

Causes of Dizziness Requiring Hospitalization in Emergency Department Patients: Five-Year Experiences of a Training Hospital

Acil Servis Hastalarında Hastaneye Yatırılmayı Gerektiren Bař Dönmesi Nedenleri: Bir Eđitim Hastanesinin Beř Yıllık Deneyimleri

Özgün Arařtırma
Research Article

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ABSTRACT

Objective: Dizziness, which is one of the frequent complaints of the emergency departments, has a broad spectrum of differential diagnosis. The aim of this study is to examine the severe causes of dizziness requiring hospitalization and to discuss the diagnostic processes in light of the literature in order to contribute to the management of emergency department patients with dizziness.

Methods: In this cross-sectional observational study, medical records of adult patients who applied to the emergency department of a comprehensive medical centre due to dizziness between January 1, 2013 and December 31, 2017 were screened retrospectively. The frequency and demographic characteristics of patients with isolated dizziness and the causes of dizziness in hospitalized patients were examined in detail.

Results: A total of 20.542 (2.3%) patients were admitted to the emergency department due to dizziness in five years. The median age of the study population was 51 (IQR: 37-65) years and 59% of them were female. Of these, 326 (1.6%) patients with median age of 64 (IQR: 56-74) years were hospitalized and 54% of them were male. The most common causes of dizziness in hospitalized patients were central neurological (36.8%), peripheral vestibular (27.3%), cardiac (8.9%), and metabolic (8.0%) disorders and each were presented with subheadings.

Conclusions: Benign vestibular disorders as well as serious systemic disorders are seen in patients with dizziness. The causes of dizziness, differential diagnosis processes, and epidemiological data examined in this study may be useful in planning optimized algorithms of dizziness.

Keywords: Emergency department, dizziness, differential diagnoses

ÖZ

Amaç: Acil servise sık bařvuru sebeplerinden biri olan bař dönmesi geniř bir ayırıcı tanı spektrumuna sahiptir. Bu çalışmada, bař dönmesi olan hastaların acil servis yönetimine katkıda bulunmak amacıyla hastaneye yatırılmayı gerektiren ciddi bař dönmesi nedenlerinin incelenmesi ve tanı süreçlerinin literatür eřliđinde tartıřılması amaçlanmıřtır.

Yöntem: Bu kesitsel ve gözlemsel çalışmada, kapsamlı bir sađlık merkezinin acil servisine 1 Ocak 2013 ile 31 Aralık 2017 arasında bař dönmesi nedeniyle bařvuran eriřkin hastaların tıbbi kayıtları geriye dönük olarak tarandı. İzole bař dönmesi olan hastaların sıklıđı ve demografik özellikleri ile hospitalize edilen hastalarda saptanan bař dönmesi sebepleri ayrıntılı olarak incelendi.

Bulgular: Beř yıl içerisinde toplam 20542 (%2,3) hastanın izole bař dönmesi sebebiyle acil servise bařvurduđu belirlendi. Bu hastaların median yařı 51 (IQR: 37-65) idi ve %59'u kadın idi. Bunlardan hastaneye yatırılan 326 (%1,6) hastanın median yařı 64 (IQR: 56-74) idi ve %54'ü erkek idi. Hospitalize edilen hastalarda saptanan en sık bař dönmesi nedenleri santral nörolojik (%36,8), periferik vestibüler (%27,3), kardiyak (%8,9) ve metabolik (%8,0) bozukluklar idi ve bunların herbiri alt bařlıkları ile birlikte verildi.

Sonuç: Bař dönmesi olan hastalarda benign vestibüler bozuklukların yanı sıra ciddi sistemik bozukluklar da görülmektedir. Bu çalışmada incelenen bař dönmesi nedenleri, ayırıcı tanı süreçleri ve epidemiyolojik veriler optimize edilmiř bař dönmesi algoritmalarını planlamada faydalı olabilir.

Anahtar kelimeler: Acil servis, bař dönmesi, ayırıcı tanılar

Alındıđı tarih: 21.07.2019

Kabul tarihi: 11.09.2019

Online Yayın tarihi: 31.12.2019

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Cite as: Idil H, Eyler Y. Causes of dizziness requiring hospitalization in emergency department patients: Five-year experiences of a training hospital. Tepecik Eđit. ve Arařt. Hast. Dergisi. 2019;29(3):259-64.

