

Section 4. Medical science

Секция 4. Медицина

*Azizova Rano Bakhodirovna,
senior scientific assistant, Neurology department applicant,
Tashkent Medical Academy
E-mail: mbshakur@mail.ru*

Interrelation of P300 cognitive potentials and neuro-immunologic values of patients with idiopathic and symptomatic epilepsy

Abstract: The inverse relation of latent period prolongation degree and amplitude to the presence and expression of neuro-immunologic values was detected in the analysis of interrelation of the latest ones and cognitive initiated potentials in the patients with symptomatic and idiopathic epilepsy.

Key words: epilepsy, forms, neuro-immunologic values, P300 cognitive potentials

Topicality. One of the most important aims of the modern neurology and epileptology is the study of epilepsy problems [2, 3–4]. During the recent decades multiple data were accumulated proving interrelation of epilepsy with immunologic disorganization, due to which the given pathology is considered to be one of immune-dependent diseases with pro-gradient progress [1, 9–11]. Though, it is possible that immunologic mechanisms can become an important part of integral theory of epilepsy origin and the further immunologic researches will promote better diagnostics of this pathology and will reveal new therapeutic possibilities [4, 14–16].

The progress of epilepsy is clinically expressed in the appearance and growth of various cognitive functions disorder degree. It was noted, that with the perfection of diagnostics and application of the modern anti-convulsion agents, more often psychic disorders in case of epilepsy are observed in the form of moderate cognitive disorders, while significant intellectual-mnemonic ones are usually described in cases of resistant forms of the disease [5, 5–8]. The clinical analysis of the dynamics of cognitive disorders let us more accurately detect progressing, remission or inversion of brain organic damage in comparison with the study of motor and sensory disorders [3, 15–18].

P300 method of cognitive initiated potentials is actively applied recently in the study of electro-physiologic correlators of cognitive processes [3, 5–6].

Taking into account the aforesaid, nowadays one of the actual problems is to study the interrelation on

neuro-immunologic values and the cognitive sphere disorders in case of epilepsy.

The aim of the research: is to study the interrelation of neuro-immunologic values and P300 cognitive initiated potentials in the patients with idiopathic and symptomatic epilepsy.

Materials and methods of the research: 43 patients with epilepsy aged from 16 to 70 were examined (27 men; 16 women), among which there were 11 with idiopathic epilepsy (I group) and 32 patients with symptomatic focal epilepsy (II group). All the patients had detailed preliminary anamnesis and clinical selection performed by means of stratified randomization method using inclusion and exclusion criteria.

The quantitative definition of antibody (AB1 and ALAB2) serum immune reactivity to the neuro-mediators receptors (glutamate, GABA, dopamine, serotonin and cholin receptors) was performed with the help of ELI-N-Test firm-phase immune-enzyme method and its test sets produced by “Immunkulus” (Russia).

The study of acoustic cognitive initiated potential (ACIP) or P300 was performed in compliance with the standard “odd-ball paradigm” method. For the research we used four-channel electro-myograph by MEDELEC «Sapphire premier». The calculation of P300 main peaks was made automatically with the markers set in the progress of the analysis. We measured the latent periods of N2 and P3 peaks, N2 — P3 peak interval in milliseconds (ms), в миллисекундах (мс), N2/P3 complex amplitude in

micro Volts (mkV) as a sum of amplitude values of N2 and P3 peaks from isoline. The maximal positive component with latency 300ms and more was taken as P300. P300 alterations in the central leads were taken for quantitative analysis.

The analysis of the received values was performed by means of «SPSS for Windows» software with processing of the material with the help of variation statistic methods. The reliability of the received data was estimated by means pair method according to Student t-criteria. The difference was considered to be reliable with $p < 0,05$.

