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Features of MRI signs in patients with Parkinson's disease

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Background: Parkinson's disease (PD) involves widespread damage to various areas of the cerebral cortex. We aimed to establish using MRI the presence of differences in the thickness of the cortical layer in patients with early and advanced stages of PD.

Methods: We examined 22 patients with PD, with stages 2 (group 1) and 3 (group 2) according to the Hoehn-Yar functional scale, of which 12 patients had an akinetic-rigid form of the disease (54,5%), the rest patients had a mixed form of PD (45,5%). The examination protocol consisted of a clinical assessment of the condition of patients with the determination of the stage of the disease, as well as an MRI study on a magnetic resonance tomography.

Results: Complications of the course of the disease in the 2nd stage of PD were represented by moderate cognitive deficit, increased daytime sleepiness, and depressive disorders. In the 3rd stage of the disease, cognitive impairments ranged from moderate to dementia, there was also a significant increase in the severity of daytime sleepiness and night sleep disturbances, and deepening of depression. In patients with PD, we found significant differences in the thickness of the cortex in both the left and right hemispheres of the brain. One of the most interesting results obtained is degeneration in the visual cortex. Pathology of the posterior dorsal cingulate gyrus (group 1-2.758; group 2-2.624; $p=0.017$) affects the performance of operations with episodic memory and the ability to understand and realize the opinions of other people. There is a decrease in the thickness of the cortical layer (group 1-2.21; group 2-2.11; $p=0.044$), which negatively affects cognitive and mental disorders that develop in patients with PD. Changes in the fusiform gyrus (Group 1-1.83; Group 2-1.75; $p=0.042$) has a negative impact primarily on the state of cognitive functions of patients and is one of the mechanisms for the development of hallucinations. Despite the fact that there were no significant differences in the thickness of the cortex among the structures of the parietal lobe, graphic post-processing visualizes very bright differences between patients with the 2nd and 3rd stages of the disease.

Conclusions: The data obtained make it possible to establish a connection between non-motor manifestations of PD and degeneration of certain cortical areas of the brain. In this regard, it is necessary to further develop and improve high-tech methods that will contribute to clarifying the issues of pathogenesis and predicting the course of PD.