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INTRODUCTION

Approximately one-third of people experience at least one episode of dizziness during their lifetime ⁽¹⁾. This disorder, which can cause imbalance, nausea and vomiting and therefore it adversely affects quality of life. So, it is one of the important reasons for admittance to the emergency department (ED) ⁽²⁾. Dizziness is mostly benign and self-limiting, but may also be associated with severe clinical processes ⁽³⁾. Therefore, ED physicians should be familiar with the causes and differential diagnosis of dizziness.

Complaints of patients are usually expressed in the triage unit with the terms of dizziness, vertigo, imbalance, spinning or disequilibrium. Vertigo, which is described as the illusion of motion, is the feeling of movement when stationary, or the feeling of imbalance in normal movements. Dizziness is the feeling of imbalance and drowsiness without the illusion of motion, and this term is often used to cover all other relevant definitions ^(4,5).

Dizziness is mostly due to peripheral vestibular disorders, orthostatic hypotension, psychological disorders or undetermined reasons ^(5,6). Most of these patients are discharged from the ED after symptomatic relief. However, dizziness caused by disorders affecting organ systems requires more detailed investigation and increased need for hospitalization ^(7,8). This condition increases both the total length of stay in the hospital and the healthcare costs of patients ^(8,9).

Rapid and safe evaluation of dizziness requires a systematic clinical approach, especially in crowded EDs. Timing and triggers of dizziness, related symptoms, vital parameters, medical history, blood glucose measurement and ECG are important parameters in differential diagnosis. Blood tests, including blood gas analysis, have an important place in the diagnosis of anemia, intoxications and metabolic disorders that may be the cause of dizziness. Lateralizing neurological findings, gait disturbance,

abnormal eye movements, and treatment-resistant symptoms may indicate central dizziness and neuroimaging studies should be performed in suspicious cases ^(3,10,11).

As mentioned above, dizziness has a broad spectrum of the differential diagnosis and each cause requires a different clinical approach. Investigating the severe causes of dizziness and discussing the processes of differential diagnosis may contribute to the ED management of patients with dizziness. The aim of this study was to determine the percentages of patients admitted to the ED of a tertiary referral hospital with a complaint of isolated dizziness within a five-year period and to discuss the causes of dizziness identified in hospitalized patients.

MATERIAL AND METHODS

This cross-sectional observational study was conducted in a training and research hospital with approximately 180,000 ED admissions per year. This urban ED provides 24-hour advanced neuroimaging and access to consultancy from all branches, including neurologists and otorhinolaryngologists. Ethical committee approval was obtained before initiation of the study. Data of patients aged 18 years and over who applied to the ED between January 1, 2013 and December 31, 2017 for dizziness were screened through their medical records. All the indications of applications which were recorded as dizziness, vertigo, imbalance or disequilibrium were included in the study, and these complaints were expressed with the general term of "dizziness".

Patients with symptoms suggestive of a cerebrovascular event, such as altered mental status, speech disorder, visual impairment, and lateralizing neurological signs, patients with obvious causes of dizziness (hypoglycemia, etc.), syncope, and concurrent serious complaints (chest pain, palpitations, shortness of breath, high fever, etc.) were not included in the evaluation. Patients with missing data and incomple-

te ED follow-up due to various reasons were excluded from the study.

In the first part of the study, age, gender and outcome of the patients were recorded. In addition, the frequency of patients admitted to the ED with complaints of isolated dizziness, basic demographic characteristics and hospitalization rates of these patients were determined. In the second part of the study, the causes of dizziness of hospitalized patients were investigated and classified in detail.

Statistical Analysis

IBM® SPSS 22.0 (SPSS Inc., Chicago, Illinois, USA) software package was used to analyze the data. Qualitative variables were expressed as number of observations and percentages. Quantitative data were presented with median, interquartile range (IQR), minimum (min) and maximum (max) values. Pearson’s chi-square test was used to analyze categorical variables. In all analyses, odds ratio (OR) was given with 95% confidence interval (95% CI) and P<0.05 was considered statistically significant.

RESULTS

Within five years, a total of 20,542 (2.3%) patients were admitted to the ED with a complaint of isolated dizziness. In total, 48 patients with incomplete ED follow-up and 12 patients with missing data were excluded from the study. The median age of the patients with dizziness was 51 years (IQR: 37-65, min: 18, max: 92) and 59% of them consisted of female patients.

A total of 326 patients (1.6%) with dizziness were hospitalized and all other patients were discharged from the ED after symptomatic relief was achieved to be followed-up in outpatient clinics. Hospitalized patients were admitted to neurology (n=167), otorhinolaryngology (n=68), internal medicine (n=45), cardiology (n=39), and neurosurgery (n=7) units. Median length of hospital stay was 5 days (IQR: 3-7, min: 2, max: 11).

