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COMPREHENSIVE ASSESSMENT OF COGNITIVE DYSFUNCTION IN PATIENTS WITH PARKINSON'S DISEASE DEPENDING ON THE DEGREE OF IMPORTANCE OF THE DISEASE

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Abstract: Parkinson's disease (PD) is the second most common neurodegenerative disease after Alzheimer's disease, affecting approximately 1-2% of the population over 60 years of age and characterized by progressive death of dopaminergic black substance neurons. According to epidemiological studies, the global prevalence of Parkinson's disease is about 10 million cases, with the number of patients projected to double by 2030 due to population aging.

Keywords: comprehensive assessment, cognitive impairment, Parkinson's disease

Introduction. In the Republic of Uzbekistan, the problem of Parkinson's disease is becoming particularly relevant due to the increasing proportion of the elderly population and the growing number of patients with chronic neurodegenerative diseases. Existing domestic studies are mainly devoted to the clinical and therapeutic aspects of Parkinson's disease, while systematized data on the neuropsychological and cognitive characteristics of patients, depending on the severity of the disease, are presented in a limited way and require further in-depth study. Despite the successes achieved in understanding the pathogenesis of Parkinson's disease, the issue of comprehensive assessment of cognitive and neuropsychological disorders, taking into account the stage and severity of the disease, remains relevant. The insufficient standardization of neuropsychological examination and the lack of a unified approach to assessing cognitive status in patients with varying degrees of Parkinson's disease severity limit the possibilities of early diagnosis and timely correction of identified disorders. Thus, the high prevalence of Parkinson's disease, the significant role of cognitive and neuropsychological disorders in the formation of the clinical picture of the disease, their dependence on the severity of the pathological process, as well as the insufficient study of this issue in domestic practice determine the relevance of this study and justify the need for a comprehensive analysis of the neuropsychological and cognitive characteristics of patients with Parkinson's disease depending on the severity of the disease.

The aim of the study is to identify neuropsychological and cognitive characteristics in patients with Parkinson's disease, depending on the severity of the disease, to justify a differentiated diagnostic approach.

Research material and methods. The study included patients with clinical manifestations of Parkinson's disease who were observed in outpatient and inpatient settings of the Multidisciplinary Clinic of Samarkand State Medical University (polyclinic department, neurology department, therapy department). The total number of examined patients was n=55 people aged 45 to 65 years (average age - 56.3±5.4). The study was conducted in the period from 2024 to 2025. The study group consisted of patients of both sexes: men 32 people (58.2%), women 23 people (41.8%). The inclusion criteria in the

study were: the presence of clinical signs corresponding to the diagnosis of Parkinson's disease according to ICD-10 (G20), age from 45 to 65 years, as well as the presence of the patient's informed written consent to participate in the study. The exclusion criteria were: a history of acute cerebral circulation disorders less than 6 months before inclusion in the study, severe dementia, inflammatory and autoimmune diseases in the acute phase, oncological diseases, acute infectious processes, as well as severe somatic pathology in the decompensation stage.

Depending on the severity of the clinical manifestations of the disease and the degree of cognitive-neuropsychological disorders, patients of the main group were divided into two subgroups: 1st group - patients with a mild form of the disease - 27 people (49.1%); The 2nd group consisted of 28 (50.9%) patients with moderate disease. The control group for a comparative analysis of the study indicators consisted of 29 relatively healthy volunteers comparable to the main group by age and sex, who underwent a preventive medical examination in outpatient settings, without clinical signs of Parkinson's disease, cognitive impairments, and pronounced somatic pathology.

Additionally, patients of the main group were distributed according to clinical and etiopathogenetic characteristics. By disease stage according to the Hen-Yar scale: I stage - 14 patients (25.5%), II stage - 26 patients (47.3%), III stage - 15 patients (27.2%). According to the presumed etiology of the disease, idiopathic forms of Parkinson's disease prevailed in 44 cases (80.0%), secondary parkinsonism in 11 cases (20.0%). Depending on the nature of the disease course, patients with slow progression of the disease were identified - 31 (56.4%), moderate progression - 18 (32.7%), rapid progression - 6 (10.9%). The presence of a hereditary predisposition to Parkinson's disease was noted in 17 patients (30.9%), while in 38 people (69.1%), no family predisposition was identified.

