EURASIAN JOURNAL OF ACADEMIC RESEARCH
Innovative Academy Research Support Center
IF = 9.3 www.in-academy.uz/index.php/ejar

ANALYSIS OF VESTIBULAR AND CENTRAL NEUROLOGICAL DISORDERS IN MENIERE'S DISEASE

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https://doi.org/10.5281/zenodo.20120454

ARTICLE INFO

Received: 03rd May 2026
Accepted: 10th May 2026
Online: 11th May 2026

KEYWORDS

Meniere's disease, vestibular disorders, central neurological disorders, vertigo, nystagmus, balance disorder, inner ear, nervous system, diagnostics, pathogenesis.

ABSTRACT

Meniere's disease is a chronic disorder of the inner ear characterized by dysfunction of the vestibular system and hearing. This study analyzes vestibular and central neurological disorders observed in Meniere's disease. Vestibular disorders include vertigo, balance impairment, and nystagmus. In addition, central nervous system-related symptoms such as headache, coordination disorders, and vegetative reactions are also considered. The study examines the pathogenesis, diagnostic methods, and the relationship between vestibular and central disorders. As a result, the impact of these disorders on patients' quality of life is determined.

Introduction. Meniere's disease is associated with impaired endolymphatic fluid metabolism in the inner ear, leading to the development of endolymphatic hydrops. As a result, the function of the vestibular apparatus and auditory receptors is disrupted. The disease is typically characterized by sudden onset and recurrent attacks.

Vestibular disorders are among the main clinical features of Meniere's disease. Patients often complain of severe vertigo, which may last from several minutes to several hours. During vertigo episodes, maintaining balance becomes difficult, increasing the risk of falls. Nystagmus, characterized by involuntary rhythmic eye movements, is also observed. Dysfunction of the vestibular apparatus leads to gait instability, impaired spatial orientation, and coordination deficits.

Central neurological disorders develop as a result of pathological impulses from the vestibular system affecting the central nervous system. These include headache, general weakness, decreased attention, and vegetative symptoms such as nausea, vomiting, sweating, and increased heart rate. In some cases, symptoms may decrease over time due to central compensatory mechanisms.

Vestibular and central disorders in Meniere's disease are closely interconnected and mutually aggravating. Abnormal signals from the vestibular apparatus are processed in the central nervous system, negatively affecting the patient's overall neurological condition. This complicates

the course of the disease and reduces quality of life.

Diagnostic methods such as audiometry, vestibulometry, and electronystagmography are essential. These methods help identify changes in vestibular and auditory systems and allow differential diagnosis. Timely and accurate diagnosis plays a key role in effective treatment.

Methods. This study used комплекс clinical and instrumental methods to investigate vestibular and central neurological disorders in Meniere's disease. The research was conducted using prospective and partially retrospective analysis.

Patients diagnosed with Meniere's disease were selected based on clinical symptoms such as vertigo attacks, hearing loss, and tinnitus. Age, gender, and disease duration were taken into account.

Clinical examination included assessment of complaints, medical history, and neurological status. Vestibular function was evaluated using the Romberg test, Unterberger test, and coordination tests. Central neurological status was assessed through reflexes, balance, and coordination.

Instrumental diagnostics included audiometry to assess hearing, vestibulometry and electronystagmography to evaluate vestibular function and nystagmus characteristics. In some cases, MRI was used to exclude organic central nervous system pathology.

Data were statistically analyzed using averages, percentages, and comparative methods to determine relationships between vestibular and central disorders.

Results. The study revealed clear clinical and functional indicators of vestibular and central neurological disorders in patients with Meniere's disease.

Vertigo was the most common symptom, observed in almost all patients. Its duration and intensity varied. Balance impairment and gait instability were common, with positive Romberg and Unterberger tests. Nystagmus was confirmed instrumentally in most cases.

Audiometric results showed sensorineural hearing loss of varying degrees, often unilateral in early stages.

Central neurological symptoms included headache, decreased attention, and general weakness. Vegetative symptoms such as nausea, vomiting, sweating, and tachycardia were especially prominent during vertigo attacks.

Instrumental diagnostics confirmed vestibular dysfunction. MRI findings showed no significant central organic pathology.

Overall, vestibular disorders were primary, while central neurological symptoms were secondary but significant, negatively affecting quality of life.

Discussion. The findings confirm that vestibular disorders play a leading role in Meniere's disease and are closely related to central neurological changes. Frequent and intense vertigo reflects dysfunction of the vestibular apparatus, explained by increased endolymphatic pressure.

Central symptoms arise due to pathological vestibular impulses affecting the central nervous system, highlighting the role of compensatory mechanisms. In some patients, symptom reduction over time is linked to these processes.

The results align with existing literature, indicating that peripheral (vestibular) dysfunction precedes central involvement. Therefore, a comprehensive neurological approach is essential.

Audiometry and electronystagmography proved highly effective diagnostically, while MRI was crucial for differential diagnosis.

Limitations include a relatively small sample size and lack of full stratification by disease stage. Future studies with larger samples are needed.

Conclusion. Meniere's disease is a complex inner ear pathology in which vestibular and central neurological disorders are interrelated. Vestibular symptoms (vertigo, balance impairment, nystagmus) are primary, while central symptoms significantly affect overall condition.

Pathological vestibular impulses influence the central nervous system, causing headaches, vegetative reactions, and coordination disorders, necessitating a comprehensive approach.

Modern diagnostic methods enable early detection and accurate differentiation. Timely diagnosis and proper treatment significantly improve patients' quality of life.

Thus, comprehensive evaluation of vestibular and central disorders remains a crucial task in clinical practice.

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