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ORIGINAL ARTICLE / ÖZGÜN ARAŞTIRMA MAKALESİ

Assessment of Dyspnea in Acute Heart Failure Patients with Three Scales in the Emergency Department

Acil Serviste Akut Kalp Yetmezliği Hastalarında Nefes Darlığının Üç Skala ile Değerlendirilmesi

Canan Kara Genoğlu[1], Ataman Köse[2], Seyran Bozkurt Babuş[2], İbrahim Toker[3], Semra Erdoğan[4], Necati Muşlu[5], Ahmet Çelik[6]

ABSTRACT

Aim: This study aimed to compare the three dyspnea scales (Likert, VAS, and NRS) in patients with acute heart failure (AHF) in the emergency department (ED).

Material and Methods: This study enrolled 114 patients prospectively diagnosed with AHF in the ED. We assessed the dyspnea scales for severity at admission and the 4th hour. We used the Likert scale, Visual Analogue Scale (VAS), and the Numerical Rating Scale (NRS).

Results: Sixty-five patients were women. The mean age of the patients was 72.1 ±11.7 years. 74.1% of the patients whose dyspnea was relieved were discharged. Seventy-seven of the patients were discharged from ED, while 37 were hospitalized, and 51.7% of the hospitalized patients had no improvement in dyspnea. The severity of dyspnea decreased after the treatment on each scale ($p< 0.05$). The 4th-hour scores were lower for all three scales ($p< 0.01$), but VAS and NRS scores on the 4th hour were higher in hospitalized patients than in discharged ($p< 0.01$). There was a similarly significant relationship between the admission and 4th hour of dyspnea scales ($p<0.001$).

Conclusion: Dyspnea scales are compatible with dyspnea and clinical relief in patients with AHF in the ED, whereas improvement in dyspnea is insufficient to decide whether the patient should be hospitalized or discharged.

Keywords: Emergency department, heart failure, shortness of breath, dyspnea scales

ÖZ

Amaç: Bu çalışmada, acil serviste (AS) akut kalp yetmezliği (AHF) olan hastalarda üç dispne ölçeğini (Likert, VAS ve NRS) karşılaştırmayı amaçladık.

Gereç ve Yöntemler: Acil serviste AHF tanısı konan hastalarda prospektif olarak yapılan bu çalışmaya toplam 114 hasta dahil edildi. Başvuru sırasında ve 4. saatte dispne skalaları dispne şiddeti açısından değerlendi. Likert, Visual Analog Skala (VAS) ve Sayısal Derecelendirme Ölçeği (SDÖ) kullandı.

Bulgular: Çalışmaya katılan hastaların altmış beşi kadındı. Hastaların ortalama yaşı 72.1 ±11.7 yıl idi. Nefes darlığı düzelen hastaların %74,1'i taburcu edildi. Hastaların 77'si acil servisten taburcu edilirken 37'si hastaneye yatırıldı ve yatan hastaların %51,7'sinde nefes darlığında düzelme olmadı. Her skalada tedaviden sonra dispne şiddeti azaldı ($p<0.05$). Dördüncü saat skorları her üç ölçek için düşüktü ($p<0.01$), ancak hastanede yatan hastalarda 4. saat VAS ve NRS skorları taburcu olana göre daha yüksekti ($p<0.01$). Dispne skalalarının başvuru ve 4. saatinde de benzer anlamlı doğrusal ilişki bulundu ($p<0.001$).

Sonuç: Acil serviste AKY olan hastalarda dispne skalaları nefes darlığında düzelme ve klinik rahatlama ile uyumludur, buna karşın nefes darlığındaki düzelme hastaların hastaneye yatırılması mı yoksa taburcu edilmesi mi gerektiğine karar vermek için yetersizdir.

Anahtar Kelimeler: Acil servis, kalp yetmezliği, nefes darlığı, dispne skalaları

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Introduction

The most frequent symptom of urgently hospitalized patients with acute heart failure (AHF) is dyspnea, a significant stress factor. Although dyspnea is not a symptom-specific to HF, the severity of dyspnea may vary over time (1,2). The severity of dyspnea is a relative concept for the patient and the physician (3). Despite the development of scales to measure dyspnea severity, studies have been used to measure the severity of dyspnea in asthma and chronic obstructive pulmonary disease (COPD) (4,5). Few studies on scales measure the severity of dyspnea in AHF (1,2,6). However, in several studies, VAS and Likert scales were used to measure the severity of dyspnea in the early period of ED admission (1,3).

This study aimed to compare the three dyspnea scales (Likert, VAS, and NRS) in patients with acute heart failure.

Material and Methods:

Study design

This prospective observational study aimed to investigate the dyspnea scales in patients with AHF who applied to Mersin University Research and Practice Hospital ED between 01.08.2015 - 01.08.2016. The study was approved by the Mersin University Medical Faculty Ethics Committee on 25.06.2015 (Approval no. 2015/211). The informed consent form was obtained from all patients. Patients who wanted to leave the study and died in the emergency room were excluded from the study. When the Likert, VAS, and NRS dyspnea severity scales were applied, it was estimated that a 0.30 difference between the admission and 4th hours was considered clinically significant.

A case form was used to record all the parameters for this study. Emergency medicine physician assistants (EMPA) were informed about this case form and the research. Standardization was provided to collect and record data, and the EMPAs collected all data. Reasons for dyspnea included pneumonia, sepsis, renal failure, and spontaneous/traumatic pneumothorax excluded. In addition, patients with non-invasive positive pressure ventilation, patients with invasive ventilation, patients with positive inotropic agents, patients with altered consciousness, decreased visual acuity, and physical abnormalities that prevent their scoring were excluded.

Demographic and clinical parameters

Age, gender, vital signs on admission (systolic and diastolic blood pressures (SBP and DBP), heart rate (HR), heart rhythm, pulse oximetry (SpO2), and respiratory rate (RR)), ECG, laboratory tests on admission (complete blood count, renal function tests, liver function tests, electrolytes, and blood sugar) were recorded.

Patients were assessed for dyspnea with dyspnea scales (VAS, NRS, 5-point Likert) at the admission and the 4th hour. Vital signs of patients, blood gases, cardiac enzyme [conventional troponin (Tn-T)], and NT-proBNP were monitored during the admission and 4th hours. Adequate standard AHF therapy (positioning, O2, iv diuretic, vasodilator therapy) was given to patients.

Use of dyspnea scales (Likert, VAS, and NRS)

Patients in this study were asked to grade dyspnea with three scales (VAS, NRS, and Likert scales) at admission and the 4th hour after appropriate standard treatment.

Likert scale: A 5-point Likert scale is 1 point refers to the absence of dyspnea; 2,3,4,5 points defined mild, medium, serious, and severe dyspnea, respectively (1)

VAS scale: On this scale, the straight line representing 100 mm was divided into ten equal parts with 1 cm intervals and 0 to 10. The patients were informed: "Show me the level of breathlessness on the ruler: 0 indicates no breathing disturbance, 10 indicates the worst breathing that you can imagine," The patients were asked to rate their shortness of breath (7).

NRS scale: It was stated that a number should express the severity of dyspnea from 0 to 10. It was noted that 0 defined that the patient did not have shortness of breath, and 10 represented the worst shortness of breath that the patient could imagine (8).

After HF treatment, the severity and state of dyspnea (improved and not improved) were evaluated. The severity of dyspnea was compared between the admission and 4th hours. Improvement of dyspnea was defined according to the Likert scale. Those who regressed to severity 1 and 2 were noted as " improved," whereas those 3, 4, and 5 were defined as "not improved." In VAS scales, for dyspnea improvement, 50 points and over were described as "not improved, <50 points were noted as "improved," whereas 5 points and over on the NRS scale was defined as ''not-improved" and <5 points were stated as ''improved".

Statistical Analysis

The normality of continuous variables was tested with the Shapiro Wilk test. Student t-test and Mann Whitney U test were used for differences between two groups of continuous variables. Paired t-test and Wilcoxon Signed Rank tests were used for differences between admission and 4th-hour measurements. Mean and standard deviation values for normal distributions as the descriptive statistics and minimum, maximum, median, and 25-75% values for the data with no normal distribution were calculated. The relationship between continuous measurements, Pearson and Spearman correlation coefficients was calculated. Differences between categorical variables and groups were tested with Pearson chi-square and Exact chi-square tests. Numerical and percentage values are given as descriptive statistics, and statistical significance was taken as $p < 0.05$. Statistical analyses were done using SPSS 21 software demo (SPSS Inc., NY, USA).

Results

A total of 114 AHF patients aged 18 years and older who came to the ED with shortness of breath were included in the study.

The mean age of the patients was 72.1 ±11.7 years. 57% (n=65) of the patients participating in the study were women. 32.5% (n=37) of the patients were hospitalized.

Time course of clinical features and dyspnea scales

The heart rate (HR) at the admission was 89.84 ±21.53 for patients discharged; 93.27 ±19.37 for hospitalized patients. HR at 4th hours was 80.19 ±14.65 in the patients discharged and 89.68 ±16.94 in the hospitalized patients. HR values were significantly lower in patients discharged at the admission and 4th hours than in hospitalized patients ($p = 0.0039$ and $p = 0.001$).

Parameters	At admission	4th hour	p
	Median [% 25-75]	Median [% 25-75]	
Likert	5 [4-5]	2 [1-3]	<0.001
VAS	90 [80-100]	30 [0-50]	<0.001
NRS	9 [8-10]	3 [0-5]	<0.001
RR /minute	26 [24-30]	23.5 [20-25]	<0.001
SpO_2 (%)	90 [85-94]	94 [90-96]	<0.001
Tn-T (ng/mL)	0.028 [0.02-0.054]	0.03 [0.02-0.08]	0.002
NT-proBNP (pg/mL)	3160 [1327.75-8780]	4070.5 [1452.5-9928]	<0.001
pH	7.40 [7.35-7.43]	7.41 [7.37-7.45]	0.001
BE (mmol/L)	-0.7 [-3.9-2.3]	0.55 [-2.2-2.33]	0.002
	Mean ± SD	Mean ± SD	
SBP (mmHg)	150.94 ± 30.81	128.78 ± 19.71	<0.001
DBP (mmHg)	87.99 ± 20.27	75.30 ± 13.45	<0.001
HR /minute	90.96 ± 20.83	83.27 ± 15.99	<0.001
PO_2 (mmHg)	63.05 ± 11.80	70.68 ± 12.06	<0.001
PCO_2 (mmHg)	38.28 ± 8.13	37.46 ± 6.53	0.204
HCO_3 (mmol/L)	23.12 ± 4.23	23.61 ± 3.75	0.146
SaO_2 (%)	89.40 ± 6.13	93.43 ± 3.54	<0.001

Data are presented as median ([% 25-75 percent]) or Mean ±SD
Abbreviations: RR: respiratory rate, SPO_2: pulse oximetry, Tn-T: Troponin T: pro-BNP: pro-brain natriuretic peptide, VAS: Visual analog scale, NRS: numerical assessment scale, BE: Base excess, SBP: systolic blood pressure; DBP: diastolic blood pressure; HR: heart rate, PO_2: partial pressure of oxygen, PCO_2: partial pressure of carbon dioxide, HCO_3: bicarbonate: SaO_2: oxygen saturation

Table 1. Distribution of dyspnea scales and clinical parameters at admission and 4th hour

SaO2 mean values at the admission were 90.94 ±5.17 for patients discharged and 86.21 ±6.80 for inpatients; the mean values at 4th hours were 94,24 ±2,84 in patients with discharge; 91,73 ±4,23 in hospitalized patients. SaO2 value was lower in hospitalized patients at admission and 4th hours (p = 0.001 and p = 0.002) (Table 1). pH, base excess (BE), partial oxygen pressure (PO2), and oxygen saturation (SaO2), SpO2, Tn-T, and NT-proBNP were higher at the 4th hour than at the admission (p values < 0,05). RR, Likert, VAS, NRS, SBP, DBP, and HR parameters were lower at the 4th hour (p values < 0,05).

The changes in the clinical parameters of the patients for time are shown in Table 1.

Dispne scales, state of dyspnea, and clinical features related to hospital admission and discharge

The median values for VAS and NRS at the 4th hour were significantly higher in hospitalized patients. According to this, for the Likert scale, VAS, and NRS, both the discharged and hospitalized patients had lower scores in the 4th hour, and this decrease was statistically significant (p <0.001) (Table 2).

Each scale was evaluated by itself and others to determine if the patient's dyspnea had improved. According to the Likert scale, 71.1% (n = 81) of the patients improved their dyspnea. For VAS and NRS scales, the improvement in dyspnea was 74.6% (n = 85) (Table 3).

When the correlations of the parameters observed at the 4th hour with NT-proBNP and dyspnea scales were examined, there was a linear relationship between SS and NT-proBNP and Likert scale measurements; and between HR and Likert, VAS, and NRS dyspnea scales. There is a linear relationship between NT-proBNP and NRS, between Tn-T and NT-proBNP, between VAS and NRS, and between Likert and VAS and NRS (Table 4).

Discussion

In this study, in patients with AHF in the ED, we found that using these scales successfully evaluated the improvement of dyspnea in patients. Still, it was not enough to decide whether patients should be discharged or hospitalized.

Scales for measuring the severity of dyspnea have been developed to evaluate this subjective complaint more objectively. Because a single dyspnea scale cannot reflect the severity of dyspnea, it is recommended that several dyspnea scales be used together (1). The timing of assessing the severity of dyspnea is essential, and earlier treatment has been associated with a further reduction in the severity of dyspnea (2,6,9).

Early enrollment can lead to difficulty expressing patients' severity of dyspnea in severe respiratory distress. Mebazaa and colleagues (2) assessed the effects of early standard care in patients with AHF-induced dyspnea with dyspnea scales (5-point Likert, 7-point Likert, and VAS) at 1 and 6 hours. According to this study, the 5-point Likert scale scored 2 for dyspnea on admission and 5 for VAS. In the 6-hour Likert score, fewer patients reported severe and very severe dyspnea, and VAS scores were regressed to 3.5. In our study, the median value of the Likert scale was 5, the VAS median value was 90, and the NRS median value was 9. After treatment, the Likert score at the 4th hour had a median value of 2, the VAS score was 30, and the NRS score regressed to 3. According to Likert, VAS, and NRS scales, it was observed that most of the patients had very severe breathing difficulty at the time of admission, while the shortness of breath mainly was decreased at 4 hours after in the ED.

Past studies have shown that VAS better captures changes in respiratory distress according to the Likert-type scales (2,10,11). In Pang et al.'s (1) research, the improvement in dyspnea according to both VAS and 5-point Likert was associated with baseline severity of dyspnea. Allen et al. (11), with the 7-Likert and VAS scales, the progress of dyspnea was observed daily during AHF patients' hospitalization period. This study included patients with AHF, as in our study. According to the same study, in the measurements of the Likert scale, statistically significant

Scales	Hospitalized			Discharge		
	At admission	4th hour	p	At admission	4th hour	p
Likert	5 [4-5]	2 [2-3]	<0.001	5 [4-5]	2 [1-2]	**<0.001**
VAS	100 [80-100]	40 [10-70]	<0.001	90 [70-100]	20 [0-40]	**<0.001**
NRS	10 [8-10]	4 [1.5-7]	<0.001	9 [7-10]	2 [0-4]	**<0.001**

Data are presented as median ([% 25-75 percent]). NRS: Numerical Rating Scale, VAS: Visual Analog Scale

Table 2. Dyspnea scales between admission and 4th hour among discharged and hospitalized patients

improvement was detected at the beginning (admission and 2nd day). On the contrary, according to VAS, more improvement in dyspnea was observed day by day, and this improvement was statistically significant between days 2 and 7 (11).

In a prospective cohort study by Placido et al. (12), which examined the ED patients who complained of shortness of breath with or without AHF, the median severity of dyspnea severity score at admission was the same for both VAS and NRS. The correlation between NRS and VAS scores was similar (r = 0.810) in patients without AHF (r = 0.788)(12). In our results, the median values for both VAS and NRS were the same in AHF patients. And we found VAS and NRS dyspnea scales are compatible in evaluating the severity of dyspnea.

According to our hypothesis, there was an increase in SpO2, PO2, SaO2, pH, and BE levels and decreased RR, SBP, DBP, HR, Likert, VAS, and NRS levels after treatment of our patients. Our findings are consistent with our hypothesis.

A large study found that initial fatigue and dyspnea levels were associated with cardiovascular death or the length of stay in an HF-related hospital (13). In our research, hospitalized patients' VAS and NRS 4th hour values are higher than discharged patients. Our study shows that 78% of those discharged improved dyspnea, and 74% of those whose dyspnea improved were discharged.

In a prospective observational ten-year cohort study by Llorens et al. (14), the rate of discharge of 13971 ED patients was 24.9%. In our results, 67.5% of the patients were discharged from ED. Several reasons may cause the big difference, such as the data collection time, patient number, and clinical characteristics (15).

Limitations

There are many restrictions in this study. First of all, it is single-centered, and the number of patients is small. In addition, the absence of data on the drug use history of HF is also a limitation. Assessment of dyspnea status at the 4th hour after treatment in patients referred to the ED with shortness of breath may not be a sufficient response to treatment. The lack of physical examination findings of the patients enrolled in the study and the lack of medical treatment data (need for intravenous diuretics or intravenous nitrates) they received had led us not to determine the factors that affected the state of dyspnea thoroughly. The fact that patients do not have hospitalization and mortality data within 30 days decreases the power of this study. Since the patient defines the severity of dyspnea, these scales alone may be misleading in determining the significance of dyspnea medically.

Conclusion

As a result, evaluation of improvement in dyspnea in AHF patients who present with shortness of breath in ED by dyspnea severity scaled is compatible with the clinical relief of the patient. The use of dyspnea scales in patients with AHF who have complaints of shortness of breath in the ED may guide physicians in evaluating the general condition of patients.

Scales	Status	n (%)	Discharge n (%)	Hospitalized n (%)	p
Likert	**Not improved**	33 (28.9)	17 (22.1)	16 (43.2)	**0.020**
	Improved	81 (71.1)	60 (77.9)	21 (56.8)	
VAS	**Not improved**	29 (25.4)	14 (18.2)	15 (40.5)	**0.010**
	Improved	85 (74.6)	63 (81.8)	22 (59.5)	
NRS	**Not improved**	29 (25.4)	14 (18.2)	15 (40.5)	**0.010**
	Improved	85 (74.6)	63 (81.8)	22 (59.5)	

NRS: Numerical Assessment Scale, VAS: visual analog scale

Table 3. Dyspnea status to hospitalization and discharge according to dyspnea scales

Correlation of parameters measured at admission with dyspnea scales				
Parameters		**Likert**	**VAS**	**NRS**
Likert	r		0.833	0.833
	p		<0.001	<0.001
VAS	r			1.000
	p			<0.001
SBP (mmHg)	r	0.205	0.144	0.144
	p	0.028	0.127	0.127
DBP (mmHg)	r	0.264	0.170	0.170
	p	0.005	0.070	0.070
RR/minute	r	0.254	0.209	0.209
	p	0.006	0.026	0.026
HR/minute	r	0.131	0.081	0.081
	p	0.165	0.391	0.391
SpO_2 (%)	r	-0.166	-0.219	-0.219
	p	0.077	0.019	0.019
Tn-T (ng/mL)	r	0.059	0.095	0.095
	p	0.532	0.315	0.315
NT-proBNP (pg/mL)	r	0.245	0.167	0.167
	p	0.009	0.076	0.076
Correlation of parameters measured at 4th hour with dyspnea scales				
Likert	r		0.893	0.89
	p		<0.001	<0.001
VAS	r			0.997
	P			<0.001
SBP (mmHg)	r	0.017	0.013	0.015
	p	0.855	0.891	0.876
DBP (mmHg)	r	0.117	0.109	0.109
	p	0.217	0.249	0.25
RR/minute[a]	r	0.258	0.16	0.159
	p	0.005	0.09	0.092
HR/minute[a]	r	0.195	0.206	0.201
	p	0.038	0.028	0.032
SpO2 (%)	r	-0.07	-0.071	-0.074
	p	0.46	0.452	0.436
Tn-T (ng/mL)	r	0.169	0.266	0.273
	p	0.073	0.004	0.003
NT-proBNP (pg/mL)	r	0.15	0.181	0.187
	p	0.11	0.054	0.046

Abbreviations: RR: respiratory rate, SpO_2: pulse oximetry, Tn-T: Troponin T: PRO-BNP: pro-brain natriuretic peptide, VAS, Visual analog scale, SBP: systolic blood pressure; NRS: numerical assessment scale, DBP: diastolic blood pressure; HR: heart rate, r: correlation coefficient

Table 4. Correlations of the parameters measured at admission and 4th hour with dyspnea scales

However, assessment with dyspnea scales alone is insufficient to decide whether the patient should be hospitalized or discharged. Therefore, AHF patients should be hospitalized according to their clinical characteristics, other findings of congestion, and comorbidities, together with the severity of dyspnea.

Conflict of Interest: The authors declare no conflict of interest regarding this study.

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Ethical Statement: The study was approved by the Mersin University Medical Faculty Ethics Committee on 25.06.2015 (Approval no. 2015/211). All authors declared that they follow the rules of Research and Publication Ethics.

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ORIGINAL ARTICLE / ÖZGÜN ARAŞTIRMA MAKALESİ

Determination of the Effects of Change in Anxiety Level on Pain Perception in Patients who Present to Emergency Department due to Acute Pain: A Double Blind, Randomized, Controlled Trial

Acil Servise Akut Ağrı Sebebiyle Başvuran Hastalarda Anksiyete Düzeyindeki Değişimin Ağrı Algısı Üzerindeki Etkisinin Saptanması: Randomize Kontrollü, Çift kör Çalışma

Asım Enes Özbek[1], Murat Pekdemir[1], Asım Tomo[1], Hüseyin Acar[1], Ümit Tural[2]

ABSTRACT

Aim: The aim of this study is to determine the level of pain and anxiety, and to investigate the effect of standard analgesic treatment and additional anxiolytic treatment on pain and anxiety in patients who presented to the emergency department due to acute pain.

Material and Methods: This is a prospective, randomized, controlled, double-blind study. As the study group received dexketoprofen trometamol plus midazolam, the control group received dexketoprofen trometamol alone. At 0th, 30th, 60thand 120th minutes of treatment, patients' pain and anxiety levels were measured. Patients' overall anxiety levels were measured. The primary outcome measure was the comparison of pain and anxiety change at 0-30 minutes.

Results: The study was conducted with 90 patients in each group. The median pain change was 33.5 (IQR, 38) for the control group and 30 (IQR, 33) for the study group, and the mean difference was 3.5 (95% CI; -7.2 to 14.2). The median anxiety change was 9.5 (IQR, 41) for the control group and 20 (IQR, 40) for the study group, and the mean difference was -10.5 (95% CI; -24.37 to 3.37). The rescue therapy needed, treatment satisfaction and preference to the same treatment in the future were similar between the control and the study group, respectively (26.7% vs 40%, p=0.058; 64% vs 57%, p=0.770; 90% vs 89%, p=0.802).

Conclusion: In patients who present to the emergency department due to an acute pain complaint, adding anxiolytic treatment to the analgesic treatment does not contribute to a reduction of pain and anxiety.

Keywords: Acute pain, anxiety, emergency department, pain management

ÖZ

Amaç: Çalışmanın amacı, acil servise akut ağrı sebebiyle başvuran hastaların ağrı ve anksiyete düzeylerini belirleyip standart ağrı kesici tedaviye ek olarak anksiyolitik tedavi vermenin ağrı ve anksiyete düzeyleri üzerindeki etkisini araştırmaktır.

Gereç ve Yöntemler: Bu çalışma prospektif, randomize, çift kör bir klinik çalışmadır. Çalışma grubuna deksketoprofen trometamol ve midazolam verilirken, kontrol grubuna sadece deksketoprofen trometamol verildi. Tedavinin 0, 30, 60 ve 120. dakikalarında hastanın ağrı ve anksiyete düzeyleri ölçüldü. Hastaların genel anksiyete düzeyleri ölçüldü. Birincil sonuç ölçümü hastaların 0-30. dakikalardaki ağrı değişimidir.

Bulgular: Çalışmada her gruba 90 hasta dahil edildi. Çalışma grubunda ağrı değişim medyanı 30 (IQR, 33), kontrol grubunda 33.5 (IQR, 38) tespit edildi. Ortalama değişim 3.5 (95% CI; -7.2 - 14.2) olarak saptandı. Çalışma grubunda anksiyete değişim medyanı 20 (IQR, 40), kontrol grubunda 9.5 (IQR, 41) tespit edildi. Ortalama değişim -10.5 (95% CI; -24.37 to 3.37) olarak saptandı. Kurtarıcı tedavi ihtiyacı, tedavi memnuniyeti ve uygulanan tedaviyi gelecekte de isteme oranları gruplar arasında benzerdi (26.7% vs 40%, p=0.058; 64% vs 57%, p=0.770; 90% vs 89%, p=0.802).

