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NEUROPHYSIOLOGICAL ASPECTS OF IDIOPATHIC EPILEPSY IN CHILDREN

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Annotation: This article presents a study of the neurophysiological and clinical-neurological features of idiopathic epilepsy. We examined 68 children (36 boys 53%, 32 girls 47%) aged 5 to 10 years (average 7.5 years). All patients were divided into two groups, depending on the form of idiopathic epilepsy. An EEG study was performed in all groups. The data obtained were compared with the clinical and neurological course of this pathology.

Key words: Generalized attacks, psychological emotional attacks, infant epilepsy.

Epilepsy is a disease characterized by chronization, which is manifested by repeated unprovoked seizures in which there is a violation of motor, sensory, vegetative, cognitive, mental functions caused by ultrahigh neuronal discharges of the cerebral cortex. In the modern world, epilepsy is considered the most common paroxysmal condition of the brain in the population of childhood diseases.

The presented definition contains two important provisions:

1) only repeated seizures are the basis for the diagnosis of epilepsy;

2) epilepsy includes spontaneous, unprovoked seizures (with the exception of reflex forms, for example, photosensitive epilepsy).

Febrile seizures are not epilepsy, as well as seizures that occur in acute brain diseases (for example, encephalitis, subdural hematoma, acute cerebrovascular accident, etc.).

The modern classification of epileptic syndromes in 1989 confirms that there are many forms of epilepsy (syndromes) that have their own patterns of course and prognosis of development, depending on which electrical discharges occur in the cerebral cortex, where they are localized, how they spread, transform and what seizures occur in the patient. Neuroimaging techniques (CT, high-resolution MRI, PET, SPECT), digital EEG and video EEG monitoring play an important role in the study of epilepsy. Currently, approximately 65% of epilepsy cases are completely curable, in 20% of cases this is achieved by surgical methods. The attitude towards patients has also changed, and their social adaptation has improved. However, until now, many mechanisms of the pathogenesis of this severe disease have not been studied; there are a large number of atypical forms that significantly complicate accurate diagnosis; some resistant forms of epilepsy remain intractable.

Worldwide, the prevalence of epilepsy in the general population reaches 0.5-0.75%, and in children 1%. In most patients (75%), epilepsy can occur in childhood and adolescence, being one of the most common pathological conditions of pediatric neurology.

According to the etiology, all forms of epilepsy are divided into idiopathic, symptomatic and cryptogenic.

Idiopathic forms are characterized by normal intelligence, the absence of focal symptoms and structural changes in the patient's brain, as well as a hereditary predisposition. The etiology is mainly due to channelopathy, a genetically determined diffuse instability of neuronal membranes. The genes of three main monogenously inherited forms of epilepsy have been identified:

autosomal dominant frontal epilepsy with nocturnal paroxysms (loci 20ql3.2 and 15q24), benign familial seizures of newborns (loci 20ql3.2 and 8q24) and generalized epilepsy with febrile seizures plus (19ql3.1, mutation of the SCN1B gene; 2q21-q33, mutation of the SCN1A gene).

Other forms are determined by several genes (polygenic inheritance). These include juvenile myoclonic epilepsy, rolandic epilepsy, benign epilepsy of infancy, etc. From a practical point of view, it must be remembered that if one of the parents has idiopathic epilepsy, the probability of having a sick child will be no more than 10%.

The aim of the study was to compare and analyze the clinical, neurological and neurophysiological features in children with idiopathic epilepsy.

Materials and methods of research.

Using clinical, neurological and neurophysiological data, 68 children (36 boys 53%, 32 girls 47%) aged 5 to 10 years were examined (average.7.5 years old), who were in outpatient and inpatient treatment at the Regional Neuropsychiatric Hospital, as well as in the departments of pediatric neurology of the Regional Multidisciplinary Children's Medical Center from 2022 to 2023. All patients were divided into two groups, depending on the form of idiopathic epilepsy: The first group consisted of 44 patients (67%) with a generalized form of idiopathic epilepsy, and the second group consisted of 24 patients (33%) with a focal form of idiopathic epilepsy. A comprehensive study was conducted using neurological and neurophysiological methods. The neurological status was examined according to a generally accepted method. The EEG study was conducted by the NEURON-SPEKTR-2 apparatus.

Results and discussion.

From the anamnestic data, it was revealed that 28 (40%) patients had a hereditary predisposition to this disease. The etiology of the disease has not been clarified in 40 (60%) patients.

In group 1, 16 patients had an absentee form, and the remaining 28 had tonic-clonic seizures. Seizures in patients with abscess form lasted on average 3-7 seconds, with an average frequency of 2-3 times a day. And with the tonic-clonic form of the disease, the frequency of seizures was observed 2-3 times a month, lasting 2-3 minutes. After the attack, muscle hypotension and revival of tendon reflexes were observed. 30% of patients have involuntary urination and defecation.

