DIZZINESS SYNDROME: ETIOLOGICAL FACTORS AND COMORBID CONDITIONS

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Annotation. This study analyzed the etiological structure, accompanying symptoms, comorbid diseases, and instrumental findings in patients presenting with dizziness syndrome. Twenty-seven patients aged 20–75 years (mean age 51.05 ± 5.24) underwent clinical-neurological assessment, brain and spinal MRI/CT, and duplex scanning of cerebral vessels. The leading causes of dizziness were chronic cerebral circulatory disorders, asthenoneurotic syndrome, vertebrobasilar insufficiency, vestibular syndrome, and cardiovascular pathology. Headache was the most frequent accompanying symptom, while hypertension and diabetes mellitus were the most common comorbidities. MRI/CT findings predominantly reflected vascular and intracranial pressure-related changes, including intracranial vertebral artery atherosclerosis, vertebral artery hypoplasia, extracranial arterial changes associated with cervical disc herniation, and signs of intracranial hypertension. The results support the need for an integrated diagnostic approach combining neurological, vascular, and systemic evaluation to improve etiological identification and management of dizziness syndrome.

Keywords. Dizziness syndrome, etiology, comorbidity, cerebrovascular insufficiency, vertebrobasilar insufficiency, vestibular syndrome, hypertension, diabetes mellitus, MRI/CT, duplex scanning.

Dizziness (vertigo and non-vertiginous dizziness) is among the most frequent complaints in outpatient and inpatient practice and represents a heterogeneous clinical syndrome arising from complex interactions between the central nervous system, vestibular apparatus, proprioceptive inputs, and cardiovascular regulation. Epidemiological observations indicate that approximately 20–30% of individuals experience dizziness at least once during their lifetime, and its prevalence increases with age, reflecting the growing burden of vascular, degenerative, metabolic, and anxiety-related conditions in older populations. Clinically, dizziness is not a diagnosis but a symptom that may be associated with more than 80 diseases, ranging from benign vestibular disorders to potentially life-threatening cerebrovascular and cardiac causes.

In neurological practice, the most challenging aspect of dizziness is its multifactorial etiology and frequent overlap with comorbid conditions (e.g., hypertension, diabetes, anemia, thyroid disorders) that can either precipitate dizziness directly or worsen cerebral perfusion and vestibular compensation. Additionally,

dizziness often coexists with headache, nausea, insomnia, anxiety, and postural instability, which complicates history-taking and differential diagnosis. Modern imaging (MRI/CT) and vascular investigations (duplex scanning) improve diagnostic accuracy by identifying structural and vascular changes such as vertebrobasilar insufficiency, atherosclerotic lesions, intracranial hypertension signs, vertebral artery hypoplasia, and cervical disc pathology contributing to extracranial vessel compression.

Purpose of the study: To investigate the etiological factors and comorbid conditions associated with dizziness syndrome in a cohort of patients presenting with dizziness complaints, and to describe associated clinical manifestations and instrumental findings.

MATERIALS AND METHODS

STUDY DESIGN AND PATIENTS

A descriptive observational study was conducted involving **27 patients** who presented with complaints of dizziness. The **age** of participants ranged from **20 to 75 years**, with a mean age of **51.05 ± 5.24 years**. The sample included **18 females** and **9 males**.

AGE DISTRIBUTION

Patients were stratified into three age groups:

- **20–39 years:** 19% (n = 5)
- **40–59 years:** 48% (n = 13)
- **60–75 years:** 33% (n = 9)

CLINICAL ASSESSMENT

All patients underwent a standardized assessment that included:

1. **Clinical and neurological examination** (cranial nerves, coordination tests, gait evaluation, muscle strength, sensory examination, autonomic signs).
2. **Neuroimaging: brain MRI/CT** and, where indicated, **spinal MRI/CT** to assess intracranial and cervicogenic contributors.
3. **Duplex scanning of cerebral blood vessels** to evaluate extracranial and intracranial vascular changes, blood flow characteristics, and possible vertebrobasilar insufficiency.

