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ORIGINAL ARTICLE / ÖZGÜN ARAŞTIRMA MAKALESİ

Evaluation of Pre-Hospital Healthcare Personnel's Knowledge and Experience Levels About Prone CPR: A Survey Study

Hastane Öncesi Sağlık Personelinin Pron Kardiyo Pulmoner Resüsitasyon Hakkında Bilgi Düzeyinin Değerlendirilmesi

Fatma Karakoyun[1], Gül Pamukçu Günaydın[2], Murat Genç[3]

ABSTRACT

Aim: Prone cardiopulmonary resuscitation (CPR) (CPR performed in the prone position) is an important intervention for managing cardiopulmonary arrest in patients that experience cardiopulmonary arrest in the prone position. It is important for pre-hospital healthcare personnel to learn and practice this technique when necessary. This study aims to determine the knowledge level of pre-hospital healthcare personnel on prone CPR.

Material and Methods: Our study is a cross-sectional survey study conducted at a single center. Pre-hospital healthcare personnel who transferred patients by ambulance to Ankara City Hospital between July 1-31, 2021, were included in the study. Participants were given a total of 31 questions, 24 of which aimed to determine demographic information and educational status, and 7 of which assessed theoretical knowledge about prone CPR.

Results: A total of 99 pre-hospital healthcare personnel participated in the study. The average age of the participants was 32±5 (Mean±SD). Examination of the responses revealed that half of the participants (n=45, 45.5%) had transported patients in the prone position, yet the majority had not received any training on prone CPR (n=73, 73.7%) and had never performed prone CPR (n=88, 88.9%). Participants' knowledge levels were low about prone CPR, with a mean total correct answer rate of 3±1 (Mean± SD) out of 7 questions, median of 3 (0-6) (min-max). Mean and median number of total correct answers were compared according to participants' gender, prone CPR training status, years of experience, previous experience in prone CPR, the school of graduation, professional title, guideline reading status, routine CPR training status. No statistically significant difference was found between the groups.

Conclusion: We observed that healthcare personnel working in pre-hospital ambulance services do not have sufficient knowledge or training about prone CPR. Since pre-hospital healthcare personnel may encounter prone CPR, there is a need for training on performing prone CPR in this group.

Keywords: Prone CPR, reverse CPR, prehospital

ÖZ

Amaç: Pron kardiyopulmoner resüsitasyon (KPR) (yüzüstü pozisyonda yapılan KPR), yüzüstü pozisyonda kardiyopulmoner arrest olan hastaların yönetiminde önemli bir müdahaledir. Bu tekniğin öğrenilmesi ve gerektiğinde uygulanması, hastane öncesi sağlık personeli için önemlidir. Bu çalışmanın amacı, hastane öncesi sağlık personelinin pron KPR konusundaki bilgi düzeylerini belirlemektir.

Gereç ve Yöntemler: Çalışmamız tek merkezde yürütülen kesitsel bir anket çalışmasıdır. 1-31 Temmuz 2021 tarihleri arasında Ankara Şehir Hastanesine ambulansla hasta nakleden hastane öncesi sağlık personeli çalışmaya dâhil edilmiştir. Katılımcılara 24'ü demografik bilgi ve eğitim durumunu belirlemeyi, 7'si ise pron KPR konusundaki teorik bilgiyi değerlendirmeyi amaçlayan toplam 31 soru yöneltilmiştir.

Bulgular: Çalışmaya toplam 99 hastane öncesi sağlık personeli katılmıştır. Katılımcıların ortalama yaşı 32±5 (Ort±SS) idi. Yanıtlar incelendiğinde, katılımcıların yarısının (n=45, %45,5) en az bir kez pron pozisyonda hasta taşıdığı, ancak çoğunluğun pron KPR konusunda eğitim almadığı (n=73, %73,7) ve hiç pron KPR uygulamadığı (n=88, %88,9) tespit edildi. Katılımcıların pron KPR konusundaki bilgi düzeyleri düşüktü; 7 soru üzerinden ortalama toplam doğru yanıt oranı 3±1 (Ort±SS), medyan 3 (0-6) (min-maks) idi. Katılımcıların cinsiyet, pron KPR eğitim durumu, mesleki deneyim yılı, daha önceki pron KPR deneyimi, mezun olduğu okul, mesleki unvan, rehber okuma durumu, rutin KPR eğitim durumu gibi değişkenlere göre ortalama ve medyan toplam doğru yanıt sayıları karşılaştırıldı. Gruplar arasında istatistiksel olarak anlamlı bir fark bulunamadı.

Sonuç: Hastane öncesi ambulans hizmetlerinde çalışan sağlık personelinin pron KPR konusunda yeterli bilgiye veya eğitime sahip olmadığını gözlemledik. Hastane öncesi sağlık personeli pron KPR ile karşılaşabileceğinden, bu grup için pron KPR uygulama eğitimi gerekmektedir.

Anahtar Kelimeler: Pron KPR, yüzüstü KPR, hastane öncesi

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Introduction

The prone position is generally used in the operating room to facilitate access to the surgical area and in the intensive care units (ICU) to improve oxygenation in patients with severe hypoxic respiratory failure. During the coronavirus disease 2019 (COVID-19) pandemic, this position has been widely used in both spontaneously breathing and mechanically ventilated patients with acute respiratory failure (1). The application of the prone position in intubated or non-intubated patients with COVID infection and lung involvement has shown positive effects on hypoxia (2). "Prone CPR", also referred to as "Reverse-CPR", is defined as CPR performed in the prone position.

If a patient experiences cardiopulmonary arrest while monitored in the prone position, it takes approximately 5-6 people and up to 3 minutes to turn the patient from prone position to supine position and initiate cardiopulmonary resuscitation (CPR) (3). This delays the start of chest compressions. Additionally, attempting to turn the patient to the supine position can dislodge critical lines, detach monitoring equipment cables, or the endotracheal tube of a critically ill patient. Attempting to turn the patient to the supine position without adequate number of people can pose a risk to both the patient and the healthcare personnel. Delays in chest compressions and defibrillation can negatively impact patient outcomes (4,5). The American Heart Association (AHA) Guidelines for CPR and Emergency Cardiovascular Care recommends that CPR in the prone position might be reasonable when the patient cannot be placed in the supine position, particularly in hospitalized patients with an advanced airway in place (6).

Prone CPR is also an important skill for pre-hospital healthcare personnel. The aim of this study is to determine the knowledge levels of pre-hospital healthcare personnel on prone CPR and whether they have applied this method on their patients in their daily practice.

Material and Methods

This study is a single-center, cross-sectional, observational survey study. Surveys were administered to pre-hospital healthcare personnel who brought patients to Ankara City Hospital by 112 emergency ambulance system between July 1-31, 2021. The hospital where the study was conducted is a city hospital that accepts approximately 250-300 ambulance cases daily, serving a population of 2.5 million. The hospital has 700 intensive care beds and handles secondary transfers to intensive care units from other hospitals by ambulance. Ethical approval was obtained from the Ankara City Hospital Ethics Committee with decision number E-2-21-559.

A 31-question survey was administered to participants who brought patients to the emergency department by ambulance after they handed over their patients. The survey included 24 questions about the participants' demographic characteristics (age, gender, educational status, professional title), professional training in CPR, and the guidelines they had read, as well as 7 multiple-choice questions assessing their theoretical knowledge of prone CPR. The survey form was created through Google Forms and was electronically delivered to the participants. Informed consent was obtained from the participants via the same platform. Participants were prevented from giving more than one answer to the same question on the Google Forms platform. Inclusion criteria for the study: Pre-hospital healthcare personnel working in Ankara 112 emergency ambulance services and bringing patients to Ankara City Hospital by ambulance.

The exclusion criteria for the study is as follows: refusal to participate in the survey and failure to answer all survey questions.

Statistical Methods

IBM SPSS Statistics Version 16 was used to evaluate the survey results. Frequency distributions were provided for categorical variables, and descriptive statistics were given for continuous variables. The Shapiro-Wilk normality test was applied for continuous variables. For comparisons of medians between two independent groups where the normality assumption was not met ($p<0.05$), the non-parametric Mann-Whitney U test was used. For comparisons of means between two groups with normally distributed data, the Independent Samples t-test was used. The Chi-square test was applied for ratio comparisons of independent frequency data. A significance level of $p<0.05$ was used for statistical significance.

Results

A total of 105 pre-hospital healthcare personnel working in ambulances participated in the study. 6 surveys were excluded because they were incomplete. 99 surveys were included in statistical analysis. The average age of the participants was 32±5 (Mean±SD), with a median age of 33 (min-max 21-45). The demographic data of the participants are presented in Table 1.

Total number of participants (n=99)		**n (%)**
Gender, male		43 (43.4)
Education level	High school	8 (8.1)
	Two Year Degree	37 (37.4)
	Bachelor's Degree	48 (48.5)
	Master's Degree	6 (6.1)
Professional title	Emergency Medical Technician	40 (40.4)
	Paramedic	54 (54.5)
	Nurse	5 (5.1)
Graduation Year	2000-2005	16 (16.2)
	2006-2010	28 (28.3)
	2011-2015	20 (20.2)
	2016-2020	25 (25.3)
	2021-..	10 (10.1)
Years of work experience	0-5	22 (22.2)
	6-10	38 (38.4)
	11-	39 (39.4)
Timing of prone CPR training	Never received training	73 (73.7)
	After starting to work	18 (18.2)
	In high school	1 (1.0)
	In university	7 (7.1)

Table 1. Demographic data of participants

CPR: Cardiopulmonary resuscitation

Question	Answer	n (%)
Did you receive certified routine CPR training?	Yes	54 (54.5)
	No	45 (45.5)
Did you receive prone CPR training?	Yes	26 (26.3)
	No	73 (73.7)
Do you read current Resuscitation Guidelines?	Yes	30 (30.3)
	No	69 (69.7)
Did you ever transport COVID-19 positive patients?	Yes	91 (91.9)
	No	8 (8.1)
Have you ever transported a patient in the prone position?	Yes	45 (45.5)
	No	54 (54.5)
Have you ever performed Prone CPR?	Yes	11 (11.1)
	No	88 (88.9)

Table 2: Participants' answer about CPR and prone CPR
CPR: Cardiopulmonary Resuscitation.

		n (%)
If a prone patient experiences cardiopulmonary arrest, in which position is CPR performed?	Prone (correct)	37 (37.4)
	Supine (false)	62 (62.6)
Is prone CPR applied to a patient without an advanced airway?	Yes (correct)	51 (51.5)
	No (false)	48 (48.5)
On which vertebrae should the hands be placed during prone CPR?	T1-T4 (false)	7 (7.1)
	T4-T7 (false)	68 (68.7)
	T7-T10 (correct)	24 (24.2)
How many compressions in a minute should be performed in prone CPR?	100-120 (correct)	43 (43.4)
	120-140 (false)	11 (11.1)
	80-100 (false)	45 (45.5)
Can prone CPR be performed on children?	Yes (correct)	57 (57.6)
	No (false)	42 (42.4)
Where should defibrillator pads be placed during prone CPR?	All of the positions described below (correct)	35 (35.4)
	Only front-back (false)	20 (20.2)
	Only between vertebral column and the right scapula-the axilla (false)	44 (44.4)
Can End-tidal CO_2 be measured during prone CPR?	Yes (correct)	82 (82.8)
	No (false)	17 (17.2)

Table 3. Answers to the Questions Assessing Their Knowledge Levels
CPR: Cardiopulmonary resuscitation

The ratio of participants who transported COVID-positive patients, received prone CPR training, read guidelines, received certified routine CPR training, transported patients in the prone position, and performing prone CPR are presented in Table 2.

