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Evaluation of Benign Paroxysmal Positional Vertigo in Patients Presenting to the Hospital with Dizziness: A Retrospective Study

Fatma Çakmak[1], Hamit Çelik[2]

[1]Private Erzurum Buhara Hospital, Clinic of Emergency Medicine, Erzurum, Turkey
[2]Private Erzurum Buhara Hospital, Clinic of Neurology, Erzurum, Turkey

Abstract

Aim: Dizziness is one of the most common complaints in society and one of the most frequent reasons for referral to both emergency departments and outpatient neurology clinics. This study aimed to investigate the demographic characteristics and etiology of vertigo in patients who presented to the hospital with dizziness and were diagnosed with benign paroxysmal positional vertigo (BPPV).

Materials and Methods: In this study, the data of patients who presented to a private secondary care hospital due to vertigo were retrospectively analyzed. Peripheral-central differentiation, medical history, and additional symptoms were examined and statistically compared between patients diagnosed with BPPV and those with generalized dizziness.

Results: The study included 120 patients. Of the patients diagnosed with BPPV, 68.4% were female. Peripheral causes were detected in 76.6% (n=92) of the patients. Vertigo was the most common presenting symptom in 84.2% of the patients in the BPPV group. Eighteen (15.0%) patients with generalized dizziness and two (5.2%) with BPPV were hospitalized. The difference in the hospitalization rates of the two groups was statistically significant (p=0.003)

Conclusion: BPPV is the most common etiology in most patients with dizziness. Therefore, knowing the general epidemiological and demographic characteristics of patients with dizziness is an important factor in the management of vertigo.

Keywords: Dizziness, vertigo, benign paroxysmal positional vertigo

Introduction

Dizziness is one of the most common complaints in society and one of the most frequent reasons for referral to both emergency departments and outpatient neurology clinics (1,2). It affects approximately 20-30% of the general population (3). It is important to diagnose patients with dizziness because it affects a huge part of the population, causes a loss of workforce, and can sometimes be a symptom of a life-threatening disease (4).

Patients usually use the term "dizziness" to describe different complaints, such as vertigo, nonspecific drowsiness, and imbalance (3). In the literature, all these complaints are also expressed as "dizziness". It may develop because of peripheral or central factors, psychiatric disorders, systemic causes such as anemia and hypoglycemia, drug side effects, cardiovascular causes, or multifactorial causes (5,6). Benign paroxysmal positional vertigo (BPPV) is the most common cause of vertigo (7). BPPV is often attributed to calcium deposits in the posterior semicircular canal, which is called "canalolithiasis" (8). Patients with BPPV typically describe a brief spinning sensation when rolling in bed or tilting their head back. This sensation is very brief, usually lasting seconds and rarely minutes. If it continues, it can become serious enough to prevent activities (9).

In this study, we aimed to investigate the demographic characteristics, symptoms, and etiologies of patients who presented to the outpatient neurology clinic and emergency department of a secondary level hospital with the complaint of vertigo and were diagnosed with BPPV.

Corresponding Author: Fatma Çakmak MD, Private Erzurum Buhara Hospital, Clinic of Emergency Medicine, Erzurum, Turkey
Phone: +90 506 237 89 66 **E-mail:** dr.fatmacakmak@gmail.com **ORCID ID:** orcid.org/0000-0002-5770-3554

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Materials and Methods

The study was initiated after receiving approval from the Erzurum Regional Training and Research Hospital Local Ethics Committee (date: 01.08.2022) with the approval number E-377712818-51499-3254. In this study, the data of patients who presented to the emergency department and outpatient neurology clinic of a secondary level private hospital from June 1, 2021 through May 31, 2022 due to vertigo were analyzed retrospectively.

Our private hospital is a secondary level healthcare center that receives 100 daily admissions to the emergency department and 40 daily admissions to the outpatient neurology clinic. The hospital has a capacity of 40 beds and is equipped with computed tomography (CT) and magnetic resonance imaging (MRI) devices for imaging. An emergency medicine specialist and a neurology specialist are always available, working shifts. For all patients presenting to our hospital with the complaint of dizziness, the first evaluation outside the emergency department is performed by a neurologist, and the central-peripheral differentiation is made; then, these patients are referred to an otolaryngologist. The hospital also has a center where necessary laboratory tests are conducted.