Sonuç: Acil servise akut ağrı şikayetiyle başvuran hastalarda ağrı kesici tedaviye anksiyolitik tedavi eklemek ağrı ve anksiyete düzeylerinin azalmasına katkı sağlamamaktadır.

Anahtar Kelimeler: Akut ağrı, anksiyete, acil tıp, ağrı yönetimi

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Introduction

Pain is a common health problem; it accounts for 78-84% of emergency department (ED) visits (1,2). Since pain is one of the major reasons for presentation to the ED, emergency physicians must focus on pain relief, detection of the cause of the pain, and prevention of pain dominance to evaluate the patient objectively. Pain sensation is also an obstacle for proper history taking and physical examination. As the pain is relieved, better patient care will be provided. Unrelieved pain prolongs the stress response, adversely affecting the patient's recovery (3). Anxiety is frequently observed together with pain. Approximately 60% of patients in the ED demonstrate pain-related anxiety (4). Previous non-ED clinical studies show that as the anxiety reduces, the chronic pain or post-operative pain perception reduces (5). Analgesics and sedatives are integral for the relief of pain and anxiety in critically ill patients (6). In addition, anxiety and pain relationship in the patients who present to the ED with acute pain remains controversial. Some studies reported that higher anxiety levels were related to higher pain scores whereas, some reported that adding anxiolytics to analgesics offers no advantage to the standard treatment (4,7).

The aim of this study is to determine the level of pain and anxiety in patients who present to the ED with acute pain, and to investigate the effect of the standard analgesic treatment and an additional anxiolytic treatment on pain and anxiety.

Material and Methods:

Study Design

This was a single centre, prospective, randomised, double-blind study. This centre was an academic ED with 35000 ED visits per year. The study was approved by the local ethics committee (KOU KAEK 2013/147). Written consent was obtained from each participant.

Study Order and Population

The study was conducted with the patients who presented consecutively to the ED with acute pain between June 2013 and December 2013. Acute pain is defined as pain that started in the last 12 weeks (8).

Inclusion criteria

The patients who presented to the ED with acute pain (headache,
flank pain or musculoskeletal pain)
Who accepted to include the study
Who were older than 18 years old

Exclusion criteria

History of allergy to any of the study drugs
Pregnancy
Chronic pain
Antidepressant or anxiolytic drug use
Advanced kidney or liver failure
Use of analgesics within 6 hours before presentation

Study Protocol

After triage, each acute pain patient who qualified for the study was asked for consent. Written informed consent was obtained from all patients who were eligible for the study. After obtaining written informed consent, demographic and clinical data were collected and recorded by the attending physician. Our study consisted of two parallel groups. Participants were randomly assigned into two groups with a 1:1 allocation following simple randomization procedures by a program (www.randomization.com) generating an online random number. The study group was given analgesic plus anxiolytic, dexketoprofen trometamol (Arveles®, UFSA ILAC SANAYI VE TICARET AS, Istanbul, Turkiye) plus midazolam (Dormicum® DEVA ILAC SANAYI VE TICARET AS, Istanbul, Turkey) and the control group was given only the same dose of the analgesic drug dexketoprofen trometamol. Both groups received the study drugs in 100 mL of normal saline within 5 minutes. The dexketoprofen trometamol dose was 50 mg, and the midazolam dose was 1 mg. The study was double-blind. Sequenced study medications were prepared by a nurse, and another nurse administered the medications. In patients with an insufficient improvement of pain after 60 minutes, fentanyl (TALINAT®, VEM ILAC SANAYI VE TICARET LTD STI Istanbul, Turkiye) 1 mcg/kg IV was administered as a rescue medication.

Pain and anxiety in patients were measured at 0, 30, 60 and 120 minutes using the standard 100 mm horizontal visual analogue scale (VAS). The patient's general anxiety states were measured with the Turkish adopted version of the Hospital Anxiety and Depression Scale (HADS) which contains seven questions to determine general anxiety level of the patient in anxiety scale and each question on the questionnaire is scored from 0 to 3. Therefore, HADS scale might be scored between 0 to 21 points range. Patients who have greater than 10 points are assumed anxious (9). Depression part of the HADS scale was not used in the study. The HADS and VAS scores were measured and recorded to the database by the researcher. At the time of discharge, patient satisfaction with treatment was evaluated by asking two questions with the 5-step Likert scale. The questions were, "I am satisfied with the applied treatment", and "I would like the same treatment applied again". Patient answers were, "1-I strongly disagree", "2-I disagree", "3-I am not sure", "4-I agree", and "5-I strongly agree".

Outcome Measures

The primary outcome measure was determined as the change in pain levels between groups on the visual analogue scale at 0-30th minutes. The secondary outcome measures were the change in anxiety levels between groups on the visual analogue scale at 0-30th minutes, general anxiety levels according to the HADS scale, the need for rescue treatment at 60th minute and at 120th minute the rate of the request for the same treatment again on the Likert scale, and the comparison of the pain and anxiety change on the visual analogue scale in patients who have a greater anxiety score.

Statistical Analysis

Data were analysed using SPSS version 13.0 (SPSS Inc. Chicago, USA). The normality of the distribution of the data was assessed with the Kolmogorov-Smirnov test. The continuous variables were analysed using a range between median and quartiles, and the categorical variables were analysed with percentages. The Chi-square test was used to compare the rate of independent groups. The Mann Whitney U test was used for comparison between the groups. Owing to the skewed distribution of the response variable, the median of the changes in this study would be more meaningful than the mean of the changes. Therefore, the mean of the changes between the treatment groups was

calculated with the confidence interval of the medians description by Bonnet & Price (10). The Spearman correlation test was performed to determine the relationship of pain and anxiety between the groups. $p<0.05$ was considered statistically significant. The number of subjects required for the study was calculated with the G*Power program (G*Power 3.1.3, Franz Faul, Kiel University, Kiel, Germany). We determined the sample size 80 for each group to achieve 0.90 power, $\alpha=0.05$ and a standard deviation of 25 for 15 mm VAS (visual analogue scale) difference.

Results

During the study period, 936 patients presented with complaints of acute pain. 756 patients were excluded from the study for various reasons, and the study was conducted with 180 patients (Figure 1).

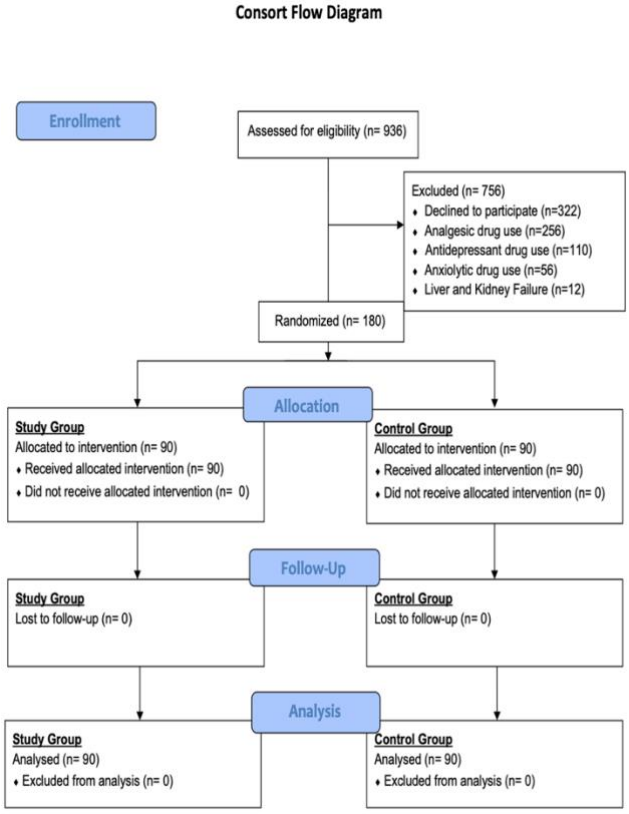

Figure 1. Consort flow diagram

The demographic characteristics of the patients in both groups were similar (Table 1). The patients who had anxiety were 34 (38%) in the study group and 35 (39%) in the control group. The proportion of those diagnosed with renal colic at discharge was not similar between the two groups ($p = 0.006$).

The median value of the pain score at the baseline was 70 (IQR, 27) in the study group and 73.5 (IQR, 33) in the control group. The median pain score at 30 minutes was 32 (IQR, 45) in the study group and 25.5 (IQR, 40) in the control group (Figure 2). The mean of the changes in the pain levels among the treatment groups was -3.5 (95% CI; 14.2 to -7.2) (Table 2).

The median anxiety score at the baseline was 52 (IQR, 58) in study group and 52.5 (IQR, 79) in control group.

Characteristics	Study (n=90)	Control (n=90)	p values
Age (median, IQR)	35 (24-44)	35.5 (24-49)	0.78
Male (%)	45 (50)	46 (51.1)	0.88
Education (%)			0.47
Primary School	30 (33.3)	39 (43.8)	
Junior High School	12 (13.3)	9 (10.1)	
Senior High School	17 (18.9)	12 (13.5)	
University	31 (34.4)	29 (32.6)	
Comorbidity (%)			
Hypertension	14 (15.6)	13 (14.4)	0.83
Diabetes Mellitus	1 (1.1)	3 (3.3)	0.62
CAD	2 (2.2)	2 (2.2)	
Migraine	4 (4.4)	1 (1.1)	0.36
Kidney stone	3 (3.3)	3 (3.3)	
Other	2 (2.2)	9 (10)	0.019
Clinical Findings			
HADS (median, IQR)	7.5 (5-12)	7.5 (5-11)	0.92
Discharge Diagnosis (%)			
Headache	39 (43.3%)	44 (48.9%)	0.45
Renal colic	23 (25.6%)	9 (10%)	0.006
Muscle-skeletal Pain	28 (31.1%)	34 (37.8%)	0.34
Other	0 (0%)	3 (3.3%)	0.24

IQR=interquartile range; CAD=coroner artery disease; HADS=hospital anxiety and depression scale

Table 1: Demographic data of study patients

The median anxiety score at 30 minutes was 13.5 (IQR, 42) in study group and 20 (IQR, 49) in control group (Figure 3). The mean of the changes in the anxiety levels among the treatment groups was 10.5 (95% CI; 3.37 to -24.37) (Table 2).

	Study	Control	Mean of the changes
Pain change (median, IQR)	30 (33)	33.5 (38)	-3.5 (95% CI, 14.2 to -7.2)
Anxiety change (median, IQR)	20 (40)	9.5 (41)	10.5 (95% CI, 3.37 to -24.37)

IQR=interquartile range

Table 2: Pain and anxiety change (delta) values of groups at 0 – 30th minutes

The patients who were assumed as anxious since their HADS score were greater than 10 points were analysed separately. A total of 69 (38.3%) anxious patients included to the analysis. There were 34 patients (38%) in the study group and 35 patients (39%) in the control group. The median pain change was found to be 31.5 (IQR, 30) in the study group and 35 (IQR, 39) in the control group. The mean of the changes in the pain levels between the treatment groups was -3.5 (95% CI, 19 to -12) in the anxious patients. The median anxiety change was found to be 24.5 (IQR, 36) in the study group and 14 (IQR, 54) in the control group. The mean of the changes in the anxiety levels between the treatment groups was 10.5 (95% CI, 11.38 to -32.38) in the anxious patients.

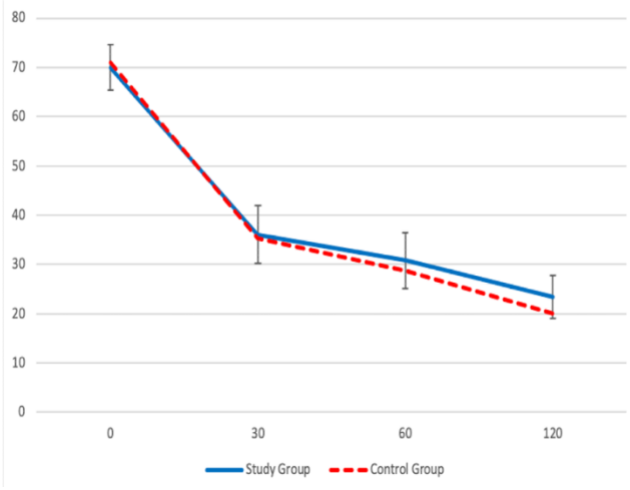

Figure 2. Study and control group pain change graph

In order to determine the relationship between pain and anxiety, the intra-group correlation of changes in pain and anxiety was evaluated. There was a positive correlation between the pain and anxiety levels in the study group (Rho: 0.599; p<0.001). There was no correlation between the pain and anxiety changes in the control group (Rho: 0.274; p=0.144).

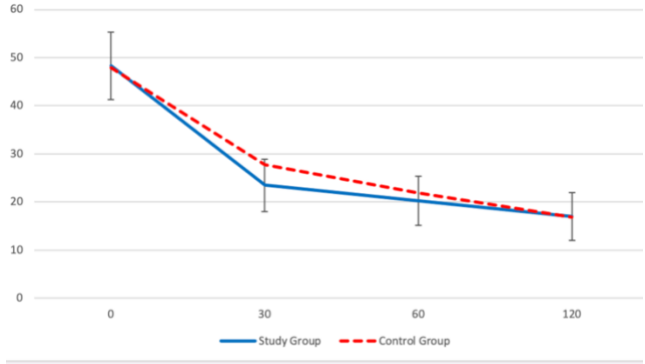

Figure 3. Study and control group anxiety change graph

There were no serious adverse events with the study drugs. After the fentanyl implementation, a symptomatic hypotension occurred in one of the patients. After a fluid resuscitation, the symptoms improved.

The rate of need for additional treatment at the 60th minute was 40% in the study group and 26.7% in the control group (p=0.058). 57% of the patients in the study group and 64% of the patients in control group stated that they were very satisfied with the treatment (p=0.770). 89% of the patients in the study group and 90% of the patients in the control group stated that they would prefer the same treatment in the next emergency visit (p=0.802).

Discussion

This prospective, randomized double-blind study failed to show the presence of any statistically significant difference in VAS of pain between study groups when treating patients with acute pain in the ED. The VAS of anxiety also did not differ between the groups. HADS scores, the rate of need for additional treatment and the mean of the changes in the pain and anxiety levels in patients who have a greater anxiety score were similar between two groups.

There was no statistically significant difference in the pain perception between the two groups. The relationship

	Study Group Level of Pain Measured by VAS	Control group Level of Pain Measured by VAS	P values
Baseline (median, IQR)	70 (58-85)	73 (56-89)	0.60
30th minute (median, IQR)	32 (14-58)	25 (12-52)	0.68
60th minute (median, IQR)	29 (14-64)	24 (0-73)	0.40
120th minute (median, IQR)	24 (0-48)	3 (0-29)	0.05
	Study Group Level of Anxiety Measured by VAS	**Control group Level of Anxiety Measured by VAS**	
Baseline (median, IQR)	52 (18-76)	52 (0-79)	0.97
30th minute (median, IQR)	13 (0-42)	20 (0-49)	0.53
60th minute (median, IQR)	18 (0-46)	14 (0-56)	0.99
120th minute (median, IQR)	5 (0-38)	8 (0-25)	0.71

IQR=interquartile range; VAS=Visual Analog Scale

Table 3: Pain and anxiety levels of the patients at 0, 30th,60th, and 120th minutes

between acute pain and anxiety is unclear. There are few studies conducted on this issue, specifically in the ED. Previous studies have shown differing effects of anxiety on pain perception. Craven et al. reported that higher anxiety scores were found to be related to higher pain scores (4). In accordance with the Craven et al.'s findings Kapoor et al. reported that pain intensity was associated with the state anxiety (11). In contrast, Behrbalk et al. reported that an anxiolytic adjunct to morphine analgesia for acute low back pain relief in the ED showed no advantage over morphine alone (7).

In our study, 51.6% of the patients who were assessed with the HADS scale were anxious. Similarly, previous studies identified a general anxiety rate of the Turkish population as 55.6% (12). The general anxiety level in the patients of this study was consistent with this data. According to the U.S. National Institute of Mental Health, the anxiety rate in women is 60% higher than the rate in men (13). In our study, the general anxiety rate in women was also higher than the rate in men. Our study also demonstrated that acute anxiety is a common problem in patients presenting to the ED due to pain. This result is consistent with previous studies (14).

In previous studies, Shillington et al. evaluated that whether a therapeutic conversation with an ED nurse was effective on patient satisfaction who was on acute pain and found that this has no effect on pain management (15). The underlying reason of these results might be that pain perception may be affected by many factors and a therapeutic conversation is the only one dimension of these factors during the pain management. In contrast, Lefebvre et al. found that mood changes directly affect the experience of acute pain (16).

Mocha Chai et al. reported that in patients with acute low back pain, anxiety levels are associated with pain levels (17). Oktay et al. evaluated pain and anxiety during the IM diclofenac administration and proposed that anxiety is associated with pain. However, they did not evaluate the relationship between instant anxiety and pain (18). Craven et al. evaluated pain and anxiety scores with the VAS and found a relationship between anxiety and pain in the ED; however, this study included patients with diagnoses of anxiety disorders and chronic pain (4). In our study, we excluded the patients with diagnoses of anxiety disorders and chronic pain, and we examined the relationship between instant anxiety and pain.

We examined whether or not the patients without anxiety affected the study results. A subgroup analysis was performed for the anxious patients. There was no significant difference on pain perception and anxiety levels between the two groups.

As a result of our study, there is no difference in terms of analgesic efficacy between analgesics alone and the use of an anxiolytic with analgesic in the patients who presented to the emergency service with acute pain. More randomized controlled studies on this subject are needed in the future.

Our study has several limitations. Since this study was conducted in a single academic ED, the results cannot be generalized. Pain types were classified in the study, but the primary etiological factor causing the pain was not specified. Types of pain were not evaluated independently. For example, migraine or tension-type pain may respond differently to therapy. We expect our study to be a beginning point for studies to evaluate the efficiency of combination of NSAIDs and benzodiazepines in particular pain types.

In this study, the pain and anxiety scores of the patients were measured at the baseline, 30, 60 and 120 minutes. After the treatment, for those patients who stated that they wanted to leave the emergency medical service, changes in the pain and anxiety at 0-30 minutes were evaluated. The anxiety and pain scores of these patients were not measured separately. Patients' complaints, such as headache and low back pain, may be caused by different reasons. In this study, symptomatic treatment was conducted in order to reduce pain but not according to etiology. Study patients were patients with an acute pain complaint in different features, and a single analgesic treatment was dispensed to patients with different characteristics. However, since there was a significant reduction in pain in all subgroups, it is thought that the results are affected by the application of the same analgesic to pain in different regions. In this study, pain levels of the patients were not classified as mild, moderate and severe. Since patients with severe pain were given the same NSAID treatment, the reduction in the pain level might have been insufficient. However, there was no significant difference in the rate of patients with severe pain, and patients' pain in both groups was significantly reduced with the NSAID treatment. The patients in our study were consistently medicated with 1 mg of midazolam according to the recommended initial IV dose for anxiolysis but if this dose is not enough, supplemental IV doses is recommended to achieve and maintain the desired effect so for some patients 1 mg midazolam might not be enough to reach the desired anxiolysis. In this study, midazolam and dexketoprofen trometamol were delivered in same saline solution; it was administered in this way because there is no known drug interaction. Patients evaluated pain and anxiety subjectively. Even patients without a significant reduction in pain evaluated their satisfaction as "I strongly agree". Since this was not the aim of the study, there is no evaluation of these results.

Conclusion

In conclusion anxiety is frequently observed in patients who present to the ED with an acute pain complaint. However, additional anxiolytic treatment to analgesic treatment does not contribute to the treatment of pain and anxiety in these patients.

Conflict of Interest: The authors declare no conflict of interest regarding this study.

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Authors' Contribution: AEO, and MP conceived the study, designed the trial, and supervised the conduct of the trial and data collection. AT and HA collected the data. MP and UT provided statistical advice on study design and analyzed the data. AEO and MP drafted the manuscript, and all authors contributed substantially to its revision. AEO takes responsibility for the paper as a whole.

Ethical Statement: The study was approved by the local ethics committee (KOU KAEK 2013/147). Also this study was registered to Clinical Trials with NCT03420911 ID number. All authors declared that they follow the rules of Research and Publication Ethics.

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ORIGINAL ARTICLE / ÖZGÜN ARAŞTIRMA MAKALESİ

Evaluation of the Relationship Between Hematological Parameters and Stroke in Emergency Department

Acil Serviste İnme ve Hematolojik Parametreler Arasındaki İlişki İncelemesi

Elgin Bahçeli[1], Mehtap Bulut[2]

ABSTRACT

Aim: Our aim is to investigate the relationship between ischemic stroke, which is one of the leading causes of death in the world, and hematological parameters which are easily accessible, cheap and rapid tests.

Material and Methods: The study was a single-center, retrospective and patients aged 18 years and older with acute ischemic stroke and transient ischemic attack (TIA) who applied to Medipol Mega University Hospital Emergency Department were included in the study. Hematological parameters of patients were evaluated with stroke subgroups according to TOAST, clinical outcomes and duration of hospitalization. The predictive efficiency of the hematological parameters to the intensive care unit (ICU) admission status was compared using the ROC (Receiver Operating Characteristic).

Results: Of the 152, 97 (63.8%) were male and 55 (36.2%) were female. The median age of the patients was 64,38 ± 13,69. Leukocyte (WBC), neutrophil, monocyte and leukocyte to mean platelet volume ratio (WMR) values in ICU patients were statistically higher than the service patients. Mean platelet volume to platelet ratio (MPR) value was lower in the intensive care unit (ICU) than in the service patients. WBC, neutrophil, monocyte, MPR and WMR's predictive efficiencies to admission to ICU from emergency department were found statistically significant and the predictive power of WMR (AUC: 0.699 ± 0.056) was highest.

Conclusion: As a result, WBC, neutrophil, monocyte, WMR and MPR can be used to predict ICU admission in patients with transient ischemic attack and ischemic stroke.

Keywords: Emergency department, hematological parameters, ischemic stroke, MPR, WMR

ÖZ

Amaç: Amacımız dünyada ölüm nedenleri arasında ön sıralarda yer alan iskemik inme ile kolay ulaşılabilir, ucuz ve hızlı bir test olan hematolojik parametrelerin ilişkisini araştırmaktır.

Gereç ve Yöntemler: Araştırma tek merkezli, retrospektif olup Medipol Mega Üniversitesi Hastanesi Acil Servisine başvuran 18 yaş ve üzeri akut iskemik inme ve geçici iskemik atak (GİA) tanısı alan hastalar dahil edildi. Hastaların hematolojik parametreleri ile TOAST sınıflamasına göre inme alt grupları, acil serviste klinik sonlanma durumları ve yatış süreleri değerlendirildi. Hematolojik parametrelerin yoğun bakım ünitesine (YBÜ) yatış durumunu öngörmedeki etkinlikleri ROC (Receiver Operating Characteristic) eğrisi kullanılarak karşılaştırıldı.

Bulgular: Toplam 152 hastanın 97'si (%63,8) erkek ve 55'i (%36,2) kadındı. Hastaların yaş ortalaması 64,38 ± 13,69 olarak saptandı. YBÜ'de takip edilen hastaların lökosit (WBC), nötrofil, monosit ve lökositin ortalama platelet hacmine oranı (WMR) servis hastalarına göre istatistiksel olarak yüksek bulundu. Ortalama eritrosit hacminin platelete oranı (MPR) YBÜ'de takip edilen hastalarda servis hastalarına göre daha düşük bulundu. WBC, nötrofil, monosit, ortalama eritrosit hacminin platelete oranı (MPR) ve WMR değerlerinin acil servisten yoğun bakıma yatışı öngörme başarısı istatistiksel olarak anlamlı bulunmuş olup WMR'nin öngörme gücü (AUC: 0,699 ± 0,056) en yüksek saptandı.

Sonuç: Sonuç olarak GİA ve iskemik inmeli hastalarda WBC, nötrofil, monosit, WMR ve MPR, YBÜ'ye yatışı öngörmede kullanılabilir.

Anahtar Kelimeler: Acil servis, hematolojik parametreler, iskemik inme, MPR, WMR

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Giriş

İnme, Dünya Sağlık Örgütü (DSÖ) tarafından "hızla gelişen ve 24 saat veya daha uzun süren ya da ölümle sonuçlanabilen, serebral işlevlerin fokal veya global bozukluğuna bağlı bulgular" olarak tanımlamaktadır (1). İnme olgularının %80-85'i iskemik, %15-20'si kanama kökenlidir (2). İnme, dünya çapında 2. sıklıktaki ölüm nedeni (3) (4) iken, Türkiye Sağlık İstatistiklerine göre, Türkiye'de de ikinci ölüm nedenidir (5) (6).

