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NEUROPHYSIOLOGICAL CHANGES IN EPILEPSY WITH DISORDERS OF HYPOTHALAMIC-PITUITARY SYSTEM

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ABSTRACT

The gold standard in diagnosing epilepsy as well as predicting its clinical course is the electroencephalographic (EEG) examination method, which indicates the functioning of brain neurons and their excitability, which makes it possible to diagnose an epileptic focus. EEG is performed on patients with suspected or already diagnosed seizures to identify the type of epilepsy. The sensitivity of EEG for epilepsy is up to 50%; in 10% of epileptic patients epileptiform activity is not recorded [2].

KEYWORDS

Depolarisation paroxysms, pathomorphosis.

Introduction

30-75% of focal pharmacoresistant epilepsies have electro-clinical manifestations of secondary bilateral synchronisation (SBS) on EEG due to pathomorphosis of bioelectrical activity, which reduces epileptiform bursts and produces an α-wave dominant pattern [7].

Depolarisation paroxysms are a characteristic sign of epilepticisation of cortical neurons, causing the generation of strong pathological neuronal excitation [5]. Currently, the study of endogenous evoked potentials (EPs), and in particular cognitive evoked potentials (CEPs), which are characterised by the presence of a P300 component in EEG studies, is attracting increasing attention. The study of this technique in patients with epilepsy is recommended by the Association of Neurophysiologists at the international level [8]. This study makes it possible to diagnose functional disorders in the cognitive sphere, in particular conscious perception [7] decision-making, recognition and memory [9]. The development of disorders in the cognitive sphere of epileptic patients is characterised by the appearance of a positive specific wave with a latency of 300 ms (P300) during EEG. P300 is characterised by the presence of amplitude and latency, so the amplitude gives an idea of the number of neurons involved in stimulus processing, and the level of latency indicates the speed of stimulus classification [6]. EP P300 performance depends on age, cognitive ability, memory, personality type, and degree of wakefulness [1]. The EP P300 is produced by the cortex of temporal, parietal regions and frontal lobes of the large hemispheres with the involvement of the thalamus [4]. EP P300 in

epilepsy stated the effect of epiactivity strength on cognitive abilities [3]. The P300 in epilepsy depends on the location of the epileptic focus, the type of epileptic seizures, and the type of AEDs taken by the patient and his sensitivity to them [2].

It is known that in hormonal imbalance, especially GHNS imbalance, cognitive disorders are noted in patients, and the presence of epilepsy significantly aggravates them. The study of P300 indices in this cohort of patients will allow us to establish the degree of cognitive disorders, since a decrease in P300 amplitude will allow us to characterise the synchronisation of neuronal processes activity when solving cognitive tasks, and its prolongation will characterise cognitive disorders and structural disorders of the cortex and white matter of the brain [8].

The fight against epilepsy, as defined by WHO experts, requires special and priority attention, because in the structure of morbidity, is characterised by severe consequences. Epilepsy refers to systemic diseases, where the pathological process of the brain reflects a single functional system of the body[7]. At one time, the state of the brain, it is the result of the activity of non-specific structures with the manifestation of neuropsychic, autonomic and neurohormonal systems. Accordingly, the aspect of studying the nature of the hypothalamic-pituitary system in patients with epilepsy, expands the diagnostic field of research, for a deeper evaluation of clinical signs of the disease, identifying new pathogenetic mechanisms, in order to optimise treatment tactics[7].

Modern scientific research is mainly focused on the study of hormonal status in epilepsy and hormonal imbalance, few and contradictory, little studied remain, interictal period and chronicisation of the process, the mechanism of adaptation in the gender aspect, depending on metabolic disorders. The modern level of scientific research requires, not only analyses in the course of the disease, the relationship with somatoform changes in the structure of the whole organism as a whole, but an important component of the study is the prognosis[2].

In the Republic of great importance is a comprehensive programme to improve early diagnosis and reduce complications of somatic pathologies. In this regard, the study in patients with epilepsy, clinical and paraclinical manifestations of disorders in the hypothalamic-pituitary system, as well as characteristic features. neurophysiological disorders in order to develop an integral assessment of risk factors for the development of adverse outcomes of epilepsy and predicting its severity in hypothalamic-pituitary-adrenal system dysfunction is an urgent problem. The development of complex treatment of patients with epilepsy using the results of the study of identified disorders in the hypothalamic-pituitary-adrenal system will contribute to improving the provision of medical care to patients with epilepsy at a higher level[4].

The problem of epilepsy is one of the most urgent in modern neurology [3]. Lack of epidemiological data on epilepsy, as WHO believes, in part of countries leads to poor level of medical care for such patients (World Health Organization; 2019).

Antiepileptic drug (AED)-resistant forms of epilepsy and some epileptic syndromes force researchers to search for alternative therapies that sometimes provide comparable clinical efficacy to AED therapy [7]. Modern epileptology is developing an active search for early predictors of pharmacoresistance to AEDs in epileptic patients for better therapy of the disease and prevention of direct and indirect manifestations of pathology. The effect of hormone therapy (HT) on epileptogenesis of brain cells is based on the activity of the hypothalamic-pituitary-adrenal system (HHAS), as epileptic activity of brain neurons stresses the CNS and the whole organism, and HHAS activation is a normal

neurophysiological response [10]. GHNS hormones influence epileptogenesis, so adrenocorticotropic hormone (ACTH) stimulates the adrenal cortex, increasing the secretion of GCS, aldosterone and sex hormones, affecting melanocortin receptors in the hypothalamus reduces the production of CRH, reducing epileptogenic activity and negative effects on immature neurons of the large hemispheres of multiple epileptic impulses.

Understanding the influence of the hypothalamic-pituitary system in epileptoid patients, provides an opportunity to expand the assessment of the clinical diagnostic picture of the disease and the ability to optimise treatment tactics. Regulation of the cerebral function of the hypothalamus, which ultimately constitutes the hypothalamic-pituitary system (HPS), by the hormonal background modulates epileptic activity; study in this direction creates a prerequisite for new promising approaches to the treatment of epilepsy, taking into account the lack of efficacy of antiepileptic drugs. Conclusions: In the scientific literature for the last 10 years, we have not found studies on EEG and EP P300 indices among epilepsy patients on the background of GHNS disorders. However, their evaluation can serve as an aid in studying the functionality of the cerebral hemispheres, clarification of clinical symptomatology, predetermination of critical states and convulsive activity of CNS neurons, and thus enable specialists to predict the patient's condition and adjust the prescription of AEDs in terms of preventive treatment.

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