

UDC: 66858-06:668-00917

FEATURES OF THE HUMORAL SEROTONIN SYSTEM AND NON-MOTOR MANIFESTATIONS IN PARKINSON'S DISEASE (Literature Review)

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Abstract: This article presents information about the manifestations of Parkinson's disease (PD). Parkinson's disease is the second most common progressive neurodegenerative disorder affecting older adults and is predicted to increase in prevalence with an aging population. It results from the pathophysiological loss or degeneration of dopaminergic neurons in the substantia nigra of the midbrain and the development of Lewy bodies. Idiopathic Parkinson's disease is associated with risk factors such as aging, family history, pesticide exposure, and environmental chemicals.

Keywords: Parkinson's disease, Lewy bodies, substantia nigra.

Relevance: Parkinson's disease (PD) is one of the most common neurodegenerative diseases in the elderly, characterized by the involvement of various mediator systems, with the dopaminergic system being the most studied [1, 2]. PD manifests with motor impairments (bradykinesia, increased muscle tone, tremors, and gait instability) and a wide range of non-motor (emotional, cognitive, behavioral, sleep-related, and other) disorders [1]. The risk of developing depression in PD patients is about twice as high as in healthy individuals of the same age and sex [1, 3, 4].

Depression in PD patients has specific features: suicidal attempts are uncharacteristic (despite suicidal thoughts), and there is a high degree of anxiety and pessimism with low self-reproach [5, 6]. Depression in PD is explained by damage to subcortical nuclei and prefrontal cortex, striothalamic loop, limbic system, and brainstem structures, with the serotonergic neurotransmitter system playing a significant role [4, 6, 7].

Up to 40% of PD patients suffer from anxiety disorders, including generalized anxiety disorder, panic attacks, and social phobia. Although antidepressants have demonstrated anxiolytic efficacy, no studies have been conducted specifically on treating anxiety disorders in PD [8].

Sleep disturbances are the most frequent non-motor symptoms of PD. These include difficulty falling asleep, frequent awakenings, night cramps and painful

dystonia, restless leg syndrome, nighttime confusion, hallucinations, and daytime sleepiness. Sleep behavior disorder during REM sleep occurs in more than 60% of PD patients and significantly impacts quality of life [5].

Cognitive impairments, including memory and attention decline, slowed thinking (bradyphrenia), and dementia-like symptoms, occur in about 80% of patients over the disease's progression. These impairments significantly worsen life quality, increase disability, and burden caregivers [7].

Discussion

PD is an idiopathic neurodegenerative disorder affecting both motor and non-motor systems, predominantly in older individuals but also in younger patients. It is the second most common neurodegenerative disease. Differentiating idiopathic PD from other parkinsonian syndromes (e.g., dementia with Lewy bodies, corticobasal degeneration, multiple system atrophy, progressive supranuclear palsy) remains challenging.

The pathology of PD involves dopaminergic neuronal loss in the substantia nigra and the development of Lewy bodies. Environmental toxins, aging-related chronic inflammation, and genetic factors contribute to the disease's progression.

Pathophysiology

The hallmark pathological feature of PD is the degeneration of dopamine-producing neurons in the substantia nigra and the accumulation of Lewy bodies, which disrupt neuronal function. By the time motor symptoms manifest, approximately 60-70% of the neurons are already lost. Genetic mutations, abnormal protein aggregation, mitochondrial dysfunction, and oxidative stress contribute to this degeneration.

Conclusion

Parkinson's disease poses a significant clinical challenge as a prevalent neurodegenerative condition primarily affecting an aging population. While it is not directly fatal, PD is associated with increased morbidity and mortality. A comprehensive understanding of its manifestations, treatment options, and progression is essential for improving patient care and quality of life.

References

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