Akut iskemik inmeye bağlı mortalite, morbidite, sakatlık oranları yüksek olduğundan dolayı bu hastalara erken tanı koymak ve tedavi başlamak önemlidir (7). Son yıllarda iskemik inme sonrası inflamasyonun, akut dönem beyin hasarını kolaylaştırdığı şeklinde birçok kanıt sunulmuştur. Bu inflamatuar yanıt, serebral iskemi sonrası periferik kandan beyne, lökosit ve mikrogliaların aktivasyonunun immün cevabı tetiklemesiyle oluşur (8). İnflamatuar yanıtın değerlendirilmesi için kolay ulaşılabilir, ucuz ve hızlı bir biyokimyasal tetkik olan tam kan sayımı (TKS) kullanılabilmektedir. WBC'nin inflamatuar bir cevap olarak aterotrombotik inmenin patogenezinde rol oynadığı çalışmalarda gösterilmiştir (7). Yine son zamanlarda yapılan çalışmalarda kırmızı hücre dağılım genişliği (RDW) kardiyovasküler hastalık ve inmede mortalite belirleyicisi olarak saptanmıştır (9). Platelet dağılım genişliği (PDW) ve ortalama platelet hacmi (MPV) ile ilgili yapılmış çalışmalarda MPV'nin tüm inme tiplerinde yükseldiği saptanmıştır (10). Nötrofil / lenfosit oranının (NLR) (11, 12, 13) ve Platelet lenfosit oranının (PLR) (14) yüksekliğinin inmede yüksek mortalite ve kötü prognoz ile ilişkili olduğunu gösteren az sayıda çalışma mevcuttur. Lökosit sayısının ortalama platelet hacmine oranı (WMR) yakın zamanda ST segment yükselmesiz miyokard infarktüslü (NSTEMI) hastalarda uzun dönem sonuçları öngören yeni bir non invaziv belirteç olarak bulunmuştur (15).

İnme hastalarında WBC, MPV, NLR değerleri ile ilgili çok sayıda çalışma varken, bildiğimiz kadarıyla WMR değeri ile ilgili çalışma henüz yapılmamıştır. Bunun yanında MPV/PLT (MPR), PLR değerleri ile ilgili sınırlı çalışma bulunmaktadır.

Bu çalışmada dünyada ölüm nedenleri arasında ön sıralarda yer alan iskemik inme ile hematolojik parametreler ve birbirlerine oranları ile ilişkisini araştırmak amaçlanmıştır.

Gereç ve Yöntemler

Araştırma tek merkezli, retrospektif olarak yapıldı. Etik kurul onayı İstanbul Medipol Üniversitesi Girişimsel Olmayan Klinik Araştırmalar Etik Kurulu'ndan alındı. (Etik kurul tarih ve karar no: 23.06.2017-215).

Çalışmaya, Medipol Mega Üniversitesi Hastanesi Acil Servisine 01.01.2014-01.07.2017 tarihleri arasında başvuran 18 yaş ve üzeri iskemik inme ve geçici iskemik atak tanısı alan hastalar dahil edildi.

Acil servise başvuruda arrest olan hastalar, >24 saatten sonra başvuran hastalar, hemorajik inmeli hastalar, travma nedenli inmesi olan hastalar, intrakraniyal kitle öyküsü olan hastalar, bilinen hematolojik bozukluğu olan hastalar, bilinen tiroid hastalık öyküsü olan hastalar, kronik renal yetmezliği, karaciğer yetmezliği olan hastalar, eş zamanlı akut koroner sendrom (AKS), pulmoner emboli (PE), akut böbrek yetmezliği (ABY) bulunan hastalar ve yeterli laboratuvar verilerine ulaşılamayan hastalar çalışmaya alınmamıştır.

Kayıtlara Ulaşma

Hastanemiz etik kurulundan aldığımız onayla, acil serviste akut iskemik inme ve geçici iskemik atak (GİA) tanısı alan hastaların dosyalarına ulaşabilmek amacıyla Medipol Mega Üniversitesi İstatistik Bürosundan uluslararası hastalık sınıflaması (ICD-10) kodlama sistemine göre G45 (Geçici serebral iskemik ataklar ve bununla ilgili sendromlar), G46 (Serebrovasküler Hastalıklarda Beynin Vasküler Sendromları), G46.8 (Serebrovasküler Hastalıklarda Beynin Diğer Vasküler Sendromları), I67.(Serebrovasküler Hastalıklar, Diğer), I67.8 (Serebrovasküler Hastalıklar Diğer, Tanımlanmış), I67.9 (Serebrovasküler Hastalık, Tanımlanmamış), I68 (Serebrovasküler Bozukluklar, Başka Yerde Sınıflanmış Hastalıklarda), I68.8 (Serebrovasküler Bozuklukları Diğer, Başka Yerde Sınıflanmış Hastalıklarda), I69 (Serebrovasküler Hastalık Sekeli), I69.8 (Serebrovasküler Hastalıkların Sekelleri Diğer Ve Tanımlanmamış) tanı kodlarını alan hastaların protokol numaraları alındı. Bu protokol numaraları sayesinde Hastane Bilgi Yönetim Sistemleri'nden (HBYS) hastaların dosyalarına ulaşıldı. Dışlama kriterleri uygulandıktan sonra toplam 152 akut iskemik inme ve GİA hastasına ulaşıldı.

Verilerin toplanabilmesi amacıyla veri toplama formu oluşturuldu. Veri toplama formuna demografik özellikleri, bilinen sistemik hastalıkları, alışkanlıkları, fizik muayene bulguları, geliş vital bulguları, laboratuvar sonuçları, TOAST sınıflamasına göre alt grupları, şikayet başlangıcından itibaren acil servise başvurma zamanı, acil serviste klinik sonlanma durum bilgileri kaydedildi.

Çalışma

Tam kan sayımı Sysmex XT 2000İv (Sysmex Corporation, Kobe, Japan) hemogram analiz cihazı ile çalışıldı. MPR; MPV'nin platelete oranı, NLR; nötrofilin lenfosite oranı, PLR; plateletin lenfosite oranı, WMR ise; WBC'nin MPV'ye oranı olarak hesaplandı. İskemik inme TOAST sınıflamasına göre alt gruplara ayrıldı. TOAST sınıflamasına göre iskemik inme ve GİA hastalarının hematolojik parametreleri değerlendirildi.

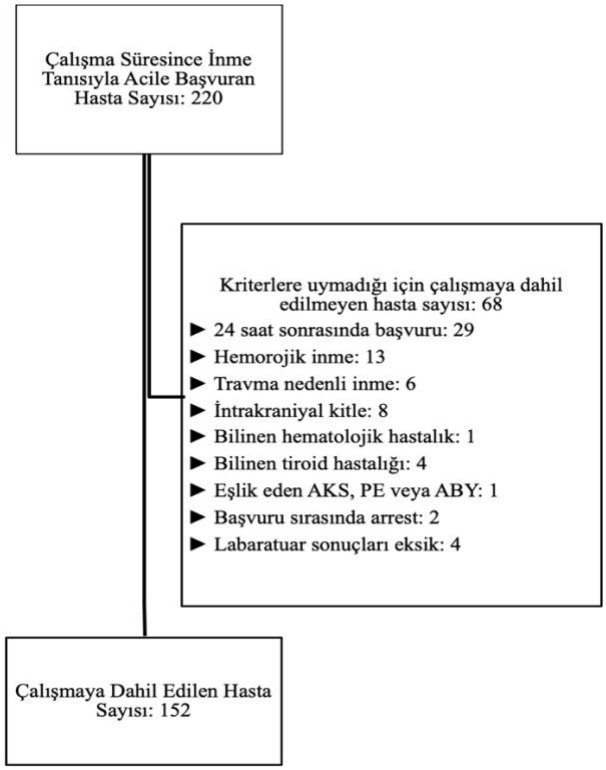
İstatistiksel Yöntemler

Tüm analizler IBM SPSS (Statistical Package for the Socia lSciences) Staticstics v21 (SPSS Inc., Chicago, IL, USA) programında yapıldı. Nicel değişkenlerin normal dağılıma uygunluk kontrolü Shapiro Wilk testi ile yapıldı. Normal dağılıma uygun olan değişkenlerin cinsiyet veya yaş gruplarına göre karşılaştırılması bağımsız örneklemlerde t testi ile yapılırken, normal dağılıma uygun olmayan değişkenlerin karşılaştırılması Mann Whitney U testi ile yapıldı. Normal dağılıma uygun olan değişkenlerin TOAST sınıflamasına göre değerlendirilmesi tek yönlü varyans analizi (ANOVA) ile yapıldı. İkili karşılaştırmalar için Tukey testinden faydalanıldı. Normal dağılıma uygun olmayan değişkenlerin TOAST sınıflamasına göre değerlendirilmesi Kruskal Wallis testi ile yapılırken ikili karşılaştırmaları Dunn's testi ile yapıldı. Kategorik değişkenlerin gruplar arası karşılaştırmalarında Pearson ki-kare testi, Yates düzeltmeli ki-kare testi ve Fisher'in kesin testinden faydalanıldı. Nicel değişkenler arası ilişkinin incelenmesinde normal dağılıma uygunluk durumuna göre Pearson ve Spearman korelasyon katsayılarından faydalanıldı. Nicel değişkenler tablolarda ortalama ± std (standart sapma) ve medyan aralık (maksimum-minimum), kategorik değişkenler ise n (%) olarak gösterildi. Değişkenlerin yoğun bakım ünitesine yatış

durumunu öngörmedeki performans ölçülerini hesaplanması için ROC (Receiver Operating Characteristic) eğrileri analizinden faydalanıldı. Değişkenler %95 güven aralığında incelenmiş olup P ≤ 0,05 değerleri istatistiksel olarak anlamlı kabul edildi.

Bulgular

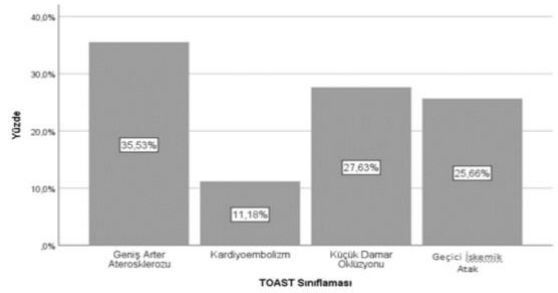
Çalışma süresince acil servise başvuran inme ve GİA tanısı alan 220 hastadan 152 hasta çalışmaya dahil edildi (Şekil-1).



Şekil 1. Hasta Akış Şeması

152 hastanın 97'si (%63,8) erkek ve 55'i (%36,2) kadın idi. Hastaların yaş ortalaması 64,38 ± 13,69 (25-94 yıl) olarak saptandı. Erkeklerde yaş ortalaması 61,42 ± 13,91 iken, kadınlarda ise 69,58 ± 11,71 saptandı. Kadın hastaların yaşları erkek hastalara göre istatistiksel olarak yüksek bulundu (p<0,001). Yetmiş dört hasta (%48,68) 65 yaş altı grubunda yer alırken, 78 hastanın (%51,32) 65 yaş ve üstü grubunda yer aldığı görüldü. Hastaların semptom başlangıcından itibaren acil servise ortalama başvuru saati 6,01 ± 6,38 saat olarak saptandı.

TOAST alt grupları arasında en sık 54 hasta (%35,53) ile geniş arter aterosklerozu saptanırken, 42 hasta (%27,63) ile küçük damar oklüzyonu 2. sırada yer aldı. GİA tanısı alan hasta sayısı ise 39 saptandı (%25,66) (Şekil-2).



Şekil 2. TOAST Sınıflamasına Göre İskemik İnme ve GİA Hastaların Dağılımı

Geçici iskemik atak sınıfındaki hastaların MCHC değerleri geniş arter aterosklerozu ve küçük damar oklüzyonu sınıflarına göre daha yüksek olarak bulundu (p=0,029). Geniş arter aterosklerozu sınıfındaki hastaların PDW değerleri GİA sınıfındaki hastalara göre daha yüksek olarak bulundu (p=0,009). Geniş arter sklerozu sınıfındaki hastaların MPR değerleri küçük damar oklüzyonu ve GİA sınıflarına göre daha düşük olarak saptandı (p=0,005) (Tablo 1). Diğer tam kan sayımı ölçüleri, NLR, PLR ve WMR değerleri için TOAST alt grupları ve GİA sınıfı arasında istatistiksel olarak farklılık gözlenmedi.

	TOAST	n	Ortalama	Std Sapma	Ortanca	En Küçük	En Büyük	P
MCHC	Geniş Arter Aterosklerozu	54	32,77	1,42	32,70	28,10	35,30	**0,029**
	Kardiyoembolizm	17	33,06	1,82	33,30	29,70	36,80	
	Küçük Damar Oklüzyonu	42	32,76	1,44	32,75	30,10	36,20	
	Geçici İskemik Atak	39	33,59	1,21	33,30	31,60	36,90	
PDW	Geniş Arter Aterosklerozu	54	11,74	2,13	11,15	8,80	17,90	**0,009**
	Kardiyoembolizm	17	10,63	4,32	11,80	0,00	17,60	
	Küçük Damar Oklüzyonu	42	12,66	2,05	12,45	9,20	17,10	
	Geçici İskemik Atak	39	12,69	1,80	12,20	10,70	18,30	
MPR	Geniş Arter Aterosklerozu	54	0,043	0,016	0,039	0,014	0,091	**0,005**
	Kardiyoembolizm	17	0,040	0,020	0,041	0,000	0,076	
	Küçük Damar Oklüzyonu	42	0,053	0,021	0,047	0,031	0,139	
	Geçici İskemik Atak	39	0,053	0,020	0,047	0,024	0,114	

Tablo 1. Hematolojik Parametreler ile TOAST Sınıflamasına Göre İskemik İnme ve GİA Hastaları Arasındaki İlişki

Hastaların tam kan sayımı parametrelerinin ve PLR, NLR, WMR, MPR değerlerinin ortalama, standart sapma, ortanca, en küçük ve en büyük değerleri hesaplandı. PLR, NLR, WMR ve MPR'nin ortalama değerleri sırasıyla 135,437 ± 94,360; 3,861 ± 4,891; 871,269 ± 317,924; 0,048 ± 0,020 olarak bulundu (Tablo 2).

	n	Ortalama	Std Sapma	Ortanca	En Küçük	En Büyük
WBC	152	8,85	3,23	8,03	0,21	20,93
RBC	152	4,69	0,60	4,67	2,92	6,19
HGB	152	13,17	1,79	13,10	8,40	17,40
HCT	152	39,85	4,69	39,70	25,30	51,10
MCV	152	85,28	6,08	85,35	60,50	108,40
MCH	152	28,19	2,34	28,50	19,80	35,50
MCHC	152	33,01	1,45	33,00	28,10	36,90
PLT	152	234,00	82,50	230,00	3,00	627,00
RDW	152	14,20	1,63	13,80	12,00	22,50
PDW	152	12,12	2,45	12,00	0,00	18,30
MPV	152	10,10	1,47	10,10	0,00	12,60
PCT	152	0,24	0,08	0,23	0,00	0,55
MPR	152	0,048	0,020	0,045	0,000	0,139
NLR	152	3,861	4,891	2,512	0,231	48,739
PLR	152	135,437	94,360	112,457	18,750	831,111
WMR	152	871,269	317,924	797,012	237,500	2250,538

Tablo 2. Araştırma Grubundaki Hastaların Hematolojik Parametreleri

Tüm hastalarımıza BBT ve MRG çekilmiş olup; 66'sında (%43,42) BBT bulgusu mevcut iken, 114 (%75,00) hastada MRG bulgusu mevcut idi. Hem BBT hem de MRG bulgusu olan hasta sayısı 65 (%42,76) olarak saptandı.

	r	p
WBC	0,243	**0,017**
RBC	-0,041	0,688
HGB	-0,017	0,866
HCT	0,004	0,968
MCV	0,036	0,731
MCH	-0,021	0,837
MCHC	-0,137	0,182
PLT	0,241	**0,018**
RDW	0,104	0,315
PDW	-0,030	0,773
MPV	-0,033	0,751
PCT	0,247	**0,015**
Nötrofil	0,174	0,090
Lenfosit	0,065	0,528
Monosit	0,216	**0,034**
Eozinofil	0,069	0,506
Bazofil	-0,017	0,866
% Nötrofil	0,071	0,492
% Lenfosit	-0,110	0,286
% Monosit	-0,014	0,892
% Eozinofil	0,013	0,901
%Bazofil	-0,138	0,180
MPR	0,174	**0,030**
NLR	0,051	0,619
PLR	0,120	0,243
WMR	0,242	**0,019**

Tablo 3. Hematolojik Parametreler ile Yatış Süreleri Arasındaki İlişki

Hastaların klinik sonlanımları değerlendirildiğinde 71 hasta servis şartlarında, 25 hasta ise yoğun bakım şartlarında takip edildi. 47 hasta servis yatışı önerildiği halde tedavi red vererek hastaneden ayrıldı. 4 hasta dış merkez yoğun bakım ünitesine sevk edildi, 5 hasta taburcu edildi. Hastanede yatışı olan hastalardan YBÜ'de takip edilen 3 hasta ölümü olduğundan mortalite hesaplanamadı. Hastanede ortalama yatış süresi 5,85 ± 6,50 gün olarak bulunurken, en uzun yatış süresi 45 gün olarak bulundu.

Yatış süreleri ile WBC, platelet, PCT, Monosit ve WMR değerleri arasında pozitif (doğrusal) ilişki saptanırken; yatış süreleri ile MPR değeri arasında negatif (ters) ilişki saptandı (Tablo 3).

Yoğun bakım ünitesinde takip edilen hastaların WBC (p=0,002), nötrofil (p=0,002), monosit (p=0,016) ve WMR (p=0,001) değerleri servis hastalarına göre istatistiksel olarak yüksek bulundu. MPR değeri yoğun bakım ünitesinde takip edilen hastalarda servis hastalarına göre daha düşük saptandı (p=0,003) (Tablo 4).

Yoğun Bakım Ünitesine yatışı öngörmede hematolojik parametrelerin performans ölçüleri incelendiğinde en yüksek oran WMR değişkeninde olmakla birlikte WBC, nötrofil, monosit, MPR'de istatistiksel olarak anlamlı sonuçlara ulaşıldı (Tablo 5). WMR değişkeninde 818 kesim noktası için duyarlılık %77,8 seçicilik % 63,6 ve doğru sınıflama oranı % 66,2 olarak bulundu (p=0,001) (Şekil 3).

Tartışma

Son yıllarda dünya çapında 2. sıklıktaki ölüm nedeni olan inmelerin mortalite ve morbiditesini öngörmek amacıyla klinik bulgular, skorlama sistemleri, biyokimyasal belirteçler ve görüntüleme yöntemleri ile bir takım çalışmalar yapılmıştır. Biz de iskemik inme ve GİA ile acil serviste tam kan sayımı ile elde edilen basit, hızlı ve ucuz olan hematolojik parametreler arasındaki ilişkiyi araştırdık.

Yaş, iskemik serebrovaküler hastalık (SVH) için önemli bir risk faktörüdür. SVH geçirenlerin yaklaşık %70'inin 65 yaş üzerinde olduğu bildirilmiştir (16). Dogan ve ark. (17) iskemik inme ve GİA hastalarında yaptıkları çalışmada yaş ortalaması 67,7 ve %52,4 oranıyla erkek cinsiyet oranı daha fazla tespit edilmiştir. Buna benzer olarak Arıkanoğlu ve ark (18) çalışmalarında yaş ortalaması 64 olarak bulunmuştur. Çalışmamızda hastalarımızın yaş ortalaması 64,38 ve erkek cinsiyet oranımız %63,8 olup literatürdeki çalışmalarla uyumluydu. Kadın hastaların yaşları erkek hastalara göre istatistiksel olarak yüksek bulundu, 65 yaş ve üstü grubunda kadın hastaların erkeklere göre daha fazla yer aldığı saptandı ve yapılan çalışmalarla uyumluydu (19) (20).

Çalışmamızda geniş arter aterosklerozu sınıfındaki hastaların MPR değerleri küçük damar oklüzyonu ve GİA sınıflarına göre daha düşük olarak saptandı. Ayrıca YBÜ'de takip edilen hastalarda servis hastalarına göre daha düşük MPR değeri saptandı. Yatış süreleri ile MPR değeri arasında negatif (ters) ilişki saptandı. MPR ile iskemik inme ilişkisini araştıran çalışmalar çok az sayıda ve nöroloji bölümünce yapılmış olup, bildiğimiz kadarıyla acil servisten hasta yatışını öngörme, yatış süreleri ile ilgili çalışmalar mevcut değildir. Ancak var olan iki çalışmadan biri olan Lim HH. ve ark.nın (21) iskemik inmeli hastalarda yaptıkları prospektif bir çalışmada MPR oranı hem ilk başvuruda hem de 3 ay sonra istatistiksel olarak anlamlı sonuçlar göstermiştir. Elsayed ve ark.nın (22) yaptıkları çalışmada ise 50 akut iskemik inme hastasında kontrol grubuna (20 kişi) göre anlamlı olarak yüksek MPR düzeyi bulunmuştur.

İskemik inme hastaları ile yapılan çalışmalarda yaygın olarak erken dönem mortalite yüksek NLR değerleri ile ilişkili bulunmuştur (11) (12) (13). Yapılan başka çalışmalarda NLR'nin iskemik inmeli hastalıklarda kötü prognozu öngördüğü saptanmıştır (23) (24). Bizim çalışmamızda NLR ile gerek TOAST alt sınıfları ve GİA arasında gerekse de yatışı ön görme ve yatış süresi üzerinde istatistiksel olarak farklılık saptanmadı. Mortalite için hasta sayımız yeterli olmadığından mortalite ile olan ilişkisini değerlendiremedik. PLR'nin genel olarak iskemik olaylarla (akut koroner sendrom) ilişkisinin araştırıldığı birkaç çalışma vardır ve henüz iskemik olaylarla ilişkisi tam olarak netleşmemiştir (25-26). Altıntaş ve ark.nın (14) iskemik inmeli hastalarda yaptığı retrospektif çalışmada yüksek PLR'nin, akut iskemik inme hastalarında kötü prognoz ile ilişkili olduğu görülmüştür. PLR iskemik inme ilişkisiyle ilgili yapılan çalışma çok azdır. Bizim çalışmamızda PLR ile gerek TOAST alt sınıfları ve GİA arasında gerekse de yatışı ön görme ve yatış süresi üzerinde istatistiksel olarak farklılık saptanmadı.

WMR'nin kardiyak iskemi ile ilişkisini araştıran, yakın zamanda NSTEMI hastalarda uzun dönem sonuçları öngören

		N	Ortalama	Std Sapma	Ortanca	En Küçük	En Büyük	P
WBC	Servis	118	8,43	2,65	7,73	2,47	17,65	**0,002**
	YBÜ	29	10,50	4,74	9,33	0,21	20,93	
MPV	Servis	118	10,24	0,88	10,20	8,30	12,30	0,107
	YBÜ	29	9,36	2,74	9,80	0,00	11,70	
Nötrofil	Servis	118	5,41	2,35	4,81	1,20	14,49	**0,002**
	YBÜ	29	7,33	3,61	6,29	1,70	17,25	
Monosit	Servis	118	0,69	0,32	0,66	0,03	2,29	**0,016**
	YBÜ	29	0,93	0,52	0,83	0,04	2,19	
MPR	Servis	118	0,050	0,019	0,046	0,016	0,139	**0,003**
	YBÜ	29	0,039	0,018	0,037	0,000	0,084	
NLR	Servis	118	3,609	4,853	2,475	0,231	48,739	0,072
	YBÜ	29	4,958	5,244	2,924	0,914	26,250	
PLR	Servis	118	137,166	102,389	108,380	41,119	831,111	0,548
	YBÜ	29	130,110	60,552	120,988	18,750	242,085	
WMR	Servis	118	829,799	273,896	764,986	237,500	1782,828	**0,001**
	YBÜ	29	1058,592	433,752	950,000	353,043	2250,538	

Tablo 4. Hematolojik Parametreler ile Servis veya YBÜ'ye Yatış İlişkisi

yeni bir non invaziv belirteç ve STEMI hastalarında bağımsız mortalite belirleyicisi olduğunu gösteren az sayıda çalışma bulunmaktadır (15) (27). Bildiğimiz kadarıyla WMR ile iskemik inme ilişkisini araştıran bir çalışma yapılmamıştır. Çalışmamızda YBÜ'de takip edilen hastaların WMR değerleri servis hastalarına göre istatistiksel olarak yüksek bulundu. Yatış süreleri ile WMR değerleri arasında pozitif (doğrusal) ilişki saptandı. Yoğun bakım ünitesine yatışı öngörme başarısı değerlendirildiğinde ise WMR değişkeninde 818 kesim noktası için duyarlılık %77,8 seçicilik %63,6 ve AUC değeri 0,699 ± 0,056 bulundu (p=0,001). İskemik inme tanısı alan hastaların acil servisten YBÜ veya kliniğe yatışı öngörmede WMR değişkeninin diğer parametrelere göre daha iyi olduğunu saptadık.

