NEUROLOGY

Intensity of Cognitive Disorders in Epilepsy and in Symptomatic Epilepsy Syndrome

Alexander L. Malev[1)], Vitalii B. Kaliberdenko[2)], Anna N. Zakharova[3)], Shanmugaraj Kulanthaivel[4)], Eduard S. Kuznetsov[3)], Keerthanaa Balasundaram[2)]

ABSTRACT

Introduction: **The presence of cognitive impairment is one of the essential aspects in epileptology. At the same time, neuropathologists involved in the treatment of epilepsy, often underestimates this disorder. Ignoring these disorders in the future can lead to their aggravation, decrease in social adaptation and quality of life, aggravating the disability of patients.**

Purpose of the Study: **To analyze patients with cognitive impairment due to idiopathic epilepsy and epileptic syndrome of alcoholic, cerebrovascular, post-traumatic and neurosurgical postoperative origin, gone through Mini-Mental state examination (MMSE) to assess the cognitive impairment.**

Materials and Methods: **The research has been conducted from April to December 2015 on the basis of State budget institution of the Republic of Crimea "Republican Psychiatric Hospital No. 1". Clinically-anamnestically, clinically psychopathologically, psychometrically (MMSE, FAB scale, Schulte table, clock drawing test). 76 male patients were examined, which, according to the etiological affiliation of the epileptic syndrome. They were divided into 5 groups: Group 1 - Idiopathic epilepsy (22 patients, medium age - 37.3 years); Group 2 - Epileptic syndrome of alcoholic origin (11 patients, average age - 44.5 years); Group 3 - Epileptic syndrome due to a traumatic brain injury (23 patients, average age - 45 years); Group 4 - Epileptic syndrome of neurosurgical postoperative genesis (10 patients, average age - 43 years); Group 5 - Epileptic syndrome due to cerebrovascular pathology (10 patients, average age - 48.2 years). The data obtained were processed by nonparametric statistical methods for small groups (Anova - Kraskela-Walis), Mann-Whitney U-test.**

Research Results: **In patients with epilepsy and epileptic syndromes, the comparative analysis of the cognitive disorders was performed. It was found that the severity of cognitive impairment in patients with epileptic syndrome going to the medical and social expert commission increases in the following order: 1) idiopathic epilepsy (which corresponds to mild cognitive impairment); 2) epileptic syndrome alcoholic origin, as a result of traumatic brain injury and post-operative neurosurgical epileptic syndrome which corresponds to mild cognitive impairment; 3) epileptic syndrome at cerebrovascular pathology which corresponds to mild dementia.**

Conclusions: **1) It was found that the severity of cognitive disorders depending on the etiology of convulsive syndrome grows in the following order: a) idiopathic epilepsy; b) epileptic syndromes of alcoholic, post-traumatic and neurosurgical postoperative genesis; c) cerebrovascular epileptic syndrome, which can be recommended to pay attention to clinicians in the first place. 2) Cognitive disorders in symptomatic epilepsy are more severe than in idiopathic epilepsy, and are also more associated with frontal dysfunctions.**

KEY WORDS

epilepsy, epileptic syndrome, cognitive disorders, personality profile, personality, Psychiatry

INTRODUCTION

The presence of cognitive impairment is one of the essential aspects in epileptology. At the same time, neuropathologists involved in the treatment of epilepsy, often underestimates this disorder. Ignoring these disorders in the future can lead to their aggravation, decrease in social adaptation and quality of life, aggravating the disability of patients. The question of the effect of epilepsy on cognitive functions attracted the attention of researchers back in the late 19th - early 20th centuries, which is connected with the names of V.M. Ankylosing spondylitis, E. Krepelina, A.N. Bernstein[1)]. Epileptic seizures are transient episodes of

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1) Department of Psychiatry, Narcology, Psychotherapy with a course of general and medical psychology V.I. Vernadsky Crimean Federal University Simferopol, Russia
2) Department of Internal Medicine, No.2, V.I. Vernadsky Crimean Federal University Simferopol, Russia
3) Department of Internal Medicine No.1, V.I. Vernadsky Crimean Federal University Simferopol, Russia
4) Science and Research Department, Naarayani Multi Speciality Hospital Erode, Tamilnadu, India
Correspondence to: Vitalii B. Kaliberdenko
(e-mail: vit_boris@mail.ru)