The results of the research: taking into account the deviations of immune reactivity from the individual average level of serum reactivity we detected doubtful decrease of aAB level to glutamate receptors (Glu-R) 1.92 times in the I group (1.50 ± 1.96 R.U) and 1.19 times in the II groups (2.42 ± 2.21 R.U), in comparison with the control group (2.88 ± 1.91 R.U). We noted a reliable rise of aAB to GABA receptors (GABA-R) 2.11 times in the I group (18.81 ± 2.76 R. U., $p \leq 0,01$) and 2.08 times in the II group

(18.57 ± 2.37 R. U., $p \leq 0,01$), in comparison with the control group (8.93 ± 2.05 R. U.). A similar rise of aAB was detected to dopamine receptors (Dop-R) and serotonin receptors (Ser-R): 2.18 times (16.05 ± 1.86 R. U., $p \leq 0,001$) and 3.04 times (5.63 ± 2.54 R. U., $p \leq 0,01$) in the I group; 2.19 times (16.10 ± 2.55 R. U., $p \leq 0,01$) and 3.66 times (8.65 ± 2.36 R. U., $p \leq 0,001$) in the II group correspondingly. Statistically non-significant deviations of aAB immune-reactivity were revealed in relation to cholin-receptors (Chol-R): decrease of aAB 1.2 times (16.97 ± 6.58 R. U.) in the I group and 1.13 times rise (23.03 ± 4.24 R. U.) in the II group correspondingly (table 1). Thus, while in the I group there were the greatest deviations of aAB immune reactivity tend to reliable rise to GABA-R, Dop-R, Ser-R and statistically non-significant decrease to Glu-R and Chol-R, in the II group there was noted rise of aAB to GABA-R, Dop-R, Ser-R and Chol-R and decrease only to Glu-R. Herein, the difference between the groups turned to be statistically non-significant (Table 1).

Table 1. – Deviations of aAB immune reactivity to neuro-mediator receptors from the individual average level of serum reactivity in case of epilepsy, R. U. (M \pm m).

Value	I group (n=11)	II group (n=32)	Control (n=16)
Glu-R	1.50 \pm 1.96	2.42 \pm 2.21	2.88 \pm 1.91
GABA-R	18.81 \pm 2.76*	18.57 \pm 2.37*	8.93 \pm 2.05
Dop-R	16.05 \pm 1.86*	16.10 \pm 2.55*	7.36 \pm 1.73
Ser-R	5.63 \pm 2.54*	8.65 \pm 2.36*	1.85 \pm 1.96
Chol-R	16.97 \pm 6.58	23.03 \pm 4.24	20.42 \pm 1.92

Note: * — results are reliable in comparison to the control group, $p < 0,05$.

The patients with epilepsy had rise of individual level of serum immune reactivity of all aAB to receptors of neuro-mediators (table 2). Thus, we detected the rise of aAB level to Glu-R 1.21 times (69.30 ± 8.36 R. U.) and 1.41 times (80.88 ± 8.76 R. U., $p \leq 0,05$), to GABA-R 1.08 times (48.99 ± 5.86 R. U.) and 1.32 times (59.89 ± 6.53 R. U., $p \leq 0,05$), to Dop-R 1.1 times (51.75 ± 6.54 R. U.) and 1.33 times (62.36 ± 6.43 R. U., $p \leq 0,05$), to Ser-R 1.11 times

(62.18 ± 6.19) and 1.24 (69.81 ± 6.20 R. U., $p \leq 0,05$), and to Chol-R 1.50 times (50.83 ± 4.93 R. U., $p \leq 0,01$) and 1.63 times (55.43 ± 6.26 R. U., $p \leq 0,01$), in comparison with the control group, correspondingly in the I and II groups of patients. And the greatest increase of all aAB level to neuro-mediator receptors was statistically significantly higher in the group of patients with symptomatic epilepsy (table 2).

Table 2. – Individual level of serum immune reactivity of auto antibodies to neuro-mediator receptors in case of epilepsy (M \pm m).

Value	I group (n=11)	II group (n=32)	Control (n=16)
Glu-R	69.30 \pm 8.36	80.88 \pm 8.76*	57.19 \pm 4.77
GABA-R	48.99 \pm 5.86	59.89 \pm 6.53*	45.38 \pm 4.77
Dop-R	51.75 \pm 6.54	62.36 \pm 6.43*	46.94 \pm 4.79
Ser-R	62.18 \pm 6.19	69.81 \pm 6.20*	56.16 \pm 4.49
Chol-R	50.83 \pm 4.93*	55.43 \pm 6.26*	33.89 \pm 3.15

Note: * — results are reliable in comparison with the control group, $p < 0,05$.

Thus, abnormal rise of aAB to ligand-binding side of neuro-mediator receptors (Glu-R, GABA-R, Dop-R, Ser-R and Chol-R) shows the alterations in the corresponding systems of neurons. The higher serum level of aAB to neuro-mediator receptors in the patients with symptomatic epilepsy can indicate the presence of various mechanisms of neuro-mediation and neuro-plasticity implementation in the patients with idiopathic and symptomatic epilepsy.

