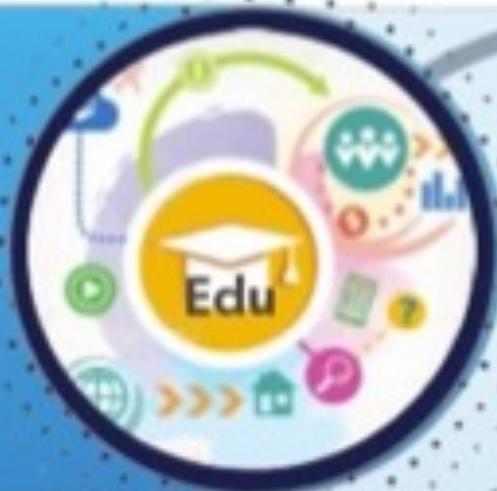




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COGNITIVE IMPAIRMENT IN PARKINSON'S DISEASE: Early Diagnosis and Ways to Correct

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ABSTRACT

An urgent problem of neurology is the improvement of diagnostics and correction of cognitive impairment in Parkinson's disease and Parkinsonism syndromes. On the basis of a comprehensive study, including clinical, laboratory and psychometric data, the results of CT, MRI, angiography of cerebral vessels, computed electroencephalography, the features of cognitive impairment in Parkinson's disease and vascular parkinsonism were studied. Particular attention among the syndromes of parkinsonism is paid to vascular parkinsonism, the pathogenetic mechanisms of which are still insufficiently studied. Recommendations have been developed to improve the diagnosis and correction of cognitive disorders in Parkinson's disease and vascular parkinsonism.

Keywords: Parkinson's disease, vascular parkinsonism, dementia

INTRODUCTION

An urgent problem of modern neurology is the study of pathogenesis and improvement of methods for diagnosing and treating Parkinson's disease. Currently, the prevalence of Parkinson's disease is 100 to 200 patients per 100,000 population. Parkinson's disease is the second most common neurodegenerative disease after Alzheimer's disease [7].

At the same time, the number of people suffering from Parkinson's disease increases with age: such patients make up 1% in the age group of 65-69 years and up to 3% in the age of 80 years [3].

According to modern concepts, along with Parkinson's disease (idiopathic or primary parkinsonism), symptomatic parkinsonism is distinguished (secondary - toxic, neuroleptic, vascular, post-traumatic, post-infectious, neoplastic); and "Parkinsonism plus", which develops in inherited neurodegenerative diseases such as Huntington's disease [4].

It is estimated that approximately 60%-80% of Parkinson's cases are due to Parkinson's disease. Currently, due to the high incidence of cerebrovascular pathology, the number of cases of vascular parkinsonism has increased, which can develop as a consequence of acute

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cerebral circulation disorders, or be a manifestation of stage 3 dyscirculatory encephalopathy [5].

Currently, the study of the relationship between parkinsonism and cognitive impairment is one of the priority areas of research in clinical neurology. However, to date, no modern comprehensive assessment of cognitive disorders in Parkinson's disease and parkinsonism syndromes has been developed, taking into account clinical, laboratory, neuropsychological data, neuroimaging results, and computed electroencephalography. Therefore, an urgent problem of neurology is the improvement of diagnostics and correction of cognitive impairment in Parkinson's disease and Parkinson's syndromes.

MATERIAL AND METHODS

The mean age of patients with Parkinson's disease (43 women, 23 men) was 67.8 ± 1.2 ; Accordingly, this indicator was 68.5 ± 1.4 in females and 66.4 ± 2.2 in males, no significant difference was found ($p > 0.05$).

The average duration of Parkinson's disease was 5.0 ± 0.4 in the group, 4.8 ± 0.5 in women and 5.4 ± 0.7 in men, respectively, the differences were insignificant ($p > 0.05$).

The age of onset of Parkinson's disease also did not differ significantly in women and men (63.7 ± 1.3 and 61.0 ± 2.2 , respectively), $p > 0.05$, making the average for the group - 62.8 ± 1.2 .

The severity of the disease in the examined patients according to the Hen and Jahr scale corresponded to stages 2 - 3 - 4: on average - 2.7 ± 0.1 ; 2.7 ± 0.12 for women and 2.8 ± 0.2 for men ($p > 0.05$).

Patients with rigid-trembling form prevailed among the examined patients (58.1% in women, 60.9% in men, $p > 0.05$).

RESULTS AND DISCUSSION

The use of a unified rating scale for assessing the manifestations of parkinsonism showed the following. According to the second section of the unified rating scale for assessing the manifestations of parkinsonism, which characterizes the daily activity of patients, the total indicator was 12.4 ± 0.7 in women, 12.8 ± 0.9 ($p > 0.05$) in men, and 12.6 ± 0.5 on average.

According to the third section of the unified rating scale for assessing the manifestations of parkinsonism, which assesses motor disorders, the sum of points for females was 23.2 ± 1.0 , for males - 24.7 ± 1.4 ($p > 0.05$), on average - 23.7 ± 0.8 .

