

EPV0625

EEG dynamics during long-term treatment of depression in young female patients

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Introduction: The need to study and clarify the neurobiological basis of depression is due to the widespread prevalence and heavy socioeconomic burden of this disease. In order to prevent relapses, it is recommended to continue treatment for depression for a long time after the relief of the main depressive symptoms. However, delayed EEG changes have been almost completely unstudied.

Objectives: The aim of the study was to analyze the dynamics of spectral-coherent EEG parameters during long-term treatment for endogenous depression in young female patients.

Methods: The study included 20 female patients aged 16-25 years who underwent quantitative clinical (using the HDRS-17 and GAF scales) and neurophysiological (multichannel resting EEG recordings with subsequent analysis of absolute spectral power and EEG coherence) examination three times: upon admission to hospital before the start of the course of treatment (at visit 1), upon discharge from the hospital at the stage of remission establishing (at visit 2) and one year after discharge from the hospital on maintenance therapy (at visit 3). The clinical and EEG changes were statistically assessed using the Wilcoxon test.

Results: After the course of stopping treatment (at visit 2), there was a significant ($p < 0.01$) reduction in depressive symptoms. This was associated with an EEG slowdown in the form of a generalized increase in the spectral power of theta-delta activity (2-4 Hz and 4-8 Hz), which was significant ($p < 0.05$) in the frontal-central leads, and a significant ($p < 0.05$) decrease in the alpha2 (9-11 Hz) and alpha3 (11-13 Hz) components of the alpha rhythm in the occipital zones. Further improvement in the clinical condition (according to the HDRS-17 scale) and social functioning (according to the GAF scale) was noted a year later (at visit 3), and was associated with the same EEG pattern, including a significant ($p < 0.05$) increase of theta2 sub-band (6-8 Hz) spectral power in the central-parietal-occipital leads.

Conclusions: The observed EEG slowdown is considered to be a reflection of a complex restructuring of brain activity into a mode more adequate for these patients, ensuring the suppression of depressive symptoms and restoration of the social functioning of patients, rather than traditionally considered general decrease of the brain functional state.

Disclosure of Interest: None Declared

EPV0624

Neurophysiological correlates of decision-making efficiency in depressive disorders

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Introduction: Reduced ability to make adequate decisions significantly affects the daily functioning and social adaptation in depressive patients. Neurophysiological bases of reduced efficiency of decision-making based on both logical reasoning and emotional processes are not sufficiently studied.

Objectives: The aim of the study was to search for possible links between signs of decision-making efficiency and EEG parameters in depressive patients.

Methods: The study involved 48 depressive female in-patients (F31.3-4, F34.0, by ICD-10), aged 16-25 years (mean age 18.4 $\pm$ 2.6). To assess the decision-making process, computer versions of the Wisconsin Card Sorting Test (WCST) and the Iowa Game Task (IGT) were used. Multichannel resting EEG recordings with spectral power analysis were performed at the same visit before the start of treatment. The rank correlation analysis (Spearman) was used for statistical data processing.

Results: In WCST test, negative correlations ($p < 0.05$) were found between the "percentage of conceptual level responses", and the spectral power values of beta1 (13-20 Hz), beta2 (20-30 Hz) in the central and posterior areas, and theta1 (4-6 Hz) in anterior areas of the cerebral cortex. Delta (2-4 Hz) activity values in the left frontal areas positively correlated with the WCST parameters "number of moves spent on completing the first category", "number of perseverations on the previous move", "number of moves" and "test completion time". Thus, patients complete the task longer and less effectively with frontal hypoactivity and increased activation of the posterior areas of the cortex that reflects a violation of the brain's inhibitory mechanisms. In the IGT test, positive correlations ($p < 0.01$) were revealed between the number of choices of the "bad" deck (A) and both "bad" decks (A and B), as well as negative correlations between the preference for "good" (C and D) over "bad" (A and B) decks in the second half of testing and the values of the alpha2 (9-11 Hz) spectral power in the anterior areas of the left hemisphere. The preference for "good" over "bad" decks on moves 40-60 negatively correlated with the values of alpha3 (11-13 Hz) and beta2 (20-30 Hz) in the right frontal and central areas. Thus, decision-making deficit in the IGT was associated with a relative decrease in the activation of the anterior regions of the left hemisphere and hyperactivation of the right hemisphere.