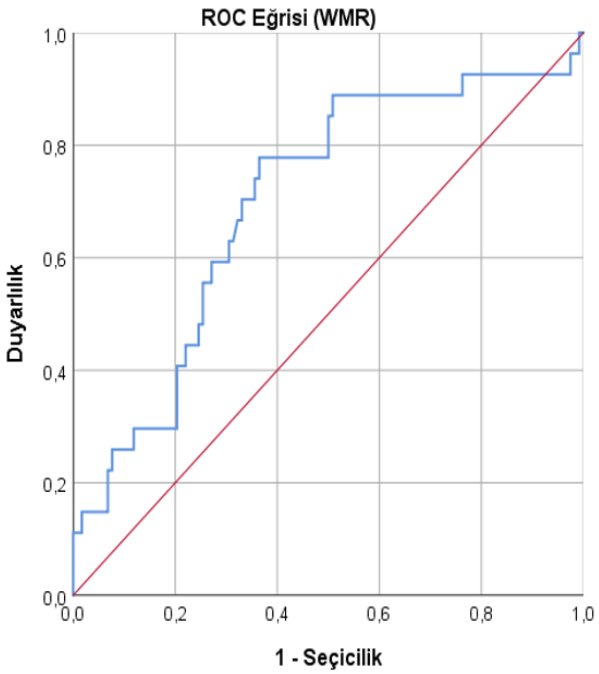
Ren H. ve ark.nın (28) iskemik inmeli hastalarda yaptıkları çalışmada, yüksek monosit sayısının kötü prognoz için bağımsız bir risk faktörü olduğu tespit edilmiştir. Liberal L ve ark.nın (29) çalışmasında da yüksek monosit sayısının kötü prognoz için bağımsız risk faktörü olduğu tespit edilmiştir. Bizim çalışmamızda ise YBÜ'de takip edilen hastaların monosit değerleri servis hastalarına göre istatistiksel olarak yüksek bulundu. Yatış süreleri ile monosit değerleri arasında pozitif (doğrusal) ilişki saptandı. Yoğun bakım ünitesine yatışı öngörme başarısı değerlendirildiğinde monosit değişkeninde 0,73 kesim noktası ile duyarlılık % 69,0 seçicilik % 61,9 ve AUC değeri 0,644 ± 0,065 olarak bulundu (p=0,016). WMR değişkeni kadar olmasa da acil servisten YBÜ'ye yatışı öngörme gücünün yüksek olduğunu saptadık.

Çalışmamızın birkaç kısıtlığı bulunmaktadır. Birincisi tek merkez de yapılması diğeri ise retrospektif olmasıdır. Geriye dönük bir çalışma olması nedeniyle kontrol grubumuzun olmaması da bir kısıtlılık olarak ifade edilebilir. Mortalite sayısı yeterli olmadığı için hematolojik parametrelerin mortalite ile ilişkisi incelenememiştir.

Sonuç olarak acil servisten yoğun bakım ünitesine yatışı öngörmede WMR başta olmak üzere monosit, nötrofil, WBC ve MPR'nin kullanılabileceğini düşünmekteyiz. Ancak, özellikle hem WMR hem de MPR ile iskemik inme arasındaki ilişkinin araştırılması için çok merkezli, prospektif, hasta sayısının fazla olduğu farklı hasta grupları üzerinde yapılacak çalışmalara ihtiyaç vardır.

	Kesim Noktası	Duyarlılık	Seçicilik	Doğru Sınıflama Oranı	ROC Eğrisi Altında Kalan Alan	p
WBC	> 8,85	69,0%	65,3%	66,0%	0,682 ± 0,058	0,002
Nötrofil	> 5,78	65,5%	70,3%	69,4%	0,690 ± 0,055	0,002
Monosit	> 0,73	69,0%	61,9%	63,3%	0,644 ± 0,065	0,017
MPR	< 0,042	65,5%	64,4%	64,6%	0,679 ± 0,059	0,003
WMR	> 818	77,8%	63,6%	66,2%	0,699 ± 0,056	0,001

Tablo 5. Yoğun Bakım Ünitesine Yatışı Öngörmede Hematolojik Parametrelerin Performans Ölçüleri



Şekil 3. WMR Değeri İçin ROC Eğrisi Analizi

Çıkar Çatışması: Yazarlar çıkar çatışması beyan etmemiştir.

Finansan Destek: Yazarlar finansal destek beyan etmemiştir.

Yazar Katkısı: Tüm yazarlar makalenin hazırlanmasında eşit katkıda bulunmuştur.

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ORIGINAL ARTICLE / ÖZGÜN ARAŞTIRMA MAKALESİ

Retrospective Analysis of the Oldest-Old Patients Who Applied to the Emergency Department and Their Differences from the Young-Old And Middle-Old

Acil Servise Başvuran İleri-Yaşlı Hastaların Retrospektif Analizi ve Genç-Yaşlı ve Orta-Yaşlılardan Farklılıkları

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ABSTRACT

Aim: Our study examined young, middle, and oldest-old patients who visited the emergency department (ED) and their differences.

Material and Methods: The research was executed retrospectively, utilizing the medical data of patients aged 65 and over who applied to the ED of a research hospital in Kayseri for the two years between January 1, 2020, and December 31, 2021. The patients were young-old, between 65 and 74 years old; aged 75 to 84 were middle-old, and those aged 85 and over were classified as oldest-old.

Results: 84415 (13.7%) older patients visited the ED during the study period. The patients' median age was 74 years, IQRs (69- 80) and 53.9% (n=45466) were female. 53.4% of the patients were young-old, 33.4% middle-old, and 13.2% were oldest-old. 7.2% (n=6060) of the hospitalized patients were admitted to the intensive care unit, and 7.8% (n=1719) died. Among the first three reasons for admitting the patients to the ED, 20% (n=16874) had COVID-19, 14.4% (n=12131) had gastrointestinal symptoms, and 13.9% (n=11718) had circulatory system symptoms. Oldest-old patients were brought to the ED by ambulance more (38.4% vs. 50.9% vs. 63.2% p< 0.001), stayed longer in the ED (81 vs. 103 vs. 116 minutes, p<0.001), fewer discharged (76.2% vs. 69.5% vs. 66%, p<0.001) and a higher in-hospital mortality rate (6% vs. 8.1% vs. 12.4% p<0.001).

Conclusıon: We found that the length of stay in the ED, hospitalization rate, and ED and hospital mortality increased with age and were higher in oldest-old patients. We think that emergency health services should be developed according to the groups of elderly patients.

Keywords: Aged, patient outcome assessment, emergency medicine

ÖZ

Amaç: Çalışmamızda acil servise (AS) başvuran genç, orta ve ileri yaşlı hastaları ve farklılıklarını incelemeyi amaçladık.

Gereç ve Yöntemler: Çalışma 1 Ocak 2020 ile 31 Aralık 2021 arasındaki 2 yıllık dönemde Kayseri'de bir araştırma hastanesinin AS' e başvuran 65 yaş ve üzeri hastaların tıbbi kayıtları kullanılarak geriye dönük olarak yapıldı. Hastalar 65 ile 74 yaş arasında genç-yaşlı; yaşları 75 ile 84 arasında olanlar orta yaşlı; 85 yaş ve üzerinde olanlar ileri-yaşlı olarak sınıflandırıldı.

Bulgular: Çalışma süresi boyunca 84.415 (%13,7) yaşlı hasta AS' e başvurdu. Hastaların yaş ortancası 74 yıl, ÇAA (69- 80) ve %53.9' u (n=45466) kadındı. Hastaların %53,4' ü genç-yaşlı, %33,4 orta-yaşlı ve %13,2' si ileri-yaşlı idi. Hastaneye yatan hastaların %7,2' sinin (n=6060) yoğun bakıma yattığı ve %7,8' inin (n=1719) öldüğü tespit edildi. Hastaların acil servise başvuru nedenlerinde ilk üç sırada %20 ile (n=16874) COVID-19, %14,4' ünün (n=12131) ile gastrointestinal sistem, %13,9 ile (n=11718) dolaşım sistemi semptomları vardı. İleri-yaşlı hastaların AS' e daha fazla ambulans ile geldiği (%38,4 vs %50,9 vs % 63,2 p<0,001), AS' de daha uzun süre kaldığı (81 vs 103 vs 116 dakika, p<0.001), daha az taburcu edildiği (%76,2 vs %69,5 vs %66, p<0.001) ve hastane içi ölüm oranın daha fazla olduğu (%6 vs %8,1 vs %12,4 p<0.001) bulundu.

Sonuç: AS kalış süresi, hastaneye yatış oranı ve AS ve hastane mortalitesinin yaşla birlikte arttığını ve ileri-yaşlı hastalarda daha yüksek olduğunu bulduk. Acil sağlık hizmetlerinin yaşlı hasta gruplarına göre geliştirilmesi gerektiğini düşünüyoruz.

Anahtar Kelimeler: Yaşlı, hasta sonuçlarının değerlendirilmesi, acil tıp

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Introduction

Because of the increase in the older population (65 years and over) worldwide and these patients need health services more frequently, it is a significant challenge for the emergency departments (ED). According to the United States census data, it is estimated that by 2030, approximately 20 percent of the total population will be over 65, which will be about 77 million (1). In Turkey, the older population increased by 17% in 2016 compared to 2012 and reached approximately 6.7 million. The proportion of the elderly society to the whole community has risen from 7.5% to 8.3% (2).

The rise in the older population brings important concomitant diseases such as diabetes, coronary artery disease, chronic obstructive pulmonary disease, and cancer. As a result, it increases health services, especially EDs. Various studies showed that elderly patients in the EDs are growing. These studies were generally conducted on patients over 65 years, and this patient group was not grouped. (3, 4). The studies have stratified the elderly population as young-old (65-74 years), middle-old (75-84 years), and oldest-old (85 years and older) (5). In Turkey, in 2016, 61% of the elderly were young-old, 30% were middle-old, and 8% were oldest-old (2).

We aimed to investigate the trends of patients aged 85 and over who visited the ED in two years in our tertiary hospital, which serves as a pandemic and regional hospital and compare them with those of the young and middle-old. And the difference of our study from other studies was that studies conducted in Turkey examined the elderly patients in a single group aged 65 and over.

Material and Methods:

Study group

Our study was retrospective; we used the medical data of elderly patients who visited the ED of a research hospital in Turkey over two years, from January 1, 2020, to December 31, 2021. Our study included patients aged ≥ 65 with medical problems who visited the ED. We only excluded the patients who visited at ED due to out-of-hospital cardiopulmonary arrest (dead on arrival). We classified the patients as young-old, aged 65 to 74; middle-old aged 75 to 84; oldest-old, aged 85 and over. We gathered data on age, gender, the ED visit' reasons, transport and route of the visit to ED, ED outcome, hospitalization department, hospital outcome, and length of stay (LOS) in the ED and hospital. ED outcome was classified as discharge, hospitalization, death, referral, leaving the ED without permission, and treatment refusal. We recorded the hospitalization site as an intensive care unit (ICU) or ward.

We used the International Classification of Diseases 10 (ICD-10) codes to identify the ED visit's reason. According to ICD-10 codes, the reasons for elderly patients' emergency room visits are gastrointestinal, cardiovascular, and respiratory systems, etc., classified as complaints. For example, we ranked abdominal pain, diarrhea, and constipation as the gastrointestinal system, chest pain, and palpitation as the cardiovascular system, shortness of breath, cough, and hemoptysis as the pulmonary system.

Statistical analysis

We used the IBM SPSS (version 26) program and summarized the categorical data as frequency and percentage, continuous data with normal distribution as mean value ± standard deviation, and non-normally distributed data as median 25%-75% interquartile range (IQR). After performing the normal distribution test (Kolmogorov-Smirnov) of continuous variables, the Kruskal Wallis test was used to compare more than two groups of variables incompatible with the normal distribution. The Chi-square test was used to compare categorical variables. We considered the p-value <0.05 as statistically significant.

Ethical approval

The Kayseri City Hospital Ethics Committee approved our study (Approval no: 434, approval date: 01.07.2021). We waived the informed consent form because the study was retrospective.

Results

Demographic characteristics of elderly patients

During the 2-year study period, 613686 patients, 84415 (13.7%) of whom were 65 years and older, visited the ED.

The patients' median age was 74, IQRs (69- 80) (min: 65, max: 122) years. 53.9% (n=45466) of the patients were women. 53.4% (n=45063) of the patients were young-old, 33.4% (n= 28233) were middle-old, and 13.2% (n= 11119) were oldest-old. It was found that 45.8% (n=38687) of the patients came to the ED by ambulance. 26% (n=21942) of patients were hospitalized, 0.6% (n=466) were referred to another hospital, and 0.3% (n=256) died. The first three reasons for visiting the ED were COVID-19 with 20% (n=16874), gastrointestinal symptoms with 14.4% (n=12131), and circulatory system symptoms with 13.9% (n=11718). 7.2% (n=6060) of the hospitalized patients were admitted to the ICU, and 7.8% (n=1719) died. The median LOS in the ED was 94 minutes, IQRs (19-168) (min: 5, max: 2158). The median LOS of the hospital was four days of IQRs (1-8) (min: 1-119).

Distribution of variables by age groups

According to age category, the rate of female patients was 51.2% in the young-old and 58.3% in the oldest-old. Conversely, the rate of the male was 48.8% in the young-old, while it was 41.7% in the oldest-old (p < 0.001) (Table 1).

Regarding the arrival at the ED, the oldest-old patients used ambulance more frequently (38.4% vs. 50.9% vs. 63.2% p< 0.001) (p <0.001) (Table 1).

Oldest-old patients fewer discharged (76.2% vs. 69.5% vs. 66%, p<0.001) and a higher mortality rate in the ED (0.2% vs. 0.4% vs. 0.5%, p <0.001) (Table 1) (Graphic 1).

While the admission rate to ICU was 32.4% for the oldest-old, it was 26.6% for the middle-old and 26.7% for the young-old (p <0.001). Oldest-old patients had a higher in-hospital mortality rate (6% vs. 8.1% vs. 12.4% p<0.001) (Table 1).

Oldest-old patients had higher LOS in the ED (81 vs. 103 vs. 116 minutes, p<0.001). We found no crucial statistical difference among age categories regarding the LOS in the hospitals (p=0.053) (Table 1).

The main reasons for admitting the elderly patients to the ED, first three were COVID-19 (20%), gastrointestinal (14.4%), and circulation (13.9%) systems.

Significantly, the rate of oldest-old patients admitted to ED for COVID-19 was statistically significantly higher (17% vs. 22.8% vs. 25%, p<0.001) (Table 2).

	n (%)				
	Young-old (65-74)	**Middle-old (75-84)**	**Oldest-old (≥85)**	**Total**	**p value**
Gender					
Female	23077 (51.2)	15902 (56.3)	6487 (53.9)	45466 (53.9)	< 0.001
Male	21986 (48.8)	12331 (43.7)	4632 (41.7)	38949 (46.1)	
Type of visit to ED					
Ambulance	17301 (38.4)	14364 (50.9)	7022 (63.2)	38687 (45.8)	< 0.001
Ambulatory	27762 (61.6)	13869 (49.1)	4097 (36.8)	45728 (54.2)	
ED outcome					
Discharge	34334 (76.2)	19618 (69.5)	7338 (66)	61290 (72.6)	< 0.001
Admission	10099 (22.4)	8226 (29.1)	3617 (32.5)	21942 (26)	
Leave without permission	89 (0.2)	0 (0)	1 (0)	90 (0.1)	
Referral	238 (0.5)	161 (0.6)	67 (0.6)	466 (0.6)	
Refuse treatment	205 (0.5)	123 (0.4)	43 (0.4)	371 (0.4)	
In-ED death	98 (0.2)	105 (0.4)	53 (0.5)	256 (0.3)	
Admission to					
Ward	7402 (73.3)	6034 (73.4)	2446 (67.6)	15882 (72.4)	< 0.001
ICU	2697 (26.7)	2192 (26.6)	1171 (32.4)	6060 (27.6)	
Admission Department					
Surgical ward	1344 (13.3)	1051 (12.8)	503 (13.9)	2898 (13.2)	< 0.001
Internal medicine ward	2046 (20.3)	1624 (19.7)	626 (17.3)	4296 (19.6)	
Pandemic ward	4012 (39.7)	3359 (40.8)	1317 (36.4)	8688 (39.6)	
Surgical ICU	323 (3.2)	284 (3.5)	137 (3.8)	744 (3.4)	
Internal medicine ICU	1179 (11.7)	715 (8.7)	307 (8.5)	2201 (10)	
Pandemic ICU	1195 (11.8)	1193 (14.5)	727 (20.1)	3115 (14.2)	
Hospital outcome					
Discharge	9493 (94)	7560 (91.9)	3170 (87.6)	20223 (92.2)	< 0.001
In-hospital death	606 (6)	666 (8.1)	447 (12.4)	1719 (7.8)	
		Median (IQRs)			
LOS in ED, minutes	81 (15- 154)	103 (40- 179)	116 (60-191)	94 (19-168)	<0.001*
LOS in hospital, days	4 (1-8)	4 (1-8)	4 (1-8)	4 (1-8)	0.053*

*p= Kruskal Wallis test
The chi-square test was used for the calculation of other p values.
ED= Emergency department, ICU= Intensive care unit, LOS= Length of stay

Table 1. Demographic characteristics of elderly patients who visited the ED

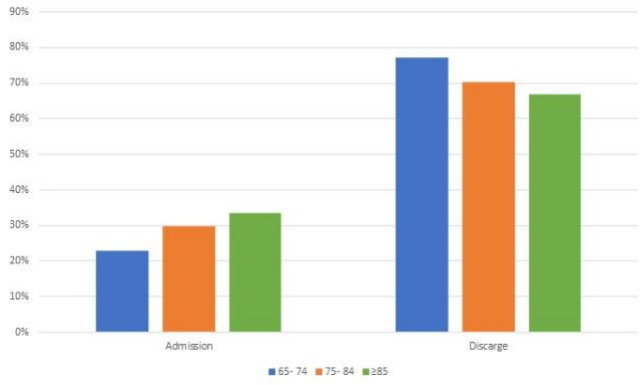

Figure 1. Admission and discharge rates of elderly patients

Discussion

The elderly population is increasing rapidly in the world and Turkey. Within the Organization for Economic Cooperation and Development, Turkey is a younger country with a 9.3% oldest age population in 2022 compared to countries such as Japan, Italy, and Germany, which have an elderly population of over 20% (6). In the province of Kayseri, where our study was conducted, the total population was 1376722 in 2017, according to TUIK data. According to the data, 8.5% of the total population belonged to older adults aged 65 and over, corresponding to approximately 118 thousand older people (2). Between 2014 and 2017, according to the US Department of Health and Human Services data, patients aged 60 and over visited the ED rate was 20% of all ED visits. The ED visit rate increased with age; for every 100 older people, 43 ED visits occurred. At the same time, 34 visits per 100 persons aged 60-69 years and 86 per 100 persons aged 90 and over happened (7). Elderly patients comprised 13.7% of the ED visits in 2020 and 2021 when our study was conducted, corresponding to 42 thousand elderly patients annually. Approximately 35% of our research's elderly population applied to the ED. We think that this rate is high for Turkey with a young population.

Studies showed that visits to the ED in elderly female patients increase with age (5). In our research, female patients were higher numbers. Women constituted 53.9% of all elderly patients, and the rate of female patients was higher than male patients in the young-old, middle-old, and oldest-old. Therefore, especially for elderly patients, hospital managers should consider increasing the number of women's services and the number of medical services for women.

In our study, 54.2% of the patients visited the ED by an ambulatory, but using an ambulance was higher for oldest-old patients than young-old (63.2% vs. 38.4%). In studies conducted during the pandemic period, like our study, it was shown that the total number of ED visits decreased in all age groups, and the number of patients arriving by ambulance, especially elderly patients, increased (8–10).

In our study, approximately one-fourth of the elderly were hospitalized, around 30% of the oldest-old patients. A systematic review has shown that elderly patients have a higher rate of arriving at the ED by ambulance and hospitalization. It has been reported that one-third to half of all ED visits by elderly patients result in hospitalization, 2.5 to 4.6 times higher than the hospitalization rate for younger patients (11).

	n (%)				
	Young-old (65-74)	Middle-old (75-84)	Oldest-old (≥85)	Total	p value
Main conditions					
COVID-19	7647 (17)	6445 (22,8)	2782 (25)	16874 (20)	
Gastrointestinal	6350 (14,1)	4028 (14,3)	1753 (15,8)	12131 (14,4)	
Cardiovascular	6156 (13,7)	4064 (14,4)	1498 (13,5)	11718 (13,9)	
Other conditions*	4300 (9,5)	2699 (9,6)	1106 (9,9)	8105 (9,6)	
Respiratory	4526 (10)	2282 (8,1)	643 (5,8)	7451 (8,8)	
Musculoskeletal	4068 (9)	1943 (6,9)	596 (5,4)	6607 (7,8)	
Traumatic injury	3799 (8,4)	2063 (7,3)	959 (8,6)	6821 (8,1)	
Nervous system	3257 (7,2)	1928 (6,8)	715 (6,4)	5900 (7)	
Genitourinary	1652 (3,7)	976 (3,5)	413 (3,7)	3041 (3,6)	
Otorhinolaryngology	687 (1,5)	300 (1,1)	90 (0,8)	1077 (1,3)	
Nephrology	368 (0,8)	281 (1)	114 (1)	763 (0,9)	<0,001
Hematology	350 (0,8)	291 (1)	105 (0,9)	746 (0,9)	
Dermatology	472 (1)	169 (0,6)	56 (0,5)	697 (0,8)	
Infectious diseases	224 (0,5)	190 (0,7)	78 (0,7)	492 (0,6)	
Endocrine and metabolic	219 (0,5)	129 (0,5)	44 (0,4)	392 (0,5)	
Eye	307 (0,7)	110 (0,4)	33 (0,3)	450 (0,5)	
Cardiopulmonary arrest	157 (0,3)	143 (0,5)	74 (0,7)	374 (0,4)	
Mental and behavioral disorders	170 (0,4)	63 (0,2)	25 (0,2)	258 (0,3)	
Intoxication	170 (0,4)	53 (0,2)	21 (0,2)	244 (0,3)	
Gynecology	113 (0,3)	40 (0,1)	9 (0,1)	162 (0,2)	
Oncology	71 (0,2)	36 (0,1)	5 (0,05)	112 (0,1)	

p= The chi-square test

*= weakness, eating disorders, senility, symptoms, signs, and abnormal clinical and laboratory findings, not classified elsewhere

Table 2. Reason for ED visit of elderly patient groups

Elderly patients are at higher risk of hospitalization and death, including atypical clinical complaints, multi-comorbidities, increased frailty, delayed diagnosis, dementia, falls, and multiple drug use (12, 13). In our study, in-hospital mortality was 7.8% in all elderly patients, higher in the oldest-old.

Studies have reported that elderly patients stay longer in the ED, which may be due to the need for more extended consultation and diagnostic testing and the increase in the number of age-related diseases (5). One study showed oldest-old patients stayed in the ED 1.5 hours longer than young-old patients (14). Our research found that LOS in the ED in oldest-old patients was approximately 35 minutes longer than in young-old patients.

Common reasons for the visiting elderly patients to the ED are cardiovascular system disorders (ischemic heart disease, congestive heart failure, syncope, cardiac rhythm disorders), acute cerebrovascular strokes, pneumonia, abdominal pain, urinary tract infections, and fall-related injuries (11). We conducted our study during the pandemic. The most prevalent cause for visiting ED was COVID-19; the most common non-pandemic cause was gastrointestinal system complaints, similar to other studies from Turkey and other countries (15, 16, 17).

Our study had some limitations. First, our study was conducted in a regional hospital in the Kayseri province for two years. Therefore, applying the results to all elderly patients in the country may be challenging due to the region's characteristics, hospital scale, and length of study. Second, this was a retrospective study of medical records, which may contain inaccuracies or insufficient information.

Conclusion

We found that older adults visited the ED most frequently with gastrointestinal system complaints, except for the cause of the COVID-19, and the rate of using ambulances increased with age. The hospitalization of the elderly patient's rate was about a quarter. We found that the LOS in the ED, hospitalization rate, and ED and hospital mortality increased with age and were higher in oldest-old patients. Due to the differences between age groups, we recommend that healthcare services tailored to the needs of older patients be developed and delivered at the national level.

