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Dizziness – Causes, Symptoms, Diagnosis and Treatment

Oskar Woźniak

Medical University of Silesia, Katowice, Poland Faculty of Medical Sciences in Katowice (FMS in Katowice) Poniatowskiego 15, 40-055 Katowice

s81490@365.sum.edu.pl

https://orcid.org/0009-0006-1016-0720

Joanna Wąsik

lek.wasik.joanna@wp.pl

1 Wojskowy Szpital Kliniczny z Polikliniką SPZOZ w Lublinie

https://orcid.org/0009-0004-9415-0508

Kacper Gryboś

SPZOZ Myślenice Szpitalna 2, 32-400 Myślenice

kacper.grybos@gmail.com

https://orcid.org/0009-0007-9598-8494

Weronika Sepioło

Provincial Specialist Hospital in Wrocław, Kamieńskiego 73A, 51-124 Wrocław, Poland

weronika.sepiolo@gmail.com

https://orcid.org/0009-0007-3060-5966

Julia Kiełbratowska

Polish Red Cross Maritime Hospital in Gdynia, 1 Powstania Styczniowego Street, 81-519 Gdynia,Poland

juliakielbratowska@gmail.com

https://orcid.org/0009-0005-3328-5502

Jowita Mikulska

Pabianice Medical Center Sp. o.o., ul. Jana Pawła II 68, 95-200 Pabianice, Poland

jowitamikulska@onet.pl

https://orcid.org/0009-0004-4176-8195

Mikołaj Lewandowski

Poznan University of Medical Sciences ul. Fredry 10, 61-701 Poznań

lewymikus99@gmail.com

https://orcid.org/0009-0001-8533-0660

Wojciech Kurkiewicz

Doctor of Medicine, Hospital of the Ministry of the Interior and Administration in Cracow, Kronikarza Galla Street 25, 30-053 Cracow, Poland;

https://orcid.org/my-orcid?orcid=0009-0000-0137-1311

kurkiewiczw@gmail.com

Abstract:

Dizziness is a common symptom affecting 15-35% of people, often leading them to seek medical help. It can arise from various causes, including neurological, otolaryngological, metabolic, cardiological, and psychological factors, and is often mistaken for fainting or weakness. Dizziness may be short-lived or chronic, and accurately identifying its cause is crucial for effective treatment. It is categorized into peripheral and central vertigo, based on the origin of the problem.Dizziness is described variably, from spinning sensations (vertigo) to feelings of unsteadiness or lightheadedness. It may be accompanied by nausea, vomiting, and other symptoms depending on the underlying condition. A thorough medical history, neurological examination, vestibular tests, imaging, and hearing tests are key steps in diagnosing the cause of dizziness. Treatment depends on the identified cause and includes medication, vestibular rehabilitation and surgical treatment.

Keywords: Dizziness, Vertigo, Meniere's Disease, Benign Paroxysmal Positional Vertigo

Introduction

Dizziness is a common symptom that prompts many patients to seek medical attention, affecting 15-35% of the general population at some point in their lives [1]. While dizziness is often linked to issues with the balance system, it can have various underlying causes, including neurological, otolaryngological, metabolic, cardiological, and psychological factors [2]. It is frequently confused with other conditions such as fainting or weakness. Dizziness can occur suddenly, last for a short time, or become chronic. Diagnosing the primary cause of dizziness is crucial for

selecting the appropriate treatment. A comprehensive understanding of the etiology, accurate diagnosis, and appropriate therapeutic options are key to effectively treating those suffering from this condition [3].

Etiology of Dizziness

Dizziness can result from a wide range of causes, which are classified based on the mechanism behind the symptom. The primary causes can be categorized into disorders of the central nervous system, the labyrinth (inner ear), the cardiovascular system, and the patient's mental health. For classification purposes, dizziness is divided into peripheral and central vertigo, depending on the location of the problem [4,5].