Participants were asked 7 questions to assess their knowledge level regarding prone CPR. The ratio of correct and incorrect answers for each question are shown in the table 3.

2% of participants (n=2) did not answer any questions correctly. 6.1% of participants (n=6) answered 1, 16.2% (n=16) answered 2, 28.3% (n=28) answered 3, 30.3% (n=30) answered 4, 15.2% (n=15) answered 5, and 2% (n=2) answered 6 questions correctly. No participant answered all 7 questions correctly (n=0). The average number of correct answers was calculated as 3±1 (Mean±SD), with a median of 3 (0-6) (min-max).

Table 4 presents a comparison of participants' gender, prone CPR training status, average years of experience, whether they have previously performed prone CPR, the school they graduated from, professional title, guideline reading status, routine CPR training status, and the mean and median number of correct answers. No statistically significant difference was found between the groups.

Discussion

Cardiac arrest occurring in prone positioned patients may slightly increase the complexity of the procedures, with additional pitfalls (7). Rapid defibrillation, along with early and uninterrupted chest compressions, is crucial for the return of spontaneous circulation in cardiac arrest patients. Prone CPR shortens the time to start CPR for patients that are already in the prone position, thereby reducing the no-flow time. In the literature, this technique is recommended to avoid delays, especially in situations where it is not easy to turn patients to the supine position (8). In 2001, Brown et al. published a review on prone CPR (9). In 2003, Mazer et al. demonstrated that prone CPR during cardiac arrest produced higher systolic and mean arterial pressures compared to standard CPR (10). H-W's study also found that although physicians rarely encountered prone CPR, the outcomes were positive (11).

Prone CPR is also included in the AHA and European Resuscitation Council (ERC) guidelines (7). When performing prone CPR, hands should be placed over the T7-T10 vertebrae, and a firm surface should be present under the patient (12). The rate of chest compressions should be 100-120 per minute, with a depth of 5-6 cm, allowing for full recoil, like routine CPR (12). Defibrillation pads can be placed under both armpits or on the left mid-axillary line and right scapula (3,13).

		Total number of correct answers		Mann Whitney-U test
		Mean±SD	Median (Min-max)	p value
Prone CPR training status	Yes	3±1	4 (0-5)	0.749
	No	3±1	3 (0-6)	
Years of experience	0-5	3 ±1	3 (1-5)	
	6-10	3 ±1	3 (0-6)	0.360
	11-	4 ±1	4 (1-6)	
Have you ever performed prone CPR?	Yes	4±1	4 (2-6)	0.067
	No	3±1	3 (0-6)	
Education level	Bachelor's Degree	3±2	4 (0-6)	
	High School	4±1	4 (3-5)	0.685*
	Two-year degree	3±1	3 (1-5)	
	Master's Degree	3±1	3 (1-5)	
Professional title	Emergency Medical Technician	3±1	4 (0-6)	
	Paramedic	3±1	3 (0-5)	0.783*
	Nurse	3±0	3 (3-4)	
Guideline reading status	Yes	4±1	4 (0-5)	0.277
	No	3±1	3 (0-5)	
Routine certified CPR training status	Yes	4±1	4 (0-6)	0.088
	No	3±1	3 (1-5)	
Gender	Male	4±1	4 (1-6)	0.167
	Female	3±1	3 (0-6)	

Table 4. Comparison of gender, prone CPR training, average years of experience, prone CPR performance, Sschool graduated from, professional title, guideline reading status, routine CPR training, and number of correct answers
CPR: Cardiopulmonary resuscitation. * Kruskall-wallis test.

The risk of respiratory transmission, which has become more significant during the COVID-19 pandemic, is theoretically lower with prone CPR as the rescuer is not face-to-face with the patient. Prone CPR, performed only with hands in the field, contributes somewhat to air exchange, making it a good alternative for rescuers who avoid mouth-to-mouth ventilation (14).

In their study Erdur et al. observed that that most of the physicians had not received post-graduation training on emergencies amongst general practitioners working in emergency services in Denizli (15). Likewise, in our study, the participation rate in certified training programs on routine CPR was found to be 45.5%. These finding indicate the need for more training on routine CPR in our country.

In a study related to supine CPR by Kayıpmaz et al. faculty of dentistry school students received CPR training, and it was observed that the number of compressions per minute, the ratio of correct compressions to total compressions, and compression percentages significantly improved positively with the training (16). In a study Martinez et al investigated the knowledge level of supine CPR among physicians in the internal medicine department and similar results were obtained. They emphasized the insufficient knowledge level of doctors regarding routine CPR and noted that this knowledge level did not vary with years of experience or relevant training (17). Similarly, no relationship was found in our study between the participants' professional titles, years of experience, and the number of correct answers.

Between participants who received prone CPR training and those who did not, no significant difference was found regarding mean number of correct answers. This could be due to the small number of prone CPR knowledge questions and the fact that some of the questions could be answered with knowledge of routine CPR.

70% of our participants stated they do not read current resuscitation guidelines. This indicates a need for awareness to follow these guidelines for continuing professional development among pre-hospital healthcare personnel.

When we asked, "Have you ever performed prone CPR?" 88.9% of the participants answered "no". This result may be due to the lack of training on prone CPR among pre-hospital healthcare personnel. Healthcare personnel might be reluctant to perform reverse CPR as a first option, especially due to the lack of specific training and knowledge of the procedure (7). Healthcare personnel involved in the care of prone positioned patients would also benefit from specific protocols for periodic training on how to perform CPR on a prone patient (7). In a study by Tejas Sinha et al., the importance of training and practice in prone CPR was emphasized. In their study, internal medicine residents were given prone CPR training using a simulation method with a cardiopulmonary arrest patient in the prone position, and participants indicated that this simulation training was beneficial for performing prone CPR in the future (18). In Genç et al.'s study, most physicians reported not having any training on prone CPR (19). This result is consistent with our finding that EMT's and paramedics in our study had not received post-graduation training on prone CPR. Such training is needed in our country for prone CPR.

Additionally, in a study by Tofil et al. on anesthesiologists, ventricular fibrillation (VF) was simulated during a spinal cord operation while the patient was operated on in the prone position. The participants' skills in recognizing and intervening in VF in prone patients were assessed.

Participants were divided into groups for the simulation study, and none of the groups performed prone CPR. Additionally, the average time to recognize VF in patients was 76 seconds, and the average time to start chest compressions was 77 seconds, indicating a delay in patient intervention (20). The authors concluded that anesthesiology residents need additional training in recognizing arrest and performing prone CPR in prone patients.

In our study, when comparing the total number of correct answers given by pre-hospital healthcare workers based on their years of experience, no statistically significant difference was found between the groups. This was thought to be due to the lack of in-service training after graduation. In a study by Kocalar et al., similar to our study, no significant relationship was found between the years of experience and knowledge levels of physicians (21). When comparing the years of experience of pre-hospital healthcare personnel participating in the survey with their prone CPR training status, no statistically significant difference was found between the groups in our study. In their study Güven et al. also concluded that there was no correlation between the years of experience and knowledge level (22). These findings indicate that professional experience alone is not sufficient to increase knowledge levels, and structured training is needed.

When examining the total number of correct answers based on the gender of our participants, the average number of correct answers given by males was 4, while the average number of correct answers given by females was 3. No statistically significant difference was found between the groups. Similarly, in a study by Aygin et al. on knowledge levels regarding CPR, no significant difference was found between genders (23).

It is important for pre-hospital healthcare personnel to have sufficient knowledge of prone CPR. Prone CPR can be applied by 112 emergency medical services during the transfer of patients monitored in the prone position or for patients found in arrest in the prone position at the scene to enable rapid intervention. Turning a patient transported in the prone position to the supine position for CPR inside the moving ambulance is technically challenging and time-consuming; therefore, performing prone CPR on patients transported in the prone position may be more appropriate. However, no studies on outcomes of prone CPR in ambulance were found in the literature, this may be an area of future research.

Limitations

The most significant limitation of our study is that it is single-centered. This prevents the generalization of our results. There is a need for multi-centered studies on prone CPR. Due to measurement convenience, only theoretical questions were asked in the study, and comparisons were made based on these. Adequate theoretical knowledge does not always directly show real-life applications. The sample of healthcare personnel participating in our study was not randomly selected; the survey form was offered to all pre-hospital healthcare personnel, but only those who voluntarily filled out the form participated in the study, which may have introduced bias in the sample.

Conclusion

intervention in managing cardiac arrest in patients monitored in the prone position in the hospital or ambulance or those experience cardiopulmonary arrest in the prone position in the field.

In our study, the percentage of correct answers to the knowledge questions about prone CPR was found to be low. Although during the COVID-19 pandemic, most ambulances carried patients in prone position at least once, the number of pre-hospital healthcare personnel performing prone CPR and their knowledge level on this subject were found to be low. Most pre-hospital personnel have not received any training on prone CPR. There is a need for training on performing prone CPR.

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Ethical Approval: Ethical approval was obtained from the Ankara City Hospital Ethics Committee with decision number E-2-21-559.

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ORIGINAL ARTICLE / ÖZGÜN ARAŞTIRMA MAKALESİ

Retrospective Evaluation of Adolescent Patients Presenting to the Emergency Department with Suicidal Attempt

Özkıyım Girişimi ile Acil Servise Başvuran Adolesan Hastaların Retrospektif Değerlendirilmesi

Faruk Danış[1], Yasemin Baranoğlu Kılınç[2]

ABSTRACT

Aim: Suicide attempts among adolescents are a major public health problem. It is important to understand the prevalence of suicide attempts in the adolescent population and the risk factors underlying the attempts so that the necessary precautions can be taken by health authorities. We therefore aimed to retrospectively evaluate the demographic and clinical characteristics of adolescent patients presented to the emergency department due to suicide attempts.