Conflict of Interest: The authors declare no conflict of interest regarding this study.

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Ethical Statement: The Kayseri City Hospital Ethics Committee approved our study (Approval no: 434, approval date: 01.07.2021). We waived the informed consent form because the study was retrospective. All authors declared that they follow the rules of Research and Publication Ethics.

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ORIGINAL ARTICLE / ÖZGÜN ARAŞTIRMA MAKALESİ

Do Really Urgent Cases Present to the Emergency Department: What a Pandemic Has Shown

Gerçekten Acil Olan Olgular mı Acil Servise Başvuruyor: Bir Pandeminin Gösterdikleri

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ABSTRACT

Aim: The COVID-19 pandemic has had significant health and social impacts globally. This study aimed to describe the variance in emergency department admissions during the COVID-19 pandemic and to reveal the profile of patients admitted to the emergency department (ED).

Material and Methods: Data from patients in the ED between 11.03.2020-23.04.2020, which is a period of the pandemic, and 11.03.2019-23.04.2019, which is the non-pandemic period, was retrospectively analyzed. The frequency, demographic and clinical characteristics, and financial costs of patients admitted to the ED in those two periods were compared.

Results: While the ratio of patients presenting to the emergency department was 69.6% in the non-pandemic period, it was calculated to be 30.4% in the pandemic period ($p < 0.001$). A higher admission rate was found in patients aged 18-24 years during the non-pandemic period and in patients aged 45-64 years and ≥ 65 years during the pandemic period ($p<0.001$). It was determined that the rate of patients transferred by ambulance ($p<0.001$), the rate of "very urgent" patient admission ($p<0.001$), and requirements for consultation ($p<0.001$) and laboratory tests were higher during the pandemic period ($p<0.001$). During the pandemic period, the rates of patients who needed hospitalization and admission to intensive care units (ICU) were higher ($p<0.001$). While the mortality rate was 0.7% in the non-pandemic period, this rate was 1.6% in the pandemic period ($p<0.001$). The total invoice amount was higher in patients who presented during the non-pandemic period, and the mean invoice amount was higher in patients who presented during the pandemic period ($p < 0.001$). Patients who presented during the pandemic period had a higher risk of being transferred to the emergency department by an ambulance (OR 9.947, CI 8.65–11.44), being in the very urgent triage category (OR 1.892, CI 1.712–2.09), in-hospital mortality (OR 2.263, CI 1.69–3.03), and the total invoice amount increased by 1.004 times for each unit increase.

Conclusion: Although overall and non-urgent patient visits to the ED during the pandemic period were found to be decreased, "very urgent" patient visits, mortality, and costs per patient were found to be increased.

Keywords: Emergency department, COVID-19 pandemic, cost, patient characteristics

ÖZ

Amaç: COVID-19 salgınının dünya çapında büyük sağlık ve toplumsal etkileri oldu. COVID-19 pandemisinin acil servis başvurularındaki göreceli değişikliği tanımlamak ve acil servise (AS) başvuran hastaların profilini ortaya çıkarmak amaçlandı.

Gereç ve Yöntemler: Pandeminin belirli bir dönemi olan 11.03.2020-23.04.2020 tarihleri arası ve ona denk düşen pandemik olmayan 11.03.2019-23.04.2019 tarihleri arasında AS'e başvuran 18 yaş ve üstü hastaların verileri retrospektif olarak incelendi. İki dönemde AS'e başvuran hastaların sıklığı, sosyodemografik, klinik ve maliyet özellikleri karşılaştırıldı.

Bulgular: AS'e hasta başvuru oranı pandemi olmayan dönemde %69.6 iken, pandemi döneminde %30.4 olarak hesaplanmıştır ($p<0.001$). Pandemi olmayan dönemde 18-24 yaş ($p<0.001$), pandemi döneminde 45-64 ve ≥ 65 yaş gurubundaki hastaların başvuru oranlarının daha yüksek olduğu tespit edildi ($p<0.001$). Pandemi döneminde ambulansla transfer edilen hasta oranının ($p<0.001$), "çok acil" hasta başvuru oranının ($p<0.001$), konsültasyon ($p<0.001$) ve laboratuvar tetkik istenme oranlarının daha yüksek olduğu tespit edildi ($p<0.001$). Pandemi döneminde servis ve yoğun bakıma yatırılan hasta oranları daha fazlaydı ($p<0.001$). Pandemi olmayan dönemde ölüm oranı %0.7 iken, pandemi döneminde bu oran %1.6 tespit edildi ($p<0.001$). Pandemi olmayan dönemde başvuran hastalarda toplam fatura, pandemi döneminde başvuran hastalarda ise ortalama fatura tutarı daha yüksek tespit edildi ($p<0.001$). Pandemi döneminde başvuran hastaların ambulansla AS'e transfer edilme (OR 9.947, CI 8.65-11.44), çok acil triaj kategorisinde olma (OR 1.892, CI 1.712-2.09), hastanede ölüm (OR 2.263, CI 1.69-3.03) riskinin daha fazla olduğu ve toplam fatura tutarının her birimlik artış için 1.004 kat arttığı tespit edildi.

Sonuç: Pandemi dönemde AS'e genel hasta başvuru oranı ve acil olmayan başvuru oranları azalırken, "çok acil" olan hasta başvurusu, mortalite ve hasta başı maliyet artmıştır. Çalışmamızdan elde edilen bulgular acil servislerin yoğunluğunu azaltmak için gelecekteki müdahalelere rehberlik edebilir.

Anahtar Kelimeler: Acil servis, COVID-19 pandemisi, hasta özellikleri, maliyet

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Introduction

Over the course of several decades, the utilization of emergency departments (ED) has increased, leading to the overcrowding of EDs in several countries (1). Overcrowding of EDs can lead to extended stays in ED and worse outcomes for those who really need the ED (2). The number of presentations to ED is periodic, and patient density may vary depending on the day of the week, time of the year, local weather, and environmental factors (3).

The novel coronavirus (COVID-19) has spread the whole world; and was declared a pandemic on March 11, 2020. The COVID-19 pandemic has had huge health-related and societal effects worldwide (4-7). The impact of viral epidemics on ED presentations have yet to be sufficiently investigated in Turkey, and there is very limited information regarding the impact of the COVID-19 pandemic on ED. There have been varying results reported in the literature about this subject. A decrease in presentations to ED was detected in epidemics such as severe acute respiratory syndrome and Middle East respiratory syndrome (8,9). In contrast, it has been reported that there was an increase in presentations to the ED in a group of EDs in the United States of America (USA) in the early period of the H1N1 influenza epidemic in 2010 (10). Nourazari et al. reported in their study that the number of presentations to ED significantly decreased while the COVID-19 pandemic was spreading in the USA in 2020 (11).

In our study, we aimed to evaluate the effect of the COVID-19 pandemic on presentations to ED and to determine the profile of patients who presented to ED by comparing patients who presented to ED in a specific period of the pandemic and a corresponding non-pandemic period in terms of sociodemographic, clinical, and cost aspects. It also aimed to provide a brief overview of the impact of a pandemic on ED to set goals for improvements and future planning.

Material and Methods:

An observational and retrospective study was conducted in a tertiary hospital with data collected from patients presenting to the emergency department. Inclusion criteria: Patients aged ≥18 years who presented to ED between 11.03.2020 and 23.04.2020, which was a specific interval in the pandemic period, and during a corresponding non-pandemic period between 11.03.2019 and 23.04.2019, were included in the study. Exclusion criteria: Patients, who presented outside the time frame or had missing data, were excluded. Each presentation was evaluated as a separate visit if a patient presented more than once within the specified periods.

The patients were divided into two groups. Those who presented to ED between 11.03.2020 and 23.04.2020 were categorized as the COVID-19 pandemic period and those who presented between 11.03.2019 and 23.04.2019 as the non-pandemic period.

Health insurance refers to the assurance that hospital expenses are covered by the Social Security Institution (SSI) of the Republic of Turkey. Patients whose expenses are covered by the SSI were defined as patients with SSI, and those with no health insurance but covered the treatment costs by themselves were defined as self-paid patients. Triage categories were made according to the 3-stage (very urgent, urgent, and nonurgent) triage categorization. The number of radiological examinations refers to the number of imaging methods ordered for the patient among computed radiography (CR), computed tomography (CT), ultrasound, and magnetic resonance imaging (MRI) examinations at a single presentation.

In the power analysis performed for the study, it was assessed that the study should be conducted with a minimum of 1438 cases (Power of test: 80%, type 1 error: 5%, effect size = 2.82).

Our study was conducted after obtaining approval from the Presidency of Mersin University Clinical Research Ethics Committee (dated 13/05/2020 and numbered 2020/379).

Statistical analysis

Number and percentage values were given as descriptive statistics for categorical data. Mean, and standard deviation were given as descriptive statistics for age and invoice amount. Student's t-test was used to check whether there was a difference between the mean age and invoice amount in the pandemic and non-pandemic periods. The chi-square test was used to test the relationships between pandemic and non-pandemic periods and between the categorical variables. The z-test was used to check whether there was a difference between the two ratios. Binary logistic regression was used in risk calculations. Statistical significance was assumed at $p < 0.05$.

Results

A total of 19148 patients were included in our study, including 13334 patients from the non-pandemic period and 5814 patients from the pandemic period. The rate of patient presentation to ED in the non-pandemic period was 69.6%, and that during the pandemic period was 30.4% ($p < 0.001$). It was found that the presentation rates of the patients were higher in the age group of 18–24 years during the non-pandemic period ($p < 0.001$), whereas that in the age groups of 45–64 and ≥65 years were higher during the pandemic period ($p < 0.001$). The rate of patients presenting to the hospital by their own means was higher in the non-pandemic period, and the rate of patients presenting by ambulance was higher during the pandemic period ($p < 0.001$). There was a statistically significant relationship between the triage category and the period of presentation ($p < 0.001$). Based on the triage category, the rate of "very urgent" patient presentation was higher during the pandemic period ($p < 0.001$), whereas the rates of urgent and nonurgent patient presentation were higher during the non-pandemic period ($p < 0.001$). The number of very urgent patients decreased by 28%, and that of nonurgent patients decreased by 62% during the period corresponding to the pandemic period (Table 1).

The presentation rate of patients aged ≥65 years in the very urgent category was higher during the pandemic period, whereas that of patients in the age group of 18–24 years in the nonurgent category was higher during the non-pandemic period ($p < 0.001$) (Figure 1).

The rate of consultation and laboratory examination requests was higher during the pandemic period ($p < 0.001$). The rate of requesting one of the CT, CR, USG, or MRI

Data		Non-pandemic period (n = 13334) n (%)	Pandemic period (n = 5814) n (%)	p
Gender	**Male**	6180 (46.3)	3062 (52.7)	**<0.001**
	Female	7154 (53.7)	2752 (47.3)	
Mean age		41.11±18.63	44.64 ± 19.26	**<0.001**
Age group	**18-24**	2808 (21.1)	868 (14.9)	**<0.001**
	25-34	2945 (22.1)	1219 (21)	0.085
	35-44	2443 (18.3)	1055 (18.1)	0.772
	45-64	3105 (23.3)	1515 (26.1)	**<0.001**
	≥65	2033 (15.2)	1157 (19.9)	**<0.001**
	Turkish	13147 (98.6)	5756 (99)	
Health insurance	**SSI**	13151 (98.6)	5671 (97.5)	**<0.001**
	Paid	183 (1.4)	143 (2.5)	
Type of arrival	**By own means**	13068 (98)	4835 (83.2)	**<0.001**
	Ambulance	266 (2)	979 (16.8)	
Oncological diagnosis	**no**	12432 (93.2)	5304 (91.2)	**<0.001**
	yes	902 (6.8)	510 (8.8)	
Triage category	**Very urgent**	1746 (13.1)	1254 (21.6)	**<0.001**
	Urgent	8601 (64.5)	3426 (58.9)	
	Non-urgent	2987 (22.4)	1134 (19.5)	

Abbreviation: SSI: Social Security Institution

Table 1. Comparison of the basic characteristics at presentation pertaining to patients who presented during the non-pandemic period and the COVID-19 pandemic period

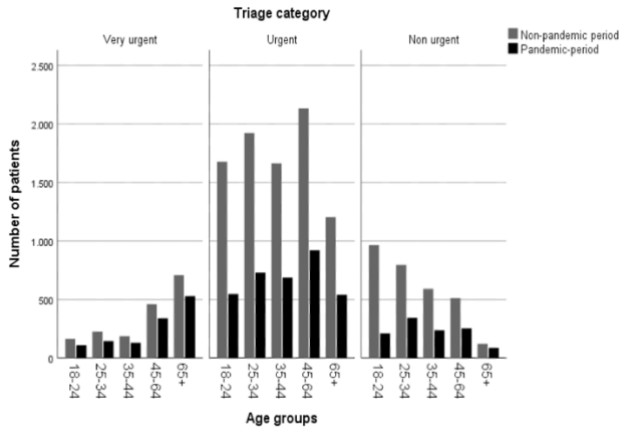

Figure 1. The presentation rate of the patients by age

radiological examinations was higher in the non-pandemic period ($p < 0.001$) (Table 2). It was determined that the patients' final diagnoses differed according to the periods. Diagnostic differences in the pandemic and non-pandemic periods are shown in Table 3.

During the pandemic period, the rates of patients admitted to ED and having an indication for hospitalization ($p < 0.001$) and the mortality rates in ED ($p = 0.008$) were higher. Considering the hospital outcomes database, it was found that the rate of patients discharged during the non-pandemic period ($p < 0.001$) and the mortality rate during the pandemic period were higher ($p < 0.001$). The total amount of invoices in the patients who presented during the non-pandemic period and the mean invoice amount in the pandemic period were found to be higher ($p < 0.001$) (Table 4).

According to the results of binary logistic regression analysis, patients who presented during the pandemic period had a higher risk of being transferred to the ED by an ambulance (OR 9.947), being in the very urgent triage category (OR 1.892), and in-hospital mortality (OR 2.263); the total invoice amount increased by 1.004 times for each unit increase (Table 5).

Discussion

In the last 30 years, the literature on emergency medicine has raised concerns regarding the increasing number of patients presenting to EDs with special attention to the use of EDs, access to care, and the “inappropriate” or “non-urgent” use of EDs (1). In a study, it was reported that the number of patients admitted to the ED increased faster than the population growth rate (12). Overcrowded EDs hinder the ability to provide timely critical services to patients in need of urgent care. The population of patients presenting to ED varies periodically (3). According to studies examining ED presentations during the COVID-19 pandemic period, the number of presentations decreased significantly (6,13-16). In our study, the number of patients decreased by 57.5%

ICD-10 code	Diagnosis	Non-pandemic period n (%)	Pandemic period n (%)	p
A00-B99	Certain infectious and parasitic diseases	117 (0.9)	33 (0.6)	0.025
C00-D48	Neoplasms	80 (0.6)	510 (8.8)	**<0.001**
D50-D89	Diseases of the blood and blood-forming organs and certain immune system disorders	60 (0.4)	42 (0.7)	0.017
E00-E90	Endocrine, nutritional and metabolic diseases	82 (0.6)	45 (0.8)	0.213
F00-F99 (except F10-19)	Mental and behavioral disorders	185 (1.4)	80 (1.4)	0.950
G43, G44, R51	Migraine and other headaches	1020 (7.6)	302 (5.2)	**<0.001**
G40, G41	Epilepsy and related conditions	63 (0.5)	40 (0.7)	0.061
G00-G99 (except G40,41,43,44)	Other central nervous system disorders	55 (0.4)	25 (0.4)	0.863
H00-H95	Eye and ear diseases	382 (2.9)	127 (2.2)	**<0.05**
I100-199 (except I60-69)	Circulatory system diseases	185 (1.4)	98 (1.7)	0.116
I60-I69	Cerebrovascular diseases	82 (0.6)	101 (1.7)	**<0.001**
J00-06, J30-39, R07.0	Upper respiratory tract diseases	1652 (12.4)	320 (5.5)	**<0.001**
J00-J99	Other respiratory diseases	34 (0.3)	18 (0.3)	0.504
KOO-93 (excluding hemorrhage)	Digestive system diseases	300 (2.2)	116 (1)	0.266
K92, K92.1, K92.2	Gastrointestinal system bleeding	80 (0.6)	31 (0.5)	0.576
L00-L99, R21	Skin and subcutaneous tissue disorders	339 (2.5)	102 (1.8)	**<0.001**
M00-M99	Musculoskeletal and connective tissue system disorders	931 (7)	360 (6.2)	0.045
N17-N19	Renal failure	58 (0.4)	51 (0.9)	**<0.001**
N00-N99, R31, R30.0	Other genitourinary system diseases	457 (3.4)	213 (3.7)	0.413
O00-O99	Pregnancy-related conditions	238 (1.8)	133 (2.3)	0.020
R07.4	Chest pain unspecified	967 (7.3)	419 (7.2)	0.911
R06.0	Dyspnea	609 (4.6)	382 (6.6)	**<0.001**
R00-R09 (except R06-07.4)	Other respiratory and circulatory symptoms	684 (5.1)	277 (4.8)	0.287
R10-R19	Digestive and abdominal signs and symptoms	2421 (18.2)	879 (15.1)	**<0.001**
R42	Vertigo and dizziness	376 (2.8)	120 (2.1)	**<0.001**
R50-R69	General signs and symptoms	1908 (14.3)	1425 (24.5)	**<0.001**
V00-V99	Transport-transportation accidents	202 (1.5)	98 (1.7)	0.382
W00-W19	Falls	613 (4.6)	289 (5)	0.262
W19-W99, Y28, T20-31, X85-Y09	Other injuries	878 (6.6)	378 (6.5)	0.831
F10-19, X20-29, X40-49, X69-84, T36-65	Intoxications	113 (0.8)	62 (1.1)	0.144

ICD: International Classification of Diseases

Table 2. Comparison of diagnoses made in the emergency department during the non-pandemic period and the COVID-19 pandemic period

during the pandemic period compared with that during the non-pandemic period. We believe that the reason for the decrease in presentations to ED is multifaceted. Issues such as concerns about the risk of COVID-19 transmission, restrictions imposed, and school holidays may have contributed to the decrease in injuries and accidents owing to reduced mobility and social distance measures. The ban on collective activities may be attributed to reduced presentations due to transmitted infections. Although this decrease in the number of patients can be explained by the fact that the people do not apply to ED unnecessarily as a result of being vigilant in combating COVID-19, it also raises the concern that patients in need of urgent care do not present to ED. In studies conducted during the pre-pandemic period, it has been reported that the majority of the patients who presented to ED were young individuals (17,18). In a study by Leow et al., it was reported that a gross reduction occurred in all patient age groups during the pandemic period, but it occurred more significantly in individuals aged <24 years (14). A similar result was obtained in our study. Although there was a decrease in all age groups, there was a higher rate of decrease in presentations of the young age group, who are generally considered healthy, which suggests that this group of patients presented to first-line healthcare services for their treatment needs or that a significant portion of them were not real emergency cases.

Various results have been reported in studies examining health insurance status in frequent presentations to the ED (17,19,20). It was reported by Nourazari et al. that during the COVID-19 pandemic, presentations of patients with medical care insurance decreased by 37% and that of self-paid patients by 15% (11). In our study, it was found that the number of patients with SSI decreased by 57% during the pandemic period. In addition, 99.8% of the patients had health insurance in non-urgent presentations. The presence of health insurance is a comforting cause because there are fewer economic and social barriers to access to healthcare for individuals, regardless of whether their condition is urgent. In our opinion, ED overcrowding will be reduced through arrangements for emergency medical care based on analyzing the data from our study for the pandemic period and data from further studies to be conducted. In the studies conducted in Turkey in the pre-pandemic period, the transfer rate of patients by ambulance was reported to be between 6.3% and 10.2% (21,22). Really urgent cases are usually transferred to hospitals by ambulance and are not expected to be affected by any pandemic or other factors. In a study conducted by Leow et al., it was reported that although the number of patients who presented during the pandemic period decreased, the rate of patients transferred by ambulance increased (14). In our study, the rate of patients transferred by ambulance during the non-pandemic period was 2%, whereas it was found to be 16.8% during the pandemic period. It was found that transfers by ambulance increased by 9.947 times during the pandemic period. This was believed to be related to the decrease in outpatient presentations of patients who use public transport or private vehicle owing to the risk of transmission during the pandemic period and the relative increase in the rate of urgent patients whose general condition is worse.

Outcome and cost		Non-pandemic period (n = 13334) n (%)	Pandemic period (n = 5814) n (%)	p
ED outcome	Discharge	12265 (92)	5090 (87.6)	
	Admission to the ward	716 (5.4)	507 (8.7)	**<0.001**
	Admission to the intensive care unit	344 (2.6)	205 (3.5)	
	Death	9 (0.1)	12 (0.2)	
Hospital outcome	Discharge	13242 (99.3)	5723 (98.4)	**<0.001**
	Death	92 (0.7)	91 (1.6)	
	Invoice amount (mean ± SD)			
Mean invoice amount		57,63 ± 66,92	83,37 ± 92,83	0.0001
Total invoice amount		768.424,64	484.733,85	
Mean invoice amount according to triage category	Very urgent	141.41±104.03	179.10 ± 119.62	0.0001
	Urgent	53.84 ± 52.95	68.72±67.48	0.0001
	Non-urgent	19.55±0.65	21.79±5.87	0.0001

SD: standard deviation

Table 3: Comparison of patient outcomes and costs during the non-pandemic period and the COVID-19 pandemic period

Non-urgent presentations to EDs are controversial; they have been negatively associated with overcrowding and costs. The rates of nonurgent ED visits were highly variable and were found to be 32% on average (2). A study conducted by Aydın et al. observed that 16.5% of the patients who presented to ED were very urgent, and 62.3% were non-urgent presentations (21). In a study conducted by Kılıçaslan et al., the rate of very urgent patients was reported to be 10.42%, and that of non-urgent patients was 47.24% (22). In a study assessing the factors influencing the presentations to ED in Turkey conducted on 36,641,816 cases, the rate of nonurgent patients (54.2%) was higher than the rate of the sum of very urgent and urgent patients, and it has been reported that the EDs are being used outside of their actual purpose (20). In a study by Scaramuzza et al., presentations to ED during the COVID-19 pandemic were examined, and it was reported that the rate of green area (nonurgent) patients decreased by 59% (13).

In this study, it was found that the rate of patient presentation in the "very urgent" category was higher during the pandemic period than during the non-pandemic period, and the probability of patient presentation in the very urgent category increased by 1.892 times during the pandemic period. It was found that the rate of the non-urgent patient presentation was higher in the non-pandemic period.

		OR	(95% CI)	P
Age group	18-24	Ref.		
	25-34	1.339	1.21-1.48	**<0.001**
	35-44	1.397	1.26-1.55	**<0.001**
	45-64	1.578	1.43-1.74	**<0.001**
	65+	1.841	1.66-2.05	**<0.001**
Arrival by an ambulance		9.947	8.65-11.44	**<0.001**
Triage category	Very urgent	1.892	1.712-2.09	**<0.001**
	Urgent	1.049	0.970-1.135	0.253
	Non-urgent	Ref.		
Presence of consultation		1.656	1.54-1.78	**<0.001**
Presence of laboratory examination		1.423	1.34-1.52	**<0.001**
Presence of radiological examination		1.028	0.965-1.09	0.395
In-hospital mortality		2.263	1.69-3.03	**<0.001**
Total invoice		1.004	1.004-1.004	**<0.001**

Table 4. Results of binary logistic regression analysis

During the pandemic period, the significant decrease in the number of patients, the high number of very urgent patient presentations, and the significant decrease in the number of urgent and nonurgent patients suggest that a significant number of patients who previously presented to ED were not real emergencies. All patients are being admitted after presenting to ED because patients do not require an appointment to enter the ED. All patients in the ED receive a comprehensive examination and are not subject to additional health insurance fees. These factors increase the number of non-urgent cases in EDs. However, the decrease in the very urgent category suggests that patients tend to delay care owing to concerns about catching or spreading COVID-19, even if they have an emergency (11).

In EDs, examination and consultation are requested according to the current characteristics of the patients. It was found that consultation was requested at 19.66% and 39.1% (21,22). In a present study, it was determined that consultation was requested in 18.3% of the patients who presented during the non-pandemic period and 27.1% of the patients who presented during the pandemic period. The likelihood of requesting consultation (OR: 1.656) and laboratory examination (OR: 1.423) was higher during the pandemic period. These rates have been associated with an increase in urgent and very urgent patients with more complicated clinical presentations.

