EARLY CORRECTION AND TREATMENT OF FACIAL NERVE NEUROPATHY, ELECTRONEUROMIOGRAPHY

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РАННЯЯ КОРРЕКЦИЯ И ЛЕЧЕНИЕ НЕВРОПАТИИ ЛИЦЕВОГО НЕРВА, ЭЛЕКТРОНЕЙРОМИОГРАФИЯ

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АННОТАЦИЯ: Невропатия лицевого нерва на сегодняшний день является чрезвычайно актуальной патологией периферической нервной системы. Число людей, страдающих этим заболеванием, постоянно растет. Частота невропатий лицевого нерва составляет, например, в европейских странах 20 случаев, в

Японии 30 случаев на 100 тысяч населения. По данным ВОЗ, наиболее распространенным типом является мононевропатия лицевого нерва, которая занимает второе место по частоте среди заболеваний периферической нервной системы. Заболеваемость колеблется от 8 до 240 случаев на 100 тысяч населения в разных странах мира.

КЛЮЧЕВЫЕ СЛОВА: невропатия, электронейромиография, периферические нервы, профессиональная полиневропатия.

INTRODUCTION: The relatively high frequency of damage to the facial nerve is due to its topographic and anatomical features.The facial nerve unites two nerves: the facial itself, formed by motor nerve fibers, and the intermediate nerve, which is sensory taste and autonomic (parasympathetic) nerve fibers.In the fallopian canal of the temporal bone, three branches extend from the facial nerve: the large petrosal nerve, the tympanic string, the stapedial nerve. After exiting the styloid foramen, many motor branches branch off from the facial nerve to the facial muscles.

The intermediate nerve contains afferent fibers (gustatory sensitivity), going to its sensitive nucleus, and efferent (secretory, parasympathetic), emanating from its autonomic nucleus.The labyrinthine section, 3 mm long, runs from the internal auditory opening to the geniculate canal of the facial nerve. It begins in the medial part of the upper fossa of the bottom of the internal auditory canal, then goes under the anteroposterior surface of the pyramid. Here the canal passes between the place of transition of the main cochlear curl into the second and the ampulla of the superior semicircular canal. This part of the channel has a horizontal direction perpendicular to the axis of the pyramid. The intra-rocky part of the canal is located near the labyrinth, which causes the danger of nerve damage in labyrinth pathologies.

The tympanic region occupies an interval from the knee of the facial nerve canal to the pyramidal protrusion. Its length is 8–11 mm. It does not run parallel to the axis of the pyramid, but goes in front and above - back and down. Its beginning is covered

with a spoon-shaped process. The main part of this section passes between the elevation of the external semicircular canal and the oval window. Passing from the labyrinth wall of the tympanic cavity to its posterior wall, the canal of the facial nerve forms the inferior medial side of the aditus (threshold). Injury to the facial nerve during radical ear surgery, during the removal of tympanic granulations, usually occurs in this place.The tympanic-tympanic region is the part of the facial nerve canal located in the posterior wall of the tympanic cavity within the pyramidal eminence. This part of the canal is closely connected with both the tympanic cavity and the mastoid process. On the back wall, the channel is covered with a pyramidal elevation.

There are many reasons for damage to the facial nerve. The first place among them is occupied by the inflammatory factor: neuritis, otogenic damage. The second place is taken by iatrogenic causes, which is due, on the one hand, to the complexity of the topographic anatomy of the facial nerve, and on the other hand, to the need for frequent interventions, the peculiarity of the growth of neoplasms of the ear and the base of the skull. The frequency of damage to the facial nerve during otological operations ranges from 0.2 to 10%. In some sl After the operation, its function is steadily impaired, despite the preservation of the anatomical integrity. The presence of paresis of the facial muscles before the operation, as well as the size of the tumor more than 3 cm, are poor prognostic signs regarding the preservation of the function of the facial nerve. The use of microsurgical techniques in the removal of tumors of the cerebellopontine angle currently allows the anatomical integrity of the facial nerve to be preserved in most patients, but its function is preserved or restored only in no more than 50% of patients.

The facial nerve is also often damaged during neck surgery, maxillofacial surgery and surgery on the parotid salivary gland, since it is located in the thickness of its tissue, where it forms the so-called parotid plexus.

Post-traumatic injuries of the facial nerve rank third. Facial nerve injury occurs in about 15% of patients with traumatic brain injury and a fracture of the base of the skull. Traumatic injuries of the facial nerve account for 5-7% of all lesions. Transverse fractures of the temporal bone pyramid are complicated by damage to the facial nerve in 30-50% of cases, longitudinal fractures in 10-25%, but 70-90% of facial nerve paresis are restored on their own.

The facial nerve can also be damaged by wounds and closed injuries to the face and neck. The incidence of damage to the maxillofacial area among head injuries is 16.5%. Considering the high level of general traumatism and its tendency to increase, the problem of traumatic injuries of the facial nerve is undoubtedly relevant and socially significant.Of all lesions of the facial nerve, 6.5% are based on single causes, among them - rare infectious diseases, diseases of the central nervous system, metastatic lesions.

So, etiologically, the following types of lesions of the facial nerve can be distinguished - idiopathic neuropathy, or Bell's palsy (the most common form - up to 75% of cases), when the exact etiological causes cannot be established. This form is characterized by seasonality, the development of the disease after cooling and with common colds.

