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EEG markers of cognitive and communicative dysfunctions severity in children with ASD

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Objectives. The study aimed to reveal electrophysiological (EEG) markers of communicative and cognitive dysfunctions of different severity in children with autistic spectrum disorder (ASD).

Methods. 42 ASD children (36 boys, 4-9 years, 5.9 ± 1.7 [SD]) were divided into two groups on base of severity of their communicative and cognitive dysfunctions. The Control group included 70 children (44 boys, 4-9 years, 6.4 ± 1.4 [SD]) without developmental lags or autistic behaviors. EEGs were registered in resting state with opened eyes from 19 AgCl electrodes (10-20). Spectral power of group independent components (gIC) was calculated in theta (4-8 Hz), alpha (8-13 Hz), beta (13-30 Hz) frequency bands.

Results. Predominance of theta and beta EEG activity in both groups of children with ASD in comparison with Control group was found for global gIC together with predominance of beta EEG activity in the right occipital region. Spectral power of gICs in group with severe dysfunctions was increased versus Control group in more number of zones than in group with less dysfunctions. Reverse correlations of attention abilities in ASD children with spectra power in theta, theta/alpha and theta/beta power ratios in parietal associative cortex were obtained.

Conclusions. Thus, the quantity of local gICs with enhanced slow and high frequency EEG activity (in frontal, temporal, parietal cortex zones) in ASD children might be considered as the markers of cognitive and communicative dysfunctions severity.