the contrary, an albino bottom).During the analysis of the literature, we identified the causes that lead to refractive errors in the calculation of IOL during cataract surgery in the eyes after keratorefraction operations.Thus, there are a number of factors that impede the achievement of the maximum possible functional results during intraocular correction in patients during cataract extraction who have undergone excimer laser keratorefractive interventions.

Keywords: congenital cataract, high degree miopia.

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Congenital cataract is a fairly common eye disease in children, accounting for 60% of all congenital defects of the organ of vision, and is one of the main causes of congenital blindness and low vision (10.0-19.5%). Currently, it is proven that the mutation of certain genes leads to the development of cataracts. Congenital changes of the lens can be both isolated and combined with damage to other organs and systems or eye anomalies.

Like other anomalies, congenital cataracts can develop as a result of fetal abnormality due to the influence of teratogenic factors on the fetus. Opacities of the lens can be a consequence of a number of intrauterine viral infections-rubella, cytomegaly, chicken pox, herpes, flu. In this case, the mother's disease

may be asymptomatic or with mild symptoms. As a result, the disease passes for a woman unnoticed, but leads to the development of fetal abnormalities, including cataracts [11].

Congenital myopia detected in children of the first three years of life is usually characterized by a high degree (55-91% of cases), an increase in the length of the anterior-posterior axis (APA), anisometropia (45-55%), astigmatism (40%), a decrease in the corrected acuity vision (over 90%), changes in the fundus associated with abnormal development of the optic nerve (atypical form, oblique entry into the sclera, the symptom of bindweed, pseudo-congestive nipple, coloboma, atypical cones) and macular region (hyperpigmentation hypoplasia, "parquet" or, on the contrary, an albino bottom).

Often (in 19.4%, according to R.S. Sorokina et al.), Congenital myopia is combined with various types of pathology and anomalies of the eye, such as nystagmus, strabismus, colobomas of the eye membranes, subluxation of the lens, partial or complete cataract , spherophacia, lenticonus, embryonic tissue residues, pigment epithelium pathology, partial atrophy of the optic nerve, as well as with various systemic ectodermal malformations and various types of connective tissue dysplasia (Marfan, Stickler, Margesani; blue sclera, deformities thoracic cavity, flatfoot, umbilical hernia, arachnodactyly, etc.) [1,5,9,12,14,28].

The introduction of ultrasound phacoemulsification and standard implantation of posterior chamber IOLs into the capsular bag into routine clinical practice significantly reduced the percentage of secondary cataracts and vitreoretinal complications in patients with cataract and high myopia [21]. This is due to the blocking of the germs of the lens area by the haptic elements of the IOL and, moreover, the important role of the IOL optics, which prevents the proliferation of the proliferative process in the central optical region of the posterior capsule.

According to many ophthalmic surgeons, implantation of this model of posterior chamber IOL, which, due to full straightening and tension of the capsular bag of the removed remote lens, can create close contact between it and the IOL, blocking the migration of the lens epithelial cells from the equatorial membrane, can reduce the percentage of opacities in the posterior lens capsule. in the central region of the posterior capsule, which prevents the development of a secondary cataract, and also prevents the displacement of the vitreous body [23].

Most of the posterior chamber IOLs have an angle of inclination of the haptic elements relative to the optics of the IOL from 5 to 10 degrees.

Therefore, there is always a gap between the optical part of the intraocular lens and the posterior capsule of the removed lens, over which the lens epithelium cells can spread [24].

With a high degree of myopia, according to a number of authors, cataracts are found ten times more often than in the population. High degree of myopia is one of the risk factors for cataract surgery, such as damage to the posterior lens capsule, the development in the postoperative period of retinal detachment [4,6,7,16,28].

Myopia is characterized by the development of a nuclear form of cataract with a core density of 3-4, which significantly increases the energy and hydrodynamic load on intraocular tissues, and this increases the risk of keratopathy in the postoperative period [1]. Modern technology of cataract phacoemulsification through small incisions, provided that high-quality anterior capsulorhexis is used, softer hydrodynamic parameters, delicate manipulations, and sparing ultrasound modulation modes are used to remove the lens with high myopia without the risk of vitreoretinal complications.

The method of phacoemulsification occupies a leading position in modern cataract surgery. The relative closure of the eye cavity during manipulations, a small self-sealing incision, and the possibility of reliable intracapsular fixation of the IOL reduce the likelihood of severe intra- and postoperative complications, which contributes to the rapid visual and social rehabilitation of patients [22].