Patients older than 18 years of age and younger than 85 years who presented to the emergency department or outpatient neurology clinic with complaints of vertigo, imbalance, and syncope were included in the study. Patients younger than 18 or older than 85 years of age, those with missing records, and those without a definite diagnosis were excluded from the study.

Data were obtained from patient files and the hospital database. The patients' age, gender, background information (Medical History), anamnesis information (Vertigo, Imbalance, Syncope) and the presence of additional complaints (nausea-vomiting, headache, tinnitus, loss of hearing, sensation of pressure in the ear, and ear discharge) were recorded. As part of the physical examination findings, motor and sensory symptoms, abnormal eye movements, extremity ataxia, hoarseness, dysphagia, dysarthria, and facial paralysis were examined. The causes of vertigo were divided into two groups: central and peripheral. Patients with BPPV, Meniere's disease, vestibular neuritis, and other systemic causes were evaluated in the peripheral group and those with ischemic stroke and other diseases in the central group. The incidence of BPPV among all patients and other clinical and demographic data of this disease group were analyzed using statistical methods.

Statistical Analysis

Statistical Package for the Social Sciences (SPSS) (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, version 21.0. Armonk, NY: IBM Corp.) software package was used for statistical analysis. The conformity of continuous variables to the normal distribution was examined using the Shapiro-Wilk test. As a result of the test, the variables meeting the assumption of normality were presented using mean±standard deviation values, while the non-normally distributed variables were expressed as median (minimum-maximum) values. Categorical variables were evaluated as numbers (n) and percentages (%). Pairwise comparisons were made using Student's t-test. The chi-square test was conducted to determine whether there was a significant difference between the groups in terms of categorical variables. The significance level was set as $p<0.05$.

Results

In this study, the data of 176 patients were obtained. After the exclusion of 56 patients due to unclear diagnoses and missing data, 120 patients were included in the sample. Seventy-six (63.3%) of the patients who presented to the hospital with dizziness were female and 44 (36.7%) were male. The median age of the patients was 55 years, with the youngest patient being 18 years old and the oldest patient being 85 years old (Table 1).

Among the patients with dizziness, the presentation complaint was vertigo in 85 (70.8%), imbalance in 31 (25.8%), and syncope in four (3.4%). Brain CT imaging was performed in 86 (71.6%) patients and brain MRI in 42 (35.0%) (Table 1).

When the central and peripheral differentiation of the patients presenting with dizziness was made, peripheral causes were detected in 76.6% (n=92) of the patients and central causes in 23.4% (n=28). Stroke was diagnosed in 42.8% (n=12) of the patients with central causes, and BPPV was diagnosed in 41.3% (n=38) of those with peripheral causes. The remaining data of the patients with dizziness are detailed in Table 1.

When the patients diagnosed with BPPV were evaluated, 26 (68.4%) were female and 12 (31.6%) were male. The median age of the patients was 62 years. The most common presentation complaint was vertigo (84.2%). Nausea and vomiting were additional symptoms in 15 (39.5%) of these patients, and ear complaints were present in 12 (31.7%) (Table 2).

When the histories of the patients diagnosed with BPPV were examined, 17 (44.7%) had hypertension, six (15.7%) had diabetes, and four patients (10.5%) had coronary artery disease (Table 2).

When the demographic and clinical characteristics of the patients with generalized dizziness and those with BPPV were compared, the median age was 55 years for the former and 62 years for the latter, indicating a statistically significant difference (p=0.002). Female gender was dominant in both groups, with

no significant difference (p=0.486). There was a statistically significant difference between the presentation symptoms of the two groups (p=0.001). While vertigo was detected at a higher rate (84.2%) in the BPPV group, imbalance had a higher incidence in the generalized dizziness group (25.8%). No significant difference was found between these two groups in relation to the systolic and diastolic blood pressure values of the patients (p=0.286 and p=0.486, respectively). Concerning the medical histories of the patients, the rates of hypertension (48.3%) and coronary artery disease (23.3%) in the generalized dizziness group statistically significantly differed compared to the BPPV group (p=0.042 and p=0.018, respectively) (Table 3).