When examining patients with Parkinson's disease using the cumulative index scale, which characterizes the level of comorbidity, this indicator was, on average, 2.5 ± 0.2 .

It was significantly higher in males compared to females (3.05 ± 0.33 vs. 2.2 ± 0.2 ; $p < 0.02$); Basically, diseases of the respiratory system, and pathology of the genitourinary system were detected.

The level of education also did not differ significantly between women and men, respectively 12.6 ± 0.42 years and 12.4 ± 0.6 , $p > 0.05$.

At the same time, according to the results of the examination of patients using a brief scale for assessing mental status, the total score in females was 24.3 ± 0.8 , in men - 22.9 ± 1.2 , and no significant difference was revealed ($p > 0.05$). This indicator for the group was 23.8 ± 0.2 .

Examination of patients with Parkinson's disease revealed no significant differences in age, time of onset, duration, severity of the disease, daily activity severity of motor disorders, and level of education of patients depending on gender.

The obtained data made it possible to consider the results of the examination of women and men when analyzing factors affecting cognitive functions in patients with Parkinson's disease.

In all patients with Parkinson's disease, neuroimaging studies (CT or MRI of the brain) were performed, which did not reveal changes indicating the vascular genesis of Parkinson's syndrome.

According to electroencephalography, patients with Parkinson's disease showed diffuse changes, mainly in the form of desynchronization with the presence of slow theta waves, single or in the form of synchronous discharges, which corresponds to changes in the bioelectrical activity of the brain detected in this disease.

In patients with cognitive disorders, slow-wave activity was more pronounced, which is consistent with the data of other researchers [1, 6].

It was found that in 21 patients with Parkinson's disease, the total score on the Brief Mental Status Assessment Scale ranged from 28 to 30 points, indicating the absence of cognitive impairment.

The value of the total score of the short scale for assessing mental status from 24 to 27 points was revealed in 20 patients, on average - 25.3 ± 0.2 points. This indicated that they had moderate cognitive impairment that met the criteria for moderate cognitive impairment according to MCN-10 and the modified diagnostic criteria of S. Guathey, J. Touchon, and R. Petersen [2, 8].

In 25 patients with Parkinson's disease, the total score on the Brief Mental Status Assessment Scale ranged from 23 to 11, indicating the presence of dementia, the cognitive defect in these patients met the diagnostic criteria for dementia according to ICD-10 and DSM-4.

At the same time, 13 patients were diagnosed with mild dementia (the total score on the short scale for assessing mental status is 20-23, according to the clinical rating scale of dementia - 1 point), in 12 patients - dementia of moderate severity (the total score for the short scale for assessing mental status is 11-19, according to the clinical rating scale of dementia - 2 points).

Thus, the examination of patients with Parkinson's disease using a brief scale for assessing mental status revealed cognitive disorders in 68.2% of patients, including moderate cognitive impairment in 30.3% and dementia in 37.9%.

With the help of correlation analysis, the factors influencing the development of cognitive impairment in patients with Parkinson's disease were studied. It was shown that the severity of cognitive impairment did not depend on the sex of patients with Parkinson's disease ($r=-0.140$; $p=0.13$).

A significant relationship between the age of patients with Parkinson's disease and the severity of cognitive impairment was also not established ($r=-0.026$; $p=0.419$).

The dependence of the total score on the short scale of mental status assessment on the form of Parkinson's disease was revealed: this indicator significantly decreased in the range of trembling-rigid, rigid-trembling and akinetic forms.

It was found that the total score on the brief mental status assessment scale was significantly lower in patients with advanced stages of the disease on the Hen and Jahr scale ($r=-0.460$; $p<0.0001$).

An inverse correlation was revealed between the value of the total score on the short scale for assessing mental status and the total indicators for the section of the second scale of the unified rating scale for assessing the manifestations of parkinsonism, which characterizes the daily activity of patients, and the section of the third unified rating scale for assessing the manifestations of parkinsonism, which characterizes movement disorders (respectively, $r=-0.582$ and $r=-0.700$; $p<0.0001$, respectively).

Consequently, the severity of cognitive impairment depended on the severity of motor impairment and had a negative impact on the daily activities of patients with Parkinson's disease.

The duration of Parkinson's disease affected the development of cognitive disorders: an inverse correlation was found between the duration of the disease and the value of the total score on the scale of the short scale for assessing mental status ($r=-0.230$; $p=0.04$).

A comparison of the level of education in the examined patients with Parkinson's disease and the degree of severity of cognitive disorders was carried out. A higher level of education in patients with Parkinson's disease was associated with less severity of cognitive impairment on the Brief Mental Status Assessment Scale ($r=0.496$; $p<0.0001$).

It was found that the cumulative index characterizing the presence of comorbid diseases in patients with Parkinson's disease (mainly pathology of the genitourinary system, respiratory diseases) was inversely correlated with the value of the total score on the test of the brief scale for assessing mental status ($r=-0.577$; $p<0.0001$). This indicated that the severity of cognitive impairment was greater in patients with Parkinson's disease associated with comorbidity.