At the moment there are many modifications of the method of ultrasonic phacoemulsification. The correct choice of the method of operation is especially important in non-standard situations, i.e. with concomitant diseases of the eye. One of these diseases is myopia.

According to statistics, among patients seeking cataracts, its combination with myopia occurs in 10-25% of cases [26]. Thinning, stretching of the membranes of the eye and ligamentous apparatus of the lens, destruction and liquefaction of the vitreous body, as well as impaired hemo- and hydrodynamics characterize the eye in myopia [2].

Conducting cataract phacoemulsification in these patients is associated with a number of problems arising from the peculiarities of the anatomical structure of the eye in high myopia. The main ones are: obstructed visual "control of manipulation during the operation due to the great depth of the anterior chamber; the risk of damage to the Zinn ligaments and dislocation of the lens due to weakness of the ligamentousapparatus, which is observed in most patients; the risk of rupture of the posterior lens capsule during the operation due to its relative thinning. Thus, the prevention of intraoperative complications in this group of patients is relevant and requires special attention.

Own experience of using phacoemulsification methods proposed by various authors does not give grounds to consider them acceptable in all cases and safe for patients with high myopia.

In recent years, the number of patients with cataracts who have previously undergone refractive intervention for myopia has been steadily increasing.

Removal of cataracts in patients with high myopia is associated with a high risk of intra-postoperative complications associated with the features of the "long" eye (deep anterior chamber, weakness of the ligamentous apparatus of the lens, stretching of the posterior segment of the eye) [14,15,31].

In addition, these patients have anatomical changes in the cornea, which must be considered in cataract surgery [10, 11, 30]. Often in the postoperative period there is a shift of refraction towards hypermetropia [10, 27, 29]. Among the main reasons leading to an undesirable result are: incorrect determination of the refractive power of the cornea by standard keratometers, the use of inappropriate formulas for calculating intraocular lenses, inaccuracy of ultrasound biometric measurements [18, 19].

According to some authors, a measurement error of 100 ?m leads to a refractive error of 0.28 D [17]. In this regard, it is interesting to study the change in refraction and the choice of the optimal formula for calculating the intraocular lens for this group of patients.

In recent years, a significant number of cataract patients have appeared who have undergone some kind of refractive intervention, and their number continues to grow.

Extraction of cataracts in myopic is considered a risky surgery, due to possible complications associated with the features of the myopic eye (deep anterior chamber, weakness of the fibers of the cynic ligament, stretching of the posterior segment of the eye) [3].

In addition to the above, patients who have undergone excimer laser kerretorefraktsionnye operations, there are anatomical changes of the cornea, specific to excimer laser surgery (corneal thinning, the potential risk of corneal flap maladjustment) that need to be considered in cataract surgery However, in the world literature there is no detailed description of the corneal flap). and after cataract removal

It should be noted that patients who have undergone refractive interventions are particularly demanding on the quality of vision, and after cataract extraction, they expect to receive high visual acuity without correction. However, clinical experience has shown that the accuracy of the calculation of the strength of the intraocular lens (IOL) is a serious problem. Often, in these patients, in the postoperative period, there is an undesirable shift of refraction towards hypermetry [25].

During the analysis of the literature, we identified the causes that lead to refractive errors in the calculation of IOL during cataract surgery in the eyes after keratorefraction operations.

First of all, it is the incorrect

determination of the refractive power of the cornea using standard keratometers and keratotopographs based on disks. According to most researchers, in the course of standard keratometry, there is a significant overestimation of the refractive power of the cornea, which leads to a shift of refraction toward hyperopia after cataract extraction with implantation of an IOL of insufficient refractive power [17].

The second reason leading to underestimation of the refractive power of IOL on myopic eyes and hyperopic shift of postoperative refraction is the inaccuracy of biometric measurements, in particular, measurements of the anteroposterior axis of the eye (LLP) - when using standard ultrasound biometers, the deformed cornea is deformed, and there is a high probability that the optical axis does not match eyes with anatomical due to the signal at the top of the staphyloma.

The third and, in our opinion, the most important cause of refractive errors in cataract surgery is the use of inadequate formulas for calculating the IOL. / T, Holladay, Hoffer.Q. It is important to pay attention to the nature of the dependence of these techniques on corneal refraction.

Thus, there are a number of factors that impede the achievement of the maximum possible functional results during intraocular correction in patients during cataract extraction who have undergone excimer laser keratorefractive interventions.

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