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Peculiarities of the Clinical Course of Congenital Myopia

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Annotation: Congenital myopia is a decrease in visual acuity caused by intrauterine disorders in the structure and function of various parts of the eyeball. The disease develops under the influence of genetic mutations, teratogenic effects and perinatal complications. Visual impairment is detected in children from an early age, often accompanied by astigmatism and amblyopia. Visometry, ultrasound and OCT of the eye, computer accommodation and laser retinotomography are used for diagnostics. Treatment consists of early optical correction of refractive errors, the use of auxiliary drugs and physiotherapy methods.

Keywords: Causes, Pathogenesis, Classification, Symptoms of congenital myopia, Complications, Diagnostics, Treatment of congenital myopia, Optical correction, Pharmacotherapy and physiotherapy.

Introduction: Congenital myopia is caused by pathologies of the visual apparatus that develop in the antenatal and intranatal periods. The disease is multifactorial and is accompanied by various anatomical, functional and refractive disorders. Possible causes of the disease include:

Myopia is the most common visual impairment, occurring in 6-8% of primary school children, 25-30% of school graduates and 35-42% of adults. The incidence of congenital visual impairment in infants under 1 year of age is 1.4-4.5%, more than half of these cases have a high degree of myopia - minus 6 diopters. Congenital myopia is often combined with other eye diseases and is difficult to optically correct, therefore it represents a serious problem in pediatric ophthalmology.

Genetic factors. There are 23 genes responsible for the predisposition to vision disorders located at different loci on chromosome 15. They are not well understood and are probably part of polygenic systems that determine visual acuity. In addition, 54-65% of children with congenital myopia have one or both parents who are nearsighted.

Pregnancy pathologies. The risk of developing congenital myopia in the fetus increases with early and late toxicosis, the threat of spontaneous abortion, gynecological and extragenital diseases of the mother. Visual impairment is a common consequence of intrauterine TORCH complex infections.

Premature birth. High levels of congenital myopia are often observed in children with retinopathy of prematurity. The younger the gestational age of the fetus at the time of premature birth, the higher the risk of ophthalmological diseases.

Complicated labor. Congenital myopia occurs in newborns who have suffered birth trauma to the skull or cervical spine, umbilical cord, or prolonged labor. The disease can be a consequence of perinatal hypoxia and encephalopathy.

The development of congenital myopia is based on dystrophic processes and stretching of the sclera apparatus in the back of the eye. The eyeball acquires a pathologically elongated shape, which leads to the convergence of rays passing through the lens in front of the retina, which forms a blurred image. Changes in the structure of the eye are accompanied by disturbances in tissue trophism, which exacerbates existing pathologies and leads to retinal atrophy.

Research methods and materials: Metabolic disorders play an important role in the development of myopia. In patients, the antioxidant protection of red blood cell membranes decreases and the metabolism of calcium and phosphorus is disturbed. Congenital myopia is also characterized by impaired synthesis of collagen fibers and proteoglycans, so the disease is often found in children with

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connective tissue pathologies. Young children do not complain of poor vision, so parents should pay attention to indirect signs. A child with myopia constantly squints when trying to see distant objects, blinks rapidly, and wrinkles appear on his forehead. He brings toys closer to his eyes and approaches the TV to carefully study the image. Older children may complain of blurred vision and headaches after visual stress.

Transient myopia is characterized by the normalization of visual acuity at the beginning of the second year of a child's life as a result of the maturation of the ciliary muscle and a decrease in the refractive power of the anterior segment of the eye.

In true myopia, there is a steady or progressive deterioration of vision, which is accompanied by elongation of the eyeball and changes in the fundus.

Previously, congenital myopia was considered a stable disease - visual acuity in children remained unchanged for many years. However, in recent decades, doctors have increasingly encountered rapidly developing forms of the disease. In this case, the child's vision is constantly deteriorating, so that, without proper correction, already at primary school age, he sees only objects located at a distance of 1-1.5 meters around him.

Congenital high myopia is a disease that, if left untreated, can lead to disability and even blindness in the patient. Possible complications include clouding of the lens (cataract), destruction of the vitreous body and detachment of its membrane. Sometimes retinal detachment and retinal tears are observed, which occur against the background of prolonged dystrophy in the dentate gyrus.

