

## **Functional changes in brain cortex in multiple sclerosis patients with cognitive disorders and different types of disease measured by means of positron emission tomography**

Introduction: Cognitive disorders (CD) are one of the most frequent symptoms of multiple sclerosis (MS). It is not known yet the damage of which parts of the brain have the main role in CD development. The mechanisms of CD in different MS types are also obscure.

The aim of our study was to evaluate the ratio of CD in patients with different MS types and various disability levels and to assess the correlation between CD and changes of the regional cerebral metabolic rate of glucose (rCMRglu) in the grey matter measured by positron emission tomography with 18-fluorodeoxyglucose (PET - FDG).

Methods: 71 MS patients, 25 healthy controls were examined. 59% had relapsing-remitting MS (RRMS), 41% - progressive MS (PMS). The mean age was  $35,1 \pm 3,3$  y.o., disease duration -  $8,2 \pm 2,5$  years, Expanded Disability Status Scale (EDSS) score -  $3,8 \pm 1,9$ . The disability was measured with EDSS and functional systems score. A neuropsychological examination included: short-term and long-term memory, concentration, counting and cognitive performance tests. PET-FDG study of rCMRglu was made.

Results: 92% of patients had CD, even those with  $EDSS < 3$ . In some cases there was a rapid CD progression in patients with low disability level, that improves the difference and independence of pathogenesis of CD and other neurological disorders. It was revealed that the reduction of grey matter functional activity was more marked in PMS patients then in those with RRMS, despite of the equal disability score ( $3 < EDSS < 6$ ). The most marked rCMRglu reduction was observed in precentral gyrus, frontal cortex, right cingulate gyrus, left parietal cortex, postcentral gyrus.

Conclusion: CD can be an independent characteristic of the disease severity and should be evaluated regularly even if there is no aggravation of focal neurological symptoms. CD are associated with functional changes in different parts of brain cortex, that depends on the MS type.