Material and Methods: This retrospective observational study included adolescent patients aged 10-19 years who presented to the emergency department for suicide attempt between August 01, 2018 and July 31, 2023. Ethics committee approval was obtained and data were collected from the hospital automation system through ICD codes. Demographic data, clinical characteristics, intervention methods, treatment processes and outcomes of the patients were analysed in detail.

Results: Of the 126 patients included in the study, 80.2% were female, 19.8% were male, and the mean age was 184 months. 97.6% of the patients attempted suicide by ingestion of drugs or substances, and the rest of the patients preferred methods such as jumping from a height, firearm and sharp instrument use. Depression was the most common comorbid psychiatric disorder and was identified in 73.7% of the adolescents in the study. 42.1% of the patients presented to the emergency department with complaints such as nausea/vomiting and tendency to sleep with suicide attempt. Treatments such as gastric lavage and activated charcoal were administered in the majority of admissions.

Conclusion: This study reveals that suicide attempts are an important public health problem in the adolescent population and psychiatric disorders, especially depression, play a role in these attempts. It was observed that suicide attempts were more common among adolescent females. The findings emphasize the importance of early screening and interventions for psychiatric disorders for the prevention and management of suicide attempts in adolescents. The findings of the study shed light on efforts to review and improve current management strategies and demonstrate the need for large-scale community-based studies.

Keywords: Suicide, adolescents, emergency department, mental disorders, poisoning

ÖZ

Amaç: Ergenler arasında intihar girişimleri önemli bir halk sağlığı sorunudur. Sağlık otoriteleri tarafından gerekli önlemlerin alınabilmesi için ergen popülasyonda intihar girişimlerinin yaygınlığını ve girişimlerin altında yatan risk faktörlerini anlamak önemlidir. Bu nedenle, acil servise intihar girişimi nedeniyle başvuran ergen hastaların demografik ve klinik özelliklerini retrospektif olarak değerlendirmeyi amaçladık.

Gereç ve Yöntemler: Bu retrospektif gözlemsel çalışma, 01.08.2018 ile 31.07.2023 tarihleri arasında acil servise özkıyım girişimi nedeniyle başvuran 10-19 yaş arası adolesan hastaları kapsamaktadır. Etik kurul onayı alınarak hastane otomasyon sisteminden ICD kodları aracılığıyla veri toplanmıştır. Hastaların demografik verileri, klinik özellikleri, girişim yöntemleri, tedavi süreçleri ve sonlanımları detaylı bir şekilde incelenmiştir.

Bulgular: Çalışmaya dahil edilen 126 hastanın %80,2'si kadın, %19,8'i erkek olup, yaş ortalaması 184 aydı. Hastaların %97,6'sı ilaç veya madde alımı yoluyla özkıyım girişiminde bulunmuş, geri kalanlar ise yüksekten atlama, ateşli silah ve kesici alet kullanma gibi yöntemleri tercih etmiştir. Depresyon, en yaygın eşlik eden psikiyatrik bozukluk olarak bulunmuş ve çalışmadaki adolesanların %73,7'sinde tanımlanmıştır. Hastaların %42,1' i özkıyım girişimle birlikte bulantı/kusma ve uykuya eğilim gibi şikayetlerle acil servise başvurmuştur. Başvuruların büyük çoğunluğunda mide lavajı ve aktif kömür gibi tedaviler uygulanmıştır.

Sonuç: Bu çalışma, özkıyım girişimlerinin adolesan popülasyonda önemli bir halk sağlığı sorunu olduğunu ve özellikle depresyon gibi psikiyatrik bozuklukların bu girişimlerde rol oynadığını ortaya koymaktadır. Adolesan kadınlar arasında özkıyım girişimlerinin daha yaygın olduğu gözlemlenmiştir. Bulgular, adolesanlarda özkıyım girişimlerinin önlenmesi ve yönetimi için erken tarama ve psikiyatrik bozukluklar açısından müdahalelerin önemini vurgulamaktadır. Çalışmanın bulguları, mevcut yönetim stratejilerini gözden geçirme ve iyileştirme çabalarına ışık tutmakta olup, geniş çaplı toplum temelli çalışmalara duyulan ihtiyacı göstermektedir.

Anahtar Kelimeler: Suisid, adolesan, acil servis, psikiyatrik bozukluklar, zehirlenme

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Introduction

Adolescence is defined as a period in which the person gains independence and social productivity, starting with biological and physical development, sexual and psychosocial maturation (1). According to the definition of the World Health Organisation, adolescence covers the period between the ages of 10-19 (2).

Suicidal attempt in adolescence is an increasingly important public health problem in the world. Suicidal behaviour is actions, thoughts and attempts with the intention of killing oneself. The most common suicidal behaviour in adolescents is drug and substance abuse (3). Approximately 800 thousand people die annually in the world as a result of suicide. The number of suicidal attempts in a year is estimated to be 10-20 times this number. In the pediatric population, mortality rates due to suicide attempts are lower than in adults. Nevertheless, suicide is the first leading cause of death in female adolescents aged 15-19 years and the third leading cause of death in male adolescents of the same age group (4). Suicide-related mortality rates are increasing every year (5).

Studies investigating suicidal risk factors in adolescence emphasise several factors such as previous attempts, illness, domestic violence, distressing life events and substance abuse. Factors such as divorce, unemployment or migration may disrupt social ties and pave the way for suicide (6,7). Depression has been shown to be associated with suicidal behaviour in adolescents as well as in adults (8). In our study, we planned to retrospectively analyse the cases admitted to the emergency department due to suicidal attempts in adolescence. Thus, through the current study, we attempted to better understand the current status of case management and to identify areas for possible research and improvement.

Material and Methods

Approval for our retrospective observational study was obtained from Bolu Abant İzzet Baysal University Clinical Research Ethics Committee (Decision no: 2023/278). In our study, adolescent patients (aged 10-19 years) admitted to the emergency department of Bolu İzzet Baysal Training and Research Hospital between August 01, 2018 and July 31, 2023 due to suicide attempt were retrospectively analyzed. Our hospital is a tertiary hospital and the annual emergency department admissions are approximately 85,000 (pediatric and adult). Patients aged 0-17 years are admitted by a pediatric specialist and patients aged 18 years and older are admitted by an emergency medicine specialist.

Demographic data (age, gender, comorbidities), laboratory data, treatment methods, suicide methods, number of days of hospitalisation, and treatment responses and outcomes were obtained retrospectively from the hospital information management system with International Classification of Diseases (ICD) codes. Patients with missing data were not included in the study

Statistical analysis

All statistical analyses were carried out using SPSS for Windows (Version 22.0, IBM Corp., Armonk, NY, USA). The normal distribution of the data was evaluated by Kolmogorov-Smirnov test; the numerical variables that exhibited normal distribution were presented as mean ± standard deviation, and those that did not exhibit normal distribution were presented as median and interquartile range (IQR). Categorical variables were presented as number and percentage. Pearson Chi-Square test was used to compare categorical data. A value of $p<0.05$ was considered statistically significant.

Results

Of the 126 patients included in the study, 101 were female (80.2%) and 25 were male (19.8%) and there was a significant difference between the groups (Pearson Chi-square, $p<0.001$). The mean age of the patients was 184 months (± 17.4). The median length of hospitalisation was 2 days (IQR: 1-2).

Nineteen (15%) of the patients had a history of suicidal attempt or non-suicidal self-harm behaviour. While 38 (30.2%) of the patients were being followed up in the Child-Adolescent Mental Health and Diseases clinic with any diagnosis, 88 (69.8%) did not have any mental diagnosis until this presentation. Of the 38 patients with a previous diagnosis, 28 (73.7%) had depression, 6 (15.8%) attention-deficit / hyperactivity disorder (ADHD), 2 (5.3%) anorexia, 1 (2.6%) bulimia nervosa and 1 (2.6%) bipolar disorder (Table 1).

Of the 126 patients included in the study, 123 (97.6%) attempted suicide through drug or substance intake, 1 patient (0.8%) attempted suicide through jumping from a height, 1 patient (0.8%) attempted suicide through firearm and 1 patient (0.8%) attempted suicide through self-cutting with a sharp object. In 123 patients who attempted suicide by taking medication, 37 of them had taken at least one type of selective serotonin reuptake inhibitor or serotonin and norepinephrine reuptake inhibitor, 30 of them had taken at least one type of antipsychotic, 4 of them had taken at least one type of psychostimulant, 54 of them had taken at least one type of non-steroid anti-inflammatory drug or paracetamol, 16 of them had taken at least one type of antibiotic.

Of all patients, 53 (42.1%) had another main complaint at the time of presentation to the emergency department in addition to the suicide attempt. The most common complaints were nausea or vomiting and sleepiness (Table 2).

When the interventions performed to the patients after admission were analysed, 92 (74.8%) of the patients who attempted suicide through drug ingestion underwent gastric lavage, 84 (68.3%) were given activated charcoal.

Mental Diagnosis n=38	**n, (%)**
Depression	28 (73.7)
ADHD	6 (15.8)
Anorexia	2 (5.3)
Bulimia Nervosa	1 (2.6)
Bipolar Disorder	1 (2.6)

Table 1. Mental diagnoses of patients.
ADHD: Attention deficit and hyperactivity disorder.

Type of complaint n=53	n, (%)
Nausea or vomiting	24 (45.3)
Tendency to sleep	14 (26.4)
Tachycardia	3 (5.7)
Syncope	2 (3.8)
Haemorrhage	2 (3.8)
Bradycardia	2 (3.8)
Oedema in the tongue	1 (1.9)
Abdominal pain	1 (1.9)
Oral ulcer	1 (1.9)
Headache	1 (1.9)
Dizziness	1 (1.9)
Numbness in the face	1 (1.9)

Table 2. Main complaints of the patients at the time of admission.

Regarding the outcomes of the patients, 118 (93.7%) were hospitalised in the pediatric service and discharged after the observation period, 4 (3.2%) refused treatment and left the hospital, 3 (2.4%) were transferred to the child and adolescent mental health service after the observation period in the pediatric service and 1 (0.8%) died. The cause of death was NSAID poisoning.

Discussion

In this study, we retrospectively evaluated the demographic and clinical characteristics of adolescent patients admitted to the emergency department for suicide attempts. The results showed that suicide attempts were more common among adolescent girls (80.2%) and depression was the most common comorbid mental disorder (72.2%). The majority of patients (97.6%) attempted suicide by ingesting drugs or substances and 42.1% presented to the emergency department with additional complaints.

