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Research Article

Evaluation of Hematological Parameters in Differentiating Central and Peripheral Vertigo in Patients with Vertigo

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Abstract

Central and peripheral causes play a role in the etiology of patients who apply to the emergency department with the complaint of vertigo. In our study, in the differential diagnosis of patients with central and peripheral vertigo, the usability of hematological parameters (white blood cell (WBC), leukocyte, neutrophil, lymphocyte, monocytes, basophil, eosinophil and platelet counts, red cell distribution width (RDW), platelet distribution width (PDW)) and platelet/lymphocyte (PLR), neutrophil/lymphocyte (NLR) ratios was investigated. This is a retrospective study including 215 patients, 179 (83.3%)with peripheral vertigo and 36 (16.7%) with central vertigo. Patients who were discharged from the emergency department with the complaint of vertigo or were admitted to the otolaryngology clinic were considered as peripheral vertigo, and patients who had findings on central imaging or were hospitalized in neurology/neurosurgery clinics were considered as central vertigo. There was a statistically significant difference between the groups in terms of age and gender of patients with peripheral and central vertigo ($p<0.05$). There was no statistically significant difference between the groups in terms of hematological parameters ($p>0.05$). We found that the values we looked at were not useful in the differential diagnosis.

Keywords: Central vertigo, peripheral vertigo, hematological parameters, NLR (neutrophil/lymphocyte ratio)

Vertigolu Hastalarda Periferik ve Santral Vertigo Ayrımında Hemotolojik Parametrelerin Değerlendirilmesi

Acil servise vertigo şikayetiyle başvuran hastaların etiyolojisinde santral ve periferik sebepler rol oynamaktadır. Çalışmamızda santral ve periferik vertigolu hastaların ayırıcı tanısında hematolojik parametrelerin(beyaz küre, lökosit, nötrofil, lenfosit, monosit, bazofil, eozinofil ve trombosit sayıları, kırmızı küre dağılım genişliği (RDW), platelet dağılım genişliği (PDW)), ve platelet/lenfosit, nötrofil/lenfosit oranlarının kullanılabilirliği araştırıldı. Bu çalışma 179'u (%83.3) periferik vertigo, 36'sı (%16.7) santal vertigo olan toplam 215 hastanın dahil edildiği retrospektif bir çalışmadır. Acil servise vertigo şikayetiyle başvurup taburcu edilen ya da kulak burun boğaz kliniğine yatırılan hastalar periferik vertigo olarak, santral görüntülemelerde bulgusu olan ya da nöroloji/nöroşirurji kliniklerine yatırılan hastalar santral vertigo olarak kabul edildi. Periferik ve santral vertigolu hastaların yaş ve cinsiyet durumları bakımından gruplar arasında istatistiksel olarak anlamlı fark saptandı($p<0.05$). Gruplar arasında hematolojik parametreler bakımından istatistiksel olarak anlamlı bir fark yoktu($p>0.05$). Baktığımız değerlerin ayırıcı tanıda faydalı olmadığını saptadık.

Anahtar Kelimeler: Santral vertigo, periferik vertigo, hematolojik parametreler, NLO(nötrofil/lenfosit oranı)

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1. Introduction

Vertigo is a movement illusion that arises due to the pathologies of the vestibular system, in which the person expresses that his/her environment or himself/herself is spinning. It is divided into two as central and peripheral according to the region of pathology. Peripheral vertigo is usually caused by inner ear pathologies, its symptoms are more severe than central, but its prognosis is better. The source of the disease in central vertigo, which is milder and less common than peripheral vertigo, is the central nervous system [1-2]. In vertigo, anamnesis, physical examination, blood tests, central imaging are very important in the differential diagnosis and in guiding the treatment.