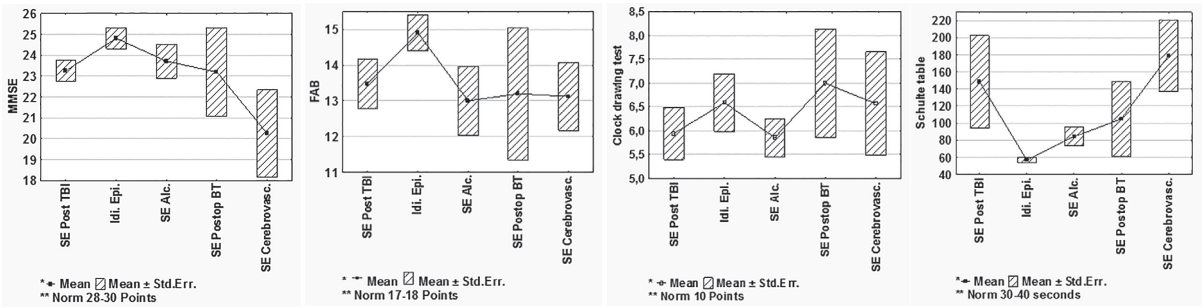

Figure 1: Graphical analysis of variant's dependence of the results of psychometric techniques on the etiological affiliation of the epileptic syndrome.

excessive synchronous activity in the brain[2-7].

In the course of epidemiological studies, it was found that the prevalence of epilepsy in the Russian Federation is 2.98 per 1000 population[8]. At the same time, symptomatic epileptic syndrome occurs in 46-58% of cases of epilepsy, however, taking into account the unclear etiology of cryptogenic forms of the disease, which are most likely symptomatic, this indicator can reach 80%[9,10]. As it was shown earlier, a significant contribution to the development of cognitive disorders, in addition to epilepsy, which is made by traumatic brain injuries and cerebrovascular pathology[11-14]. It is of particular interest to study the characteristics of cognitive disorders in patients with various etiopathogenetic factors leading to epileptic paroxysms.

The most common causes of cognitive impairment in epileptology is idiopathic and symptomatic epilepsy of cerebrovascular, post-traumatic, alcoholic and neurosurgical postoperative origin.

PURPOSE OF THE STUDY

To analyze patients with cognitive impairment due to idiopathic epilepsy and epileptic syndrome of alcoholic, cerebrovascular, post-traumatic and neurosurgical postoperative origin, gone through Mini-Mental state examination (MMSE) to assess the cognitive impairment.

MATERIALS AND METHODS

Clinical and psychological analysis

The research has been conducted from April to December 2015 on the basis of State budget institution of the Republic of Crimea "Republican Psychiatric Hospital No. 1". Clinically-anamnestically, clinically psychopathologically, psychometrically (MMSE, FAB scale, Schulte table, clock drawing test).

Patients and their groups.

76 male patients were examined, which, according to the etiological affiliation of the epileptic syndrome.

They were divided into 5 groups:

1. Group 1 - Idiopathic epilepsy (22 patients, medium age - 37.3 years);
2. Group 2 - Epileptic syndrome of alcoholic origin (11 patients, average age - 44.5 years);
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5. Group 5 - Epileptic syndrome due to cerebrovascular pathology (10 patients, average age - 48.2 years). The data obtained were processed by nonparametric statistical methods for small groups (Anova - Kraskela-Walis), Mann-Whitney U-test.

Ethical approval and standards

All procedures performed in our study involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. And our research study was approved by the Ethical Committee of our Institution named "Ethics Committee of V. I. Vernadsky Crimean Federal University". Ethics Committee Protocol No. 4. 13/03/2018.

Statistical analysis

All materials were analyzed by using variation statistics with program of Microsoft Excel 2013 and Statistica 12. The results are presented in terms of associated 95% confidence intervals (CI), P□value and reliability (t). We used statistic results with realistic prognosis, which is not less than 95% ($P < 0.05$), these results are considered statistically reliable.

RESEARCH RESULTS

Graphical analysis of variant's dependence of the results of psychometric techniques on the etiological affiliation of the epileptic syndrome, shown in Figure 1, showed that the severity of cognitive impairment on the MMSE scale depending on the etiology of the convulsive syndrome increases in the following order: 1) an idiopathic epilepsy (average score corresponds to mild cognitive impairment); 2) an epileptic syndrome of alcoholic origin, as a result of a traumatic brain injury, and a neurosurgical postoperative epileptic syndrome, the average score of which corresponds to mild cognitive impairment; 3) an epileptic syndrome with cerebrovascular pathology, the average score for which corresponds to mild dementia, which is consistent with previously obtained data on dementia of various etiologies. At the same time, a significant difference was found in patients with idiopathic epilepsy for this indicator with post-traumatic epilepsy ($p = 0.0309$) and cerebrovascular epileptic syndrome ($p = 0.0371$). The relative safety of patients with idiopathic epilepsy is obviously explained by a smaller number of etiopathogenetic factors compared with other groups.

