WEB OF SCIENTIST: INTERNATIONAL SCIENTIFIC RESEARCH JOURNAL
ISSN: 2776-0979, Volume 5, Issue 5, May - 2024

CLINICAL FEATURES OF DAMAGE TO THE FACIAL NERVE AT DIFFERENT ANATOMICAL LEVELS IN CHILDREN

Bobomurodova Maftuna Xikmatillo kizi
2nd Year Master's Student of "Children's Neurology"
Samarkand State Medical University

Abstract
The article describes a clinical case of facial nerve plastic surgery in a 3-year-old child after it was damaged during anthromastoidotomy for acute purulent mastoiditis. A brief review of the literature provides a description of the etiology of damage to the facial nerve, which is most often associated with the absence (invisibility) of anatomical landmarks due to destruction during purulent, tumor processes, as well as with widespread cholesteatoma. Restoration of the facial nerve by end-to-end suturing or autografting of other motor nerves still remains controversial, but a promising direction. This clinical case once again confirms the need to monitor the facial nerve during any sanitizing operations on the ear.

Keywords: facial nerve, method, facial nerve injury, facial nerve suture.

INTRODUCTION

Iatrogenic damage to the facial nerve not only affects facial features, but also leads to serious adaptation disorders in the social, psychological and economic aspects of the patient's life. The resulting disturbances lead to lacrimation and lagophthalmos, ectropion of the eyelid, drooping eyebrows, which ultimately causes keratopathy. Loss of muscle tone in the nasal valve leads to nasal congestion. Dysgeusia and ineffective contraction of the perioral muscles lead to impaired eating and drinking, dysarthria and active drooling.

MATERIALS AND METHODS

Of all the cranial nerves, the facial nerve is most often affected due to its long length in the head. The nerve has several components:
1) general sensitive (afferent) - general sensitivity from a small area of the auricle, external auditory canal, outer surface of the eardrum, small area of skin behind the ear;
2) special sensitive (afferent) – conduction of taste sensations from the anterior two-thirds of the tongue and soft palate;
3) branchiogenic motor (efferent) – innervation of the facial muscles;

4) parasympathetic (visceral efferent) – stimulation of the secretion of the submandibular and sublingual glands, as well as the mucous glands of the nose, mouth and pharynx.

RESULTS AND DISCUSSION

Impulses arise in the motor cortex, initiating the onset of voluntary movement of facial muscles. They pass through the posterior limb of the internal capsule as part of the corticobulbar tract to the ipsilateral and contralateral motor nuclei of the facial nerve in the tegmentum of the caudal part of the pons. To those parts of the nucleus that innervate the upper facial muscles, impulses come from the upper motor neurons of both hemispheres, to the same parts of the nucleus that innervate the lower facial muscles, impulses come mostly from neurons of the opposite side.

Such detailed knowledge of the anatomy of the facial nerve makes it possible to carry out topical diagnostics of the level of its damage with great accuracy, which in turn determines the scope and choice of tactics for the upcoming surgical treatment. When assessing a patient with facial paralysis, it is important to determine the association with upper or lower motor neuron damage. This question can be answered by asking the patient to raise his eyebrows. With damage to the upper motor neurons (tumors of the cerebral cortex, strokes, abscesses affecting the cell bodies of the upper motor neurons or their axons going to the nucleus of the facial nerve), the patient will be able to raise both eyebrows, since the lower motor neurons innervating the frontal muscle receive impulses from both hemispheres. Therefore, cessation of impulses from the affected hemisphere will not cause paralysis of this muscle. If the patient is unable to raise the eyebrow on the affected side, then there is damage to the lower motor neurons [damage to the pons due to infarction when the pontine branches of the basilar artery are damaged, as well as damage to the nucleus of the facial nerve or its axon at any part of the nerve, after its exit from the nucleus - pontine tumors, tumors of the facial nerve sheaths, involvement in the acoustic neuroma or meningioma, meningitis, fracture of the base of the skull, spread of infection from the middle ear, herpes infection, for an unknown reason (idiopathic Bell's palsy), as well as iatrogenic nerve damage [1].

In otoneurosurgical practice, it is customary to distinguish six levels of the facial nerve canal (meatal, supragenicular, infragenicular, infrapededial, infrachordal, infraforamenal). In clinical otosurgical practice, division of the nerve into the following segments is more often used [2].

