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THE PICTURE OF COGNITIVE DEVELOPMENT DISORDERS IN CHILDREN WITH RESIDUAL CEREBRAL ORGANIC PATHOLOGY AND EEG SIGNS OF BRAIN IMMATURITY

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Abstract: Today, the main tasks of the field of neurology are modern diagnostics of neuropsychiatric development in children and treatment of cerebral palsy. EEG, Echo-ES and other methods are included in the methods of neurophysiological examination in children, and neuropsychophysiological research methods in pediatric neurological practice are important in the topical diagnosis of brain lesions, in the assessment of intelligence, in determining readiness for school.

Keywords: Cognitive disorders in children, EEG, organic pathology, neurophysiology.

Introduction: currently, among disabled children, the largest group consists of patients with brain pathology, their composition is characterized by pronounced heterogeneity and polymorphism [1-12]. In childhood, under the influence of various exogenous and endogenous factors, the formation of high-level mental functions is disrupted in children [13-22].

In the process of helping children with neuropsychiatric diseases, all specialists working with children often face various pathologies [23-28]. Taking into account the generality of psychophysiological parameters of children's brain activity in combination with clinical and psychological data allows not only to predict the features of a possible violation of mental development, but also significantly increases the effectiveness of psychological support for the patient [29]. - 38].

There are a number of important domestic studies aimed at identifying neurophysiological and psychophysiological mechanisms of mental development of children with mental retardation and emotional disorders [39-51]. Electroencephalographic (EEG) characteristics of young children with perinatal encephalopathy and cerebral palsy have been studied in many studies [52-64]. At the same time, the determination of the forms, mechanisms and clinical and psychological structure of the pathology of mental development of children with organic pathology of the brain indicates the need for further study of this category of patients [65-70].

Materials and methods. 12 children aged 8 years and their parents were selected as the objects of the study. They were given the following clinical diagnoses:

F06.69 – organic sensory labile (asthenic) disorder due to an unspecified disease;
F06.79 — mild cognitive impairment due to an unspecified disease;
F06.829 is an organic non—psychotic disorder caused by an unspecified disease;
F07. 87 - Organic personality and behavior disorders due to perinatal pathology,
F07.89 Organic personality and behavior disorder due to unspecified disease;
F07.97 — organic personality and behavior disorders in the form of mild/moderate/severe mental retardation due to perinatal pathology,
F07.99 — behavior in the form of mild/moderate/severe mental retardation due to organic personality disorder and unspecified disease.

Clinical and biographical (analysis of anamnestic data, observation and study of medical documents) and experimental psychological (methods of neuropsychological research of higher mental functions in children (Tsvetkova L.S., 2002)) were used as methods of psychological research.

During the study, the following anamnestic data were analyzed, the presence of residual organic pathology of the brain and the results of an EEG examination.

Neuropsychological studies have made it possible to assess the state of cognitive functions: dynamics, hearing and perception, nominative speech function, ability to understand tactile, subject, logical and grammatical structures, attention, auditory memory, thinking. 91,67% of the children who participated in the study were diagnosed with an irregular EEG background. It was found that most of the examined children have two main types of EEG:

1. EEG is irregular, insufficient alpha activity prevails, average at the border with a high index, approximately oscillations with a frequency of 9.4 Hz and an amplitude of up to 110 MV, the rhythm is localized in the parietal-occipital and central regions of the cortex. ;
2. Irregular type of EEG without predominance of slow-wave theta activity. Alpha activity was not sufficiently pronounced, fluctuations were manifested in the form of low-frequency up to 8.5 Hz and low-amplitude up to 60 Mv.

In these children, in 40% of cases, a pronounced alpha rhythm is diagnosed within 8 years, which dominates in the occipital-parietal areas of the cortex. In 30% of cases, a combination of alpha rhythm with a large number of slow waves in the occipital-parietal regions of the cortex was found. In 35% of cases, the EEG was polymorphic in nature, low-amplitude oscillations of different frequency ranges were observed. By the age of 8, the maturation of the main rhythm of the EEG - alpha rhythm is mostly completed, its average indicators are equal to the frequency characteristics of adults, but some features of the maturity of bioelectric activity of the brain, in particular, the alpha rhythm in the occipital and central regions of the cortex of varying degrees of fluency perfection were not observed.

Statistical analysis was carried out using SPSS statistical data analysis software.

Results and their discussion. The results of the study showed that in children with residual cerebral insufficiency, the presence of an irregular type of EEG background was a regulatory factor (F=5,712; p=0.022), an optical-spatial factor (F=5,213; p=0.028), intelligence. (F=5,812; p=0.021), memory impairment (F=6,523; p=0.012) and emotional distress (F=4,658; p=0.028).

The obtained results allowed us to conclude that the irregular type of EEG background in 8-year-old children with cerebral organic pathology is primarily combined with the unformed functions of the associative zones of the third order of the cerebral cortex.

These children have difficulties in organizing their movements, difficulties with concentration. They are characterized by extreme mobility, increased distraction, activity, mental activity, which greatly complicates their upbringing. This is confirmed by the presence of a statistically significant relationship between the detection of an irregular EEG background and emotional disorders in children of this category.

We can see the presence of memory disorders and dysfunction of the first structural and functional block of the brain responsible for maintaining a sufficient tone of mental activity, or the lack of formation of cortical-subcortical interactions. These children are characterized by increased mental activity, unstable working capacity, difficulty in memorizing information about any modality, which, together with the lack of active attention and arbitrary processes, can interfere with successful studies in elementary school. an important pathogenetic factor in the violation of the cognitive development of this child as a whole.

Analysis of the state of cognitive functions in these children showed that in 8-year-old children with residual organic pathology of the brain, different EEG patterns correlate with other structures of cognitive deficit. Thus, a comparative analysis using the Student's t-test statistically revealed significant differences between the two groups of children in such parameters as the

development of regulatory, dynamic, constructive and spatial praxis, understanding of logical and grammatical constructions, intellectual processes, writing, reading. and computing skills ($p<0.05$). Consequently, in children of the second group, in whom alpha activity is insufficiently expressed on the EEG, there is a more pronounced deficit of the functions of the tertiary cortex and the formation of the premotor divisions of the frontal lobes of the cerebral cortex.

As a result of neuropsychological research in children of the first group, increased fatigue and a decrease in the rate of mental activity, emotional lability, difficulty concentrating attention were revealed.

Children of the second group are characterized by dynamic disorders, pronounced emotional lability and fatigue phenomena, features of emotional attachment.

In the first group of children, a slight violation of logical and grammatical processes was revealed. The children of the second group showed an average insufficiency of the formation of the vasospatial factor and difficulties in understanding comparative relationships.

Conclusion. As a result of the study, it was found that in children with organic brain pathology, an irregular type of EEG background is combined with an unformed regulatory factor, impaired consciousness and memory. It is concluded that this neuropsychiatric pathology in 8-year-old children is combined with an irregular EEG background, primarily with the unformed functions of the third associative zones of the cerebral cortex. Also, the lower the level of alpha activity in the EEG of younger schoolchildren, the more the regulatory functions, the dynamic factor, and spatial synthesis are disrupted.

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