The knowledge that hematological parameters increase in some diseases with various pathophysiologies and that they can be used both in the diagnosis stage and in determining the prognosis is increasingly accepted by new studies. Values such as platelet count, platelet mean size (MPV), WBC, RDW are guides in vascular pathologies [3-6]. Therefore, it can be thought that these parameters may increase in the etiology of central vertigo, especially in vascular pathologies. In this study, we aimed to investigate how significant these values can be in the differentiation of central and peripheral vertigo.

2. Material and Methods

Research; It was performed retrospectively on patients who applied with the complaint of vertigo between 01.06.2015 and 01.05.2016 in Atatürk University Medical Faculty Hospital Emergency Department. Patients were included in the study considering the inclusion and exclusion criteria. Before starting the study, the study was carried out by obtaining the approval of the ethics committee (Ethics committee meeting number: 7, decision no: 31 date: 08.12.2016). Patients who applied to the emergency department with the complaint of vertigo were included in the study after being identified through the hospital information system. The patients' hematological blood parameters, discharge and hospitalization from the emergency department, gender, age, and central imaging were recorded through the hospital information system. Patients who were discharged from the emergency department with the complaint of vertigo or were admitted to the otolaryngology clinic were considered as peripheral vertigo.

Patients with pathology in their central imaging or hospitalized in neurology/neurosurgery clinics were also considered to have central vertigo. Patients younger than 18 years of age, those with systemic inflammatory or autoimmune diseases, chronic connective tissue diseases, hematological disorders, cancer cases and patients receiving immunosuppressant treatment were excluded from the study.

Statistical analysis

The data obtained from the research were evaluated in The Statistical Package for Social Sciences (SPSS) 16 package program. In the analysis of parametric data, mean and standard deviation were used. In the comparison of the groups in terms of continuous variables in terms of independent variables, Student's T test was used for data showing normal distribution, and Mann-Whitney U test was used for data not showing normal distribution. Pearson Chi-Square test was used to compare categorical variables. When examining the difference between groups, $p<0.05$ was considered statistically significant.

3. Results and Discussion

Of the patients included in the study, 83.3% had peripheral vertigo and 16.7% had central vertigo. 33.5% of the patients diagnosed with peripheral vertigo were 58 years and older, 54.7% were women; 66.7% of the patients diagnosed with central vertigo were 58 years and older, and 77.8% were male (Table 1). A statistically significant difference was found in peripheral and central vertigo in terms of age and gender. ($p<0.05$)

Table 1. Comparison of peripheral and central vertigo patient groups in terms of age and gender

Age and gender	Peripheral vertigo (n=179)		Central vertigo (n=36)		Total (n=215)		p value
	n	%	n	%	n	%	
Age group							
18-27	31	17.3	3	8.3	34	15.8	0.00
28-37	18	10.1	2	5.6	20	9.3	
38-47	30	16.8	4	11.1	34	15.8	
48-57	40	22.3	3	8.3	43	20.0	
58 ve ↑	60	33.5	24	66.7	84	39.1	
Gender							
Male	81	45.3	28	77.8	109	50.7	0.00
Female	98	54.7	8	22.2	106	49.3	

Platelet/lymphocyte and neutrophil/lymphocyte ratios were higher in patients with central vertigo but were not statistically significant (p:0.85, p:0.24). Hemoglobin value was higher in patients with central vertigo (p:0.01). However, there was no statistically significant difference in peripheral vertigo and central vertigo patient groups in terms of RDW, PDW, MPV, MCV values, neutrophil/lymphocyte, platelet/lymphocyte ratios, platelet, lymphocyte, monocyte, WBC, neutrophil counts ($p>0.05$). The mean±standard deviation and significance values of the patient groups regarding the hematological parameters are shown in Table 2.