One method of identifying and preventing adolescents at risk for suicide is to screen for suicidal thoughts and behaviors in schools and primary care settings. More than half of adolescents receive primary care at least once a year, and these doctor visits would provide an opportunity for screening (9). In a study conducted in adults, it was determined that half of the cases who died as a result of suicidal attempt had been examined by a physician for different medical reasons in the last month (10). A study by Rhodes et al. showed that adolescents who died as a result of suicide presented to the emergency department mostly with somatic complaints in the 3 months before death (11). This data indicates that the mental health of each patient examined should also be assessed during a physical examination.

Suicide attempts are more common in female adolescents, but suicidal deaths are more common in male adolescents because male adolescents often use more lethal methods (12). In our study, 101 of 126 patients were female (80.2%) and 25 were male (19.8%). The only patient who died was a female who made a suicidal attempt with drug intake.

Suicide attempts are more often seen in adolescents who have preexisting mental health disorders (13). The most common accompanying mental health disorder is depression. In our patient group, 26 (72.2%) of 38 patients with a previous mental health disorder had a diagnosis of depression. Patients with bipolar and psychotic disorders, personality and behavioural problems, anxiety, substance abuse and trauma-related disorders are also at increased risk for suicidal attempts. Individuals with neurodevelopmental disorders, including ADHD, learning disabilities and autism spectrum disorder, are at higher risk for suicide attempts (14). In our patients, 6 (16.7%) had ADHD, 2 (5.6%) anorexia, 1 (2.8%) bulimia nervosa and 1 (2.8%) bipolar disorder. Past suicide attempts, non-suicidal self-harm and family history of suicide are risk factors for suicide attempts (15). Nineteen of our patients (15%) had a history of suicidal attempt or non-suicidal self-harming behaviour and therefore were planned to be followed up in the Department of Child Mental Health, but 16 of the patients stated that they did not continue these follow-ups regularly.

In 2021, the American Academy of Paediatrics, in collaboration with subject matter experts from the American Foundation for Suicide Prevention and the National Institute of Mental Health, asked multi-disciplinary collaborators (health care provider groups) to share insights, experiences and strategies related to this public health concern. The Youth Suicide Prevention Plan was developed by convening a 'Youth Suicide Prevention Virtual Summit' comprised of public health organisations, parent organisations, federal agencies, mental health organisations, families, adolescents and young adults with lived experience. The plan has 3 stages: (1) a brief screening with a validated measure, (2) a brief suicide risk assessment for all who test positive, and (3) plans determined by the brief suicide risk assessment (16).

According to the Protocol for Infant Child Adolescent Follow-up in Primary Care implemented by the Republic of Türkiye Ministry of Health in our country, HEADSSS [Home, Education/Employment, Eating, Activities (activity with peers), Drugs, Sexuality, Suicide/depression and Safety] follow-up is recommended 3 times in total between the ages of 10-14, 15-18 and 19-21 (17). It is very important to identify adolescents at risk of suicide early through screening programmes and to develop supportive treatment approaches.

Limitations

This study has some limitations. Firstly, since the study was conducted retrospectively, there may be some deficiencies and inaccuracies in data quality. Also, since only patients presented to a specific hospital were evaluated, caution should be exercised in generalising the results.

Conclusion

Suicide is a major public health problem and one of the leading causes of death for adolescents. Faced with an already high prevalence and increasing rates over the last decade, emergency medicine specialists and paediatricians should always be prepared to manage a suicidal patient.

This retrospective study evaluated adolescent patients admitted to the emergency department for suicidal attempts. It found that suicidal attempts were more common in females (80.2%), with depression being the most common comorbidity (72.2%). Most attempts involved drug or substance ingestion (97.6%), and 42.1% of patients had additional complaints. The majority (93.7%) were discharged, 3.2% refused treatment, 2.4% were hospitalized, and 0.8% died. The current study emphasizes the importance of mental health screening and early interventions for the prevention and management of suicidal attempts in adolescents. Although the limitations of the study affect the generalisability of the results, the findings provide valuable information to understand the current situation in the management of suicidal attempts in emergency departments and to identify areas for improvement.

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ORIGINAL ARTICLE / ÖZGÜN ARAŞTIRMA MAKALESİ

Pine Processionary Caterpillar (Thaumetopoea pityocampa) Envenomations and Global Climate Change: A Retrospective Analysis

Çam Kese Tırtılı (Thaumetopoea pityocampa) Envenomasyonları ve Küresel İklim Değişikliği: Retrospektif Analiz

Mustafa Ferudun CELIKMEN[1], Mustafa CICEK[2], Melih IMAMOGLU[3], Ozgen Gonenc CEKIC[2]

ABSTRACT

Aim: Pine Processionary Caterpillar (Thaumetopoea pityocampa) envenomations have become increasingly relevant due to the species' expanding habitat, influenced by global climate change. These envenomations present unique challenges, particularly in regions previously unexposed to this species. This study aims to retrospectively analyze envenomations caused by the Pine Processionary Caterpillar over a ten-year period, evaluating the frequency, clinical manifestations, and the impact of climate change on these cases.

Material and Methods: We reviewed patient records from four different hospitals between January 2014 and May 2024, focusing on cases with confirmed contact or exposure to the caterpillar. Data on demographics, clinical findings, treatment approaches, and seasonal trends were collected and analyzed.

Results: A total of 53 patients were included, with a nearly equal distribution between male and female patients. The most affected areas were the neck and face, primarily due to outdoor activities in pine forests. The peak incidence of envenomations was observed in May and June. Antihistamines, particularly intramuscular administration, were the most common treatment, with racemic epinephrine used in cases of severe reactions. Notably, the northward expansion of the caterpillar's habitat has been linked to increasing cases of envenomation.

Conclusion: The findings highlight the need for heightened awareness and preventive measures, especially during the caterpillar's peak activity season. As climate change continues to alter the distribution of Thaumetopoea pityocampa, regions unaccustomed to such exposures must prepare for the associated health risks.

Keywords: Allergic reactions, ecological shifts, public health impact, climate-driven expansion

ÖZ

Amaç: Küresel iklim değişikliğinin etkisiyle yaşam alanı genişleyen Çam Kese Tırtılı (Thaumetopoea pityocampa) zehirlenmeleri, giderek daha fazla önem kazanmaktadır. Bu zehirlenmeler, özellikle bu tür ile karşılaşmamış bölgelerde benzersiz zorluklar oluşturmaktadır. Bu çalışma, Çam Kese Tırtılı ile temas sonrası oluşan zehirlenmeleri on yıllık bir dönem boyunca retrospektif olarak analiz ederek, vakaların sıklığını, klinik belirtilerini ve iklim değişikliğinin bu vakalar üzerindeki etkisini değerlendirmeyi amaçlamaktadır.

Gereç ve Yöntemler: Ocak 2014 ile Mayıs 2024 arasında dört farklı hastaneden alınan hasta kayıtları incelendi ve tırtıl ile temas veya maruziyetin doğrulandığı vakalar tespit edildi. Demografik veriler, klinik bulgular, tedavi yaklaşımları ve mevsimsel değişimler tespit edildi ve analiz edildi.

Bulgular: Toplamda 53 hasta çalışmaya dahil edildi ve cinsiyet dağılımı neredeyse eşit bulundu. En çok etkilenen vücut bölgeleri boyun ve yüz olup, bu durum çoğunlukla çam ormanlarında yapılan açık hava aktivitelerine bağlandı. Zehirlenmelerin en yoğun olduğu dönem Mayıs ve Haziran aylarıydı. Tedavide en sık kullanılan ilaç antihistaminikler olup, özellikle kas içi uygulama tercih edildi; ciddi reaksiyonlar için ise rasemik epinefrin kullanıldı. Tırtılın yaşam alanının kuzeye doğru genişlemesi, artan zehirlenme vakalarıyla ilişkilendirildi.

Sonuç: Bulgular, özellikle böceğin en aktif olduğu mevsimde farkındalık ve önleyici tedbirlerin artırılması gerektiğini vurgulamaktadır. İklim değişikliği Thaumetopoea pityocampa'nın dağılımını değiştirmeye devam ettikçe, bu tür maruziyetlere alışık olmayan bölgeler ilgili sağlık risklerine hazırlıklı olmalıdır.

Anahtar Kelimeler: Alerjik reaksiyonlar, ekolojik değişimler, halk sağlığı etkisi, iklim kaynaklı yayılım

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Introduction

The Pine Processionary Caterpillar (Thaumetopoea pityocampa) is a species of caterpillar that predominantly inhabits pine trees and is widespread in the Mediterranean region (1,2). This species prefers hot and dry climates and typically resides in large colonies within pine forests. The geographic distribution of Thaumetopoea pityocampa spans Central and Southern Europe, the northern regions of the Middle East, North Africa (particularly Algeria), and the Marmara, Aegean, Mediterranean, and Black Sea regions of Türkiye (3). In addition to pine species such as Pinus (P.) pinaster, P. silvestris, P. halepensis, P. nigra, P. pinea, and P. radiata, this caterpillar also affects cedar trees (4).

Humans are frequently exposed to the pine processionary caterpillar through occupational exposure, outdoor activities, picnics, or forest walks. Envenomation occurs from caterpillar hairs, which can cause clinical conditions such as urticarial rash, angioedema and anaphylaxis after these hairs contact with the skin or mucosa. The potential for envenomation increases during the caterpillar's larval stage. The caterpillar's urticant hairs, which begin to appear in the third stage of its development (L3) around September, increase progressively until the last stage (L5), which can extend from January to May, depending on the climatic conditions of the area (5). These urticating hairs are highly specialized structures, each caterpillar possessing up to 1 million of these hairs (6). These hairs are typically around 100-250 micrometers in length and are designed to easily detach and become airborne, acting as a defense mechanism when the caterpillar feels threatened (Figure 1). The hairs are also notable for their "mirror-like" morphology, being densely packed and arranged on the caterpillar's dorsal and medial segments (6). These airborne hairs can be detected using techniques designed for airborne microorganisms and pollen research (7).