1. Vestibular Disorders

Vertigo may be related to issues within the vestibular system, which is responsible for maintaining balance. The following conditions fall under this category:

- Benign Paroxysmal Positional Vertigo (BPPV): This condition is associated with problems in the inner ear [6].
- Meniere's Disease: A chronic condition of the inner ear that causes episodes of vertigo, tinnitus, hearing loss, and a feeling of fullness in the ear. Its exact cause is not fully understood but is thought to be related to an excessive buildup of fluid in the inner ear [7].
- Labyrinthine Vertigo: This can result from head injuries, infections, or exposure to toxins [8].

2. Neurological Causes of Dizziness

Dizziness may also arise from neurological disorders, including:

- Migraine: In some patients, migraines can lead to dizziness, particularly in cases of vestibular migraine [9].
- Multiple Sclerosis: This neurodegenerative disease can damage the central nervous system, leading to dizziness [10].

- Stroke: Both cerebellar and brainstem strokes can cause dizziness as an early symptom [11].
- Vestibular Neuropathy: Damage to the vestibular nerve can result in chronic dizziness [12].
- Cerebral Circulatory Disorders: Atherosclerosis of the carotid or cerebral arteries can lead to cerebral ischemia and dizziness [13].

3. Metabolic Disorders

Certain metabolic disorders may contribute to dizziness, such as:

- Hypoglycemia: Low blood sugar levels, especially in diabetic patients, can cause dizziness [14].
- Dehydration: This condition reduces blood pressure and blood flow to the brain [15].
- Electrolyte Imbalance: An imbalance in the body's fluids can cause swelling of cells, including neurons, which may lead to dizziness, confusion, headaches, and weakness [16].

4. Cardiac Causes

Cardiac problems may also cause dizziness, including:

- Orthostatic Hypotension: A sudden drop in blood pressure when standing up from a sitting or lying position can lead to dizziness [17].
- Arrhythmias: Irregular heartbeats can cause dizziness [18].
- Heart Attack: A heart attack can decrease blood flow to the brain, resulting in dizziness [16].

5. Psychological Causes

Psychological conditions may contribute to dizziness, such as:

- Anxiety: Panic attacks, which cause excessive muscle tension and altered breathing patterns, can result in dizziness [19,20].
- Depression: Some individuals with depression may experience dizziness, either due to an underlying anxiety disorder or somatization disorder [21].

6. Other Causes

Certain medications, such as benzodiazepines, antipsychotics, and sleeping pills, can also cause dizziness as a side effect [22].

Symptoms Associated with Dizziness

Dizziness is a subjective symptom that manifests in various ways. People who experience dizziness often describe it as a sensation of the world "spinning," or as a feeling of being unsteady, lightheaded, or unstable. Depending on the cause, vertigo may be accompanied by additional symptoms:

- Labyrinthine Vertigo: Symptoms typically appear suddenly and are often triggered by specific head movements. Patients may experience nausea, vomiting, and balance disturbances [23].
- Central Vertigo: This is often associated with other neurological symptoms, such as visual disturbances, limb weakness, and speech difficulties, which may indicate serious conditions like stroke or multiple sclerosis [24].
- Migraine-Related Vertigo: This may occur alongside sensitivity to light and sound, as well as headache [25].

Diagnosis of Dizziness

Diagnosing dizziness involves a thorough medical history and a series of tests. Key diagnostic steps include:

- Clinical Interview: The physician conducts an in-depth interview to assess the nature of the dizziness, its duration, triggers, and any associated symptoms.
- Neurological Examination: An assessment of brain and nervous system function, including tests for muscle weakness, impaired coordination, and neurological reflexes.
- Imaging Tests: If a central nervous system disorder (e.g., stroke) is suspected, imaging tests such as computed tomography (CT) or magnetic resonance imaging (MRI) are performed.
- Vestibular Tests: Tests like vestibular calorimetry, electronystagmography (ENG), or balance tests evaluate the function of the balance system.