Conclusions: In depressive patients, impairments in the logical reasoning task (WCST) are associated with hypofrontality while impairments in the emotional learning task (IGT) – with disbalance of hemispheric activation, namely with hypoactivation of the frontal regions of the left hemisphere and increased activation of the right hemisphere.

Disclosure of Interest: None Declared

EPV0625

EEG features in young female depressive patients with ultra-high risk of psychosis

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Introduction: One of the directions of scientific research in modern psychiatry is the search for predictors of the developing of a manifest psychotic attack in patients with non-psychotic disorders,

that is, predictors of an ultra-high risk of psychosis. Such predictors may include various biomarkers, for example, the quantitative EEG parameters, which subtly reflect the features of the brain functional state.

Objectives: The aim of the study was to search for EEG correlates of the brain functional state in depressive patients of the group of an ultra-high risk of developing psychosis in comparison with EEG parameters of patients without symptoms of a risk of psychosis.

Methods: The study included 74 female depressive patients (F31.3-4, F32.1-2, by ICD-10) aged 16-26 years (mean age 20,8 $\pm$ 3,5 years) at the stage of remission establishing after treatment course, clinically divided into two groups. First group consisted of 32 patients with depressive conditions and attenuated prodromal psychotic symptoms assessed by SANS and SAPS scales and by COGDIS and COPER criteria, but without a history of manifest psychotic attack. The second group included 42 depressive patients without symptoms of ultra-high risk of developing psychosis. In all patients, multichannel background EEG was recorded with spectral power analysis in narrow frequency sub-bands. Intergroup EEG differences were statistically analyzed using Mann-Whitney test.

Results: According to EEG data, the functional state of the cerebral cortex in patients of group 2 at the stage of remission establishing was approaching normal. The EEG of the 1st group of patients differed from the EEG of the 2nd group by significantly lower values of EEG spectral power in the alpha3 sub-band (11-13 Hz) in the occipital leads and by significantly increased spectral power of theta1 (4-6 Hz) activity in the central-parietal areas. Such EEG frequency structure of patients in group 1 reflects a reduced functional state of associative areas, and may also indicate dysfunction of the frontal parts of the cerebral cortex. These EEG features of patients in group 1 are consistent with a significantly greater severity of their positive and negative symptoms scores by the SAPS and SANS scales compared to group 2.

Conclusions: In depressive patients at the stage of remission establishing who have symptoms of an ultra-high risk of developing psychosis a reduced functional state of the associative and frontal areas of the cerebral cortex is noted, which may underlie the characteristics of their clinical conditions.

Disclosure of Interest: None Declared

EPV0626

Evaluating the Efficacy and Safety of Repetitive Transcranial Magnetic Stimulation (rTMS) in Treating Prenatal Unipolar Depression: A Systematic Review

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Introduction: Prenatal unipolar depression is a significant mental health challenge affecting a considerable number of pregnant

women worldwide, with higher prevalence rates in developing regions. Due to the potential risks of antidepressant medications on fetal health, there is an increasing need for safe, non-pharmacological treatments. Repetitive transcranial magnetic stimulation (rTMS) has emerged as a promising neuromodulation therapy, offering a non-invasive approach to treating depression. This systematic review explores the efficacy and safety of rTMS in addressing prenatal depression, aiming to provide evidence for its potential as an alternative therapy for this vulnerable population.

Objectives: The primary objective of this review was to assess the therapeutic effectiveness and safety profile of rTMS in treating unipolar depression among pregnant women. The secondary aim was to identify gaps in the current literature and provide recommendations for future research to strengthen clinical guidelines for rTMS use during pregnancy.

Methods: A comprehensive search was conducted using the PubMed database without a time restriction, focusing on case reports, case series, uncontrolled studies, and randomized controlled trials that examined rTMS for prenatal depression. Inclusion criteria required studies to involve adult pregnant women diagnosed with major depressive disorder undergoing rTMS treatment. Data on depressive symptom improvements and any adverse effects on both mother and fetus were extracted for analysis.

Results: Analysis of ten studies, including six case reports/series, three uncontrolled studies, and one randomized controlled trial, indicated that rTMS was well-tolerated by pregnant women and showed effectiveness in reducing depressive symptoms. Notably, no adverse effects were observed in fetal outcomes across these studies. Symptom improvement was significant, with high patient satisfaction reported, yet the limited sample sizes and variations in methodology underscore the need for more robust trials.

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