Figure 1. Pine processionary caterpillar

The parts of the body most often affected by this caterpillar hairs are the neck, arms, and legs, with the abdomen, face, and hands being less frequently involved. This clinical condition was first described by Reaumur in 1736 and later by Fabre in 1900 (8). Lamy and colleagues in 1986, and Werno and colleagues in 1993, identified a 28 kDa IgE-binding band from these hairs, which they named thaumetopoein, composed of two polypeptides (9,10). Skin reactions are primarily triggered by contact with these highly allergenic hairs during this stage. People who encounter these hairs often report itchy rashes at contact area, dermatitis, and sometimes angioedema. Depending on the contact area, these hairs can cause contact dermatitis on the neck, allergic conjunctivitis in the eyes, or severe anaphylactic reactions (6,11). The term "contact urticaria" describes the rapid onset of these reactions, typically within 30–60 minutes after exposure, with symptoms usually resolving within a few hours to 24 hours. Treatment typically involves local and systemic antihistamines; and in severe cases, corticosteroids are used (12). Precautions and treatment methods for the caterpillar's hairs are important for protecting and effectively treating patients.

Global climate change, which affects many ecosystems and species, also impacts the habitats of Thaumetopoea pityocampa. Rising temperatures and changing climate conditions have caused this species to spread northward, from the Mediterranean region to the Marmara and Black Sea regions (3,13). Because of climate change, the habitat of the pine processionary caterpillar has expanded, and populations have begun to form in areas where they were not previously observed. This expansion has allowed the caterpillar to establish itself in regions that were previously too cold for its survival, increasing the likelihood of human contact and leading to a rise in envenomation cases (3,13). Understanding these ecological shifts is crucial for predicting and managing future risks associated with this species as it continues to adapt to changing environmental conditions.

This study examines the 10-year retrospective data of patients who presented to the emergency departments of four different hospitals. The aim of the study is to evaluate the frequency, clinical findings, and the impact of global climate change on pine processionary caterpillar envenomations. We emphasize that health services and the public should be made aware of these types of envenomations and necessary precautions should be taken. It is important to clarify the terminology used throughout this study to avoid confusion. 'Envenomation' specifically refers to the process where urticating hairs from the caterpillar cause systemic toxic reactions. In contrast, 'reactions' can refer to both localized and systemic responses, 'dermatitis' denotes an inflammation of the skin, and 'urticaria' is characterized by transient, itchy welts on the skin. 'Exposure' simply denotes contact with the caterpillar's hairs, regardless of symptom presence.

Material and Methods

Our study is designed as a multi-center, retrospective analysis. Cases presenting to the emergency departments of Trabzon Kanuni Training and Research Hospital, Karadeniz Technical University Faculty of Medicine Farabi Hospital, Yeditepe Koşuyolu Hospital, and Yeditepe Kozyatağı Hospital between January 1, 2014, and May 31, 2024, and identified as having Pine Processionary Caterpillar (Thaumetopoea pityocampa) envenomations were included in the study. During the diagnosis stage, direct history of contact with and encounter with the Pine Processionary Caterpillar (Thaumetopoea pityocampa), the presence of patients in areas with pine trees, and subsequent skin reactions were considered. Ethical approval for the study was obtained from the Scientific Research Ethics Committee of the Faculty of

Medicine, University of Health Sciences Trabzon, with approval number 2024/120.

A comprehensive list of all patients who presented to the emergency department and were assigned ICD codes related to allergy, urticaria, and anaphylaxis between January 1, 2014, and May 31, 2024, was requested from the hospital information systems unit. The ICD codes examined included T78.4, L50, L50.0, L50.1, L50.2, L50.3, L50.4, L50.5, L50.6, L50.8, L50.9, T78.0, W57, and T78.2. Following this, the medical records of the identified patients were thoroughly reviewed using the hospital information system. After this review, patients who provided a history of direct contact with the caterpillar in pine forests, presence in areas with pine trees 1-24 hours before the onset of contact urticaria symptoms, and subsequent skin reactions were included in the study. Demographic data, clinical findings, treatment applied in the emergency department, and outcome information for each identified patient were meticulously recorded.

All relevant data for all patients were processed using Microsoft Excel. Statistical calculations were performed using SPSS 23.0 (IBM USA). Frequency data were presented as numbers and percentages. Ordinal and nominal data were presented as mean ± standard deviation.

Results

Between January 1, 2014, and May 31, 2024, a total of 53 patients identified from hospital records were included in the study. These patients had a history of direct contact or encounter with the pine processionary caterpillar in pine forests, or they were present in areas with pine trees 1-24 hours before the onset of contact urticaria symptoms, leading to subsequent skin reactions. The average age of the patients was 30.75 ± 22.9 years, with a range from 1 to 80 years. Of these, 25 (47.2%) were male, and 28 (52.8%) were female. A significant proportion of the patients, 37.7% (20), were younger than 18 years old (Table 1).

The most frequently affected body regions were the neck with 35 cases (66%), the face with 34 cases (64.2%), and the hands with 18 cases (34%), highlighting the vulnerability of exposed areas during outdoor activities. Among the treatment modalities, intramuscular antihistamines were the most commonly used, administered to 27 patients (50.9%), followed by oral antihistamines for 19 patients (35.8%) and intravenous steroids for 12 patients (22.6%). Racemic epinephrine was administered to 16 patients (30.2%), showcasing its importance in managing severe allergic reactions. The majority of envenomations were recorded during the peak activity season of the caterpillar, with 27 cases (50.9%) occurring in May and 17 cases (32.1%) in June (Table 1).

Parameter	*n*	*%*
Gender		
Male	25	47,2
Female	28	52,8
Child (0-18)	20	37,7
Adult(>18)	33	62,3
Environment		
Island	18	34
City	13	24,5
Rural	22	41,5
Contact Area		
Neck	35	66
Face	34	64,2
Hands	18	34
Forearms	16	30,2
Mouth	11	20,8
Back	2	3,8
Arms	1	1,9
Trunk	2	3,8
Legs	1	1,9
Treatment		
Antihistaminic Oral	19	35,8
Antihistaminic Intramuscular	27	50,9
Antihistaminic Topical	2	3,8
Antihistaminic Ocular	1	1,8
Epinephrine Racemic	16	30,2
Epinephrine Inhaler	3	5,7
Steroids Intravenous	12	22,6
Months		
February	1	1,9
March	2	3,8
April	5	9,4
May	27	50,9
June	17	32,1
July	1	1,9
Other Clinical Findings		
Anaphylaxis	10	18,9
Angioedema	14	26,4
Dyspnea	2	3,8
Conjunctivitis	27	50,9
Rhinitis	16	30,2
Skin Lesions Types		
Urticaria	42	79,2
Papules	13	24,5
Pustule	3	5,7
Reason for Exposure		
Lumberjack	8	15,1
Farmer	3	5,7
Touristic Trip, Picnic	42	79,2
Other Affected Persons(a)		
1	23	43,4
2	10	18,9
3	1	1,9

Table 1. Demographic data of Pine Processionary Caterpillar exposure
a.The patient evaluated in the emergency department and the other accompanying patients

Discussion

This study retrospectively analyzes envenomations caused by the pine processionary caterpillar (Thaumetopoea pityocampa) over a ten-year period, from January 1, 2014, to May 31, 2024, in four different hospitals. A total of 53 patients with various complaints following contact with this caterpillar were identified. This study represents the largest case series in the literature to date, with a notable inclusion of the highest number of pediatric cases, providing a comprehensive overview of the clinical implications of pine processionary caterpillar envenomations. The average age of the patients was 30.75±22.9 years, with a range from 1 to 80 years. The majority of the cases were female (52.8%). The data collected provided insights into the demographics, exposure characteristics, clinical findings, and treatment outcomes of these cases. This study also examines the impact of global warming on the spread of Thaumetopoea

pityocampa, particularly in regions where the habitat of this species has expanded, leading to an increase in envenomation cases. Literature suggests that the rise in global temperatures has facilitated the northward expansion of this caterpillar, contributing to a higher incidence of human contact and subsequent envenomations (4,11).

The most commonly affected areas during pine processionary caterpillar envenomations are the neck, face, forearms, and hands. These exposed body parts are particularly vulnerable during outdoor activities, as the caterpillar's urticating hairs can easily penetrate the epidermis and cause significant allergic reactions, including contact urticaria. Studies consistently highlight that the neck and face are the most frequently impacted regions, given the high sensitivity of the skin in these areas and their regular exposure (1,11,14,15). The frequent contact with the neck and face areas may be due to the caterpillar falling onto patients while they are walking in pine forests (Figure 2). Additionally, children are especially susceptible to these reactions, often experiencing papular dermatitis and vesiculopustular rashes on the wrists, forearms and mouth after contact with the caterpillar's hairs (1,14). Particularly in young children, handling the caterpillar with their hands and then putting it in their mouth could lead to an increased occurrence of angioedema-like reactions around the mouth and surrounding areas (Figure 3). Interestingly, while exposed areas are most commonly affected, covered regions can also be impacted due to airborne dispersal of the hairs, particularly in cases of high infestation or strong winds (4–6). These findings underscore the need for protective clothing and preventive measures, particularly during periods of high caterpillar activity, to reduce the risk of envenomation and subsequent allergic reactions.

Figure 2. Contact urticarial lesions that have developed on the neck of a patient following contact with the pine processionary caterpillar.

Figure 3. Angioedema and contact urticarial rash around the mouth in a child who had placed the caterpillar in his mouth.

The majority of envenomations occurred between May and June, coinciding with the larval stage of the pine processionary caterpillar. During this period, the larvae are highly allergenic due to their urticating hairs. Literature indicates that the larval stage is the most hazardous time for human contact, as the caterpillar's defense mechanism is most active. Some of the cases were observed in February and March, which might indicate occupational exposures. Additionally, the larval stages of the caterpillars could vary depending on regional temperature differences due to changing seasons (7,16). Public awareness campaigns and preventive measures should be intensified during these months to reduce the risk of envenomations.

Pine processionary caterpillar envenomations have been treated with various approaches in the literature. In our study, antihistamines were administered intramuscularly, orally, topically, and ocularly, while corticosteroids were given intravenously. Racemic epinephrine and nebulized epinephrine were also used effectively found in our study. For instance, Cuevas et al. utilized topical potassium dobesilate cream for dermatitis, achieving rapid symptom resolution without side effects (12). Similarly, Galip et al. emphasized the success of systemic steroids and antihistamines in severe cases involving bullous reactions (15). On the other hand, Vega et al. primarily used oral and intramuscular antihistamines alongside corticosteroids for treatment (11).