The median age of hospitalized patients was 64 (IQR: 56-74, min: 21, max: 87) and 54% were male. While the majority of patients admitted to the ED with complaints of dizziness were female, it was observed that the ratio of males was higher among hospitalized patients. A statistically significant difference was found between these patient groups in terms of gender (p< 0.0001, OR=1.71, 95% CI=1.33-2.21).

The causes of dizziness detected in hospitalized patients are shown in Table 1. Central neurological disorders were detected in 120 (0.58%) patients admitted to the ED with complaints of dizziness. In the classification of these causes, posterior circulation strokes due to occlusion of basilar or vertebral arteries were evaluated separately from other strokes (Table 2). The median age of the patients with central dizziness was 65 (IQR: 56-72, min: 32, max: 86) years and male/female ratio was 57/43%. In addition, the causes of

Table 1. Causes of dizziness in hospitalized emergency department patients.

Diagnoses	n (%)
Central neurological	120 (36.8%)
Peripheral vestibular	89 (27.3%)
Cardiac	29 (8.9%)
Metabolic	26 (8.0%)
Orthostatic hypotension	22 (6.8%)
Idiopathic	17 (5.2%)
Anemia	9 (2.8%)
Gastrointestinal hemorrhage	6 (1.8%)
Antiepileptic drug overdose	3 (0.9%)
Hypercapnia	3 (0.9%)
Drug abuse	2 (0.6%)
Total	326 (100%)

Table 2. Central neurological causes of dizziness in hospitalized emergency department patients.

Diagnoses	n (%)
Posterior circulation strokes	47 (39.2%)
Other ischemic strokes	18 (15.0%)
Transient ischemic attack	16 (13.3%)
Vertebrobasilar insufficiency	13 (10.8%)
Intracranial mass, tumor	9 (7.5%)
Internal carotid stenosis	7 (5.8%)
Intracranial hemorrhage	4 (3.4%)
Sinus vein thrombosis	2 (1.7%)
Miller-Fisher syndrome	2 (1.7%)
Chiari malformation	1 (0.8%)
Multiple sclerosis	1 (0.8%)
Total	120 (100%)

peripheral vestibular, cardiac and metabolic dizziness are also shown in detail with sub-headings in Table 3.

Table 3. Peripheral vestibular, cardiac and metabolic causes of dizziness in hospitalized emergency department patients.

Diagnoses	n (%)
Peripheral vestibular disorders	89 (100%)
Vestibular neuritis or labyrinthitis	35 (39.3%)
Benign paroxysmal positional vertigo	27 (30.3%)
Non-categorized	16 (18.0%)
Meniere's Disease	7 (7.9%)
Other reasons	4 (4.5%)
Cardiac disorders	29 (100%)
Arrhythmia	11 (38.0%)
Acute coronary syndrome	7 (24.1%)
Hypertension	6 (20.7%)
Aortic stenosis	3 (10.3%)
Digoxin overdose	2 (6.9%)
Metabolic disorders	26 (100%)
Hyponatremia	11 (42.3%)
Hyperglycemia	7 (27.0%)
Acute renal failure	5 (19.2%)
Other reasons	3 (11.5%)

Clinical deterioration in two patients followed in the the neurology unit resulted in death. It was learned that these patients who were 72 and 76 years of age were hospitalized due to transient ischemic attack and cerebellar stroke was detected in their control neuroimaging studies. All other hospitalized patients were discharged after the necessary examinations were completed.

DISCUSSION

Dizziness is one of the common causes of admission to the ED and its differential diagnosis is examined in a wide range. Therefore, determining the causes of dizziness especially in crowded EDs requires a challenging and comprehensive research process. At this point, it will be useful to discuss the severe causes of dizziness and processes of differential diagnosis that have been identified in a comprehensive health center over a five-year period.

The rates of admission to the ED due to dizziness have been reported as 2.1-3.3%, consistent with the results of our study^(8,12). As is known, the decision of hospitalization of the patients with dizziness is affected by the healthcare quality of the ED and the bed

capacity of the hospital. Since our ED has extensive examination facilities including advanced neuroimaging studies, most of the patients with dizziness were referred to the outpatient clinics after emergency disorders were ruled out and therefore low rates of hospitalization were recorded in our study.