Table 1. Demographic characteristics of the patients with dizziness

		Number (120)	Percentage (100%)
Age (min-max/years)	18-85, median 55		
Gender	Female	76	63.3
	Male	44	36.7
Symptom	Vertigo	85	70.8
	Imbalance	31	25.8
	Syncope	4	3.4
Computed tomography	Ordered	86	71.6
	Not ordered	34	28.4
Magnetic resonance imaging	Ordered	42	35.0
	Not ordered	78	65.0
Central/peripheral differentiation	Peripheral vertigo	92	76.6
	Central vertigo	28	23.4
Central vertigo diagnoses	Stroke	12	42.8
	Other	16	57.2
Peripheral vertigo diagnoses	BPPV	38	41.3
	Vestibular neuritis	5	4.6
	Meniere's disease	3	3.3
	Other systemic causes	46	50.0

BPPV: Benign paroxysmal positional vertigo, min-max: Minimum-maximum

Table 2. Demographic characteristics of the patients diagnosed with BPPV

		Number (38)	Percentage (100%)
Age (min-max/years)	22-80, median 62		
Gender	Female	26	68.4
	Male	12	31.6
Symptom	Vertigo	32	84.2
	Imbalance	5	13.1
	Syncope	1	2.7
Medical history	Hypertension	17	44.7
	Diabetes	6	15.7
	Coronary artery disease	4	10.5
	Migraine	2	5.2
	Other	9	23.9
Additional symptoms	Nausea-vomiting	15	39.5
	Dizziness	3	7.9
	Ear complaints	12	31.7
	None	8	20.8

BPPV: Benign paroxysmal positional vertigo, min-max: Minimum-maximum

Table 3. Comparison of the characteristics between the generalized vertigo and BPPV groups				
		Generalized vertigo (n=85, 100%)	**BPPV (n=38, 100%)**	**p**
Age (median/years)		55	62	0.002
Gender	Female	76 (63.3)	26 (68.4)	0.486
	Male	44 (36.7)	12 (31.6)	
Symptom	Vertigo	85 (70.8)	32 (84.2)	0.001
	Imbalance	31 (25.8)	5 (13.1)	
	Syncope	4 (3.4)	1 (2.7)	
Medical history	Hypertension	58 (48.3)	17 (44.7)	0.042
	Diabetes mellitus	22 (18.3)	6 (15.7)	0.809
	Coronary artery disease	28 (23.3)	4 (10.5)	0.018
	Migraine	2 (1.7)	2 (5.2)	0.068
	Other	10 (8.4)	9 (23.9)	0.001
Blood pressure	Systolic (mmHg)	128.57±31.6	122.64±2	0.286
	Diastolic (mmHg)	77.1±15.2	71.8±21.4	0.486
Hospitalization status	Hospitalized	18 (15.0)	2 (5.2)	0.003
	Discharged	102 (85.0)	36 (94.8)	
BPPV: Benign paroxysmal positional vertigo				

Eighteen (15.0%) patients with generalized dizziness and two (5.2%) with BPPV were hospitalized. The difference in the hospitalization rates of the two groups was statistically significant (p=0.003) (Table 3).

Discussion

Dizziness is one of the most prevalent complaints in society and one of the leading causes of hospital visits (10). Knowing the approach to patients presenting with dizziness is important for preventing unnecessary tests since the etiology of dizziness can often be determined based on anamnesis and physical examination findings alone, increasing their quality of life with a correct diagnosis and treatment, preventing the loss of workforce, and not losing time in patients with serious neurological diseases (11,12). Therefore, studies to determine the etiology and approach of dizziness are important. In the current study, it was determined that peripheral causes were mostly involved in the etiology of patients with dizziness complaints, and BPPV was the most common diagnosis among these patients.