DATA COLLECTION

The following data were recorded:

- Presumed etiological category of dizziness based on clinical-instrumental correlation.
- Accompanying symptoms reported by patients (headache, nausea, insomnia, anxiety, etc.).
- Comorbid diseases potentially contributing to dizziness.
- Key MRI/CT findings associated with dizziness syndrome.

ETHICAL CONSIDERATIONS

The study was performed in accordance with clinical practice standards. Patient data were analyzed in an anonymized form for scientific reporting.

Results. A total of 27 patients presenting with complaints of dizziness were evaluated. The mean age of the participants was 51.05 ± 5.24 years (range 20–75 years). Women predominated in the sample (n = 18; 66.7%), while men accounted for 9 cases (33.3%). Age distribution analysis showed that dizziness was most common in the 40–59 year age group (48%; n = 13), followed by the 60–75 year group (33%; n = 9), and the 20–39 year group (19%; n = 5). This distribution suggests an increased prevalence of dizziness syndrome in middle-aged and elderly individuals.

Comprehensive clinical-neurological assessment combined with MRI/CT imaging and duplex scanning of cerebral vessels allowed identification of the probable etiological structure of dizziness. The most frequent cause was chronic cerebral circulatory disorders, accounting for 25% of cases. In these patients, dizziness was often recurrent or persistent and frequently associated with headache and fluctuations in arterial blood pressure. Asthenoneurotic syndrome was identified in 17.9% of patients, characterized by nonspecific lightheadedness, subjective instability, sleep disturbances, and anxiety-related exacerbations. Vertebrobasilar insufficiency was diagnosed in 14.3% of cases, typically accompanied by postural imbalance and occasional nausea, suggesting compromised blood flow in the posterior circulation.

Vestibular syndrome was identified in 10.7% of patients and was more commonly associated with nausea and balance disturbances. Cardiac defects were considered the underlying cause in 10.7% of cases, where dizziness was likely related to hemodynamic instability or reduced cerebral perfusion. Brain trauma and brain tumors accounted for 7.1% of cases and were characterized by more complex neurological presentations requiring instrumental confirmation.

Analysis of accompanying symptoms demonstrated that headache was the most common associated complaint, reported by 52% of patients. Episodes of increased blood pressure were observed in 24% of cases. Nausea and insomnia were each reported in 20% of patients. Fear or anxiety attacks occurred in 16%, while balance disturbances and limb weakness were each observed in 12% of patients. Impaired consciousness was noted in 12%, anxiety in 8%, and speech disturbances in 4% of cases. The high frequency of headache and blood pressure fluctuations supports the significant contribution of vascular and intracranial pressure-related mechanisms to dizziness syndrome.

Evaluation of comorbid conditions revealed that hypertension was the most prevalent associated disease (28%), followed by diabetes mellitus (12%). Anemia, goiter, and ventricular extrasystole were each identified in 8% of patients, while diabetes insipidus was observed in 4%. These comorbidities, particularly hypertension and diabetes mellitus, likely contribute to cerebrovascular insufficiency and autonomic dysregulation, thereby exacerbating dizziness symptoms.

MRI/CT findings further supported the vascular and structural basis of dizziness in many patients. Signs of intracranial hypertension were detected in 11% of cases. Atherosclerosis of intracranial vertebral arteries was also found in 11%, indicating impaired vertebrobasilar circulation. Cerebrovascular insufficiency was noted in 7% of patients. Expansion of the subarachnoid space in the parietal regions was observed in 7%, possibly reflecting age-related atrophic or cerebrospinal fluid dynamic changes. Basal ganglia calcification was identified in 4% of cases. Cervical intervertebral disc

herniations were found in 7%, potentially contributing to extracranial vascular compression and cervicogenic dizziness mechanisms. Dilation of cervical arteries was also observed in 7%, while vertebral artery hypoplasia was detected in 4% of patients.

Overall, the results indicate that dizziness syndrome in this cohort was predominantly associated with vascular mechanisms, particularly chronic cerebral circulatory disorders and vertebrobasilar insufficiency. Headache and hypertension were frequent accompanying factors, and neuroimaging findings largely reflected vascular alterations and intracranial pressure-related changes.