For the detection of cognitive disorders we applied neuro-physical research of cognitive initiated potential. As a result, in cases of SE we detected slight emotional deregulation disorders reflecting dysfunction of cortex — sub-cortex structures. It was manifested by the absence of clear P300 amplitude asymmetry between hemispheres (fig. 1).

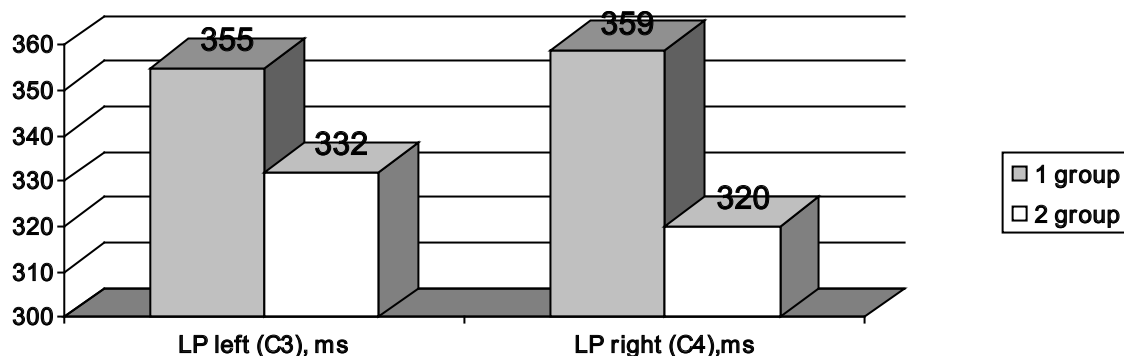


Figure 1. P300 wave parameters (latent period) in C3 and C4 leads in the examined patients with epilepsy

The patients with IE had more significant disorders, characterized by the absence of P300 amplitude

asymmetry between hemispheres and reliable increase of P300 latent period.

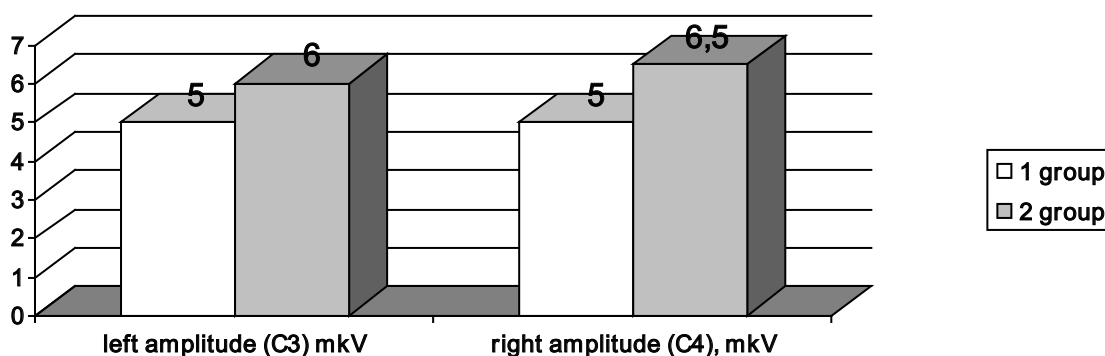


Figure 2. P300 (amplitude) wave parameter in C3 and C4 leads in the examined patients with epilepsy

In the analysis of interrelation of neuro-immunologic values and cognitive potentials of patients

with epilepsy we revealed the following regularities represented in the table 3.

Table 3. – Correlation link of neuro-immunologic values and cognitive potentials in the patients with epilepsy

Values	C3 lead				C4 lead			
	P1	N1	P2	N2	P1	N1	P2	N2
Glu-R	-0.357	-0.143	-0.216	-0.384	-0.078	-0.302	-0.287	-0.091
GABA-R	-0.371	-0.193	-0.269	-0.519	-0.418	-0.524	-0.328	-0.110
Dop-R	-0.390	-0.160	-0.265	-0.235	-0.088	-0.425	-0.335	-0.130
Ser-R	-0.273	-0.410	-0.279	-0.219	-0.449	-0.330	-0.332	-0.105

As it is seen from the table there is traced inverse relation of neuro-immunologic values and P300 cognitive potentials.