The final diagnoses of patients who presented to the ED have been reported variably in the literature, including studies comparing the pandemic period (5,11,23-27). In our study, it was observed that presumably serious diagnoses such as CVD, malignancy, diseases of the blood and blood-forming organs, RF, and pregnancy-related diagnoses were more common in patients who presented during the pandemic period. In addition, although the number of patients diagnosed with neoplasm and CVD increased during the pandemic period, it was found that the number of patients with other diagnoses decreased.

EDs play a critical role in diagnosing and treating life-threatening conditions that can result in severe disability or death. Presentations to the ED by individuals with symptoms of serious life-threatening diseases are not expected to be affected by the pandemic. Across countries and hospitals, patients presenting to EDs may have various diagnoses. The difference in the diagnoses found in our study does not reflect whether there was a real decrease in the incidence of diseases; nevertheless, similar results obtained in other studies have shown that the pandemic affects the profile of

patients presenting to the ED. This may indicate that patients avoid going to ED due to infection risk.

Studies have reported that most patients presenting to ED are discharged, and 2.4%–17.6% of them are hospitalized (13,18,22,24,28). In a study conducted by Scaramuzza et al., the rate of patients hospitalized from the ED before the pandemic period was 2.4%, which increased to 7.5% during the pandemic period. In our study, it was observed that the hospitalization rate of patients from ED during the non-pandemic period was 8%, whereas this rate increased to 12.2% during the pandemic period. The rate of mortality in ED increased during the pandemic period. In addition, in our study, the in-hospital mortality risk was 2.263 times higher during the pandemic period. This can be explained by the increased number of patients in the "very urgent" category presenting to the ED, particularly patients with chronic illnesses not visiting for follow-ups owing to concerns of COVID-19, patients not coming to the hospital in the early stages of the disease and seeking solutions on their own, and coming to the hospital only at the advanced stage of the condition as a result of the delay in availing care.

Overcrowded EDs are a global problem with significant organizational and financial impacts (29). In our study, although the total amount of invoices was lower among patients who presented during the pandemic period owing to the decrease in the number of patients, the mean invoice amount per patient was higher. Costs include examinations, tests, consultations, and treatment procedures for patients presenting to the ED. Increased requests for tests, consultations, and treatment procedures raise the cost accordingly. The difference in the amount of mean invoice per patient indicates the difference in the examinations and consultations requested per patient. The number of examinations and consultations requested per patient is usually higher in patients with complications than in those without complications. The increased amount of invoices per patient during the pandemic period suggests that the patients who presented during this period had more complicated and urgent conditions.

Limitations

It was a retrospective study conducted in a single center covering a short period. In addition, our study is limited by the fact that the rate of presentation of very urgent or nonurgent cases to different institutions, at-home mortality rates, and the real reason underlying the decrease in the pandemic period are all unknown.

Conclusion

During the pandemic, most patients presenting to ED had health insurance. It was found that the patient presentations rate significantly decreased, the number of patients presenting to the emergency department by an ambulance increased, the number of presentations by the "very urgent" patient group according to the triage category increased, the rate of non-urgent presentations decreased, and the mean amount of invoice per patient increased. Findings from our study may guide future interventions to reduce the overcrowding of EDs. Identifying and implementing additional measures to prevent the use of EDs by patients who do not urgently require care, such as measures introduced to delay the spread of COVID-19, may reduce inappropriate presentations to EDs and overcrowding of EDs.

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Authors' Contribution: All authors contributed equally.

Ethical Statement: The study was conducted after obtaining approval of Presidency of Mersin University Clinical Research Ethics Committee (dated 13/05/2020 and numbered 2020/379).

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ORIGINAL ARTICLE / ÖZGÜN ARAŞTIRMA MAKALESİ

Determination of Women and Reproductive Health Awareness in Emergency Department: A Descriptive Cross-Sectional Study

Acil Serviste Kadın ve Üreme Sağlığı Farkındalığının Değerlendirilmesi: Tanımlayıcı Kesitsel Bir Çalışma

Ramazan Saral[1], Özlem Yiğit[2], Süleyman İbze[2], Gülşen Öztürk Örmeci[3]

ABSTRACT

Aim: Emergency departments (EDs) are units in which acute management of traumatic and medical emergencies are provided; but also guidance on public health is provided as well as ensuring personal health and awareness. In this study, it was aimed to determine the level of knowledge about women's and reproductive health and possible disease symptoms in female patients aged 18 years and older who applied to the emergency department, regardless of the complaint of admission. We also aimed to determine the role of EDs in contributing to the correct referral of these patients.

Material and Methods: This was a descriptive cross-sectional study which took place in a tertiary care center. Women aged 18 years and older who applied to the emergency department with any complaint were assessed with a structured questionnaire consisting of 18 questions and multiple-choice options about women's health. Participants' sociodemographic characteristics, fertility, menstrual cycle and contraception patterns, their knowledge about cancer prevention, gynecological and urological complaints were asked. It was also asked whether the ED physician gave any guidance on issues related to women's health, before discharge from ED.

Results: Totally 523 women were included in the study. The mean age was 38.89±14.32 years. Most of them (91.6%) were lived in city center, 63.3% were married and 60% were high school and university graduates. The ratio of not using any contraceptive method and total number of pregnancies were higher at the lower education levels (p=0.003 and 0.004, respectively). The knowledge of women about cancer screening was low and 42.4% of them did not have information about screening issues. In comparison according to educational status, it was seen that the ratio of screening awareness, breast self-examination, HPV test, and mammography were higher and statistically significant in university graduates (p=0.000). ED physicians conducted appropriate outpatient clinic referral for screening and follow-up in 53.6% of 114 patients with gynecological complaints.

Conclusion: The level of knowledge about women's health is still not at the desired level. Although there are a wide variety of effective and modern methods available, not to use a contraceptive method is still common. With the increase, dissemination and continuity of reproductive health education and consultancy services, the lack of information on this subject will be eliminated to a large extent and wrong practices will be prevented. Emergency departments are places for preventing public health, besides managing acute conditions.

Keywords: Reproductive health, contraception, cancer screening, emergency department

ÖZ

Amaç: Acil servisler (AS), travmatik ve tıbbi acil durumların akut yönetiminin sağlandığı birimler olmanın yanı sıra, kişisel sağlık ve farkındalığın sağlanması ve halk sağlığı konusunda da rehberlik sağlanan alanlardır. Bu çalışmada acil servise herhangi bir şikâyetle başvuran 18 yaş ve üstü kadın hastaların kadın ve üreme sağlığı ile olası hastalık belirtileri hakkındaki bilgi düzeylerinin belirlenmesi ve acil servislerin bu hastaların doğru yönlendirilmesine katkı sağlamadaki rolünü belirlemek amaçlanmıştır.

Gereç ve Yöntemler: Bu çalışma üçüncü basamak bir hastanede tanımlayıcı kesitsel bir çalışma olarak yapıldı. Acil servise herhangi bir şikâyetle başvuran 18 yaş ve üstü kadınlar, kadın sağlığı ile ilgili 18 sorudan ve çoktan seçmeli seçeneklerden oluşan yapılandırılmış bir anket ile değerlendirildi. Katılımcıların sosyodemografik özellikleri, doğurganlık bilgileri, adet döngüleri ve korunma şekilleri, kanserden korunma, jinekolojik ve ürolojik şikâyetleri hakkındaki bilgileri soruldu. Ayrıca acil servis doktorunun acil servisten taburcu olmadan önce kadın sağlığı ile ilgili konularda yönlendirme yapıp yapmadığı da değerlendirildi.

Bulgular: Çalışmaya yaş ortalaması 38,89±14,32 olan toplam 523 kadın alındı. Çalışma popülasyonunun çoğunluğu (%91,6) il merkezinde ikamet etmekte olup, %63,3'ü evli, %60'ı lise ve üniversite mezunu idi. Gebeliği önleyici yöntem kullanmayanların ve toplam gebelik sayısının oranı alt eğitim kademelerinde daha yüksekti (sırasıyla, p=0,003 ve 0,004). Kadınların kanser taraması konusundaki bilgileri düşüktü ve %42,4'ünün tarama konuları hakkında bilgisi yoktu. Eğitim durumuna göre karşılaştırıldığında üniversite mezunlarında tarama farkındalığı, kendi kendine meme muayenesi, HPV testi ve mamografi yaptırma oranlarının daha yüksek ve istatistiksel olarak anlamlı olduğu görüldü (p=0,000). Jinekolojik şikâyetleri olan 114 hastanın %53,6'sında acil servis hekimleri tarama ve takip için uygun poliklinik yönlendirmesi yapıldı.

Sonuç: Kadın sağlığı konusundaki bilgi düzeyi halen istenilen seviyede değildir. Çok çeşitli, etkili ve modern yöntemler mevcut olmasına rağmen, doğum kontrol yöntemi kullanılmaması hala yaygındır. Üreme sağlığı eğitim ve danışmanlık hizmetlerinin artması, yaygınlaşması ve sürekliliği ile bu konudaki bilgi eksikliği büyük ölçüde giderilecek ve yanlış uygulamaların önüne geçilecektir. Acil servisler, akut durumları yönetmenin yanı sıra halk sağlığının korunması için de çalışan birimlerdir.

Anahtar Kelimeler: Üreme sağlığı, kontrasepsiyon, kanser taraması, acil servis

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Introduction

Patients of all ages and sex apply to emergency departments (ED) with various complaints. In the real world, EDs are not only places in which acute management of traumatic and medical emergencies are provided; but also units where guidance on public health is provided and ensuring personal health and awareness. Increasing the awareness of patients about their health conditions, managing their follow-up visits, and directing them to appropriate healthcare facilities for further evaluation and screening is essential and routinely applied part of the daily practice of ED doctors.

Routine follow-up visits are required to ensure appropriate women's health and reproductive health issues. The World Health Organization (WHO) describes reproductive health as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity in all matters relating to the reproductive system and its functions and processes. Reproductive health implies that people can have a satisfying and safe sex life and that they have the capability to reproduce and the freedom to decide if, when, and how often to do so (1). Comprehensive education and information about preventing and controlling sexually transmitted infections, contraception, and fertility are all involved in women's health care (2). There are several contraception methods, such as intrauterine devices, hormonal methods, barrier methods, and sterilization. In our country, intrauterine devices, condoms, and oral hormonal pills are the most known methods. According to a study in 2018, 48.9% of women use a modern contraception method (mostly intrauterine devices), besides 20.9% of them use traditional methods (3).

Cancer screening means checking people for cancer before they have symptoms. Getting screening tests regularly may find breast, cervical, and colorectal (colon) cancers early. Early cancer detection when treatment is likely to work best is essential for reducing mortality. Cancer is the second reason for death from illnesses in most parts of the world and Turkey (4). Primary prevention is still the most cost-effective and long-term strategy in cancer control with four topics; primary prevention, early diagnosis, treatment, and palliative care (5). In Turkey, the National Cancer Control Program is carried out for cancer control, and Cancer Early Diagnosis, Screening, and Training Centers (KETEM) are opened by the Ministry of Health in every city of the country (6). However, public awareness of KETEM and the effectiveness of utilizing its services is skeptical.

This study aimed to determine the level of knowledge about women's and reproductive health and possible disease symptoms in female patients aged 18 years and older who applied to the emergency department, regardless of the admission complaint. Further, a questionnaire administered to all female patients regarding their awareness of women's health will determine whether physicians who evaluate the patient in the emergency department offer appropriate referrals for screening and follow-up visits. It is aimed to assess the role of emergency departments in contributing to the correct referral of these patients.

Material and Methods

This study was conducted as a descriptive cross-sectional study between January and March 2021 in the ED of Antalya Akdeniz University Hospital, a tertiary care center. Before starting the study, ethics committee approval was obtained from the Clinical Research Ethics Committee of Akdeniz University Faculty of Medicine with the decision number KAEK-914 dated 09.12.2020.

Study design

The study group was selected among women aged 18 years and older who applied to the emergency department with any complaint. A structured questionnaire consisting of 18 questions and multiple-choice options was used for the patients included in the study by face-to-face interview technique. Patients aged 18 and over, literate and cognitively competent to answer the questions, and who agreed to participate in the study were included.

The prepared questionnaire included participants' sociodemographic characteristics (age, marital status, place of residence, occupation), fertility characteristics (pregnancy/birth/living/miscarriage), menstrual status and patterns, gynecological and urological complaints (bleeding, discharge, painful intercourse, burning urine, bloody urine, frequent urination), questions about the birth control methods they used.

Participants were also asked questions measuring their level of knowledge about cervical and breast cancer screenings. While being discharged from the emergency room, it was also asked whether the physician who evaluated the ED gave any guidance on issues related to women's health.

The survey form is presented in Appendix (Figure 1).

Statistical analysis

The data collected in the study was analyzed using the statistical software package SPSS 20 (Statistical Package for the Social Sciences – IBM®). Study data were expressed as mean±standard deviation (SD) for continuous variables and percent (%) for categorical variables. The chi-square test was used in the analysis of categorical variables. A P value of <0.05 was considered statistically significant.

Results

A total of 523 women who filled out the questionnaire were included in the study. Eleven participants' data remained incomplete because they did not answer some questions. However, these patients were also included in the statistical analysis. The mean age of the participants was 38.89±14.32 (median:36, min. 18 - max. 85) years. The socio-demographic characteristics of the study population are presented in Table 1.

Contraceptive methods used by participants are shown in Table 2. The distribution of the contraceptive methods used was 4.6%, 4.2%, and 11.1% for IUD, OCS, and condoms, respectively. When we compared the education level with the contraceptive method preference, it was determined that primary, secondary, and high school graduates preferred withdrawal, condoms, and IUD at a similar rate, while university graduates preferred to use condoms more (p=0.003). The rate of women who did not use any contraceptive method was higher at the lower education levels.

When we asked about the total number of pregnancies they experienced, 12,5% of the participants had five and more pregnancies, and the median of the total pregnancies was 2 in all study groups.

Educational Status (n=523)	
Illiterate	29 (5.5)
Literate	9 (1.7)
Primary school	116 (22.2)
Secondary School	55 (10.5)
High School	131 (25)
University	183 (35)
Place of Residence (n=523)	
Urban	479 (91.6)
Rural	44 (8.4)
Occupation (n=523)	
Housewife	215 (41.1)
Public worker	75 (14.3)
Employee	70 (13.4)
Student	41 (7.8)
Office worker	54 (10.3)
Others *	68 (13.1)
Marital Status (n=523)	
Married	331 (63.3)
Single	162 (31)
Divorced	30 (5.7)

* others: retired, engineer, employer, farmers and out of a job

Table 1. Characteristics of participants

The number of total pregnancies was significantly lower in women who had an occupation (p=0.004).

The knowledge of women about cancer screening and KETEM was questioned, and 42.4% of the women participating in the study did not have information about the services offered by KETEM. Of the participants, 33.7% had a Pap-smear HPV test, 28.5% never had a Pap-smear, 20.8% had a breast examination in a health institution, 15.7% had mammography, and 42.4% did breast self-examination at home (Table 3).

Method	Number (n=512)	Percentage (%)
Not protected	197	37.7
Not sexually active	114	21.8
Coitus interruptus	38	9.4
Condoms	58	14.6
Tube ligation	33	8.3
Intrauterin device	24	6
Oral contraseptives	22	5.5
Monthly injections	4	1
Calender method	3	0.7
Spermicide	1	0.2
Postcoital method	1	0.2
Multiple methods	17	4.2

*The percentage of contraceptive methods used by women was calculated for only sexually active women

Table 2: Contraceptive methods used by women

In comparison according to educational status, it was seen that the rate of KETEM awareness, breast self-examination, HPV test, and mammography were higher and statistically significant in university graduates (p=0.000).

	Number (n)	Percentage (%)
HPV Test		
Tested	176	33,7
Not Tested	149	28,5
Out of Age Range*	187	35,8
Breast Self-examination		
Doing	222	42,4
Not Doing	265	50,7
Out of Age Range*	25	4,8
Examination in a medical institution		
Examined	109	20,8
Not Examined	378	72,3
Out of Age Range*	25	4,8
Got mammography		
Yes	82	15,7
No	123	23,5
Out of Age Range*	307	58,7

* Breast cancer scanning starts at 40 and ends at 69, cervix cancer scanning starts at 30 and ends at 65. The ages younger or older than these ranges were classified as 'out of age range'

Table 3. Awareness of protective and preventive interventions

Of women who applied to the ED with any complaint, 33.8% had a concomitant urological complaint, while 22.2% had a gynecological complaint. Vaginal discharge (15,7%) and pollakiuria (21,6%) were the most common complaints. The other complaints mentioned by the participants were vaginal bleeding (5.7%), dyspareunia (5.9%), dysuria (17.4%), hematuria (3.4%), and urgency (11.9%). When women were asked about menstrual cycles, 62.1% were aware of the last time of their cycle, 53.2% reported that they had a regular menstrual period, 28.3% were in menopause, and 9.6% did not know the date of their last menstruation.

Emergency physicians conducted appropriate outpatient clinic referrals for screening and follow-up in 53.6% of 114 patients with gynecological complaints. The referral was done mostly by describing where she can apply for her complaints. Women without any obstetric or gynecological complaints got less referral for women's health and screening (p=0.01) Table 4.

Complaint	No referral	Referred to obstetrician	Referred to family medicine /KETEM	Total	P
YES	247	118	33	398	0.01
NO	53	46	15	114	
Total	300	164	48	512	

Table 4. Referral by emergency medicine physician

Discussion

In our study, a questionnaire was applied to all female patients regardless of their complaints, evaluating their knowledge level about women's health and reproductive health. It was observed that the patient population mostly consisted of women of childbearing age, and more than half had high school and university education. In comparisons according to educational status, it has been determined that the number of pregnancies is less in university graduates, an active contraceptive method is used more for pregnancy control, the rate of KETEM awareness, breast self-examination, HPV test, mammography is higher and statistically significant.

According to the 2018 data from the Turkey Demographic and Health Survey (TNSA), 29% of women aged between 15 and 49 living in cities are primary school graduates, while 41% are high school or higher graduates (7). The educational status was higher in our study population. Many studies in the literature also support the relationship between education and the use of preventative health care. According to TNSA data, one out of three women still do not use a contraception method despite knowing at least one method. Çakmak et al. reported that being not literate increased not using a method by 7.7 times (8). We have found similar results in our study, 37,7% of participants who have active sexual life did not use any contraception method, and usage was higher in higher educated groups. Also, the number of total pregnancies and children they have were lesser in the women with higher education and working in a job. It can be inferred that women's work not only contributes to the economy but also enables them to decide on planned pregnancies and having children as much as they can care for.

Both breast and cervical cancer are malignancies in which mortality is considerably reduced if detected early, and the effectiveness of the screening program was proven. Breast cancer scanning starts at the age of 40 and ends at the age of 69, and cervix cancer scanning begins after age 30 and ends at the age of 65 (9). The Pap-Smear test looks for precancer cell changes on the cervix that might become cervical cancer if not treated appropriately. HPV-DNA tests detect HPV (human papillomavirus), which can cause these cell changes. A Pap-smear and HPV test are done on all women between 30 to 65 years old; if both are normal, the patient is told to wait five years until the next screening test. For many women, mammograms are the best way to find breast cancer early. Providing breast self-exam and being familiar with own normal shape and look can help to notice symptoms such as lumps, pain, or changes in size. Breast self-exam is advised to perform every month. A clinical breast exam is done by a healthcare professional by using hands and is suggested to be done every two years for ages 20 to 39 and every year for ages 40 to 69. The guidelines recommend that women 40 to 69 years old get a mammogram every two years. Breast ultrasonography is also done along with mammography (10). Screening for breast, cervical and colorectal cancer is applied in KETEM in our country. Women aged between 30 and 65 years are suggested to perform PAP-smear and HPV tests every five years by their family physicians.

However, according to Turkey Health Survey (2008) data, more than three-quarters of women aged 35-44, 45-54, and 55-64 in Turkey (78.3%, 75.7%, and 79.4%, respectively) have never had a smear test in their lifetime. While 71.1% of women aged 55-64 and 80.4% of women aged 65-74 have never had a mammogram in their lifetime (11). Other studies from different regions of our country revealed similar results (12, 13). Although the rates in our study seem to be higher than previous ones, the findings indicate that screening programs for breast and cervical cancers are not yet at the desired level. Tests were performed for the early diagnosis of cervical cancer (33.7%) and breast cancer (15.7%) only in a small portion of the study population. 42.4% of the women participating in the study stated that they did not have knowledge about the services offered by KETEM. According to educational status, the rate of KETEM awareness, breast self-examination, HPV test, and mammography was higher and statistically significant in university graduates. This was proven by Dubikaytis et al. in their study published in 2010 (14).

In our study, women who participated in the survey were also asked whether they had ongoing urological and gynecological complaints regardless of the applying complaint. It was determined that 33.8% of the women had a concomitant urological complaint, while 22.2% had a gynecological complaint. When the participants were asked whether they were referred for the treatment and follow-up of gynecological complaints, it was determined that appropriate outpatient referral was made by the ED physician for only %53 of patients. This data shows that emergency physicians' knowledge and referral about women's health is not well, and some additional education in the residency program will work better. In addition to the evaluation and management of acute real-life threatening emergencies in daily practice, EDs also are the centers where appropriate referral is made for patients who do not require acute intervention or treatment at that time. Emergency medicine specialty is a population-based program for public health. Proper follow-up and management of chronic diseases and arranging later revisits for acute, but non-life-threatening conditions will reduce the possibility of encountering unexpected acute problems and indirectly prevent emergency room crowding and unnecessary emergency department applications. Therefore, the appropriate patient referral is an important component of emergency medicine daily practice. The fact that more referrals were made in our study, especially in patients with gynecological complaints, is an indicator that emergency departments are among the centers that can be effective in raising awareness about women's health. It would also be appropriate to increase training on providing appropriate information and guidance for all female patients, not just those with complaints, and to raise the awareness of emergency medicine residents on this issue.

Limitations

One of the limitations of the study is that it is a descriptive type, and there is no representativeness of the research. The relationship between cause and effect couldn't be determined. Due to the study being carried out during the

COVID pandemic period, the number of the study population was low.

Conclusion

The knowledge about women's health, reproductive health, and family planning consultancy and implementation services such as KETEM are still not at the desired level. Although there are a wide variety of effective and modern methods available, today, not using a contraceptive method is still common. With the increase, dissemination, and continuity of reproductive health education and consultancy services, the lack of information on this subject will be eliminated to a large extent, and wrong practices will be prevented. Thus, women's health, reproductive health, and public health will be able to be carried to a higher level. Emergency departments are places for preventing public health besides managing acute conditions.

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CASE REPORT / OLGU SUNUMU

A Rare Case of Cerebral Venous Anomaly Presenting with an Epileptic Seizure

Epileptik Nöbet ile Prezente Olan Nadir Bir Serebral Venöz Anomali Olgusu

Burçin Durmuş[1], Sefer Özkaya[2]

ABSTRACT

Aim: Although there are names such as 'venous angioma' and 'cerebral venous malformation,' they are now called developmental venous anomalies. The most common form of venous anomaly is cerebral vascular malformation. They are usually detected incidentally on computed tomography (CT) or magnetic resonance imaging (MRI) scans. In addition, it may present with hemorrhage, ischemic stroke, epileptic seizure, or headache in clinical practice. It is aimed to emphasize that cerebral venous anomalies can be a rare cause of epileptic seizures in this study.

Case: A 24-year-old male patient with no previous history of epilepsy or other disease was brought to the emergency department with convulsions and loss of consciousness in all four extremities, similar to generalized tonic-clonic seizures. It was learned that there were contractions in the whole body, urinary incontinence, foaming at the mouth, and locking in the jaw, which lasted for two minutes, and he remained unconscious for 1 hour. There was no feature in his or his family's medical history. He was conscious and cooperative. His vital signs were: blood pressure: 125/80 mmHg, pulse: 88 beats/min, respiratory rate: 13/min, fever: 36°C. All other system examinations, including the neurological system, were unremarkable. Complete blood count, electrolyte values, and liver and kidney function tests provided normal results. No abnormal findings were found on the CT scan of the brain. In the follow-up examination, a contrast-enhanced brain MRI was performed due to persistent vomiting and headache. Contrast-enhanced brain MRI showed hyperintense in T1 and T2 sequences and heterogeneous contrast transition in contrast-enhanced sequences, extending from the subcutaneous region to the parenchyma in the right occipital region. Brain MR venography revealed a venous malformation extending from under the skin to the cerebral venous system in the occipital region and draining. Since the patient had a neuroradiologically pathological risk factor, 1000 mg/day of levetiracetam was started as an antiepileptic treatment, even though he had his first epileptic seizure.