In our study anaphylaxis developed in 10 cases. According to patient records, in addition to the standard treatment protocols for anaphylaxis, racemic epinephrine was administered to patients with severe airway edema. All patients showed clinical improvement following the treatments. Racemic epinephrine provided a rapid effect in reducing airway edema when used alongside standard anaphylaxis treatment. Racemic epinephrine was administered to 16 patients (30.2%), playing a supportive role in managing angioedema associated with severe allergic reactions. It is crucial to clarify that systemic epinephrine remains the primary treatment for anaphylaxis. Racemic

epinephrine, due to its balanced adrenergic effects, is particularly effective in managing airway edema in emergency settings. This intervention, when used alongside standard anaphylaxis treatments, contributes to rapid bronchodilation and reduction of mucosal edema, thus preventing progression to more severe outcomes. The use of racemic epinephrine as an adjunct treatment highlights its value in the comprehensive management of severe allergic reactions, especially when immediate intervention is critical to prevent life-threatening outcomes.

Global warming has significantly influenced the geographic distribution of the pine processionary caterpillar. Rising temperatures have allowed this species to expand northward, from the Mediterranean region to the Marmara and Black Sea regions. This northward spread increases the likelihood of human encounters and subsequent envenomations in areas previously unaffected. Understanding these ecological shifts is vital for predicting and managing future risks associated with this species. Netherer et al. conducted a study using climate modeling and field observations to investigate how global warming influences the habitat of this species. The study found that the warming of winter temperatures has enabled the caterpillar to thrive in areas like the Marmara and Black Sea regions, where it had not been able to establish colonies before (13). Similarly, Kriticos et al. used ecological niche modeling to predict future distribution shifts, indicating that if global warming continues, the caterpillar's habitat could expand even further, underscoring the need for proactive management strategies to mitigate potential risks (3). Bonamonte et al. emphasized that this expansion is not just a regional issue but part of a broader pattern driven by climate change, highlighting the necessity for comprehensive monitoring and management strategies to anticipate and address future ecological shifts (14).

Limitations

This study is subject to several limitations, including its retrospective design and reliance on hospital records, which may not capture all cases of envenomation. Clinical presentations in some patients exposed to the Pine Processionary Caterpillar may have been interpreted as anaphylaxis and treated accordingly. However, due to the retrospective nature of our study and the reliance on existing medical records, a secondary validation of these diagnoses was not feasible. Additionally, the data was collected from a limited geographic area, which may not be representative of broader trends. Further research is needed to validate these findings and explore envenomations in other regions and contexts.

Conclusion

In conclusion, the pine processionary caterpillar poses a significant envenomation risk, particularly during its larval stage. Effective treatment protocols, including the use of racemic epinephrine for angioedema, are crucial for managing these cases. The northward expansion of this species due to global warming necessitates increased awareness and preventive measures in newly affected regions. Future studies should aim to expand the geographic scope and investigate long-term trends to better understand and mitigate the impact of this environmental and health concern.

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Ethical Approval: This retrospective study involving human participants was in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Local Ethics Committee approved this study. The study received approval from the Scientific Research Ethics Committee of the Faculty of Medicine, University of Health Sciences Trabzon (approval number: 2024/120). Informed consent was obtained from all patients for the capturing and publication of their images. The patients were informed about the purpose of the study and the potential use of their images in academic publications.

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ORIGINAL ARTICLE / ÖZGÜN ARAŞTIRMA MAKALESİ

Analysis of Interhospital Emergency Referrals Despite Safety Concerns on the Roads: Emergency Referrals in Northwest Syria intraregional Borders

Güzergahlardaki Güvenlik Endişelerine Rağmen Yapılan Hastaneler Arası Acil Sevklerin Analizi: Kuzeybatı Suriye Bölge İçi Sınırlarda Acil Sevkler

Bahadır Karaca[1], Burak Çelik[2]

ABSTRACT

Aim: Our study aims to assess emergency patient transport between hospitals in the northwestern region of Syria. In this way, determining the patient profiles transferred in the region can help shed light on the reasons for avoidable transfers, reduce transfers, and reduce the risks associated with transfers.

Material and Methods: Our retrospective study investigated the patients who were transferred to Azez Vatan Hospital, Çobanbey Hospital, and Jarablus Hospital and from these facilities within the borders of the northwestern region of Syria between 01/01/2020-01/01/2021. Transfer records of patients transferred between hospitals and ambulance stations were searched in files and computer records. Because there was no automation system in the healthcare facilities involved in the study, data were recorded manually on the data collection form and processed for statistical analysis. Statistical analyses of the study were performed as descriptive statistics of variables are reported as mean±standard deviation, median (min-max), and n (%). Statistical analyses of categorical variables were performed using the chi-square test and Fisher Freeman Halton Exact test.

Results: The mean age of the patients of 899 patients included in the study was 33.68±26.80 years, 530(59.0%) were male and 369(41.0%) were female. 27.3% of patients were trauma patients and of both sexes. Male trauma patients were approximately 2.5 times more common than female trauma patients. Among pediatric transfers, trauma was present in one out of every three patients. Patients were most frequently transferred in February, March, and June and least frequently in January ($p < 0.05$). It was found that the need for adult, newborn, and pediatric intensive care, the need for medical material and equipment, the need for further examination/treatment, followed by the need for treatment under the supervision neurosurgeon, obstetric and gynecologist, cardiology specialist, or pediatrician. It was also noted that transfers for COVID-19 (SARS-CoV-2 Coronavirus Disease 2019) service needs due to the impact of the COVID-19 outbreak during the study period were among the most common reasons. COVID-19 falls, respiratory distress, traffic accidents, and acute MI were the most common diagnoses in all transferred age groups.

Conclusion: In northwestern Syria, emergency patients are most often transferred from one hospital to another because they require all types of intensive care units, medical materials and equipment, advanced diagnostic treatment, and specialists in neurosurgery, obstetrics and gynecology, cardiology, and pediatrics. Increasing hospital capacity and qualifications of hospitals within the humanitarian response and increasing the number of specialists, may be considered to reduce inter-hospital transfers of emergency patients.

Keywords: Emergency transfer, interhospital transfer, post-conflict area, Syria

ÖZ

Amaç: Bu çalışmada, Suriye'nin kuzeybatı bölgesindeki hastaneler arasındaki acil hasta sevklerini değerlendirmeyi amaçlandı. Bu çalışmayla bölgede sevk edilen hasta profillerinin belirlenmesine, önlenebilir sevk nedenlerinin aydınlatılmasına, sevklerin azaltılmasına ve sevklerden kaynaklanan risklerin azaltılmasına katkı sağlanabilir.

Gereç ve Yöntemler: Bu retrospektif araştırmada, 01/01/2020-01/01/2021 tarihleri arasında Suriye'nin kuzeybatı bölgesi sınırları içindeki Azez Vatan Hastanesi, Çobanbey Hastanesi ve Jerablus Hastanesi'ne sevk edilen ve bu tesislerden sevk edilen hastalar değerlendirildi. Hastanelerdeki ve ambulans istasyonlarındaki hastaların sevk kayıtları dosyalardan ve bilgisayar kayıtlarından araştırıldı. Araştırmaya dâhil edilen sağlık kuruluşlarında otomasyon sistemi bulunmadığından veriler, veri toplama formuna manuel olarak kaydedilerek istatistiksel analizler için kaydedildi. Araştırmanın istatistiksel analizleri değişkenlere ait tanımlayıcı istatistikler ortalama±standart sapma, ortanca (min-maks) ve n (%) olarak raporlanarak yapıldı. Kategorik değişkenlerin istatistiksel analizleri ki-kare testi ve Fisher Freeman Halton Exact testi kullanılarak yapıldı.

Bulgular: Çalışmaya dâhil edilen 899 hastanın yaş ortalaması 33,68±26,80 yıl olup, 530'u (%59,0) erkek, 369'u (%41,0) kadındı. Hastaların %27,3'ü travma hastasıydı. Erkeklerde travma kadın hastalara göre yaklaşık 2,5 kat daha sık görülüyordu. Pediatrik başvurularda her üç hastadan birinde travma mevcuttu. Hastalar en sık Şubat, Mart ve Haziran aylarında, en az ise Ocak ayında başvurdu ($p<0,05$). Hastaların; erişkin, yenidoğan ve çocuk yoğun bakım ihtiyacı; tıbbi malzeme ve ekipman ihtiyacı, ileri tetkik/tedavi ihtiyacı olduğu ve beyin cerrahı, kadın doğum uzmanı, kardiyoloji veya pediatri uzmanı gözetiminde tedavi ihtiyacı olduğu tespit edildi. Ayrıca çalışma dönemi içerisinde COVİD -19 salgınının etkisiyle oluşan COVİD -19 (SARS-CoV-2 Coronavirüs Hastalığı 2019) hizmet ihtiyaçlarına yönelik sevklerin de en sık görülen nedenler arasında yer aldığı saptandı. Sevk edilen tüm yaş gruplarında en sık görülen tanılar, COVID-19, düşme, solunum sıkıntısı, trafik kazası ve akut miyokard enfarktüsü idi.

Sonuç: Kuzeybatı Suriye'de acil hastalar çoğunlukla acil nedenlerle bir hastaneden diğerine sevk edilebilmektedir. Sevk nedenleri olarak yoğun bakım ünitesinde takip ihtiyacı; tıbbi malzeme ve ekipman ile ileri teşhis tedavi gereksinimi ve beyin cerrahisi, kadın doğum, kardiyoloji ve pediatri uzmanı değerlendirmesine ihtiyaç duyulması görülmektedir. İnsani yardım kapsamında hastane kapasitesinin ve hastanelerin niteliklerinin arttırılması ve uzman sayısının arttırılmasının, acil hastaların hastaneler arası sevkleri azaltacağı düşünülebilir.

Anahtar Kelimeler: Acil sevk, hastaneler arası transfer, çatışma sonrası bölge, Suriye

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Introduction

Treatment options are limited during prehospital and interhospital transfer, and extensive assessment is required, particularly during transfer (1,2). Studies have shown that transfer of critically ill patients increases the risk of death and transfer is considered a dangerous maneuver (3,4). For these reasons, the decision to transfer a patient is made by weighing the benefits to the patient at the transfer site against the potential risks of transfer (5).

Even in countries with well-developed health systems, patient transfers between hospitals are common (6). In low-income countries, there are many urgent surgical needs, such as motor vehicle accidents, agricultural accidents, peritonitis, long bone fractures, and postpartum hemorrhage, that may be transferred to other hospitals due to insufficient medical technical staff and equipment (7,8).