On the basis of the achieved data we can conclude there is inverse relation of the degree of latent period increase and amplitude to the presence and expression of neuro-immunologic values. It can indicate worsening of the initial stage of information process-

ing and salvation of cognitive problems, i. e. the process of stimuli recognition and differentiation in the patients with epilepsy.

Conclusion. Thus, circulating aAB to neuro-mediator receptors, particularly to glutamates, GABA, dopamine, serotonin and cholin receptors, in blood serum of the patients with epilepsy, indicate there are alterations in the corresponding systems of neurons. The higher level

of serum aAB to neuro-mediator receptors in the patients with symptomatic epilepsy can indicate the presence of various mechanisms of neuro-mediation and brain plasticity in case of idiopathic and symptomatic epilepsy.

On the basis of neuro-physiologic values of cognitive initiated potentials we detected characteristic disorders of the highest brain functions in case of epilepsy, reliable alterations of latent period and P300 amplitude dependently on the form of the disease. In cases of idiopathic and symptomatic forms there is

absence of P300 wave amplitude asymmetry between hemispheres indicating function disorders. The values of P300 latent period are increased in cases of symptomatic epilepsy, different from idiopathic one and these values reflect inhibition of cognitive processes.

The inverse relation of latent period prolongation degree and amplitude to the presence and expression of neuro-immunologic values was detected in the analysis of interrelation of the latest ones and cognitive initiated potentials.

References:

1. Vetrile L. A., Yevseyev V. A., Karpova M. N. Neuro-immune pathologic aspects of epilepsy // RAMS bulletin. – 2004. – № 8. – p. 43–46.
2. Zinkovski K. A. Clinical-pathochemical, immunologic alterations and their correction in the patients with epilepsy: Abstract. Diss.. CMS. – M., 2004. – 30 p.
3. Kropotov U. D. Quantitative EEG, cognitive BP of human brain and neurotherapy. – Donetsk: Zaslavski, 2010. – 512p.
4. Poletayev A. B., Alferova V. V., Abrosimova A. A., Komissarova I. A., Sokolov M. A., Gusev Y. I. Natural neurotropic auto antibodies and pathology of nerve system. // Neuroimmunology. – 2003. – Vol. 1, № 1. – P. 11–17.
5. Engel J. J. ILAE classification of epilepsy syndromes // Epilepsia. – 2006. – Vol. 70. – P. 5–10.

*Isayeva Ganna Sergiivna, Government Institution
“National Institute of Therapy named after L. T. Malaya
of National Academy of Medical Science”*

Head of the Department of Chronic Non-communicable Disease Prevention

E-mail: anna_isayeva_74@yahoo.co.uk

Exercise capacity in healthy perimenopausal women

Abstract: The work studies a relationship between the levels of endogenous sex hormones and exercise capacity in healthy women during their perimenopause. Seventy-one healthy perimenopausal women were included in the study. Mod BRUCE protocol has been used to assess exercise capacity. An effect of the follicle-stimulating hormone level on METs values has been detected. No similar effects have been found for estradiol, testosterone, aldosterone, and prolactin.

Keywords: women, perimenopause, climacteric period, exercise capacity, treadmill-test.

Despite the fact that menopause is a physiological stage in the life of every woman, very few patients go through this period smoothly and without symptoms. Great number of complaints presented by patients in perimenopause is related to the reduction in exercise capacity. E. g., according to the data of Ceylan B. and Ozerdoğan N., when assessing menopausal symptoms, 79.2% of women reported a feeling of tiredness [1, 1–18]. Vasconcelos-Raposo J., et al. found that vasomotor symptoms were more frequently reported by young women while older age group patients were in a greater degree concerned by feeling tired or lacking in energy, breathing difficulties [2, 257–260]. A reduction in exercise capacity in women in peri- and postmenopausal period

results in greater reduction in health-related fitness and contributes to an increase in various cardiovascular risk factors [3, 753–778]. This entire group of complaints can be combined into a reduction in exercise capacity associated with perimenopause. Exercise capacity is an estimate of the maximal oxygen uptake for a given workload and can be expressed in metabolic equivalents (METs). In addition, exercise capacity has been shown to be an independent predictor of the presence of CAD in women [4, 1018–1022]. It is known that it is difficult enough to interpret the workload test results in women for the diagnostics of ischemic heart disease. In this case, an exercise capacity assessment additional to the ST segment change allows increasing the specificity of this examination.