- Hearing Tests: Audiometry may be performed if labyrinthine diseases, such as Meniere's disease, are suspected [26,27].

Treatment Options for Dizziness

The treatment of dizziness depends on identifying the underlying cause. Based on the etiology, treatment options may include medication, vestibular rehabilitation, or surgery.

1. Drug Treatment

The primary goal of drug treatment is to alleviate symptoms, improve the patient's quality of life, and, when possible, address the underlying cause. Medications are usually chosen based on the specific cause of dizziness to ensure effective intervention. Common medications include:

- Antihistamines: These block histamine receptors in the brain, stabilizing the vestibular system and reducing the sensation of vertigo. They are used for conditions like Meniere's disease and BPPV [28].
- Antiemetics: These drugs help manage nausea and vomiting, which are often associated with dizziness [29].
- Sedatives (Benzodiazepines): These calm the nervous system and can alleviate symptoms of anxiety that often accompany dizziness [28].
- Vasodilators: These improve blood circulation, especially to the brain, and are used in cases of dizziness caused by cerebral ischemia, such as in migraines or vascular disorders [30].
- Antiviral and Antibiotic Drugs: These are used when vertigo results from infections like labyrinthitis [31].
- Anti-inflammatory Drugs: These reduce inflammation in the inner ear or labyrinth, which may cause dizziness [31].

2. Vestibular Rehabilitation

Vestibular rehabilitation is a specialized therapy aimed at improving the function of the vestibular system, which is responsible for balance and spatial orientation. It is particularly useful when other treatments, such as medications, are ineffective [32].

Key goals of vestibular rehabilitation include:

- Improving Balance: Exercises that stimulate the vestibular system to help adapt to balance disorders.
- Reducing Dizziness: Decreasing the intensity and frequency of dizziness.
- Strengthening Compensatory Abilities: Helping the vestibular system adapt to new conditions and improve functioning.

Common vestibular rehabilitation methods include:

- Balance Exercises: These exercises, such as standing on one leg or walking in different directions, help improve coordination and response to body position changes.
- Vision Stability Exercises: These involve maintaining focus on a specific point while moving the head or body.
- Vestibular Training: A series of exercises designed to stimulate the vestibular system and improve its response to body position changes.
- BPPV Maneuvers: Special techniques to reposition displaced stones in the inner ear, which can help treat BPPV [33,34].

3. Surgical Treatment

Surgical intervention is considered when other treatments, such as medications or vestibular rehabilitation, are ineffective, and the dizziness is chronic or severely disruptive. Surgery is typically reserved for cases with a serious structural cause or when other therapies fail. Surgical options include:

- Labyrinthectomy: This advanced procedure involves removing part or all of the labyrinth (the inner ear structure responsible for balance), usually when other treatments have failed and the vertigo is severe [36].
- Surgery for Vestibular Tumors: In cases where vertigo is caused by a tumor affecting the vestibular nerve, surgery may be required to remove the tumor [37,38].

- Surgery for Inner Ear Injuries: Surgical treatment may be necessary for mechanical injuries that damage the inner ear and its structures [39].

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Author's contribution

Conceptualization: Oskar Woźniak

Methodology: Wojciech Kurkiewicz, Kacper Gryboś

Software: Mikołaj Lewandowski, Julia Kiełbratowska

Check: Kacper Gryboś, Jowita Mikulska

Formal analysis: Joanna Wąsik

Investigation: Weronika Sepioło, Mikołaj Lewandowski

Resources: Weronika Sepioło, Joanna Wąsik

Data curation: Wojciech Kurkiewicz, Jowita Mikulska Oskar Woźniak

Writing- rough preparation: Oskar Woźniak

Writing – review and editing: Julia Kiełbratowska, Jowita Mikulska

Supervision: Mikołaj Lewandowski, Oskar Woźniak

Project administration: Weronika Sepioło

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