

Comparative study of brain processes related to microgravity -induced and clinical oculomotor disturbances in subjects with the right and left eye dominance

Results:

Data of 41 healthy subjects, 14 volunteers, exposed to dry immersion (DI) and 19 schizophrenic patients were analyzed. Healthy subjects were right-handed males with right (RE) and left (LE) eye dominance, and patients had RE dominance. 2 modifications of antisaccadic task were used. In A1 task fixation period was 800-1000 ms, and in A2 task – 1200-1400 ms. EEG was recorded from 19 sites. Mean amplitude of slow cortical negative potentials (SN) time-locked to peripheral cue onset was evaluated. The saccade characteristics did not depend on task and experimental conditions in healthy RE subjects. In LE subjects percent of errors was lower in A2 task than in A1 one, and increase of errors and saccade latencies was revealed after exposure to DI. Patients performed A2 task better than A1 one, but they exhibited delays in performance of correct saccades and larger number of errors in both tasks compared to healthy subjects. RE subjects demonstrated high level of frontal activation before antisaccades in both tasks. Reduced SN amplitude in frontal region was revealed in LE subjects. The most pronounced decline of SN amplitude in frontal regions was found in patients. Predominant left hemisphere activation was observed during the last 200 ms before peripheral cue in all groups. Changes in cortical activity after DI were similar in RE and LE groups: SN amplitude decreased, and foci of negativity shifted to the right hemisphere. Thus, obtained results (1) support the neurodevelopmental model of cerebral lateralization, (2) demonstrate the independence of basic hemisphere specialization from eyedness, (3) corroborate the important role of frontal disorders in genesis of schizophrenia.

Published Work:

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