At the same time, the presence of a depressive state, found in 63.3% of patients with Parkinson's disease in the form of a «minor depressive episode», according to the Hamilton Depression Scale, did not significantly affect the severity of cognitive disorders ($p>0.05$).

However, it was established that there was a significant inverse correlation between the level of motivation to control the disease, according to the Locus of Control Questionnaire method, and the value of the total score on the Hamilton depression scale: Spearman's rank correlation coefficient was -0.472 ($p<0.01$).

According to a psychometric study, in patients with Parkinson's disease with moderate cognitive disorders, thinking disorders turned out to be the most pronounced: a decrease in the level of generalization and a distortion of the generalization process were revealed.

The overall score for the «word elimination» technique ranged from 18 to 24 compared to 30 points in the control group ($p<0.05$). The decrease in short-term memory in patients with Parkinson's disease, according to the method of memorizing 10 words, was less pronounced and did not differ significantly from the indicators in the control group.

To correct cognitive disorders, patients with Parkinson's disease with moderate cognitive impairment were prescribed the dopaminergic receptor agonist Piribedil (Proporan), which patients received for 3 months. At the same time, the initial dose was 50 mg per day (1 tablet), then it was gradually increased to 150 mg per day.

It should be noted that Proporan was added to the previously received drug Levodopa, the dose of which varied from 250 to 500 mg per day.

Psychometric studies revealed an improvement in thinking processes after 3 months of taking Proporan, as evidenced by an increase in the total score in points when using the «word elimination» method, respectively 20.2 ± 0.45 against 23.2 ± 0.64 points, $p < 0.001$.

It should be noted that the positive effect of Proporan in patients with Parkinson's disease was also revealed when studying the dynamics of indicators on the test of the Brief Mental Status Assessment Scale: the total score in patients with moderate cognitive impairment 3 months after the start of treatment with Proporan significantly increased, amounting to 25.3 ± 0.3 points, respectively, versus 28.2 ± 0.2 points, $p < 0.001$. The results of the work indicate that the patients tolerated Proporan well, and there were no side effects. Therefore, the results of the study suggest a positive effect of Proporan on mild cognitive impairment in Parkinson's disease.

Particular attention was paid to the analysis of the results of the study of cognitive functions in 25 patients with Parkinson's disease (13 women, 12 men; mean age 68.2 ± 1.4) who had manifestations of dementia. In these patients, the total score, according to the test of the Brief Mental Status Assessment Scale, ranged from 11 to 23 points, on average, it was 18.4 ± 0.9 points. On the «Information-Memory-Attention-Concentration» test, the total score ranged from 17 to 38 points, making an average of 27.2 ± 1.3 , which is significantly lower than the indicator in healthy individuals, which reaches 42 points. When performing the test of drawing clocks with quantitative assessment, the value of the total score ranged from 2 to 9 points, the average score was sharply reduced, amounting to 6.4 ± 0.4 , while in practically healthy individuals it is equal to 10 points. When examining these patients with the help of a battery of frontal tests, the average score was 9.4 ± 0.4 points, which indicates the presence of frontal dysfunction, leading to a violation of conceptualization, and dynamic praxis. Consequently, patients with Parkinson's disease with dementia have a sharp impairment of visuospatial and regulatory functions, and less pronounced disorders of memory, attention and frontal dysfunction.

CONCLUSION

To detect cognitive disorders in patients with Parkinson's disease, a neuropsychological study is recommended, including, along with a brief mental status assessment scale, the «Information-

Memory-Attention-Concentration» test, a quantitative clock drawing test, and a battery of frontal tests. When making a differential diagnosis between Parkinson's disease and vascular parkinsonism, the results of a neuropsychological examination should be taken into account. In patients with Parkinson's disease, visual-spatial disorders predominate, there are no pronounced memory impairments according to the test «Information - Memory - Concentration of Attention» and significant frontal dysfunction, which is observed in patients with vascular parkinsonism.

CONFLICT OF INTEREST

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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PARKINSON KASALLIGIDA KOGNITIV DIS-FUNKTSIYA: ERTA TASHXIS VA DAVOLASH USULLARI

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Toshkent tibbiyot akademiyasi

ABSTRAKT

Nevrologiyaning muammosidan Parkinson kasalligi va parkinsonizm sindromlarida diagnostika va kognitiv disfunktsiyani davolashdir. Klinik, laboratoriya va psixometrik ma'lumotlar, KT, MRT, bosh miya tomirlarining MR angiografiyasi, xisoblangan elektroensefalografiya, Parkinson kasalligi va qon tomir parkinsonizmn-

ing kognitiv disfunktsiya xususiyatlari kabi keng qamrovli tadqiqot asosida o'rganildi. Parkinsonizm sindromlari orasida tomir parkinsonizmga alohida e'tibor qaratilmoqda, ularning patogenetik mexanizmlari hali ham etarli darajada o'rganilmagan. Parkinson kasalligi va tomir parkinsonizmida kognitiv buzilishlarni diagnostika qilish va tuzatishni yaxshilash bo'yicha tavsiyalar ishlab chiqildi.

Tayanch iboralar: Parkinson kasalligi, tomir parkinsonizmi, demensiya