Results: The severe course of congenital myopia is caused not only by the high rate of refractive errors. In many patients, myopia is accompanied by amblyopia - the syndrome of "lazy eye". The pathology leads to a further deterioration of visual acuity even with relatively stable sizes and proportions of the structures of the eyeball. With amblyopia, the visual function of one eye is suppressed, and binocular perception of the surrounding world is impaired. Consultation of patients with complaints of poor vision is carried out by a pediatric or adult ophthalmologist. If a clinical examination reveals a decrease in visual acuity, the presence of myopia is not suspected and does not require differential diagnosis. At the second stage, an expanded instrumental examination is indicated to determine the state of various structures of the eye and identify concomitant pathologies. The following methods are used:

Visometry. In patients under 3 years of age, the examination is carried out using a preference test and a method of recording optokinetic nystagmus, depending on the presence of object vision. For children 3 years of age and older and adults, special tables with pictures, rings or letters are used. Visometry is supplemented by an assessment of visual fields - perimetry

Discussion: Modern methods of optical correction allow a patient with congenital myopia to have relatively normal vision and live a full life with minimal restrictions. The long-term prognosis is determined by the timely start of treatment, the degree of myopia and the dynamics of its development. Primary prevention of the disease has not been developed. Secondary prevention includes regular examinations of the child by an ophthalmologist to monitor visual acuity.

Another typical complication of congenital myopia is astigmatism. With myopic astigmatism, the shape of the cornea and lens is distorted, as a result of which light rays are refracted incorrectly, which forms a blurry, distorted image. If timely correction is not carried out, poor vision causes problems in understanding the world, learning and social adaptation, and causes serious limitations in everyday life.

Ultrasound examination of the eye. During the ultrasound examination, an increase in the anterior-posterior segment of the eyeball is detected, the transverse diameter of the eye and the acoustic density of the sclera are measured. Ultrasound data exclude accommodation spasm and confirm the presence of anatomical changes that cause myopia.

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Accommodation. In patients with progressive myopia, a special diagnostic method is prescribed to determine the decreasing accommodation and objective accommodative response (OAR). An increase in OAR during treatment is considered a favorable prognostic factor.

Optical coherence tomography. Using OCT, specific features of the structure of the retina in congenital myopia are identified: thickening of the neuroepithelium in the center of the macula, a decrease in the thickness of the parafoveal region, changes in the relief of the retina and its pronounced thinning in the paracentral zones.

Heidelberg laser retinotomography. The study shows structural anomalies of the optic nerve head: a bent position, oblique entry of the vessels, atrophy of adjacent chorioretinal tissues. In congenital myopia, there is a smaller excavation in the optic disc than in acquired myopia. Posterior staphylomas (protrusions of the sclera) are often detected.

Electroretinography. In patients with congenital myopia, the study of the bioelectric activity of the neuroepithelium reveals stationary night blindness, pathologies of the rod and cone systems, and dysfunctions of the outer layers of the retina. The main goal of treatment is to correct visual acuity, which begins as early as possible after myopia is detected. For this purpose, glasses, contact lenses, and a combination of the two methods are used. For children under 8 years of age, only glasses are prescribed for correction, since small patients cannot correctly put on and remove lenses even with the help of their parents. In case of concomitant astigmatism, special cylindrical lenses are used.

In old age, soft contact lenses (SCL) and rigid orthokeratological lenses for night correction are prescribed. They provide clear vision in all areas of the visual field, eliminating the need for the child to wear glasses. MKL is an indispensable type of correction when there is a significant difference in refraction between the left and right eyes. Clinical observations confirm that the transition to contact correction allows you to increase corrected visual acuity by 0.1-0.3 points.

Conclusion: Drug therapy for congenital myopia shows limited effectiveness and is therefore prescribed in combination with other methods. Vitamin and mineral complexes, vasodilators and neurometabolic drugs are used. The drugs are taken orally, instilled into the eyes or administered parabulbarly. Physiotherapy is also used: electrophoresis with a solution of calcium chloride, magnetic therapy, acupuncture and electropuncture.

The operation is recommended for stretching the posterior pole of the eye, myopic staphylomas, damage to the vascular and nervous structures of this area. Patients are prescribed scleroplasty and eye filling using donor sclera to stop retinal dystrophy and prevent irreversible loss of vision. In 90% of patients, myopia can be stabilized; in the remaining 10% of cases, the rate of its development slows down by 2 times.

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