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Congenital Anomalies of the Visual Organ, Congenital Blepharoptosis

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Abstract: Congenital anomalies of the visual organ are currently the main form of ophthalmopathology in children. This is confirmed by leading specialists in pediatric ophthalmology.

Keywords: myogenic ptosis, congenital blepharoptosis, ptosis – amblyopia.

Among congenital defects of the visual organ, blepharoptosis occupies one of the first places. Drooping of the upper eyelid, even partial, is a significant cosmetic defect. Complicated forms of ptosis (reaching, according to various authors, up to 44.35% of cases), in which drooping of the eyelid is combined with other pathological conditions of the eye and oculomotor apparatus (blepharophimosis, epicanthus, paralytic strabismus, synkinesis, etc.), especially worsen the appearance of patients. Elimination of ptosis in children is not a purely cosmetic problem, since timely treatment of this pathology also helps prevent a number of complications associated with ptosis - amblyopia, incorrect head position, binocular vision disorders, posture disorders. Simple, congenital, hereditary ptosis is transmitted mainly by an autosomal dominant type and usually has a myogenic nature. Such ptosis is most often associated with levator hypoplasia. Complicated ptosis is also inherited in a dominant way. Complicated ptosis includes ptosis combined with other eyelid anomalies: epicanthus, blepharophimosis, ankyloblepharon and others. Complicated ptosis in most cases is associated not only with levator hypoplasia or aplasia, but also with incorrect, atypical attachment or complete absence of the levator. In these forms, synkinesis, fusion of the levator with the superior rectus muscle, absence of peripheral innervation, and aplasia of the oculomotor nuclei often occur.

Myogenic ptosis, developing in middle and late age, occurs in several family members and is usually symmetrical.

The bulk of publications devoted to ptosis mainly cover one narrow issue - the technique of surgical treatment. At the same time, the main difficulty in correcting congenital blepharoptosis, noted by all specialists, is the uncertainty in the results obtained. Often, various methods of surgical elimination of ptosis are used without taking into account the clinical features of ptosis and are limited to a small number of observations. The large number of existing operations for ptosis, the appearance in the ophthalmological literature of descriptions of new operations and their modifications indicate the unflagging interest of ophthalmic surgeons in this issue, as well as the fact that none of the methods used today can completely solve the problem of blepharoptosis. In this regard, there was a need to develop more advanced technologies for the treatment of blepharoptosis and the use of preformed factors with an effect on the central

structures of the nervous system. The prospects of work in this direction are supported by a number of studies demonstrating the effectiveness of their use and the features of the functions of the central nervous system in various age groups, including in congenital pathology, when the use of methods that have a normalizing effect on the functional state of the central nervous system is pathogenetically justified. As N. N. Kulikov et al. (1999) indicate, when laser radiation is applied to certain areas in the skull - the projection of the brain structures, "functional changes in the corresponding area of the cerebral cortex, where various functions of the body are represented," are observed. We have developed a comprehensive approach to the rehabilitation of children with congenital blepharoptosis using preformed factors and multi-level effects on the central and peripheral links of the neuromuscular apparatus. The indication for the use of this diagnostic and treatment method is the presence of congenital blepharoptosis of any form and degree. Contraindications include the presence of seizure readiness and epilepsy, as well as oncological disease.

Standard equipment of an ophthalmological office and an ophthalmological operating room was used.

The procedure of electrical stimulation according to the blink reflex system is performed only by a doctor using the domestic device "AMPLIPULSE-5" (TU 4-87 EX 2.893.063 TU-LU PO "Radiopribor" (Velikiye Luki) No. 88/576-71) in a rectified mode, II type of operation, with a frequency starting from 10 and gradually increasing to 150 Hz, modulation depth of 100%, duration of 2-3 seconds, current strength according to the patient's sensations until contraction of the orbicularis oculi muscle. The impact is produced by the cathode in the skin projection of the exit points of the facial nerve, I and III branches of the trigeminal nerve on both sides with a point electrode, while the second electrode (anode) with an area of 50-75 cm2 is located in the area of the cervical vertebra (exposure time is 1 min. for each point). The procedures are carried out daily, the course of treatment is from 8 to 10 procedures.

The procedures are carried out with a gradual decrease in the pulse duration to 0.5 ms.

The pulse is changed based on control measurements of the lability of the neuromuscular apparatus. IR laser irradiation of the projection motor zones of the cerebral cortex is performed using the AMOL-Izel-Viktoriya local laser device (TU 9444-001-05841879-93 AONPMTLO "Volna", Moscow, registration number 94/271-129) in a continuous mode, at a power flux density of 2.2 mW. Irradiation is performed on both sides, for 3 minutes per field, the course of treatment is 8-10 daily procedures.

The radiation dose is:

- for 1 procedure - 1.2 J / cm2;
- for a course of treatment from 9.6 J / cm2 to 12 J / cm2.

With complex exposure, laser irradiation of the projection zones of the facial area in the cerebral cortex is initially carried out, and then, without a temporary break, electrical stimulation is carried out using the blink reflex method. This sequence is the most physiological, since a time interval is required for the biological reaction of tissues to manifest.

In surgical treatment, the following methods should be highlighted: hanging the upper eyelid to the frontal muscle, combining the superior rectus muscle with the upper eyelid, maximum resection of the levator of the upper eyelid, resection of the cartilage of the upper eyelid, a combined method of resection of the levator with resection of the cartilage of the upper eyelid and lifting the ciliary edge of the upper eyelid.