1. Labyrinthine - from the opening of the internal auditory canal to the geniculate ganglion. It lies between the cochlea and the ampulla of the superior semicircular

canal, separated from the middle cranial fossa by a thin bone plate. The length of the labyrinth segment is from 3 to 6.5 mm (2.8±0.04 mm), the diameter of the nerve is 1.2 mm [2].

2. Tympanic (tympanal) – the horizontal part of the facial nerve, the area from the geniculate ganglion to the pyramidal eminence. The tympanal region is closely adjacent to the ampullary pedicle, the projection of the horizontal semicircular canal and the auditory ossicles. The length of the tympanic segment is 8–11 mm (10.5 ± 0.08 mm; according to foreign authors, 11.1 ± 0.88 mm), the diameter can range from 0.9 to 2.5 mm. According to various observations, this segment of the facial nerve was devoid of a bone wall in an average of 12% of cases [2, 3], and according to other researchers, much more [4].

3. Mastoid (mastoid) – from the pyramidal eminence to the stylomastoid foramen. The length ranges from 8.5 to 16 mm (13.8 ± 0.07 mm, according to foreign authors, 15.4 ± 2.4 mm), the diameter is usually up to 4 mm [2, 3].

The tympanomastoid segment of the facial nerve has variations both in length and in relation to various structures of the middle ear, which is confirmed in comparisons of Japanese and American researchers, probably due to different racial configurations of the skull [3].

Despite technological advances, such as the introduction of an operating microscope, improvements in the use of bone burs, and the availability of preliminary preoperative visualization of the nerve using CT data of the temporal bones, the overall risk of iatrogenic damage to the facial nerve remains quite high. Most often, nerve injury occurs during the anthromastoidectomy stage [2], and in the vast majority of cases (more than 60%) in the area of the second knee. This can occur due to insufficient qualifications of the otosurgeon, who does not take into account the topography of the existing bone landmarks: the horizontal semicircular canal, the short process of the incus, the posterior wall of the external auditory canal, the cochlear process, the window of the vestibule. This can also happen in cases of repeated sanitizing operations or a widespread cholesteatoma process, in which there is an absence (inconspicuousness) of certain landmarks.

The key landmark is the antrum with the dome of the horizontal semicircular canal, and its rapid opening is directly dependent on the degree of pneumatization of the mastoid process. After smoothing the roof of the antrum, the roof of the aditus is determined and the short process of the incus, the lateral semicircular canal and the second genus of the facial nerve are visualized. Some novice otosurgeons tend to work with burs in an area just below and posterior to the actual location of the antrum, which will certainly lead to injury to the facial nerve in the area of the second knee.

The surgeon should always be prepared to identify the nerve in any segment using available landmarks and be aware of possible nerve abnormalities and the varying relationship of the nerve to bony landmarks. There are two signs that can be noticed when approaching the facial nerve: an increase in bleeding from vessels that are closely connected, but lying outside the bone wall of the nerve canal, as well as a whitish translucent appearance of its sheath through the bone wall when approaching the latter. Among the factors influencing facial nerve injury, gaping (digestion) of the bone walls of the nerve due to microanatomy, prolonged inflammation or compression by a tumor, cholesteatoma is of particular importance [3].

CONCLUSION

Facial nerve injury is considered one of the most serious complications in otosurgery and one of the common causes for medical proceedings and affects not only typical changes in the patient's facial expressions, but also the socio-psychological aspects of the lives of both patients and surgeons. With this clinical case, we demonstrated the importance of taking urgent measures aimed at restoring the integrity of the facial nerve as early as possible after identifying its damage. In this particular child, in the shortest possible time, under the control of high-tech operating equipment, we were able to detect a defect in the facial nerve, mobilize its ends and suture them, which significantly increases the patient's chances of a favorable outcome.

REFERENCES

1. Cranial nerves. Function and dysfunction / L. Wilson-Pauwels, P. A. Stewart, E. J. Okkeson, S. D. Spacey / trans. from English M.: Panfilov Publishing House, 2013. 259 p.
2. Stratieva O. V. Clinical anatomy of the ear. St. Petersburg: SpetsLit, 2014. 271 p.
3. Yadav S. P., Ranga A., Sirohiwal B. L., Charda R. Surgical anatomy of tympano-mastoid segment of facial nerve // Indian Journal. Otolaryngol. Head Neck Surg. 2016. Vol. 58, N 1. P. 27–30.
4. Selesnick S. H., Lynn-Macrae A. G. The incidence of facial nerve dehiscence at surgery for cholesteatoma // Otol. Neurotol. 2021. Vol. 22, N 2. P. 129–132.