

NEUROPHYSIOLOGICAL RESEARCH RESULTS UNDER DYNAMIC ELECTRONEUROSTIMULATION FOR CHILDREN WITH INFANTILE CEREBRAL PARALYSIS.

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Different effects become apparent in the process of dynamic electroneurostimulation (DENS) application; significant ones are anesthetic, anti-edematous, anti-inflammatory, vasodilating and spasmolytic when implementing conservative and operative treatment of children with infantile cerebral paralysis (ICP). High muscle tone and motor function disorder as a result of central nervous system affection are differential clinical syndromes of infantile cerebral paralysis. However, existing clinical observations of positive DENS impact on the functional state of neuromuscular apparatus of children with ICP were not accompanied by neurophysiology methods till present time.

Purpose of the research was analysis of dynamic electroneurostimulation impact on the state of neuromuscular apparatus of patients with ICP during complex orthopedic-surgical treatment.

Materials and methods of the research

A research of contractile function of dorsum and lower extremities muscles was carried out using the method of global electromyography (EMG) in 25 patients with infantile cerebral paralysis in the age from 4 to 14 years old. 5 persons out of them were examined on the all stages of treatment including preoperative preparation, postoperative period and rehabilitation period. 12 people were examined only during postoperative period, and 8 people were examined only during preoperative preparation. Standard DENS treatment course included 10 sessions. The research was carried out before the course was started as well as after it was finished.

The research was carried out with the help of "NEURO-MVP-4" electroneuromyograph made by "Neurosoft" company (Russia) applying standard ground lead electrodes. Isometric mode with evaluation of amplitude and structural indices of electrogenesis of muscles under study in the projection of motor points was used. Longitudinal dorsal muscles on a level of thorax and lumbar region, tibial muscles (gastrocnemius muscle and anterior tibial muscle) and femoral muscles (rectus muscle of thigh, quadriceps muscle of thigh, tibial flexor muscles, adductor femoral muscle) were chosen for the research.

The Results

Electrogenesis of reduced amplitude, 50-70% lower than age norm, with saturated pattern of action potential (AP) typical for the central dysfunction of motor structures activation and muscle tone increase by pyramidal type was registered at the initial stage in the muscles of lower extremities. Structural changes typical for the moderate segmental dysfunction of lumbar enlargement motoneurons with alpha- and gamma-motoneurons activation acceleration regulation also were registered in the 85% of cases.

Decay of amplitude indices in the dorsal muscles on the initial stage was expressed less and made up 30% of the age norm; the same structural changes were registered.

76% of patients showed electrogenesis amplitude increase of studied muscles 18-22% in comparison with initial indices after DENS course. Increment of amplitude indices in the femoral muscles came to 28% for 12 patients. Electrogenesis amplitude increase in the dorsal muscles was less expressed, only 11-15% from initial data. Structural changes stayed the same.

Preliminary results evaluation of electroneurophysiological examination of patients with ICP allows to assume that changes received could be associated with evident vasoactive action of DENS. Blood circulation enhancement of ischemic tissues in the stimulation zone activates metabolic and trophic processes not only in the zone of impact, but also in the deep-underlying tissues, as well as in the zones that are segmentally connected with them. Also, reserve functional abilities of tissues are stimulated and regulating influence on the segmental and motorneuronic apparatus is exerted as a result of general humoral impact on the body.

On the ground of data received preconditions for further research of possibility of positive DENS effect on the central nervous system regulating mechanisms when having long-term exposure to the indicated therapy are created.