Rolandic epilepsy was observed in group 2 patients with a frequency of 2 times a year and a duration of 1 minute. (Fig. 1). They also had simple focal seizures, 80% of which occurred during awakening and 20% of patients fell asleep. The attack began with a somatosensory aura: a tingling sensation, numbness of the tongue, gums. Then there were peculiar vocal sounds; hypersalivation was noted, as well as psychoemotional changes in the form of moodiness.

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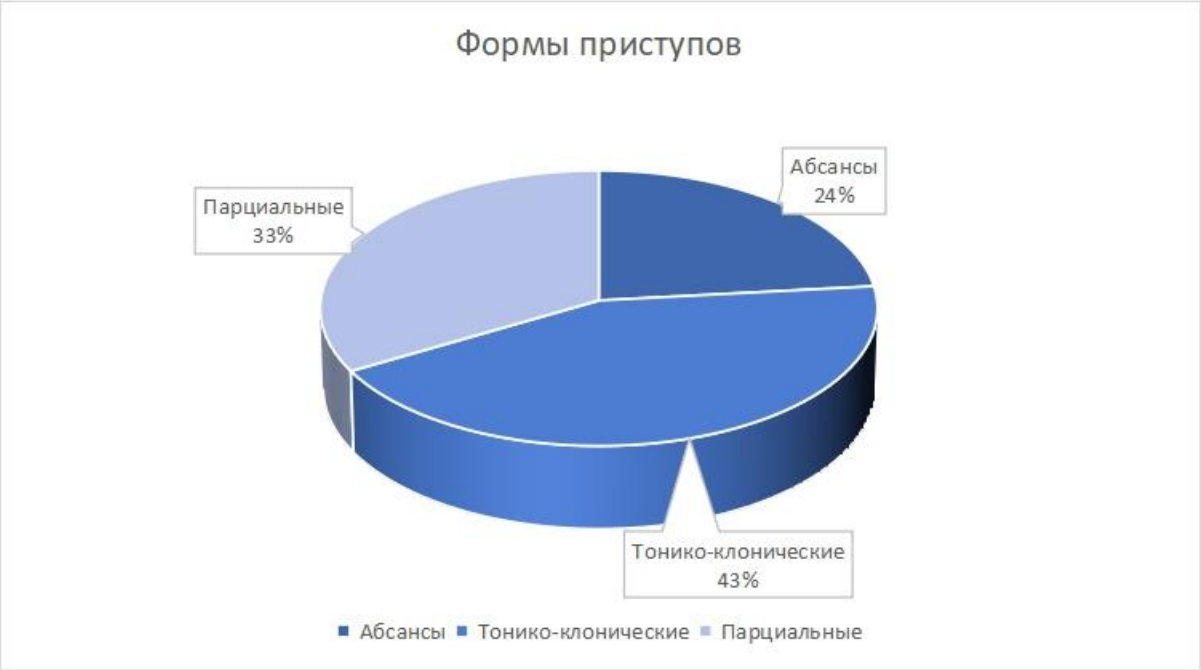

Fig. 1. Distribution of patients by types of seizures.

Studies of the neurological status within 10 days after the attack revealed characteristic symptoms in the majority of children with idiopathic epilepsy: Swelling(+), revival of tendon reflexes, transient strabismus, dysarthria, flinching in sleep, nocturnal enuresis, white dermographism (Fig. 2).

Fig. 2. Features of neurological symptoms in patients with idiopathic epilepsy.

In patients with an absentee form of idiopathic epilepsy, prolonged generalized discharges of peak wave activity with a frequency of 3 Hz or more appeared on the EEG during hyperventilation.

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In the intervertebral period, 50% of patients with generalized seizures had a normal picture on the EEG. The rest had short generalized peak wave discharges in the inter-approach period. The tonic phase of generalized seizures was characterized by the appearance on the EEG of a diffuse, amplitude-increasing rapid rhythm with a frequency of 18-40 Hz, gradually slowing down to 10 Hz. During the clonic phase, this rhythm was gradually replaced by generalized peak wave activity. Diffuse delta activity was dominant in the post-onset relaxation phase; and regional phenomena were absent.