All examined individuals (patients of the main and control groups) underwent a comprehensive clinical, neurological, and neuropsychological examination aimed at identifying cognitive and neuropsychological characteristics in Parkinson's disease, taking into account the severity of the disease. Clinical and neurological assessment included an analysis of complaints, medical history data, objective neurological status, and the severity of motor symptoms. Validated neuropsychological scales were used to assess cognitive functions. The screening assessment of cognitive status was conducted using the Montreal Cognitive Assessment (MoCA), which allows for the detection of mild and moderate cognitive impairments. For a more detailed assessment of performance functions, behavior regulation, and abstract thinking, the Frontal Assessment Battery (FAB) was used. Parkinson's Disease-Cognitive Rating Scale (PD-CRS), specific to Parkinson's disease, was used to comprehensively assess cortical and subcortical cognitive impairments with subsequent analysis of cognitive deficit structure.

Neuropsychological test results were analyzed differentially depending on the severity of the disease, the stage according to the Hyon-Yar scale, and the nature of Parkinson's disease progression, as well as compared with the indicators of the control group.

As an innovative approach, an integrative index of the cognitive profile in Parkinson's disease was used, based on a combined assessment of the total score on the MoCA, FAB, and PD-CRS scales. This index made it possible to objectify the degree of cognitive deficit, identify the prevalence of cortical or subcortical disorders, and conduct early stratification of patients based on the risk of cognitive impairment progression. The use of an integrative index ensured a more accurate assessment of cognitive status compared to the use of individual scales and allowed for a differentiated diagnostic approach.

Statistical processing of the obtained data was carried out using the Statistica and SPSS application software packages on an individual computer. Quantitative indicators are presented as average values and standard deviation. For intergroup comparison, parametric and non-parametric statistical analysis methods were used depending on the nature of the data distribution, including the Mann-Whitney U-criterion, the Kraskel-Wallis criterion, and Pearson's $\chi 2$. Correlation analysis was performed using Spearman's coefficient. Differences were considered statistically significant at a level of $p < 0.05$.

Research results. The results of the neuropsychological examination showed that cognitive impairments were detected significantly more frequently in patients with Parkinson's disease and were more pronounced as the severity of the disease increased. The nature and structure of cognitive deficit depended on the stage of the disease according to the Hen-Yar scale and the clinical course. Thus, in the group of patients with a mild degree of the disease, moderate cognitive impairments prevailed, mainly in the sphere of attention and executive functions. The average total score on the MoCA scale was 24.8±2.1 and corresponded to a slight cognitive decline. On the FAB scale, a moderate decrease in frontal functions was noted (14.6±1.8 points), while PD-CRS indicators indicated a predominantly subcortical type of cognitive impairment (89.4±7.6 points). In the control group, cognitive indicators corresponded to the age norm.

In patients with moderate severity of Parkinson's disease, more pronounced cognitive impairments were identified, including impairments in executive functions, working memory, and cognitive activity slowdown. The average score for MoCA decreased to 21.9±2.4 ($p<0.05$ compared to the 1st group), for FAB - to 12.3±2.0 points, and PD-CRS indicators reflected a combination of subcortical and cortical disorders (78.1±8.4 points). Consequently, the results indicate a progressive decrease in cognitive functions in Parkinson's disease, involving both subcortical and cortical mechanisms as the disease progresses.

Correlation analysis revealed significant relationships between the severity of Parkinson's disease and the degree of cognitive impairment. A strong negative correlation was noted between the Hen-Yar stage and MoCA scores ($r=-0.69$; $p<0.001$), as well as between the disease stage and PD-CRS indicators ($r=-0.72$; $p<0.001$). Decreased frontal functions according to FAB also significantly correlated with the duration of the disease ($r=-0.58$; $p=0.002$).