According to the results of a graphical analysis [Fig. 1] of variance of the FAB score on the etiological factor of cognitive impairment, it can be concluded that frontal dysfunction is insignificant in patients with idiopathic epilepsy, while with symptomatic epileptic syndrome they are more pronounced and are approximately at the same level, which is consistent with the MMSE data.

Attention disorders and, consequently, an increase in the time for Schulte's table grow in the following order: 1) idiopathic epilepsy (average score corresponds to mild cognitive impairment); 2) epileptic syndrome of alcoholic origin; 3) neurosurgical postoperative epileptic syndrome; 4) post-traumatic epilepsy; 5) cerebrovascular epileptic syndrome, which generally repeats the detected trends in cognitive impairment, fixed by the MMSE scale. At the same time, in patients with idiopathic epilepsy, a significant difference was found in the severity of attention disorders with post-traumatic epilepsy ($p = 0{,}0004$), cerebrovascular epileptic syndrome ($p = 0.0216$), as well as with alcoholic epileptic syndrome ($p = 0.0041$).

The results of graphical analysis of variance of the score for the clock drawing test, which is responsible for constructive gnosis and praxis, on the etiological affiliation of the epileptic syndrome, indicate

the most significant decrease in visual-spatial gnosis and constructive praxis in the group of patients with epileptic syndrome of alcoholic origin and due to traumatic brain injury.

Thus, the research results shows that all symptomatic epilepsies are determined by the more severe nature of cognitive disorders than idiopathic epilepsy, which is probably due to a large number of etiopathogenetic factors affecting the cognitive functions of these patients.

DISCUSSION

In the brain the excessive synchronous activity which are transient episodic in character are known as epileptic seizures[15]. The revised international league against epilepsy (ILAE) classificayion of epilepsies in 2017,originally the 1989 classification, is the significant changes done in terminology and classification of epilepsy[16]. Epileptic patients frequently face neurocognitive impairment. The epilepsy syndrome and several other causes leads to this neurocognitive impairment. The mental slowness, attention deficits and memory difficulties are the most common cognitive complaints seen in adult patients[17]. The cognition is seriously affected due to recurrent seizures. The patients are seen with decreased cognitive ability at post ictal state. The behavioural symptoms of inattention and lethargy may subside but the lingering cognitive deficits can remain upto days depending on severity and type of seizure. The cumulative degradation of spatial performance is observed when seizures occur frequently[18]. According to several researchers, cerebrovascular pathology is one of the most common risk factors for the development of symptomatic epilepsy. So, for example, in the clinical picture of acute cerebrovascular accident (stroke) in 10-25% there is an epileptic syndrome, which significantly complicates the clinical picture of the disease and leads to a deterioration in the quality of life of patients. It is believed that 30% of newly diagnosed epileptic seizures in patients over 60 years of age occur after a stroke, and the cause of 40% of cases of late-onset epilepsy is cerebrovascular pathology[19]. Mostly neurological and oncological diseases such as lymphoma, epilepsy, polycythemia, breast cancers etc. having a significant influences in psychological disorders[20-22]. On the other hand vice versa psychological disorders might result in systemic diseases such as osteoporosis[23]. Recent studies have also shown that posttraumatic epilepsy is a frequent consequence, up to 17% of cases of traumatic brain injuries[24], while epileptic paroxysms in 15-20% of cases also develop in patients after neurosurgical operations[25,26]. Alcoholic epilepsy, as a rule, in the first days of a hangover withdrawal syndrome, in debut or during delirium tremens, is associated with a decrease in the seizure threshold due to prolonged intoxication, metabolic imbalance and alcohol encephalopathy[27,28].

CONCLUSIONS

1) It was found that the severity of cognitive disorders depending on the etiology of convulsive syndrome grows in the following order: a) idiopathic epilepsy; b) epileptic syndromes of alcoholic, post-traumatic and neurosurgical postoperative genesis; c) cerebrovascular epileptic syndrome, which can be recommended to pay attention to clinicians in the first place.

2) Cognitive disorders in symptomatic epilepsy are more severe than in idiopathic epilepsy, and are also more associated with frontal dysfunctions.

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