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MODERN APPROACH TO THE CORRECTION OF CONGENITAL MYOPIA

Boboyev S.A.

Candidate of Medical Sciences,
Associate Professor, Head of Ophthalmology Department
Samarkand State Medical University

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Abstract:

Congenital myopia (myopia) is caused by impaired development of the eyeball during intrauterine development. It is often caused by prematurity, hypoxia, and various diseases of the mother during the first three months of pregnancy. Normally, children are born hypermetropic, i.e. farsighted. The child's eyeball is shortened, and light rays passing through the refractive media of the eye are focused not on the retina, but behind it. In small children, farsightedness of a weak degree is a natural age norm and with time (by the age of six or seven) passes, because as the child grows, the eyeball enlarges and the optical focus moves to the retina. In congenital myopia, the child is born with an elongated eyeball, which means that light rays do not reach the retina. This is very dangerous, as this condition interferes with the correct formation of the visual analyser and, as a consequence, the overall development of the baby.

Keywords: Myopic anisometropia, correction, phakic posterior chamber ICL lenses.

RELEVANCE. Congenital myopia is a special form that is formed during the intrauterine development of the foetus [1,2,11]. A distinction is made between transient (transient) myopia, which disappears by the end of 1 year of life of a newborn as a result of ciliary muscle maturation, reduction of the refractive power of the cornea and lens, and deepening of the anterior chamber. However, 42% of children with transient myopia become myopic again by the age of 8-9 years [2,3]. In addition, there is true congenital myopia, which is characterised by a high degree (55-91% of cases), increased RPE, changes on the ocular fundus. The frequency of this myopia, according to different data, is 1.4-4.5% among children 1 year old. The clinical picture of congenital myopia is characterised by significant polymorphism, it may combine refractive disorders, anatomical and functional disorders, organic changes in the optic nerve and eye membranes, and various concomitant pathologies to varying degrees [5]. The modern level of refractive surgery development has made it possible to apply a number of surgical methods of correction in paediatric practice. Traditionally, refractive surgeries are divided into two main groups: intraocular and keratorefractive methods [4,6]. Intraocular surgical methods of ametropia correction include implantation of phakic intraocular lenses of negative or positive optical power with preservation of the natural lens, as well as extraction of a clear lens with or without IOL implantation. The advantage of intraocular correction is the absence of restrictions in the amount of corrected ametropia, i.e. it can be used in case of high and ultra-high ametropia, including in combination with astigmatism. The necessary conditions for phakic IOL implantation are normal intraocular fluid hydrodynamics and sufficient anterior chamber depth [5,6].

Unsuccessful attempts to implant the first models of phakic IOLs, which were anterior chamber IOLs, and postoperative complications (corneal endothelial-epithelial dystrophy, glaucoma, cataract, iridocyclitis) constantly stimulated researchers to further develop and improve the implants [7,8,9]. The unflagging interest in phakic IOL implantation is due to the accuracy and stability of the refractive effect, preservation of the eye's own accommodative ability. [10,11]. Implantation of posterior chamber phakic IOLs in correction of high degree anisometropia in children and adolescents is reported in a number of publications [12,13,14]. However, researchers note the necessity of long-term observation to study the effect of phakic IOL, which is still a foreign body, on the children's eye.

PURPOSE OF THE STUDY. To analyse the results of correction of high degree myopic anisometropia in children by implantation of phakic posterior chamber ICL lenses.

MATERIALS AND METHODS. The results of 18 implantations of phakic posterior chamber ICL lenses for unilateral high degree myopia in children were

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analysed. The indications for the operation were the lack of possibility to use spectacle and contact correction. Contraindications to this operation were: optic nerve atrophy, very high degree amblyopia, cataract, glaucoma, incomplete transparency of optical media, inflammatory diseases, progressive myopia, anterior chamber depth less than 3.0 mm, endothelial cell density less than 2300. This study was carried out in the eye centre of A.A. Yusupov LLC. The operations were performed on 18 patients, 10 boys and 8 girls, the age varied from 14 to 18 years. The follow-up period ranged from 1 to 3 years. Initial spherical refraction ranged from -9.0 to -18.0 D (average -13.5 D), astigmatism varied from 0.5 to 2.5 D. Preoperative maximum-corrected visual acuity ranged from 0.08 to 0.2. Keratometry values ranged from 42.1 to 45.6. The mean value of the eye length was 26.9. Ultrasound biomicroscopy was performed in all patients before and after surgery. If necessary, peripheral prophylactic laser photocoagulation of the retina was performed for dystrophic changes of various degrees of severity. All ICL implantation surgeries were performed by one surgeon under general anaesthesia. The surgery was performed through a corneal incision. Additionally, paracentesis was performed at 10 and 2 hours. ICL phakic posterior chamber lens was implanted according to the manufacturer's instructions using an injector.

RESULTS AND DISCUSSION. All surgeries were performed without complications. One patient had slight hypotension in the first 3 days after surgery. The rest of the patients had areactive course of the postoperative period. Significant improvement of visual acuity without correction occurred in the first day after surgery. On the first day after implantation of phakic posterior chamber ICL lens all patients had uncorrected visual acuity of 0.3 and higher, on average visual acuity increased by 0.15. The mean postoperative IOP was 18 mmHg. One patient had IOP elevation, which was controlled by the administration of beta-blockers. Endothelial cell loss did not exceed 1.5% (0.5 to 1.5%). At 6 months after surgery, the acuity in all patients was 0.4-0.5 or higher. The spherical component of postoperative refraction averaged -0.49 D (-0.25 to 1.5 D). The astigmatic component ranged from 0.5 to 2 D. Keratometric examination did not reveal induced astigmatism of more than 0.75 D. In 84% of cases, the postoperative refraction differed from the planned refraction by no more than 0.5 D. Significant improvement of uncorrected visual acuity occurred almost immediately after surgery. Postoperative visual acuity not only reached the level of preoperative corrected visual acuity, but also exceeded this threshold. The level of maximum visual acuity was observed by the end of the 2nd week after phakic IOL implantation. According to the results of ultrasound biomicroscopy, the preoperative depth of the anterior chamber varied from 3.0 to 3.4 mm, and in the postoperative period the distance between the lens and the endothelium averaged 2.3 mm. The distance between the anterior lens capsule and the posterior surface of the phakic IOL ranged from 0.5 to 0.7 mm. The lens occupied the central position in the posterior chamber. Twelve months after surgery, acuity in all patients was 0.5 or higher (0.5 to 0.8). Refraction remained stable. The mean postoperative IOP was 18 mm Hg.

CONCLUSIONS. Correction of high degree anisometropic myopia in children by implantation of phakic posterior chamber ICL lenses gives satisfactory results in terms of efficacy, predictability, stability and safety. Postoperatively, there is an improvement in visual acuity associated with an increase in the retinal image, which creates conditions for the normal development of the visual analyser in children.

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