When the patients with dizziness were examined according to their age and gender, it was found that middle-aged women constituted the majority among all patients admitted to the ED with dizziness, and older men constituted the majority among those who were hospitalized, and especially those who had central causes of dizziness. This result supports the studies showing that older age and male sex are important predictors for severe causes of dizziness^(6,13).

The incidence of central neurological disorders in patients with dizziness is reported to range with isolated dizziness are evaluated, but it should be kept in mind that the causes between 0.7 and 5%^(14,15). As in our study, these rates may be low if only cases of neurological dizziness, such as posterior circulation strokes, are associated with serious clinical outcomes. In order not to overlook central neurological disorders in with high mortality and morbidity, medical history should be questioned in detail and neurological examination should be performed carefully.

While benign paroxysmal positional vertigo (BPPV) is the most common peripheral cause of dizziness, vestibular neuritis and labyrinthitis are more common in hospitalized patients, as it was in our study. This is because BPPV shows an episodic course, it is triggered by head movements and often ends in seconds. Patients are usually diagnosed with a history and physical examination at the bedside, and then discharged from the ED after being treated with canalith-repositioning maneuvers. Vestibular neuritis and labyrinthitis, also called acute vestibular syndrome, present with spontaneous and treatment-resistant symptoms (imbalance, nystagmus, nausea and vomiting, etc.) that may last for days or weeks, therefore,

the differential diagnosis is more difficult and may require advanced examinations such as neuroimaging studies ^(16,17).

Orthostatic hypotension is defined as a 20 mmHg decrease in systolic blood pressure or 10 mmHg decrease in diastolic blood pressure within 2 to 3 minutes after standing up ⁽¹⁸⁾. Since orthostatic hypotension may have significant consequences such as imbalance, syncope, falls and motor vehicle accidents, it should be considered in the differential diagnosis of patients with dizziness ⁽¹⁹⁾. In our study, it was observed that orthostatic hypotension was also an important etiologic factor among patients hospitalized for dizziness.

Cardiac disorders are among the important causes of dizziness which include arrhythmias and acute coronary syndromes. Therefore, vital parameters should be routinely measured in patients with dizziness. ECG and advanced cardiac examination should be considered in the cardiovascular risk group ⁽²⁰⁾. In addition, it was found in our study that digoxin overdose and severe aortic stenosis may also be causes of dizziness.

Metabolic disorders, gastrointestinal haemorrhage, and chronic anemia have been shown to be important causes of dizziness ^(17,20). In our study, among the metabolic causes of dizziness, especially hyponatremia was significantly more frequent (42%). In addition, overdose of antiepileptic drugs has also been shown to be among the causes of dizziness. All these results suggest that relevant blood tests should be performed in suspected cases and especially in patients with treatment-resistant dizziness.

Study Limitations

Considering the basic limitations of the study, it can be said that it is a retrospective and single centered study performed within a wide time interval. The fact that only hospitalized patients among all patients admitted to the ED due to dizziness were included in the study can be seen as another limitation.

However, the aim of the study was to determine the severe causes of dizziness and this patient group was chosen specifically.

CONCLUSIONS

Dizziness is a common complaint that occurs as a result of many disorders affecting organ systems. In addition to benign vestibular disorders, severe neurological, cardiac and metabolic disorders are also seen in patients admitted to the ED due to dizziness. Management of patients with dizziness requiring extensive clinical examination in ED is a challenging process. The causes of dizziness, basic differential diagnosis processes, and population-based epidemiological data examined in this study may be useful in planning and implementing optimized algorithms for dizziness.

Acknowledgements: We would like to thank Dr. Göke Özbay Yenice for her assistance with this research.

Ethics Committee Approval: Ethical approval for this study was obtained from the Ethics Committee of University of Health Sciences - Tepecik Training and Research Hospital, Izmir, Turkey. (Approval Number: 2019/1-18, Date: 09/01/2019).

Conflict of Interest: The authors declare that they have no conflict of interest.

Funding: This study has received no financial support.

Etik Kurul Onayı: Bu çalışma için etik onay, İzmir, Türkiye Sağlık Bilimleri Üniversitesi Etik Kurulu'ndan - Tepecik Eğitim ve Araştırma Hastanesi'nden alınmıştır. (Onay Numarası: 2019 / 1-18, Tarih: 09/01/2019).

Çıkar Çatışması: Yazarlar çıkar çatışması olmadığını beyan eder.

Finansal Destek: Bu çalışmaya maddi destek verilmiştir.

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