Conclusion: Developmental venous anomalies may present with hemorrhage, ischemic stroke, epileptic seizure, focal neurological deficits, or headache in clinical practice. In neurology clinics, the first epileptic seizure cases at a young age are frequently encountered as primary epileptic seizures. However, it should be kept in mind that rare clinical situations, such as in this case, may also present with epileptic seizures in young patients, and etiologic examinations should be planned accordingly.

Keywords: Epileptic seizure, venous anomaly, venous malformation

ÖZ

Amaç: 'Venöz anjiom', 'serebral venöz malformasyon' olarak isimlendirmeler olsa da günümüzde gelişimsel venöz anomaliler olarak adlandırılmaktadır. Venöz anomalilerin en sık görülen şekli serebral vasküler malformasyonlardır. Genellikle bilgisayarlı tomografi (BT) veya manyetik rezonans görüntüleme (MRG) taramalarında insidental saptanırlar. Bunun yanısıra hemoraji, iskemik inme, epileptik nöbet veya baş ağrısı ile klinik pratikte karşımıza çıkabilir. Bu çalışmada serabral venöz anomalilerin nadir bir epileptik nöbet nedeni olabileceğinin vurgulanması amaçlanmıştır.

Olgu: Daha önce epilepsi ve başka hastalık öyküsü olmayan 24 yaşında erkek hasta jeneralize tonik klonik nöbete benzer şekilde dört ekstermitede birden olan kasılma ve bilinç kaybı ile acil servise getirildi. İki dakika süren tüm vücutta kasılma, idrar inkontinansı, ağızda köpürme ve çenede kitlenme olduğu ve 1 saat boyunca bilincinin kapalı kaldığı öğrenildi. Özgeçmiş ve soygeçmişinde özellik yoktu. Bilinç açık koopere oryante idi. Vital bulgularında; kan basıncı: 125/80 mmHg, nabız: 88 atım/dk, solunum sayısı: 13/dk, ateş: 36°C olarak ölçüldü. Nörolojik sistem dahil diğer tüm sistem muayeneleri olağandı. Yapılan tam kan sayımı, elektrolit değerleri, karaciğer ve böbrek fonksiyon testleri normaldi. Beyin BT normal saptandı. Takipte dirençli kusması ve baş ağrısının olması üzerine kontrastlı beyin MRG yapıldı. Kontrastlı beyin MRG'nde sağ oksipitalde cilt altı bölgeden parankime uzanan T1 ve T2 sekansta hiperintens, kontrastlı sekansta heterojen kontrast geçişi şeklinde görünüm izlendi. Beyin MR venografide oksipitalde cilt altından serebral venöz sisteme uzanıp drene olan venöz malformasyon saptandı. Hastanın nöroradyolojik açıdan patolojik bir risk faktörü olması sebebiyle, ilk epileptik nöbeti olmasına rağmen hastaya antiepileptik tedavi olarak 1000 mg/gün levetirasetam başlandı.

Sonuç: Gelişimsel venöz anomaliler hemoraji, iskemik inme, epileptik nöbet, fokal nörolojik defisitlerle veya baş ağrısı ile klinik pratikte karşımıza çıkabilir. Nöroloji kliniklerinde genç yaş ilk epileptik nöbet olguları sıklıkla primer epileptik nöbetler olarak karşımıza çıkmaktadır. Ancak bu vakada olduğu gibi nadir görülen klinik tabloların da genç yaş hastalarda epileptik nöbet ile karşımıza çıkabileceği unutulmamalı ve yapılacak etiyolojik tetkikler buna göre planlanmalıdır.

Anahtar Kelimeler: Epileptik nöbet, venöz anomali, venöz malformasyon

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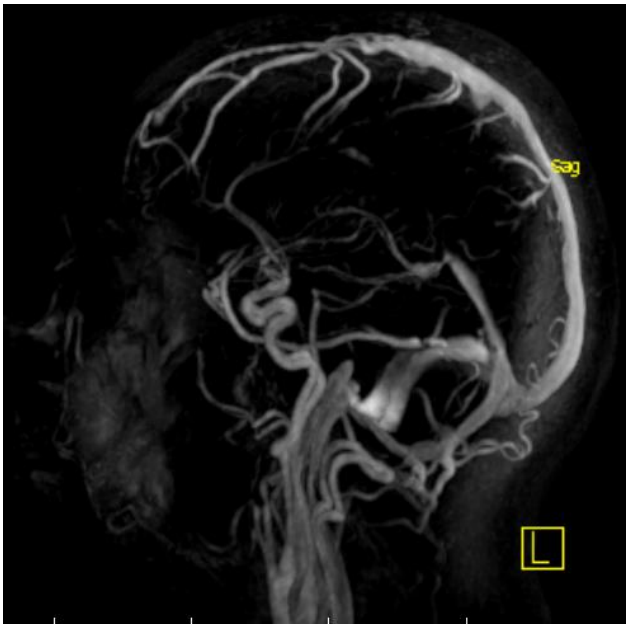
Giriş

Venöz malformasyonların en sık görüldüğü bölge baş-boyun bölgesidir. Baş boyun bölgesinde de sıklıkla, masseter, temporal, dil, oral ve larengeal mukozada etkilenme görülür (1). Venöz anomalilerin en sık görülen şekli ise serebral vasküler malformasyonlardır. 'Venöz anjiom', 'serebral venöz malformasyon' veya 'serebral venöz medüller malformasyon' olarak isimlendirmeler olsa da artık günümüzde gelişimsel venöz anomaliler olarak adlandırılmaktadır. Gelişimsel venöz anomaliler (GVA) en sık karşılaşılan serebral venöz malformasyon olup otopsi serilerinde insidansı yaklaşık %2.6 olarak bildirilmektedir (2). GVA'lar venöz yapılanmanın bir varyasyonu gibi düşünülebilir. Genellikle derin venöz sisteme drene olması beklenen alanları sentrifugal bir şekilde pial tarafa doğru veya direkt olarak dural venöz sinüslere doğru; veya normalde pial yüze veya direkt olarak dural venöz sisteme drene olması beklenen alanları sentripedal bir şekilde derin subependimal venlere doğru drene ederler. Meydana geliş şekilleri hala tartışma konusudur ancak intrauterin dönemde geliştikleri düşünülmektedir (3,4). Genel olarak rutin beyin tomografisi (BT) veya manyetik rezonans görüntülemesi (MRG) taramalarında insidental olarak saptanırlar. Hem pediatrik hem de erişkin popülasyonda karşılaşılabilir (5). İnsidental saptanabileceği gibi hemoraji, iskemik inme, epileptik nöbet, fokal nörolojik defisitlerle veya baş ağrısı ile klinik pratikte karşımıza çıkabilir. Literatürde baş ağrısı en sık karşılaşılan klinik tablodur (6). Bu çalışmada ilk defa nöbet geçirme öyküsü ile başvuran 24 yaşında bir erkek hasta sunulmuştur. Çalışmamızda hem venöz malformasyonların epileptik nöbetin nadir nedenlerinden biri olabileceğinin hem de acil servis-nöroloji klinikleri arasında yeterli iletişimin önemini vurgulayan, nadir vakaların acil servis izleminde optimal tanı ve tedavi edilebilmesinin öneminin vurgulanması amaçlanmıştır.

Olgu Sunumu

Daha önce epilepsi ve başka hastalık öyküsü olmayan 24 yaşında erkek hasta jeneralize tonik klonik nöbete benzer şekilde dört ekstremitede birden olan kasılma ve bilinç kaybı ile acil servise getirildi. Bilinç kaybı sonrasında kollarda ve bacaklarda ekstansiyon postüründe 2 dakika süren kasılmaların olduğu, bu sırada gözlerinin yukarı deviye olduğu, idrar inkontinansı, ağızda köpürme ve çenede kitlenme şikayeti olduğu ve 1 saat sonra bilincinin açıldığı öğrenildi. Öz geçmiş ve soy geçmişinde özellik yoktu. Kafa travması öyküsü yoktu. Herhangi bir ilaç ya da madde kullanım öyküsü yoktu. Hastanın ilk değerlendirmesinde genel durumu iyi, bilinç açık, koopere, oryante idi. Vital bulgularında; kan basıncı: 125/80 mmHg, nabız: 88 atım/dk, solunum sayısı: 13/dk, ateş: 36°C olarak ölçüldü. Fizik muayenesi ve nörolojik sistem muayeneleri olağandı. Acil serviste bakılan tam kan sayımı, karaciğer ve böbrek fonksiyon testleri, elektrolit değerleri olağandı. Acil serviste değerlendirilen ilk kan gazı tetkikinde laktat: 16 mmol/L, pH:7.18 saptandı. Hastanın acil servis gözlemi boyunca epileptik nöbet tekrarı olmadı ve izlemi sırasında değerlendirilen kontrol kan gazı normal saptandı. Epileptik nöbet etiyolojisi açısından çekilen beyin BT normaldi. Hastanın acil servis takibinde dirençli baş ağrısı ve kusmalarının olması üzerine etiyolojik amaçlı kontrastlı beyin MR planlandı. Takiplerde ateş yüksekliği olmadı, kontrol nörolojik muayenesi olağan saptandı. Kontrastlı beyin MRG'nde sağ oksipitalde cilt altı bölgeden parankime uzanan, T1 ve T2 sekansta hiperintens görünen, kontrastlı incelemede heterojen kontrast geçişin olduğu lezyon saptandı. Hasta ileri tetkik amaçlı nöroloji servisine yatırıldı. Hastaya yapılan beyin MR venografide dinamik kesitlerde ve 3 boyutlu sekansta, oksipitalde cilt altından serebral venöz sisteme uzanıp drene olan venöz malformasyon saptandı (Şekil-1 ve Şekil-2 a,b,c). Yapılan elektroensefalografisi (EEG) normal saptandı. Nöroloji servisi takibinde epileptik nöbeti gözlenmedi. Hastada saptanmış olan venöz malformasyon sebebiyle ilk epileptik nöbeti olmasına rağmen antiepileptik tedavi olarak 1000 mg/gün levetirasetam başlandı. Venöz malformasyonun girişimsel açıdan değerlendirilmesi ve takibi için hasta üst basamak sağlık kuruluşun sevk edildi.

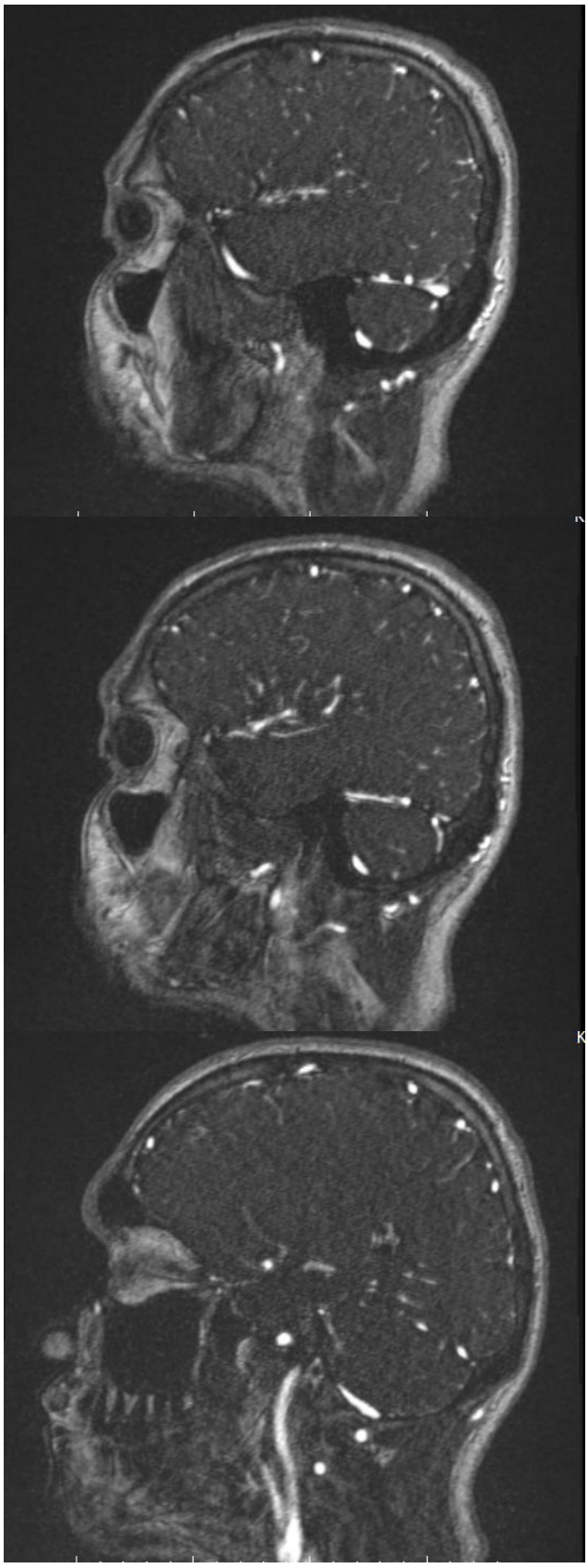
Bu olgu sunumunun ve eşlik eden görüntülerin yayınlanması için hastadan yazılı bilgilendirilmiş olur alınmıştır.



Şekil 1. Beyin MR venografi 3 Boyutlu görüntüsü

Tartışma

Gelişimsel venöz anomaliler; 'venöz anjiom', 'serebral venöz malformasyon' veya 'serebral venöz medüller malformasyon' olarak da adlandırılmaktadır. Gelişimsel venöz anomaliler (GVA) en sık karşılaşılan serebral venöz malformasyon olup otopsi serilerinde insidansı yaklaşık %2.6 olarak bildirilmektedir (2). Vasküler malformasyonlar, embriyogenezis sırasındaki bozukluk sonucu ortaya çıkar.



Şekil 2a-2b-2c. Beyin Mr venografi görüntüleri

Baskın olan damar tipine göre arteriyel, venöz, kapiller, lenfatik ya da bunların kombinasyonlarından oluşan alt gruplara ayrılıp; akım hızlarına göre ise yavaş akımlı (kapiller, lenfatik ve venöz malformasyonlar) ve hızlı akımlı (arteryel ve arteriovenöz malformasyonlar) olarak gruplandırılırlar. Daha sıklıkla supratentorial alanda ve frontal bölgede izlenirler. Russell ve Rubinstein'in yaptığı sınıflamaya göre intraserebral yerleşimli vasküler malformasyonlar; arteriovenöz malformasyonlar, kapiller telenjiektazi, kavernom ve venöz malformasyonlar olarak 4 gruba ayrılır. GVA'ların %13-40'ına kavernöz malformasyonlar eşlik edebilir. Güncel adıyla gelişimsel venöz anomaliler en sık görülen serebral vasküler malformasyon çeşidi olup geniş bir drenaj venine açılan dilate intramedüller venlerden oluşur (7).

Genellikle doğum sırasında vardır ancak çocukluk çağına hatta bazen erişkin döneme kadar bulgu vermeyebilirler (8). Sıklıkla rutin BT veya MRG taramalarında insidental olarak saptanırlar (5). İnsidental saptanabileceği gibi hemoraji, iskemik inme, epileptik nöbet, fokal nörolojik defisitlerle veya baş ağrısı ile klinik pratikte karşımıza çıkabilir. Literatürde en sık olarak baş ağrısı ile karşılaşıldığı bildirilmiştir (6). Görülme sıklığına göre klinik prezentasyonlar baş ağrısı (%93), diplopi (%72) ve unilateral hemipleji (%55) olarak bildirilmiştir. Temporal lob yerleşimli olanlarda psikomotor epilepsi sıklıkla gözlenebilmektedir (9). Ruiz ve ark. yaptıkları literatür taramasında 19 semptomatik tromboze GVA vakasıyla karşılaştıklarını ve bunların klinik olarak: venöz iskemik infarkt (%53), parankimal hemoraji (%37), subaraknoid ve intraventriküler kanama (%5) şeklinde prezente olduklarını bildirmişlerdir (3). Oksipital lob yerleşimli olanlarda sıklıkla renkli görmede bozukluklar, hareket algısı sorunu, aynı anda birden fazla nesneyi algılayamama gibi görme ile ilgili bozukluklar beklenirken epileptik nöbet genellikle temporal lob yerleşimli olgularda gözlenmektedir. Olgumuz, oksipital yerleşimli olmasına rağmen jeneralize tonik klonik epileptik nöbet ile prezente olmuş genç yaş bir vakaydı.

Gelişimsel venöz anomaliler (GVA) bir toplayıcı vene doğru konverjans gösteren kaput medusa şeklindeki medüller ven kümelerinden oluşur. Toplayıcı venin geçtiği parankim uzunluğu lezyondan lezyona farklılık gösterir. Nadiren hem pial hem de ependimal tarafa drene olabilirler (3). Günümüzde BT ve MRG teknolojisinin gelişimi sonucunda artık Dijital Substraksiyon Anjiografi (DSA) yapılmadan da GVA tanısı konulabilmektedir. DSA günümüzde sıklıkla; iskemik veya hemorajik infarkt gelişen veya eşlik eden şüpheli vasküler malformasyonu olan vakalarda kullanılmaktadır. Temporal çözünürlüğü daha yüksek olduğundan hemodinamik özelliklerinin gösterilmesinde yine de hala en iyi görüntüleme yöntemi DSA'dır (10,11).

GVA vakalarının kliniğini ve cerrahi yönetimlerini genellikle, eşlik eden kavernomun özellikleri belirler. Kavernomun eşlik etmediği pür GVA vakaları için rutinde takip gerekli değildir (12). Venöz malformasyonun yerleştiği bölgeye göre; yatarken baş elevasyonu, lazer, skleroterapi ile cerrahi ve girişimsel tedaviler tedavi seçenekleri arasında sıralanabilir. Hangi tedavinin tercih edileceği değerlendiren merkez ve uzman yaklaşımına bağlıdır. Mukozal ve cilt lezyonları için lazer tedavisi en temel tedavidir. Hava yollarındaki lezyonlar

için de endoskopik lazer tedavisi uygulanabilir. Skleroterapi de baş boyun bölgesi lezyonlarında kullanılabilir ancak hava yolu obstrüksiyonu, enfeksiyon, sinir hasarı ve kardiyovasküler kollaps gibi potansiyel komplikasyonları göz önünde bulundurmak gerekir (13). Literatürde tromboze GVA'ların tedavilerinde trombozun ilerlemesini engellemek amaçlı veya rekanalizasyonu sağlamak için antikoagülan ajanların kullanılabileceğine dair yayınlar mevcuttur (14). Bizim vakamızda ileri inceleme amaçlı hasta ileri bir merkeze yönlendirilmiş olup yapılan tetkikler sonucunda venöz malformasyona kavernom eşlik etmediği saptandı. Yapılan tüm sistem muayenelerinde de başka bir lokalizasyonda venöz malformasyon olmadığı tespit edildi. Nöroloji pratiğinde ilk kez epileptik nöbet şikayeti ile başvuran genç yaş hastalar, herhangi bir risk faktörü olmaması halinde tedavisiz izleme alınmaktadır. Ancak hastamızda nöroradyolojik olarak patolojik bir risk faktörü olması sebebiyle antiepileptik tedavi ile klinik ve radyolojik takibe alınması kararlaştırıldı.

Sonuç

Nöroloji kliniklerinde genç yaş ilk epileptik nöbet olguları sıklıkla primer epileptik nöbetler olarak karşımıza çıkmaktadır. Ancak bu vakada olduğu gibi nadir görülen klinik tabloların da genç yaş hastalarda epileptik nöbet ile karşımıza çıkabileceği unutulmamalı ve yapılacak etiyolojik tetkikler özenle planlanmalıdır. Bu çalışma venöz malformasyonların nadir bir epileptik nöbet nedeni olabileceğini göstermektedir. Bu nedenle klinisyenler nöbet etiyoloji araştırırken venöz malformasyonları göz önünde bulundurmalıdır. Son olarak vakamız üzerinden; acil servise başvuran nörolojik semptomu olan olgularda, hastanın acil ilk müdahalesi yapıldıktan sonra acil servis ve nöroloji kliniklerinin hastayı birlikte değerlendirmesi sırasında iyi ve düzenli bir iletişimle tetkik algoritmasının düzenli planlanmasının, nadir görülen olgulara acil servis izleminde optimal olarak tanı konulmasına katkı sağladığını görerek acil servislerde konsültan branşlar ile karşılıklı efektif iletişimin öneminin vurgulamak açısından da sunulmaya değer bulduk.

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REVIEW / DERLEME

Traumatic Rhabdomyolysis (Crush Injury) Management

Travmatik Rabdomiyoliz (Crush Yaralanması) Yönetimi

Ali Batur[1]

ABSTRACT

Traumatic rhabdomyolysis (Crush injury) describes metabolic disorders due to muscle cell destruction resulting from the crushing of part or whole body under an external crushing force. Especially after the removal of the overwhelming force, free radicals that occur with the reperfusion of the muscle tissue cause muscle cell destruction. With muscle cell destruction, intracellular electrolytes and enzymes influx the circulation. As a result of traumatic rhabdomyolysis, serum potassium, phosphate, myoglobin, creatinine kinase (CK), aspartate transferase (AST) and lactate dehydrogenase (LDH) levels increase. Acute kidney injury may occur especially as a result of accumulation of myoglobin in the renal tubules, and fatal dysrhythmias and sudden cardiac death may develop as a result of increased potassium level.

The classic triad used in the diagnosis of traumatic rhabdomyolysis are muscle pain, muscle weakness, and dark urine. A serum creatinine kinase level above 1000 U/L or more than five times the upper limit of normal is diagnostic for rhabdomyolysis.

The main goal of traumatic rhabdomyolysis treatment is adequate and appropriate fluid resuscitation. Appropriate fluid therapy should be initiated as soon as possible, especially in order to prevent potentially fatal conditions. Crystalloid fluids should be preferred primarily in fluid resuscitation. Although there is no consensus among crystalloid fluids, there is a widespread opinion that fluid resuscitation should be performed with isotonic saline. As soon as the patient is reached, appropriate vascular access should be provided and isotonic saline infusion at a rate of 1000 ml/hour should be started. The recommended initial rate for fluid resuscitation in children is 15-20 ml/kg/hour. The targeted urine output to assess the adequacy of fluid resuscitation is 1-3 ml/kg/hr or 300 ml/hr.

The most important electrolyte disorder caused by traumatic rhabdomyolysis is hyperkalemia. High serum potassium levels can cause fatal dysrhythmias and sudden cardiac death. For this reason, insulin-glucose infusions and inhaled beta 2 adrenergic agents should be used in the treatment of hyperkalemia. Calcium chloride or calcium gluconate can be used to reduce cardiac excitability in patients with a serum potassium level above 7 mmol/L or in suspected cardiac involvement. Hemodialysis should be applied in patients whose potassium level cannot be controlled.

Even if a consensus could not be reached in the treatment of traumatic rhabdomyolysis, past studies and experiences have enabled the establishment of standard patient management. Treatment schemes to be arranged in accordance with this management plan will contribute to the reduction of mortality and morbidity.

Keywords: Crush, rhabdomyolysis, trauma, acute renal injury, hyperkalemia

ÖZ

Travmatik rabdomiyoliz (Crush yaralanması) vücudun bir bölümünün veya tamamının harici ezici bir güç altında ezilmesi sonucu ortaya çıkan kas hücresi yıkımına bağlı metabolik bozuklukları tanımlar. Özellikle ezici kuvvetin kaldırılması sonrası kas dokusunun reperfüzyonu ile ortaya çıkan serbest radikaller kas hücre yıkımına neden olur. Kas hücre yıkımı ile hücre içi elektrolitler ve enzimler dolaşıma geçer. Travmatik rabdomiyoliz sonucu serum potasyum, fosfat, myoglobin, kreatinin kinaz (CK), aspartat transferaz (AST) ve laktat dehidrogenaz (LDH) seviyeleri artar. Özellikle myoglobinin renal tübüllerde birikmesi sonucu akut böbrek hasarı, potasyum düzeyinin yükselmesi sonucu ise ölümcül disritmiler ve ani kardiyak ölüm gelişebilir.

Travmatik rabdomiyoliz tanısında kullanılan klasik triyad kas ağrısı, kas zayıflığı ve koyu renkli idrar bulgularıdır. Serum kreatinin kinaz seviyesinin 1000 U/L nin üzerinde olması veya normal üst sınırının beş katından fazla olması rabdomiyoliz için tanı koydurucudur.