One of the regions lacking infrastructure after more than a decade of civil unrest and conflict in northwestern Syria (9,10,11). After this region was liberated from terrorism, health facilities were established as part of the humanitarian response. In addition to preventive health services, hospitals were also equipped with operating rooms, intensive care units, and other advanced diagnostic facilities (12). However, hospitals in northwestern Syria have varying capacities and service capabilities due to security concerns, transport difficulties, technical facilities, and human resources (13). If a patient is admitted to one of these hospitals for urgent surgical or medical reasons and cannot be adequately cared for there, they may be transferred to another health facility in northwest Syria where they can receive the most benefit. In north-western Syria, transport disruptions and difficulties occur due to a lack of infrastructure and security risks and controls. For elective patient transfers, it can be assumed that road and ambulance services are optimal for regional conditions. However, when emergencies require transfer to other facilities without waiting, the nature of the transfer process creates a risk that is exacerbated by transport problems. In this context, it is believed that analyzing the characteristics and reasons for patient transfers by determining the profiles of patients transferred in the region can help to shed light on the reasons for avoidable transfers, reduce transfers, and reduce the risks associated with transfers. Our study aims to assess emergency patient transfers between hospitals in the northwestern region of Syria.

Material and Methods

Study design and setting

Our retrospective study examined the patients who were transferred to Azez Vatan Hospital, Çobanbey Hospital, and Jarablus Hospital within the borders of the Northwestern Region of Syria between 01/01/2020-01/01/2021, as well as the patients who were transferred from these three hospitals to hospitals within the borders of the Northwestern Region of Syria.

The study was approved by the Non-Interventional Research Ethics Committee of Hatay Mustafa Kemal University (meeting date: 18.02.2021, decision number: 11) and the relevant hospital administrations.

Selection of Participants

Patients transferred to Azez Vatan, Çobanbey, and Jarablus hospitals from the emergency departments of other hospitals and patients transferred to other hospitals from the emergency departments of these three hospitals were included in the study. Patients who were transferred to Turkey or who returned from Turkey after completing their treatment were not included in the study. Patients transferred from wards, intensive care units, and outpatient clinics were excluded from the study. For patients who were transferred to another hospital without being treated at the place of transfer, the first and last hospitals were included in the study.

Study site and health care facilities

The study was conducted in hospitals, health centers, emergency ambulances, and their stations, and command and control centers for emergency medical services opened by Turkey as part of its humanitarian assistance in northwestern Syria, where Syrian doctors, nurses, and other health professionals' work. These health facilities serve the local population in northwestern Syria. The largest general hospitals are Azez Vatan Hospital in the south of Kilis province, ten kilometers (km) from the Turkish southern border, Çobanbey Hospital in the south of Elbeyli district in Kilis province, seven km from the Turkish southern border, and Jarablus Hospital in the south of Karkamış district in Gaziantep province, two km from the Turkish southern border. These hospitals also have ambulance stations for the transfer of emergency patients, while Çobanbey Hospital also has a command-and-control center for the management of ambulances. The patient transfers included in the study cover a radius of 131 km from Afrin in the west to Jarablus in the east.

Operation of health centers in the region

As a result of the Syrian civil war and terrorism, health centers in the region have been destroyed and rendered unusable. In addition, most of the health workers had to migrate from the region or lost their lives in the war. The Azez Vatan hospital was used by terrorist elements during the war, targeted by heavy weapons and even bombed by aircraft, and lay in ruins. After the region was cleared of terrorism, Turkey restored the Azez Vatan hospital and provided it with the physical conditions to provide advanced health services such as a 200-bed operating theatre, adult and neonatal intensive care units and a dialysis unit. Çobanbey Hospital was also rebuilt from scratch as a 200-bed prefabricated hospital capable of providing advanced health services such as operating rooms, neonatal, pediatric and adult intensive care units, a dialysis unit, and a burn unit. The Jarablus Hospital was opened as a 75-bed health facility providing advanced health services such as operating rooms, neonatal and adult intensive care units, and dialysis unit by converting the buildings with suitable physical conditions in the region into a hospital. Turkey has provided, and continues to provide, the infrastructure, equipment, and logistics for these hospitals, which were opened as part of humanitarian aid. These hospitals have provided the environment and facilities for local health workers working in the region to provide health services. Turkish health workers also provide training and advice to local health workers. Azez Vatan, Çobanbey, and Jarablus hospitals have

become the focal point of health services for local health workers through the provision of these facilities and the employment of local Syrian health workers. Azez Vatan, Çobanbey, and Jarablus hospitals are the most comprehensive hospitals in the region and receive the highest number of transfers. These hospitals have the most physical facilities, material and equipment capacity, and human resources, and provide the most advanced health services in the region. There are also smaller humanitarian hospitals and health centers opened by Turkey in the region. Some civil society organizations also run smaller hospitals and health centers with limited facilities. All patients who exceed the capacity of all hospitals and health facilities in the region are transferred to Azez Vatan, Çobanbey, and Jarablus hospitals. Particularly in emergencies, doctors in neurosurgery, head, face, and maxillofacial surgery, cardiovascular surgery, thoracic surgery, orthopedics, obstetrics and gynecology, pediatrics, and other specialties are not always present in other small hospitals or are not present at all. In at least one of the Azez Vatan, Çobanbey, and Jarablus hospitals, these specialists are available 24 hours a day, 7 days a week for emergency treatment of patients.

These hospitals, which provide the highest level of healthcare in the region, accept all patients and are the main healthcare centers for patients in the region. However, if there are situations that exceed the capabilities of the Azez Vatan, Çobanbey, and Jarablus hospitals, patients can be transferred to hospitals in Turkey with the decisions made in this hospital. These transfers can be emergency transfers. In the case of emergency patient transfers, the entire healthcare process of the patients transferred to the hospital in Turkey can be completed in Turkey until they are discharged. In other cases, patients may be transferred for appropriate interventional procedures in some selected patient groups, such as emergency PCI, or emergency advanced surgery. Patients can be readmitted to Azez Vatan, Çobanbey, and Jarablus hospitals in Syria for emergency procedures and follow-up of post-operative stabilized patients. In addition, patients residing in northern Syria who have traveled to Turkey and require hospitalization can also be transferred to Azez Vatan, Çobanbey, and Jarablus hospitals in Syria if the patient wishes. Another group, elective patients, can be transferred to these hospitals for advanced medical services upon the decision of the medical boards of these hospitals. However, these patients are not the group of patients evaluated in this study.

Data collection

Transfer records of patients transferred between hospitals and ambulance stations were searched in files and computer records. From these records, demographic information, diagnoses, reason for transfer, transferring hospital, vital signs, Glasgow Coma Scale, and time zones and days of transfer were scanned. As there was no automated system in the healthcare facilities involved in the study, data were manually recorded on the data collection form and processed for statistical analysis.

Statistics

Statistical analyses of the study were performed using Statistical Package for Social Sciences version 28.0 software for Windows (IBM SPSS Statistics for Windows, version 28.0. Armonk, NY: IBM Corp., USA). Descriptive statistics of variables are reported as mean±standard deviation, median (min-max), and n (%). Statistical analyses of categorical variables were performed using the chi-square test and Fisher Freeman Halton Exact test.

Results

A total of 899 interhospital transferred patients were included in the study. The mean age of the patients was 33.68±26.80 years, 530 (59.0%) were male and 369 (41.0%) were female. The relationship between sex and age groups was not statistically significant (p=0.096) (Table 1).

Age groups	Mean∓SD Median (Min-Max) Age	Male n (%)	Female n (%)	Total n (%)	p#
Neonatal (age≤28 Days)	3.85∓5.39 1.0 (1.0-15.0)	76 (14.3)	65 (17.6)	141 (15.7)	
Child (28 Days <age<18 years)	6.97∓5.25 6.0 (0-17.0)	97 (18.3)	84 (22.8)	181 (20.1)	
Adult (18≤age <65)	42.90∓13.24 44.0 (18.0-64.0)	280 (52.8)	166 (45.0)	446 (49.6)	0.096
Elderly (age≥65),	74.49∓7.45 72.5 (65.0-97.0)	77 (14.5)	54 (14.6)	131 (14.6)	
Total	33.68∓26.80 35.0 (0.0-97.0)	530 (59.0)	369 (41.0)	899 (100.0)	

Table 1. Values for the age of patients and distribution of age groups by sex. SD: Standard deviation, #: Chi-Square.

When analyzing the distribution of patients according to trauma status, 654 (72.7%) were non-trauma patients and 245 (27.3%) were trauma patients. When evaluating trauma patients, there was a higher prevalence of patients in the adult age group compared to the other age groups, in both sexes (p=0.016). Among transferred trauma patients, male trauma patients (n=171) were approximately 2.5 times more common than female trauma patients (n=74). In pediatric transfers, trauma was present in one in two patients (n=63) (0.016) (Table 2).

When comparing transfers by month, patients were most frequently transferred in February, March, and June, and least frequently in January (chi-square test, $p < 0.05$). When compared by days of the week, the distribution of transfers was homogeneous (chi-square test, p=0.201).

When the reasons for patient transfer were evaluated in general and by gender, the 10 most common reasons for transfer are shown in Figure 1. Accordingly, the most common reasons for transfer were the need for intensive care (n=164), the need for medical equipment and supplies (n=129), and the need for neonatal intensive care (n=120), followed by the need for treatment under the supervision of a neurosurgeon (n=47), the need for further evaluation/treatment (n=44), the need for treatment under the supervision of an obstetrician/gynecologist (n=42), the need for pediatric intensive care (n=33), and the need for treatment under the supervision of a cardiologist (n=29) or pediatrician (n=27).

Age groups	Male n (%)		Female n (%)		Total n (%)	
	Trauma (-)	Trauma (+)	Trauma (-)	Trauma (+)	Trauma (-)	Trauma (+)
Total	359 (67.7)	171 (32.3)	295 (79.9)	74 (20.1)	654 (72.7)	245 (27.3)
Neonatal (Age≤28 Days)	50 (13.9)	26 (15.2)	59 (20.0)	6 (8.1)	109 (16.7)	32 (13.1)
Child (28 Days<Age<18)	58 (16.2)	39 (22.8)	60 (20.3)	24 (32.4)	118 (18.0)	63 (25.7)
Adult (18≤Age<65)	192 (53.5)	88 (51.5)	130 (44.1)	36 (48.6)	322 (49.2)	124 (50.6)
Elderly (65≤Age)	59 (16.4)	18 (10.5)	46 (15.6)	8 (10.8)	105 (16.1)	26 (10.6)
#p	0.122		0.021		0.016	

Table 2. Trauma status of patients by age group and gender.
#: Chi-Square Test

It was also found that transfers for COVID-19 service needs (n=111) due to the impact of the COVID-19 (SARS-CoV-2 Coronavirus Disease 2019) outbreak during the study period were among the most common reasons (Figure 1). When the distribution of transfers by the hospital was evaluated, the hospital that transferred the most patients was Azez Vatan Hospital (n=558) and the hospital that received the most transfers was Çobanbey Hospital (n=341) (Table 3).