Studies have shown that 28.5-32% of patients presenting to the hospital due to dizziness are diagnosed with BPPV (13,14). In epidemiological studies, central causes are reported to be responsible for approximately 25% of patients with dizziness (15-17). Our findings were similar to the literature, with the diagnosis of BPPV accounting for 31% of all dizziness complaints. Central causes were detected at a rate of 23.4% in our patients.

In a previous study, it was reported that the mean age of patients presenting with dizziness was 59 years, and the rate of female patients was 59% (18). In another study examining the etiology of dizziness over the age of 65 years, it was found that 74% of the patients were female (19). BPPV is more common in individuals aged 50-70 years (20). Similarly, in our study, the age range of the patients diagnosed with BPPV was 22-80 years, with the median value being calculated to be 62 years, and the female patients constituted 68.4% of the sample.

Studies evaluating patients with dizziness have reported vertigo in 45-54% of patients, imbalance in 16%, presyncope in 14%, and nonspecific drowsiness in approximately 10% (21,22). In another study, 87% of the patient histories were found to be consistent with vertigo, 74% with presyncope, 55% with psychiatric disorders, and 33% with imbalance (23). In the current study, vertigo was detected at a rate of 70.8%, which is in agreement with the literature.

In a retrospective study conducted in the USA, it was determined that there was a 37% increase in the number of patients who presented to emergency departments with the complaint of dizziness over 10 years, as well as a 169% increase in the number of CT and MRI orders during the same period (24). In our study, CT and MRI were ordered for patients with vertigo at both the emergency department and outpatient neurology clinics, given the importance of imaging in the differentiation of the central causes of dizziness.

Blasberg et al. (25) reported the rates of additional diseases to be 72.9% for hypertension, 52.2% for cerebrovascular disease, 36.9% for hypercholesterolemia, 21.8% for diabetes mellitus, and 19.2% for coronary artery disease. In a study conducted with 55 patients to investigate the relationship between vertigo and brain ischemia, Mosarrezai et al. (26) found that 32 patients had hypertension, 11 had diabetes mellitus, and 29 had an abnormal lipid profile. Among the causes of central vertigo, hypertension, hyperlipidemia, diabetes mellitus, cancer, coronary artery disease, atrial fibrillation, and peripheral vascular diseases are known to be risk factors, especially for cerebellar stroke and infarct (21). In our study, it was determined that the histories of hypertension and coronary artery disease significantly differed between patients with generalized dizziness and those with BPPV.

Olshaker (27) recommended that patients with suspected cerebellar hemorrhage or infarction and those with acute bacterial labyrinthitis be hospitalized and undergo cerebral imaging. In another study, it was reported that 10% of the patients were admitted to the neurology clinic, while 90% were discharged following outpatient treatment observation (28). Similar to the literature, in our study, 15% of the patients were hospitalized, and the rate of hospitalization was only 5.2% among the patients diagnosed with BPPV.

Study Limitations

The main limitation of this study is that the laboratory parameters of patients with dizziness were not examined. Another limitation is that the sample represented a certain population from the area where the study was conducted because our hospital was a private healthcare center. Finally, all patients with dizziness were primarily evaluated by the emergency department and neurology clinics.

Conclusion

Peripheral causes are involved in the etiology of most patients with dizziness. Among these causes, BPPV has the highest rate. The complaint of dizziness was detected more in females. Knowing the general epidemiological and demographic characteristics of patients with dizziness is important in deciding on the appropriate approach to vertigo's management.

Ethics

Ethics Committee Approval: The study was approved by the Erzurum Regional Training and Research Hospital Local Ethics Committee (approval number E-377712818-51499-3254, date: 01.08.2022).

Informed Consent: Retrospective study.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: F.Ç., H.Ç., Concept: F.Ç., H.Ç., Design: F.Ç., H.Ç., Data Collection or Processing: F.Ç., H.Ç., Analysis or Interpretation: F.Ç., Literature Search: F.Ç., H.Ç., Writing: F.Ç.

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