Our own algorithm for clarifying the diagnostics of the functional state of the levator, including measuring the width of the palpebral fissure on both sides in three positions of gaze with an accuracy of 0.5 mm, allows you to monitor the results and promptly adjust the course of

treatment. The width of the palpebral fissure is examined before, immediately after and in the late period of treatment.

Using the Amplipulse device, the exit points of the trigeminal nerve are affected. An early response to electrical stimulation by the blink reflex type is a contraction of the eyelids on the side of the impact and is provided by a lower current strength, a late response is caused on the side opposite to the impact by a higher current strength. An increase in the current strength to cause a blink response over 0.8 mA for an early response and over 1.8 mA for a late response is an indicator of a decrease in the functional complex of the upper eyelid elevators. The identified objective criteria for diagnosing this pathology allow us to make additions to the generally accepted classification of the degree of blepharoptosis: 1) with a moderate change in the function of the levator and conduction pathways, 2) with a pronounced change in these structures.

Based on the differences in the functional state of the upper eyelid lifters, it is proposed to use various surgical methods. In case of "severe" blepharoptosis with borderline depression of the conduction pathways and the muscular apparatus of the upper eyelid lifter, it is advisable to perform surgical intervention to the maximum extent, namely, maximum shortening of the upper eyelid levator, with complete closure of the palpebral fissure in combination with resection of the cartilage. In the presence of "mild" types of pathology with moderate impairment of the neuromuscular structures responsible for the act of lifting the upper eyelid, the use of so-called "gentle" methods of surgical intervention is indicated, if possible not affecting the upper eyelid levator. This is resection of the upper eyelid cartilage and lifting of the ciliary edge of the upper eyelid. For all types and degrees of blepharoptosis, excluding patients with contraindications, the first stage involves diagnostic and then therapeutic use of electrical stimulation using the blink reflex method, with mandatory IR laser irradiation of the motor cortex responsible for the facial muscles. In the absence of positive dynamics in the process of carrying out preformed treatment methods, it is safe to carry out any suitable surgical techniques. In the case of a positive effect against the background of conservative treatment (widening of the palpebral fissure by more than 0.5 mm in at least one of the gaze positions, a decrease in current strength above 0.1 mA with an early response and above 0.3 mA with a late one), only "gentle" types of operations that do not affect muscle tissue are indicated, followed by the use of conservative treatment. It should be noted that the generally accepted classification of congenital blepharoptosis does not include ophthalmological complications (strabismus, amblyopia, refractive pathology) as a separate group. At the same time, in the complex approach to the treatment of blepharoptosis in children, these diseases cannot be ignored, since their elimination is included in the final goal of curing blepharoptosis. When exposed to preformed factors (electrical stimulation using the blink reflex method and IR laser irradiation), there is no isolated effect only on the levator of the upper eyelid, but a combined effect on other functions of the upper eyelid is carried out. Efficiency of using the method. The clinical experience of the ophthalmology department of MONIKI in resolving congenital blepharoptosis is based on a more than 12-year period, during which 200 children were treated (220 operations were performed on them). ¬The distribution of the number of operations by types of surgical interventions and the degree of blepharoptosis is presented in Table 1.

Dosed surgical intervention, based on previous studies of the functional capabilities of the lifting apparatus using preformed factors, is performed by various methods at different degrees of blepharoptosis.

When conducting electrical stimulation of the exit points of the trigeminal nerve using the blink reflex method, there are proven standards for early and late responses (ER and LR, respectively), focusing on which all further tactics of treating a patient with congenital blepharoptosis are based.

After the first examination using the blink reflex method, a course of treatment was carried out using this method, with the addition of laser stimulation. If the functional state of the levator of the upper eyelid improved, the digital indicators of ER and LR decreased, respectively, the width

of the palpebral fissure increased and the magnitude of blepharoptosis decreased. In the presence of unfavorable initial data, the absence of positive dynamics in the treatment process, it is possible to perform surgical intervention on the levator of the upper eyelid in isolation or with cartilage resection.

If a child of the first age group (3-5 years) has congenital blepharoptosis of the III degree, in order to avoid amblyopia and strabismus, it is necessary to perform (if possible) temporary frontal suspension using one of the methods accepted in pediatric practice. In the future, after a detailed examination of the patient, it is possible to use one of the methods described below to treat the child.

Thus, the method of hanging the upper eyelid to the frontal muscle: is performed in children under 2 years old for palliative purposes or in older children who have not been helped by other surgical interventions. This surgical method is also permissible for bilateral blepharoptosis, since it provides the ability to control both eyelids (symmetrically from the side of the central nervous system), which is carried out more simply and physiologically.

The method of combining the superior rectus muscle of the eye with the upper eyelid can be recommended only for children with paralysis of the superior rectus muscle. A big advantage of this operation is the possibility of synchronous movement of the upper eyelid and the eyeball when looking up and down.

The method of upper eyelid levator resection can be used only in blepharoptosis with a pronounced dysfunction of the upper eyelid levator or in case of ineffectiveness of previous surgical interventions.

The method of upper eyelid cartilage resection is the most suitable method for eliminating congenital blepharoptosis of the 1st and 2nd degree, accompanied by a moderate dysfunction of the upper eyelid levator in children over 5 years old.

We consider the combined method of maximum levator resection with upper eyelid cartilage resection as a worthy alternative to the method of hanging the upper eyelid to the frontal muscle.

One of the gentle techniques recognized as adequate for repeated surgical treatment is the method of lifting the ciliary edge of the upper eyelid. This method is used only in cases requiring minor correction for mild cosmetic defects, for repeated surgical interventions after more complex operations.

The effect of preformed factors on changes in visual acuity and character in blepharoptosis complicated by amblyopia was studied.

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