DISCUSSION

The present study confirms that dizziness is a **multifactorial syndrome** in clinical practice, with a predominance of **cerebrovascular-related mechanisms** in the studied cohort. The high proportion of chronic cerebral circulatory disorders (25%) and vertebrobasilar insufficiency (14.3%) suggests that impaired perfusion of brainstem–cerebellar structures and vestibular central pathways is a major contributor. This observation is clinically important because vascular dizziness may mimic vestibular vertigo yet requires a different management strategy centered on vascular risk control, hemodynamic stabilization, and prevention of ischemic events.

The notable share of **asthenoneurotic syndrome (17.9%)** indicates a significant psychovegetative component in dizziness complaints. In such patients, dizziness may be non-rotational, persistent, and associated with anxiety, panic-like episodes, insomnia, and subjective imbalance, consistent with functional dizziness patterns. The finding that **fear/anxiety attacks (16%)** and anxiety symptoms (8%) were present supports this overlap and emphasizes the need for careful assessment to avoid unnecessary imaging while not missing dangerous causes.

Vestibular syndrome (10.7%) remained an important etiology, reflecting peripheral vestibular disorders that often present with positional triggers, nausea, and instability. However, in real-world practice, vestibular and vascular mechanisms may coexist—particularly in older individuals with vascular risk factors—thus a dual-track diagnostic approach (neurological + vestibular + cardiovascular) is justified.

The proportion of **cardiac defects (10.7%)** and ventricular extrasystole (8% as comorbidity) highlights that dizziness frequently arises from systemic hemodynamic disturbances, arrhythmias, or reduced cardiac output, leading to transient cerebral hypoperfusion. This is particularly relevant when dizziness is accompanied by presyncope, palpitations, or episodic blood pressure fluctuations. In this cohort, episodes of increased blood pressure were reported by 24% of patients, and hypertension was the most common comorbidity (28%), underscoring the importance of blood pressure monitoring and cardiovascular evaluation.

Neuroimaging findings reinforce the clinical picture: intracranial vertebral artery atherosclerosis (11%) and vertebral artery hypoplasia (4%) can contribute to vertebrobasilar flow compromise. Cervical disc herniation (7%) may cause mechanical irritation or compression of vertebral arteries and autonomic pathways, potentially producing cervicogenic dizziness or exacerbating vertebrobasilar insufficiency. Signs of intracranial hypertension (11%) are also notable, because intracranial pressure dysregulation can lead to headache, nausea, transient visual disturbances, and dizziness—symptoms that overlap heavily with migraine and vascular headache.

The most frequent accompanying symptom was **headache (52%)**, which may be explained by shared mechanisms: vascular dysregulation, intracranial pressure changes, cervicogenic triggers, or migraine-spectrum overlap. From a practical standpoint, this association suggests that dizziness evaluation in neurology should routinely include headache characterization (onset, aura, triggers, photophobia/phonophobia, autonomic signs), because targeted headache management may reduce dizziness burden.

CLINICAL IMPLICATIONS

This study supports an algorithmic approach:

1. **Identify red flags** (acute onset, focal deficits, impaired consciousness, severe headache, progressive course).
2. **Classify dizziness type** (rotational vertigo vs non-vertiginous dizziness vs presyncope).
3. **Assess vascular risks and comorbidities** (hypertension, diabetes, anemia, thyroid pathology, arrhythmia).
4. **Use imaging and duplex scanning selectively** based on clinical suspicion.
5. **Implement multidisciplinary management** (neurology, cardiology, ENT/vestibular specialist, mental health support when needed).

Conclusion. Dizziness syndrome in the examined cohort was most frequently associated with impaired cerebral circulation, and it often co-occurred with headache. Among comorbid conditions contributing to dizziness, hypertension and diabetes mellitus occupied leading positions. MRI/CT findings suggest that dizziness syndrome is primarily linked to vascular changes in the brain—including atherosclerosis and hypoplasia of intracranial vertebral arteries—as well as extracranial arterial compression or dilation related to cervical disc herniation and manifestations of intracranial hypertension. A comprehensive clinical-neurological assessment supported by targeted neuroimaging and duplex scanning is essential for accurate etiological diagnosis and rational management.

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