Table 2. Comparison of the mean hematological values of peripheral and central vertigo patient groups

	Peripheral Vertigo (n=179)	Central Vertigo (n=36)	p value
Values	Mean±SD	Mean±SD	
Wbc	8.43±2.37	9.39±3.29	0.14
Hemoglobin	14.54±1.35	15.31±1.66	*0.01*
Eozinofil	0.13±0.12	0.17±0.12	0.08
MCV	87.85±5.16	87.73±6.23	0.90
Platelet	270.970±88.765	253.055±59.876	0.24
MPV	9.80±1.24	9.58±1.27	0.35
PDW	13.33±2.61	13.13±2.56	0.68
RDW	13.25±1.18	13.41±1.38	0.46
Nötrofil	5.40±2.06	6.36±2.94	0.09
Monosit	0.58±0.36	0.61±0.25	0.66
Lenfosit	2.26±1.43	2.18±1.36	0.76
Bazofil	0.04±0.08	0.04±0.03	0.97
Platelet/Lenfosit	154.41±116.58	158.24±99.40	0.85
Nötrofil/lenfosit	3.42±3.37	4.14±3.15	0.24

Wbc: white blood cell, MCV: mean corpuscular volume, MPV: mean platelet size, PDW: platelet distribution width, RDW: red cell distribution width

4. Discussion and Conclusion

When we classify vertigo as central and peripheral, central vertigo was found at a rate of 11% in the USA and 10.1% in Brazil [7], while it was found at a rate of 16.7% in our study. In the study of Neuhauser et al. [1], the incidence of vertigo was reported 2 times more frequently in women than in men. However, in our study, 49.3% of the patients in total were women, and while the majority of patients with peripheral vertigo were women (54.7%), the majority of patients with central vertigo were men (77.8%). In our study, male gender was found to be a significant risk factor for central event in patients with vertigo. The frequency of vertigo complaints increases with increasing age, and advanced age has been reported as an important risk factor for central vertigo in many studies [8-9]. According to the results of Volunteer, there is no significant difference in age between peripheral and central vertigo [10]. In our study, the majority of patients with vertigo complaints were elderly, and most of the patients were over 58 years old, and this rate was significantly higher in central vertigo than in peripheral vertigo. In terms of average age, patients with central vertigo were higher than those with peripheral vertigo, and a statistically significant difference was found.

While the number of neutrophils in the circulation is increased in a physiological way during stress, there is a relative decrease in the lymphocyte count, so the ratio of these parameters (NLR) can be used as an indicator in cases of inflammation [11-12]. A significant increase in NLR has also been reported in heart-related vascular pathologies such as AF, HT, CAD (13-15]. In addition, an increase in the incidence of cardiovascular pathologies is observed in immunosuppression states that cause lymphopenia [16-17]. In our study, there was no statistically significant difference in the comparison of NLR in patients with peripheral and central vertigo, but the rate was higher in the group with central vertigo. Although RDW is increased in iron deficiency, B12 deficiency, folic acid deficiency, hemoglobinopathies,

conditions that cause hemolysis, pathologies that will cause increased cell destruction, blood transfusion, it has been reported that RDW is also increased in stroke patients and that RDW level is associated with prognosis and mortality in these patients [18-19]. As a result, RDW elevation can be seen in many pathological conditions, so it is not specific. In our study, when comparing the RDWs of patients with peripheral and central vertigo, the value was higher in patients with central vertigo, but no statistically significant difference was found. Studies in stroke patients have found an increased risk of stroke and a relationship with mortality in those with high MPV [20-21]. In our study, however, no statistically significant difference was found in the comparison of MPVs of patients with peripheral and central vertigo. As a result, we found that the values we looked at in our study were not statistically significant in differentiating central and peripheral vertigo. However, more comprehensive and prospective studies are needed on this subject.

Limitations

The reasons limiting our study may be difficulties in retrospective data, as vertigo is a complex symptom and may be the expression of many diseases. In addition, since a certain time period was scanned, too much difference in numbers between the two groups may cause statistical errors. Prospective and more comprehensive studies on this subject are needed.

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Conflicts of Interests

The authors report no conflicts of interest.

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