A comprehensive neuropsychological analysis using the MoCA, FAB, and PD-CRS scales allowed for a differentiated assessment of cognitive impairments in Parkinson's patients depending on the severity of the disease. In patients with mild Parkinson's disease, cognitive deficit was predominantly subcortical in nature and manifested as a decrease in the rate of cognitive activity, impairment of attention and executive functions with relative preservation of memory and cortical functions. This profile of cognitive impairment differed from age-related cognitive changes and allowed for the differentiation of the initial manifestations of Parkinson's cognitive decline from normal aging.

In patients with moderate severity of the disease, an expansion of the cognitive deficit structure with involvement of cortical functions was revealed, which was confirmed by a decrease in indicators on the PD-CRS and FAB scales. The formation of a mixed cortical-subcortical cognitive profile allowed for differential diagnosis between Parkinson's cognitive disorders and early stages of dementia of other origins, as well as timely identification of patients in the risk group for cognitive deficit progression.

Using an integrative cognitive index based on a combined assessment of MoCA, FAB, and PD-CRS results ensured a more accurate stratification of patients by the degree of cognitive impairment and increased diagnostic sensitivity compared to the use of individual scales. Thus, the proposed differentiated diagnostic approach allows for the objectification of the nature of cognitive impairments in Parkinson's disease and can be recommended for clinical practice for the purpose of early detection and monitoring of cognitive decline.

Conclusions

1. In patients with Parkinson's disease, cognitive and neuropsychological disorders increase as the severity of the disease increases and are characterized by the transition from predominantly subcortical cognitive profile in the early stages to a mixed cortical-subcortical type of cognitive deficit in the moderate course of the disease.
2. The integrated use of the MoCA, FAB, and PD-CRS scales provides a differentiated diagnosis of cognitive impairments in Parkinson's disease, allowing for an objective assessment of the cognitive deficit structure and differentiating Parkinson's cognitive decline from age-related cognitive changes and other forms of dementia.

3. The use of an integrative cognitive approach increases the diagnostic sensitivity of assessing cognitive impairments in Parkinson's disease and allows for the identification of patients in risk groups for the progression of cognitive impairment, which determines the practical significance and novelty of the study.

References

1. Jurabekova A.T. Neuropsychological features of cognitive disorders in patients with Parkinson's disease. Neurology and Neurosurgery of Uzbekistan. 2021; (3):42-47.
2. Jurabekova A.T., Khamraev Kh.Kh. Cognitive disorders in neurodegenerative diseases: clinical and diagnostic aspects. Journal of Theoretical and Clinical Medicine. 2022; (4): 58-63.
3. Zakharov V.V., Vakhnina N.V. Differential diagnosis of cognitive impairments. Neurology, neuropsychiatry, psychosomatics. 2020;12 (2):9-15.
4. Illarioshkin S.N. Non-motor manifestations of Parkinson's disease. Journal of Neurology and Psychiatry named after S.S. Korsakov. 2017;117 (4):8-14.
5. Levin O.S., Fedorova N.V. Cognitive Disorders in Parkinson's Disease. Neurological Journal. 2018;23 (2):4-10.
6. Saidova G.A., Yusupova M.N. Cognitive impairments in chronic neurodegenerative diseases. Neurology and Neurosurgery of Uzbekistan. 2023; (1):29-34
7. Khamraev Kh.Kh., Rakhimova Z.B. Non-motor symptoms of Parkinson's disease. Bulletin of Samarkand State Medical University. 2019; (2):45-50.
8. Yuldashev N.M., Abdullaev A.A. Parkinson's disease: clinical and diagnostic features. Medical Journal of Uzbekistan. 2020; (5):34-39.
9. Yaxno N.N., Zakharov V.V. Neuropsychological syndromes in neurodegenerative diseases. Neurology, neuropsychiatry, psychosomatics. 2019;11 (1):4-11.
10. Aarsland D., Andersen K., Larsen J.P., Lolk A. Prevalence and characteristics of dementia in Parkinson's disease. Archives of Neurology. 2003; 60 (3):387-392.
11. Aarsland D., Bronnick K., Williams-Gray C. et al. Mild cognitive impairment in Parkinson's disease. Neurology. 2010;75 (12):1062-1069.
12. Emre M., Aarsland D., Brown R. et al. Clinical diagnostic criteria for dementia associated with Parkinson's disease. Movement disorders. 2007; 22 (12):1689-1707.