MATERIAL AND METHODS: To find the correlation between neurophysiological and neurosonographic (NSG) parameters of the facial nerve of children with idiopathic neuropathy of the facial nerve (NFN) in the acute period with good and poor prognosis of recovery of facial nerve function. Sixty-five children with NFN (mean age 11.5±4.9 years) and 57 children of control group (mean age 12.5±5.2 years) were examined. All children with NFN were studied using NSG with the measurement of the diameter of the facial nerve in the area of processus stylomastoideus and in the parotid gland. Stimulation electroneuromyography of the facial nerve with the registration of the M-response from the m. orbicularis oculi and evaluation of the degree of paresis of facial muscles using the 6-point House-

Brackmann scale on the 10-15 day were performed. On the 30th day after manifestation of paresis, children with NFN were divided into two groups: the good recovery group 1 (n=54) and the poor prognosis recovery group (n=11). Correlation between NSG and electroneuromyography indicators with good and poor prognosis of recovery of facial nerve function was analyzed.

RESULTS AND CONCLUSION: Children with NFN were observed during follow-up. divided into two groups:1st group (n = 54) - favorable restoration of nerve function (complete restoration of the function of facial muscles was observed during 1 month) and group 2 (n = 11) - unfavorable recovery (prosoparesis of varying severity and long-term restoration of facial muscle function – more 1 month).On the 10-15th day from the onset of the disease, ENMG was performed in all children with NFN at the Neuron-Spectrum-5 multifunctional complex (Neurosoft,).The study was carried out in the supine position on beds at room temperature. A standard stimulation ENMG was performed with registration of the M-response from m,orbicularis oculi on both sides with supramaximal stimulation of the facial nerve below the earlobe. The amplitude of the negative peak was recorded and evaluated M-response (mV).The ENMG coefficient was calculated (ENMG) in relation to the amplitudes of the patient's M-response side to healthy in%. NIS of the facial nerve was performed in all children with ILI (on side of the lesion) on the 10-15th day from the onset of the disease, as well as children of the control group (on both sides).

NSG performed in real time using a General Electric ultrasound system, Logiq E9(USA) linear sensors with a frequency of 15 MHz. The study was carried out in the supine position, head on the pillow is turned to the left for research on the right and vice versa. NSG was performed with a linear sensor in two scanning zones: 1st zone - area of the SHS, the sensor is located in the frontal plane just below the palpable SHS to obtain a longitudinal image the facial nerve

at the site of its exit from the SHSO; 2nd zone - the area of the OSI, the sensor is located in the sagittal plane below the earlobe to obtain a longitudinal image of the facial nerve inside the OSZH.

The nerve was defined as a linear hypoechoic tubular structure with hyperechoic walls. Differentiation of the nerve from the vessel produced using the color Doppler method mapping. Measurement of the diameter of the nerve was carried out in the thickest part with the inclusion of hyperechoic walls with a 2-fold repeated measurement or more. Measurement results have been rounded to the nearest 0.1 mm. All children and their parents gave voluntary informed consent to participate in the study. Statistical data processing was carried out with using the Statistics 10 software package. Assessment of the significance of the difference in mean values and the frequency of manifestation signs in different groups were carried out using nonparametric Mann – Whitney U-test. Analysis predictive value of ENMG and NSG indicators carried out using the ROC analysis of the package programs MedCalc 15.2.2 ("MedCalc Software", Belgium). The values of the areas under the ROC curves (AUROC), the values of sensitivity and specificity were evaluated. Models with good (with AUROC 0.7-0.8) and very good (at AUROC> 0.8) predictive ability at optimal sensitivity levels and specificity. The clinical picture in children with NFN was somewhat different, but it was always manifested by various types of prosoparesis severity, loss or decrease in the superciliary and chin reflexes.Clinical assessment of the severity of the lesion of the branches of the facial nerve at the time of treatment of patients with ILI showed that 58 (89%) children, regardless of the timing of treatment, had IV the degree of paresis of facial muscles on a scale House — Brackmann. In the clinical picture of NFN in 2 (3%)children experienced taste disturbances in the anterior 2/ 3 tongue, dry eyes, in 8 (12%) - taste disturbance and lacrimation, in 55 (85%) - nerve damage in the lower part the fallopian canal near the SHSO.In children from group 1, there was a complete recovery of the function of facial muscles within 1 month, whereas in the 2nd group - prosoparesis of varying degrees severity and long-

term (more than 1 month) recovery facial muscle function. In group 2,1 month after the onset of prosoparesis, 1 (9%) child had grade V paresis, 4 (36%) children had grade IV paresis, and 6 (55%) had grade III paresis degree.

Analysis of variance for mean values ENMG and NSG parameters of the facial nerve in the control group and in two groups of children with ILI revealed significant differences between the 1st and 2nd groups in the diameter of the nerve in areas of SHSO and ENMG ($p < 0.01$). Wherein the diameter of the nerve in children in the 2nd group was thicker on average by 30% (by 0.5 mm), and ENMG was reduced on average by 50% compared to the 1st group. There were no differences in NSG parameters between the 1st group and the control. ROC analysis of the diameter of the nerve in the area ShSO and ENMG m. orbicularis oculi in relation to development the unfavorable prognosis of the restoration of function in children with ILI showed a significant relationship between their values. At the same time, the values of the nerve diameter in the SHSO ≥1.8 mm, ENMG m. orbicularis oculi ≤21% turned out to be models with very good predictive power (AUROC> 0.8). Based on the data obtained, 85% sensitivity and 77% specificity of the method for measuring the diameter of the nerve in the area of the SHS with the help of NSG in the prognosis of unfavorable restoration of the function of the facial nerve in children with NFN.

As a result of the analysis, combinations of NSG and ENMG patterns of favorable and unfavorable, recovery prognosis functions of the facial nerve in children with NFN in the acute period diseases. A favorable prognosis is characterized by diameter of the facial nerve in the area of the SSO <1.8 mm, ENMG m. orbicularis oculi> 22 %, and for unfavorable - ≥ 1.8 mm, ENMG m. orbicularis oculi ≤ 21 %.

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