Travmatik rabdomiyoliz tedavisinin ana hedefi yeterli ve uygun sıvı resüsitasyonudur. Özellikle ölümcül seyredebilecek durumların önlenmesi için hastaya ulaşılan ilk anda uygun sıvı tedavisi başlanmalıdır. Sıvı resüsitasyonunda öncelikli olarak kristaloid sıvılar tercih edilmelidir. Her ne kadar kristaloid sıvılar arasında bir ortak görüş sağlanamamış olsa da sıvı resüsitasyonunun izotonik salin ile yapılması yönünde yaygın bir görüş vardır. Hastaya ulaşıldığı ilk anda uygun damar yolu erişimi sağlanıp 1000 ml/saat hızında izotonik salin infüzyonu başlanmalıdır. Çocuklarda sıvı resüsitasyonu için önerilen başlangıç hızı 15-20 ml/kg/saattir. Sıvı resüsitasyonunun yeterliliğini değerlendirmek için hedeflenen idrar çıkışı miktarı ise 1-3 ml/kg/saat veya 300 ml/saattir.

Travmatik rabdomiyolizin oluşturduğu en önemli elektrolit bozukluğu hiperpotasemidir. Yüksek serum potasyum düzeyleri ölümcül disritmilere ve ani kardiyak ölümlere neden olabilir. Bu sebeple hiperpotasemi tedavisinde insülin-glikoz infüzyonları, inhale beta 2 adrenerjik ajanlar kullanılmalıdır. Serum potasyum seviyesi 7 mmol/L nin üzerinde olan veya kardiyak etkilenim düşünülen hastalarda kardiyak uyarılabilirliği azaltmak için kalsiyum klorit veya kalsiyum glukonat kullanılabilir. Potasyum seviyesi kontrol altına alınamayan hastalarda hemodiyaliz uygulaması yapılmalıdır.

Travmatik rabdomiyoliz tedavisinde ortak görüş sağlanamamış dahi olsa geçmiş çalışmalar ve elde edilen deneyimler standart hasta yönetiminin oluşturulmasını sağlamıştır. Bu yönetim planına uygun düzenlenecek olan tedavi şemaları mortalitenin ve morbiditenin azalmasına katkı sağlayacaktır.

Anahtar Kelimeler: Crush, rabdomiyoliz, travma, akut böbrek hasarı, hiperpotasemi

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Giriş

İlk olarak 1941 yılında Beall ve ark *Crush Yaralanmasını* (Travmatik Rabdomiyoliz) tanımlamışlardır (1). İngiltere'de meydana gelen bir patlama sonucunda özellikle göçük altında kalan hastaların çeşitli benzerlikler taşıdıklarını fark etmişlerdir. Göçük altından çıkarıldıktan sonra özellikle göçük altında kalan uzvun takip esnasında şiştiğini, vazokonstriksiyon olmaksızın uzvun soluklaşıp soğuduğunu görmüşlerdir. Sonrasında idrar renginde koyulaşma olduğunu, kahverengi renkli granüler yapıların görüldüğünü ve idrarda albümin tespit edildiğini raporlamışlardır. Ayrıca yaygın ödemi takiben serum kalsiyum ve üre seviyesinin arttığını tespit etmişlerdir. Bu hastalara yapılan otopsiler sonucunda kas nekrozları ve renal tübüllerde kahverengi pigmentler içeren dejeneratif değişiklikler olduğu görülmüştür. Tüm bu bulgular *Crush Yaralanması* (Travmatik Rabdomiyoliz) olarak adlandırılmıştır.

Travmatik Rabdomiyoliz (TR) adı verilen ve ölümcül seyredebilen bu durum vücudun tamamının veya bir bölümünün harici bir ezici güce maruz kalması sonucu ortaya çıkar. Oluşan geri dönüşsüz iskemik kas yıkımı sonucu hücre içi elektrolit ve enzimlerin seruma geçişi ile karakterize bir durumdur (2). Hayatı tehdit eden temel sebep ortaya çıkan rabdomiyoliz ve buna bağlı gelişen komplikasyonlardır.

Sıklıkla TR 1 saat ve üzerinde ezici kuvvete maruz kalma sonucu ortaya çıktığı düşünülse de şiddetini belirleyen asıl faktörler kazazedenin yaşı, vücut kitle endeksi, etkilenen kas dokusu miktarı, dehidratasyon seviyesi ve bölgesel kanlanmanın bozulma oranıdır (3,4). Ezici güç altında kalan vücut bölgesinde ortaya çıkan venöz dönüş bozukluğu sonucu hücre dışı alanda ve kompartmanlarda sıvı birikimi oluşur. Artan kompartman basıncı eşik değeri geçtiğinde arteriyel dolaşım da kesilir. Ezici kuvvetin altında kalan bölgede şişlik, soğukluk, ağrı ve sonrasında tansiyon düşüklüğü ve metabolik bozukluklar ortaya çıkar (2,3). Ancak kısa süreli ezici kuvvet maruziyeti de ölümle sonuçlanabilen travmatik rabdomiyolize neden olabilir. Bu duruma "gülümseyen ölüm" (*smiling death*) adı verilir. Dolayısıyla yaralının ezici kuvvet altında kısa süreli kalması hekimi olası TR ön tanısından uzaklaştırmamalıdır.

Patofizyoloji

Travmatik Rabdomiyolizin (TR) patofizyolojisinde artmış kas hücresi yıkımı vardır. Kas hücreleri sodyum-potasyum adenozin trifosfataz (Na-K ATPaz) pompası ve voltaj bağımlı sodyum-kalsiyum (Na-Ca) değiştirici kanallar aracılığıyla hücre içi kalsiyum seviyesini düşük tutar. Na-K ATPaz pompası hücre içi sodyumun hücre dışına aktif olarak çıkmasını sağlar. Sodyumun hücre dışına atılması ile oluşan gradiyen kalsiyumun sarkoplazmik retikulum ve mitokondride yoğunlaşmasına neden olur (3). Ezici bir yük altında iken ortaya çıkan kas nekrozunun yanı sıra özellikle ezici yükün kalkması sonrası yeniden kanlanma (reperfüzyon) ile de travmatik rabdomiyoliz ortaya çıkabilir. Yeniden kanlanma özellikle kan, sodyum ve enflamatuvar medyatörlerin hasarlı dokuya ulaşıp serbest radikaller oluşturmasına neden olur. Oluşan serbest radikaller ve ATP arz talep uyumsuzluğu hücre içi kalsiyum seviyesinin artmasına ve hücresel transfer mekanizmalarının bozulmasına neden olur. Artmış kalsiyum seviyeleri ise proteolitik enzimleri ve fosfolipazları aktive ederek kas hücre yapısını bozar. İndüklenen hipoksi ile apopitoz ve hücre lizisi ortaya çıkar (5-7). Hücre yıkımına bağlı olarak başta potasyum, miyoglobin ve kreatinin kinaz olmak üzere fosfat, ürik asit, laktat dehidrogenaz ve aspartat transferaz gibi enzim ve elektrolitler serumda artar (6). Artan miyoglobin seviyeleri plazma bağlama kapasitesini aştığında miyoglobin akut böbrek hasarına yol açabilen glomerüler çökeltilere dönüşür (8). Travmatik rabdomiyolize bağlı akut böbrek hasarı ve eşlik eden elektrolit dengesizliği ortaya çıkar.

Klinik Belirti ve Bulgular

Travmatik rabdomiyolizin klinik belirti ve bulguları birincil olarak yıkıma uğrayan kas hücrelerinden dolaşıma salınan enzim ve elektrolitler ile ilişkilidir. Oluşan kas yıkımının düzeyi ve intravasküler volümün kaybı klinik ciddiyeti belirleyen başlıca parametrelerdir. Travmatik rabdomiyolizin klasik semptomları *kas ağrısı, kas zayıflığı ve koyu renkli idrar (çay rengi idrar)* olarak belirlenmiş olmasına rağmen bu triyad tüm hastaların sadece %10'unda görülür (9,10). Yaralılar sıklıkla ezici güce maruz kalmış bölgede ağrı, şişlik, sertlik ve kramptan yakınırlar. Ekstravasküler alandaki sıvının üçüncü boşluğa geçişine bağlı olarak ekstremitede gerginlik, şişlik ve ağrı görülebilir. Travmaya ikincil olarak bül oluşumları ve cilt nekrozları gelişebilir. Ciddi vakalarda kompartman sendromu bulguları ortaya çıkabilir. Bu hasta grubunda acil fasiyotomi uygulaması ile kompartman basıncının düşürülmesi sağlanmalıdır (11). Koyu renkli idrar yeterli sıvı replasmanı yapılamamış hastalarda tanı koydurucu temel bulgudur. Kas yıkımı sonrası dolaşıma geçen miyoglobin proteine önemli ölçüde bağlanmayan bir monomerdir. Bu sebeple idrardan hızlıca atılır. TR'de idrarın koyulaşmasının temel sebebi miyoglobinin idrar ile atılmasıdır.

TR'de görülen temel patolojik bulgular sıvı elektrolit bozuklukları ve serum enzim seviyelerindeki artıştır. Hücre içi elektrolit ve enzimlerin dolaşıma geçmesi sonucu öncelikle hücre içi enzimlerden kreatinin kinaz, laktat dehidrogenaz ve aspartat transferazın serum seviyesi yükselir. Serum kreatinin kinaz seviyeleri travmatik rabdomiyolizin ilk 12 saatinde kademeli olarak yükselir, 72 saatte pik değerine ulaşır ve 7-10 gün içinde normal seviyelere geri döner (12). Kreatinin kinaz seviyesinin 1000 U/L nin üzerinde olması veya normal üst sınırının beş katından fazla olması rabdomiyoliz için tanı koydurucudur (12). Travmatik rabdomiyolizde sıklıkla hiperpotasemi, hiperfosfatemi ve

hipokalsemi gelişir. Kas dokusundaki 100 gramlık kayıp potasyum seviyesini 1,0 mEq/L yükseltir (13). Bu sebeple ciddi kas yıkımının olduğu TR durumlarında ortaya çıkacak hiperpotasemi ciddi disritmilere ve ani kalp durmasına neden olabilir. Hiperpotaseminin erken dönemde düzeltilmesi mortalitenin azalması yönünde olumlu etkiye sahiptir. Potasyum ve fosfatın aksine serum kalsiyum seviyesi düşüktür. Bunun temel sebebi kalsiyumun hücre içine transferinin artışı, hücre içinde fosfat ile birleşerek çökelti oluşturması ve travmaya ikincil paratiroid hormon yanıtının azalması olarak gösterilir (14,15).

TR, kan üre nitrojen ve kreatinin seviyelerinin arttığı bir durumdur. Fosfat ve organik asitlerin dolaşımdaki artışı artmış anyon açıklı metabolik asidoza neden olur. Akut böbrek hasarı gelişen durumlarda kas pürinlerinin salınımının artması ve atılımının azalması sebebiyle hiperürisemi ortaya çıkar (12).

Hastane Yönetimi

Sıvı Resüsitasyonu

TR hızlı müdahale edilmesi gereken ölümcül seyredebilen bir durumdur. Bu sebeple ilk müdahalesi ve tedavisi alanda başlamalıdır. Özellikle göçük altında kalan yaralılara ulaşıldığında yaralı göçük altından çıkarılmadan önce sıvı tedavisinin başlanması hayati önem taşımaktadır (11,16). Erken dönemde başlanılan sıvı tedavisi travmatik rabdomiyolize bağlı gelişen akut böbrek hasarının önlenmesini sağlayabilir (17,18). Klinik olarak TR ön tanısı olan hastalara öncelikli olarak kristaloid sıvılar ile sıvı resüsitasyonuna başlanmalıdır. Erken dönemde başlanan yüksek hacimli kristaloid sıvı resüsitasyonu renal tübüllere kan akışını artırarak, miyoglobin gibi nefrotoksik ajanların derişimini azaltarak ve renal perfüzyonu arttırarak akut böbrek hasarının önlenmesini sağlayabilir (19).

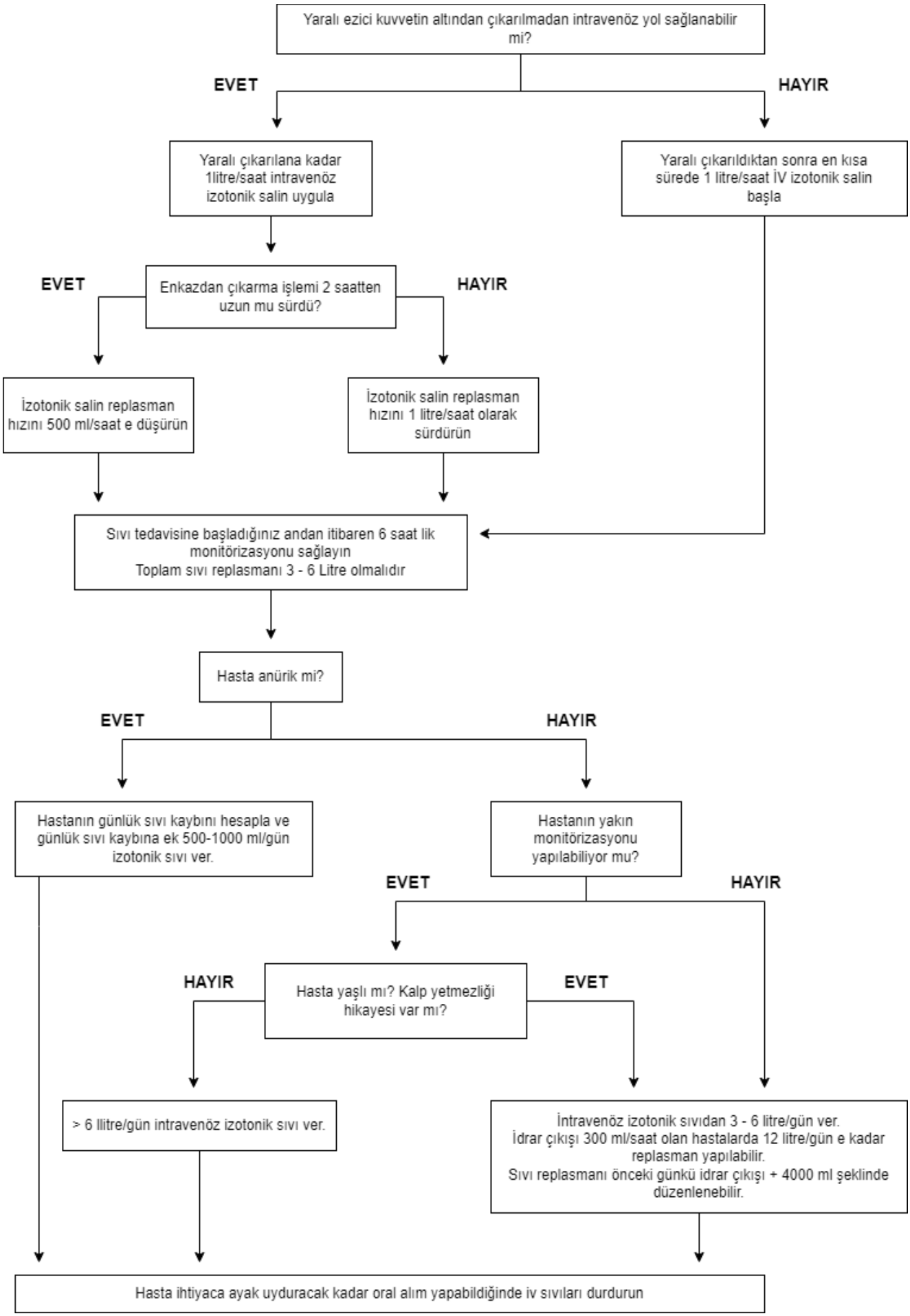
Yaralıya ilk ulaşıldığı andan itibaren olası TR açısından tedavi alanda başlamalıdır. TR yönetiminde en önemli basamak sıvı resüsitasyonudur. İyi yönetilen bir sıvı resüsitasyonu yaralının sağ kalımını arttıracak ve morbidite oranlarını anlamlı düzeyde düşürecektir (16). Uygun sıvı resüsitasyonu için hastaya uygun anatomik bölgeden santral venöz katater uygulanmalıdır. Yaralıya kristaloid sıvılardan tercihen izotonik salin 1000 ml/saat şeklinde başlanmalıdır. Çocuklarda doz 15-20 ml/kg/saat olarak belirlenmelidir (16). Yaralıya ilk 6 saat boyunca ortalama 3 – 6 litre sıvı replasmanı yapılmalıdır. Yaralının idrar çıkışı değerlendirilmeli idrar çıkışı olmayan durumlarda yaralının günlük sıvı kaybına ek 500-1000 ml izotonik salin replasmanı sağlanmalıdır. İdrar çıkışı gözlenen hastalarda hasta monitörize edilemiyor veya kalp yetmezliği öyküsüne sahip ise günlük sıvı resüsitasyon miktarı 3-6 litre ile sınırlanmalıdır. 300 ml/saat üzerinde idrar çıkışı olan hastalarda 12 L/gün'e kadar sıvı replasmanı yapılabilir. Uzun süreli takip edilen hastalarda ise günlük idrar çıkışı miktarına ek 4 litre izotonik salin replasmanı yapılmalıdır. İdrar çıkışı olan, monitörize takip edilebilen ve kalp yetmezliği öyküsü olmayan hastalarda 6 L/gün üzerinde sıvı replasmanı yapılabilir. Hastalar yeterli düzeyde oral alımı sağladıkları takdirde sıvı replasmanı kesilmelidir. Travmatik rabdomiyoliz için Sever ve ark tarafından oluşturulan sıvı resüsitasyon algoritması Şekil 1' de verilmiştir (16). Sıvı resüsitasyonu için hedeflenen idrar çıkışı miktarı 1-3 ml/kg/saat veya 300 ml/saat tir (19). Sıvı resüsitasyonu sırasında hastaların sıvı yüklenmesi açısından aralıklı takibi önerilir. Hastanın aldığı çıkardığı sıvı takibinde gözlenecek farklılıkların klinik yansıması aralıklı olarak kontrol edilmelidir. Hasta sıvı yüklenmesi açısından solunum sistemi muayenesi, santral venöz basınç ölçümü veya vena kava endeksi ölçümü ile takip edilmelidir.

Travmatik rabdomiyoliz yönetiminin temelini sıvı resüsitasyonu oluşturur. Ancak seçilecek sıvının belirlenmesi tartışmalı bir konudur. Her ne kadar resüsitasyonda kristaloid sıvıların kullanılması yönünde bir konsensus oluşmuş olsa da en uygun kristaloid sıvının hangisi olduğu ile ilgili tartışmalar devam etmektedir (1-16-18). Laktatlı ringer solüsyonları göreceli yüksek oranda potasyum içerdiği için teorik olarak hiperpotasemi ile seyreden TR'de kullanılması uygun değildir. Ancak diğer taraftan uzun süre izotonik salin infüzyonu metabolik asidoza neden olabilir. Travmatik rabdomiyoliz de klinik olarak metabolik asidoz ile seyredebileceği için derin asit baz bozuklukları açısından dikkatli olunmalıdır. Her iki kristaloid sıvıyı karşılaştıran randomize kontrollü bir çalışmada her iki sıvı tipi arasında herhangi anlamlı fark tespit edilmemiştir (19).

Elektrolit Bozukluklarının Tedavisi

TR'de en sık görülen elektrolit bozuklukları hiperpotasemi, hiperfosfatemi ve hipokalsemidir. Yaralılar özellikle erken dönemde ortaya çıkan hiperpotasemi açısından dikkatlice değerlendirilmelidir. Olası kardiyak disritmiler ve ani kardiyak ölüm açısından dikkatli olunmalıdır. Hiperpotasemi (> 6 mmol/L) tespit edilen hastalara kardiyak monitörizasyon yapılmalı ve elektrokardiyogram ile değerlendirilmelidir. Hastalar insülin – glikoz infüzyonu, inhale beta 2 adrenerjik ajanlarla erken dönemde tedavi edilmeye çalışılmalıdır. Cevap alınamayan durumlarda katyon değiştirici reçineler (kayakselat) ve son olarak hemodiyaliz uygulanabilir (4,20,21). Serum potasyum seviyesi 7 mmol/L olan hastalarda veya hayatı tehdit edici disritmi varlığında hiperpotasemi tedavisinde kalsiyum glukonat veya kalsiyum klorit kullanılmalıdır. Ciddi travmatik rabdomiyoliz medikal yöntemlerle tedavi edilemeyen hiperpotasemi durumlarına yol açar ve büyük çoğunluğu hemodiyaliz ile tedavi edilir. Travmatik rabdomiyolizde ortaya çıkan hiperpotasemi tedavisinde kullanılan ilaçlar Tablo 1'de verilmiştir.

Hücre içinde kalsiyum birikmesi ile TR erken fazında ortaya çıkan hipokalsemi semptomatik olmadığı sürece ve hiperkalemiye ikincil kardiyak etkilenim olmadığı sürece tedavi edilmemelidir (19).



Şekil 1. Travmatik rabdomiyoliz sıvı tedavisi algoritması

Tedavide Kullanılan İlaç	Etki Mekanizması	Uygulama Şekli
Kalsiyum glukonat	Miyokardiyal membran uyarılabilirliğini azaltma	1000 mg (%10'luk solüsyondan 10 ml) intravenöz 2-3 dakikada
Kalsiyum klorid	Miyokardiyal membran uyarılabilirliğini azaltma	500 – 1000 mg (%10'luk solüsyondan 10 ml) intravenöz 2-3 dakikada
İnsülin dekstroz infüzyonu	Potasyumun hücre içine girişini sağlama, Na-K ATPaz pompasını aktifleştirme	10 ünite/saat regüler insülin intravenöz infüzyon 250 ml/saat %20 Dekstroz intravenöz infüzyon*
Beta 2 adrenerjik agonist	Na-K ATPaz pompasını aktifleştirme	10-20 mg nebülizör ile 10 dakika boyunca
Kayakselat	Gastrointestinal sistemden potasyumun atılmasını arttırma	15-60 gram 5-20 mg sorbitol ile karıştırılmış su içinde oral yolla (4-6 saatte bir)

*Serum glikoz düzeyi ve yandaş hastalıklar göz önünde bulundurularak titre edilmelidir.

Tablo 1. Hiperpotasemi tedavisinde kullanılan ilaçlar

Hipokalsemi TR tedavisi ile hızlıca düzelir. Bu sebeple erken dönemde verilen kalsiyum tedavisi ani gelişen hiperkalsemiye ve kas hücresinde birikerek artmış kas yıkımına sebep olabilir (4,20).

İdrar Alkalizasyonu

TR'de hipovolemi, vazokonstriksiyona ikincil gelişen glomerüler filtrasyonda azalma, serbest radikaller ile oluşan hasar, miyoglobin yıkım ürünlerinin tübüllerde birikmesi sonucu akut böbrek hasarı oluşur. Özellikle metabolik asidoz varlığında miyoglobin yıkım ürünleri olan serbest radikaller renal tübüllerde hasara neden olur. Bu sebeple idrarın alkalileştirilmesi böbrek hasarını azaltabileceği öngörülmektir. İdrar alkalizasyonu bikarbonat aracılığıyla sağlanabilir. Bikarbonat tedavisi ile hedeflenen idrar pH düzeyi 6,5 ve üzeridir. Bu seviyenin üzerindeki pH değerleri akut böbrek hasarı gelişimini önleyebilir (22). Ancak rutin olarak önerilmemektedir (4).

İdrar alkalizasyonu temel olarak asidik ortamda artan tübüler hasarı azaltmaya yöneliktir. Ancak solunum ve dolaşım yetmezliği olan hastalarda bikarbonat tamponlama sistemi ile karbondioksit üretimi artar ve paradoksal hücre içi asidoz ile hacim artışı ortaya çıkar (23). Oluşan hücre içi asidoz ve artmış hacim yükü akut böbrek hasarı gelişimini hızlandırır.

Diürez Tedavi

Mannitol ozmotik bir diüretiktir ve diürezde artışa, renal perfüzyonda iyileşmeye ve kas kompartman basınçlarında azalmaya sebep olur.

Ayrıca böbrek parankimi üzerinde doğrudan antioksidan etkiye sahiptir. Tüm bu özellikleri nedeniyle mannitolün travmatik rabdomiyolizde kullanımını öneren çalışmalar vardır. Ancak tedaviye mannitolün eklenmesi için hastanın izotonik salin tedavisine yeterli yanıt verememesi ve idrar çıkışının 300 ml/saat'in altında olması gerektiği belirtilmiştir (16). Ancak potansiyel prerenal azotemi oluşturma özelliği sebebiyle kullanımı ile ilgili kesin bir ortak görüş yoktur (19).

Sonuç

Travmatik rabdomiyoliz ölümcül seyredebilen ve yönetimi güç olan bir durumdur. Her ne kadar temel tedavi prensipleri yapılan çalışmalar ve elde edilen deneyimlerle belirlenmiş olsa da halen tedavi yöntemleri için ortak bir görüş sağlanamamıştır. Ancak mevcut önerilerle tedavinin şekillendirilmesi ve hasta yönetimin sağlanması TR mortalite ve morbidite oranlarında azalmaya neden olacaktır.

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