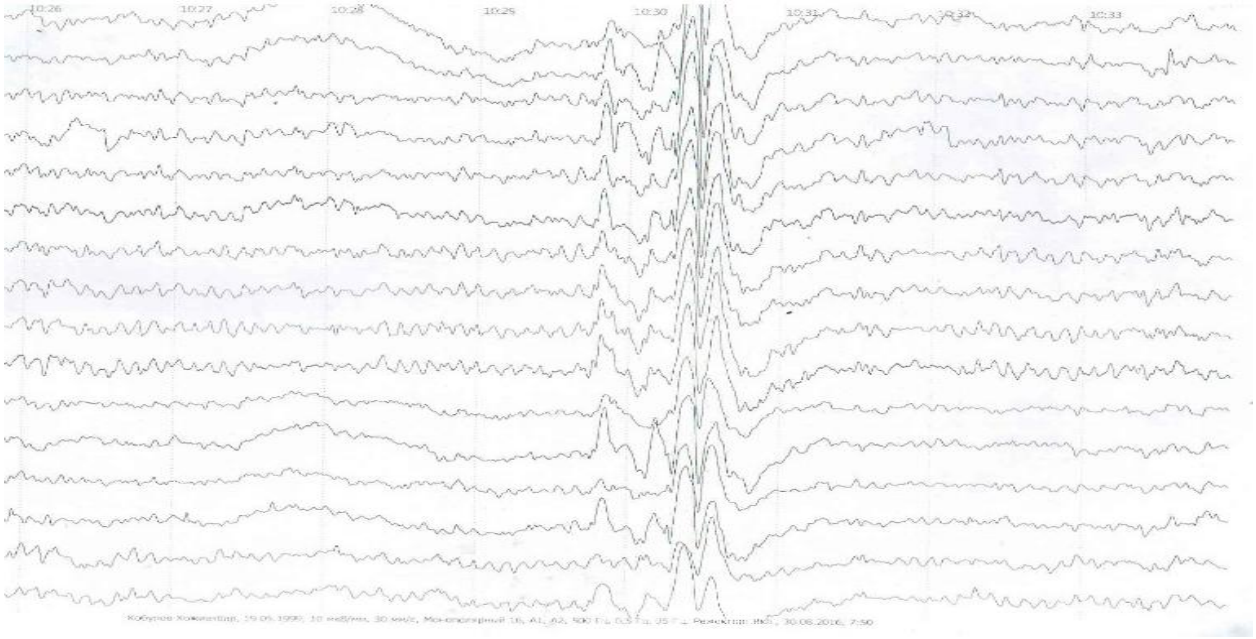

Fig. 3. EEG- picture of generalized tonic-clonic seizures in patient D., 6 years old in the intercrime period.

In patients with partial form, changes in the EEG were detected in 90% of cases in the inter-approach period, the typical pattern is the acute-slow wave complex. The initial component usually consisted of a three-phase sharp wave followed by a slow wave.

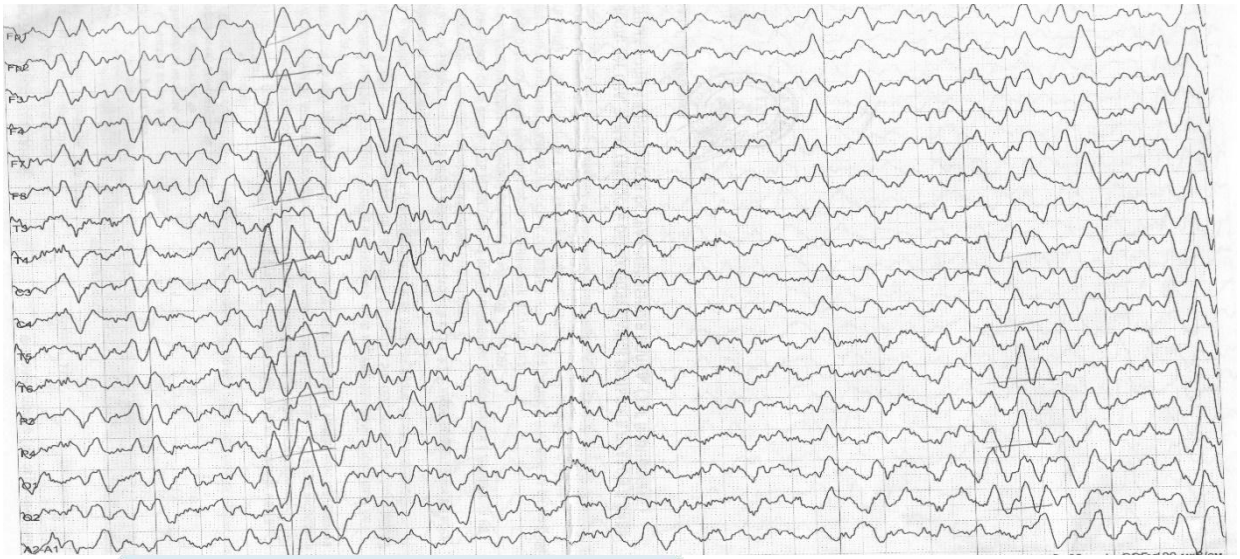

Fig.4. EEG pattern in the inter-onset period of partial epilepsy in patient M., 7 years old

Conclusion. Thus, the data obtained made it possible to identify data characteristic of various forms of idiopathic epilepsy. From anamnestic and clinical neurological data, it was determined that patients with generalized (absentee, tonic-clonic) and partial forms of idiopathic epilepsy have many general characteristics: age of onset, frequency of seizures, etc. However, neurological symptoms prevail in patients with generalized forms, compared with partial ones. While in partial seizures, both at the time of the attack and in the inter-attack period, a distinct epiactivity is determined.

IE in children is accompanied by the development of cognitive impairments, the severity of which depends on both the localization of the epileptic focus, and the frequency of seizures and duration of the disease. The most unfavorable prognosis in terms of the progression of cognitive impairment was determined in patients with a focal form of idiopathic epilepsy.

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