Hospitals accepting transfers n (%)		Referring hospitals n (%)			p#
		Azez Vatan H. 558 (62.1%)	Jarablus H. 109 (12.1)	Çobanbey H. 232 (25.8)	
Afrin H.	20 (2.2)	15 (2.7%)	1 (0.9)	4 (1.7)	<0.001
Azez Vatan H.	119 (13.2)	-	14 (12.8)	105 (45.3)	
Jarablus H.	43 (4.8)	16 (2.9%)	-	27 (11.6)	
Çobanbey H.	341 (37.9)	280 (50.2%)	61 (56.0)	-	
Elbab H.	136 (15.1)	55 (9.9%)	29 (26.6)	52 (22.4)	
IDA (Independent Doctors Association) H.	90 (10.0)	89 (15.8%)	1 (0.9)	-	
Marea H.	135 (15.0)	88 (15.8%)	3 (2.8)	44 (19.0)	
Other local hospitals	15 (1.7)	15 (2.7%)			

Table 3. Distribution of transfers among hospitals.
#: Fisher Freeman Halton Exact test, H.: Hospital

When the mean and median vital signs of the transferred patients over 18 years of age were analyzed, it was found that the vital signs were close to normal values and the Glasgow Coma Scale (GCS) score was less than 15. The assessment of the level of consciousness using the AVPU scale among the transferred patients, whose data were available, revealed that 388 (86.2%) were alert (A) and 62 (13.8%) were responsive to verbal stimuli (V), responsive to pain (P), or unresponsive (U). Diagnostic groups were used in the analysis of the diagnostic distribution of the transferred patients to facilitate the evaluation, as the spectrum was wide. After excluding inaccessible data and analyzing the distribution of diagnoses by age group, it was found that COVID-19 (n=111), falls (n=69), respiratory distress (n=63), traffic accidents (n=61), and acute MI (n=60) were the most common diagnoses in all transferred age groups. Respiratory distress (n=52) and prematurity (n=49) were the most common diagnoses in newborns, while the rate of trauma-related diagnoses was highest in children. In the adult and elderly age groups, COVID-19-related diagnoses ranked first, while respiratory distress and acute MI in the elderly and acute MI and trauma in adults were the leading diagnoses (Table 4).

When the distribution of transfer diagnoses was evaluated by sex, respiratory distress (n=37) and prematurity (n=21) were most common among all males under 18 years of age, followed by trauma-related diagnoses such as traffic accidents (n=19) and falls (n=15). When the distribution of diagnoses was analyzed for all patients over 18 years of age, COVID-19-diagnosed transfers were the most common regardless of gender, whereas cardiopulmonary and trauma were the most common diagnoses for males. When all female patients over 18 years of age were analyzed, transfers with a trauma diagnosis were less common (Table 5).

Most common diagnoses in all age groups	n (%)*	Most common diagnoses in newborns (≤28 Days)*	n (%)*	Most common diagnoses in children (28 Days -18 years)*	n (%)*	Most common diagnoses in adults (18 years-65years)*	n (%)*	Most common diagnoses in the elderly (>65years)*	n (%)*
COVID 19	111 (12.3)	Respiratory Distress	52 (36.9)	Traffic Accident	26 (14.4)	COVID-19	62 (13.9)	COVID-19	47 (35.9)
Falls	69 (7.7)	Prematurity	49 (34.8)	Falls	25 (13.8)	Acute MI	46 (10.3)	Dyspnea	16 (12.2)
Respiratory Distress	63 (7.0)	Congenital anomaly	10 (7.1)	Head Trauma	13 (7.2)	Falls	38 (8.5)	Acute MI	14 (10.7)
Traffic Accident	61 (6.8)	Jaundice	10 (7.1)	Dyspnea	10 (5.5)	Traffic Accident	34 (7.6)	Femur Fracture	8(6.1)
Acute MI	60 (6.7)	Meconium aspiration	5 (3.5)	Fever	8 (4.4)	Dyspnea	25 (5.6)	Falls	6 (4.6)
Prematurity	49 (5.5)	Cyanosis	3 (2.1)	Congenital anomaly	6 (3.3)	Pregnancy	20 (4.5)	Stroke	4 (3.1)
Dyspnea	41 (4.6)	Fever	2 (1.4)	Acute Renal Failure	5 (2.8)	Acute Renal Failure	18 (4.0)	DM emergencies	3 (2.3)
Femur Fracture	26 (2.9)	İleus	2 (1.4)	Burn	5(2.8)	Firearm Injury	17 (3.8)	Acute Renal Failure	2 (1.5)
Acute Renal Failure	25 (2.8)	Pneumonia	2 (1.4)	Femur Fracture	5(2.8)	Femur Fracture	13 (2.9)	Seizure	2 (1.5)
Firearm Injury	23 (2.6)	Blood incompatibility	2 (1.4)	Firearm Injury	5(2.8)	Burn	11 (2.5)	Hydronephrosis	2 (1.5)
Other	371 (41.3)	Other	4 (2.8)	Other	73 (40.3)	Other	162 (36.3)	Other	27 (20.6)

Table 4. Distribution of the most common diagnosis groups among transferred patients by age group
*Missing values are not included in the % calculation. Valid percent values were use

Discussion

Our study found that the most common reasons for transfer were the need for intensive care, the need for medical supplies and equipment, the need for neonatal intensive care, the need for treatment under the supervision of a neurosurgeon, and the need for further evaluation/treatment. The most common specialties required for transfer were neurosurgery, obstetrics and gynecology, cardiology, and pediatrics. The most common diagnostic groups for transfer were falls, dyspnea, motor vehicle crashes, and acute MI. In addition, the need for COVID-19 services and the importance of COVID-19-related diagnoses demonstrated the impact of the pandemic on transfers for adult and elderly patients.

A study conducted in Jamaica examining interhospital transfer of trauma patients showed that 4 out of 5 trauma patients transferred between hospitals were male (14), and a study conducted in Nigeria showed that 6 out of 7 patients transferred for head trauma were male (15). An analysis of interhospital transfers in the United States showed that, despite some differences by ethnicity, the ratio of female to male patients was equal or close to equal, and in some cases, the ratio of female to male patients was even higher (16). Considering the publications in the literature, it can be said that the difference in the ratio between females and males in interhospital transfers is related to the level of development and the reasons for transfer. In our study, the high rate of male patients and the 2.5 times higher rate of male patients in trauma-related transfers can be explained by the high incidence of trauma in Northern Syria, where civil unrest and conflict continue.

To identify the reasons for avoidable transfers, it may be strategic to first evaluate by age group. In a study investigating emergency transfers between hospitals in Mardin, a border province of Turkey close to the region where our study was conducted, it was found that 7% of patients under one year of age were transferred. In comparison, 25.8% of patients over 65 years of age were transferred (17). In our study, it was found that 14.6% of transferred patients were elderly patients aged 65 years and above, about half of them were patients aged 18-65 years, 35.8% were pediatric patients under 18 years, and 15.7% of transferred patients were neonates. In our study, the rate of transferred elderly is lower than in Mardin, but the rate of neonates is higher than in Mardin. This situation can be explained by the fact that this difference in the development of the regions, even though they are geographically close, affects the increase in the elderly population, the increase in geriatric care services, and the increase in expectations of services for the elderly.

In a study by Kilci et al. examining emergency admissions in the elderly, respiratory diseases, infections, malnutrition, and trauma were found to be the most common diagnoses (18). In our study, when the distribution of diagnoses in elderly patients was examined, it was found that patients were admitted for the most common diagnosis of COVID-19, followed by reasons such as dyspnea, acute myocardial infarction, and falls. It is reasonable to assume that the patients transferred were consistent with the population from which they were selected.

In a review of pediatric transfers in the literature, Gattu et al. showed that the most common reason for transfer was respiratory disease (19). In a study by Odetola et al. reviewing transfers to pediatric intensive care units, respiratory distress and sepsis were the most common reasons for transfer (20).

Male		Female	
Diagnosis	n (%)*	Diagnosis	n (%)*
(Age <18 years) (n=173)		(Age < 18 years) (n=149)	
Respiratory Distress	37 (21.4)	Prematurity	29 (19.5)
Prematurity	21 (12.1)	Respiratory Distress	25 (16.8)
Traffic accidents	19 (11.0)	Falls	10 (6.7)
Falls	15 (8.7)	Traffic accidents	8 (5.4)
Congenital anomaly	11 (6.4)	Head Trauma	7 (4.7)
Head Trauma	7 (4.0)	Fever	5 (3.4)
Jaundice	6 (3.5)	Congenital anomaly	5 (3.4)
Fever	5 (2.9)	Birth	4 (2.7)
Dehydration	5 (2.9)	Femur fracture	4 (2.7)
Pneumonia	4 (2.3)	Jaundice	4 (2.7)
Other	43 (26.4)	Other	48 (32.2)
(18 years ≤ Age) (n=357)		(18 years ≤ Age) (n=220)	
COVID-19	67 (18.8)	COVID-19	42 (19.1)
Acute MI	37 (10.4)	Acute MI	23 (10.5)
Traffic accidents	31 (8.7)	Pregnancy	20 (9.1)
Falls	28 (7.8)	Falls	16 (7.3)
Dyspnea	26 (7.3)	Dyspnea	15 (6.8)
Firearms Injury	17 (4.8)	Femur Fracture	10 (4.5)
Femur Fracture	11 (3.1)	Acute Kidney Failure	9 (4.1)
Acute Kidney Failure	11 (3.1)	DM emergencies	6 (2.7)
Intracranial Hemorrhage	8 (2.2)	C-Section Birth	6 (2.7)
Stroke	8 (2.2)	Burn	5 (2.3)
Other	113 (31.7)	Other	68 (30.1)

Table 5. Distribution of patient transfer diagnosis groups by gender and age

*Missing values are not included in the % calculation. Valid percent values were used.

In our study, although respiratory distress and prematurity were among the most common reasons for transfer in neonates, it is observed that trauma diagnoses are more common in pediatric patients. They were not as prominent as trauma diagnoses, in contrast to the literature. In our study, where one in three patients was a child, it is reasonable to assume that the living conditions of patients in geographical areas with irregular and incomplete infrastructure increase the risk of traffic accidents and trauma.

A literature review of neonatal patients in Iran reported that neonates transferred between hospitals were on average 4.1 days old, half were male, a quarter was premature, and the reasons for transfer of these patients were respiratory distress in 58%, need for surgery in 21%, central nervous system disorders in 9%, sepsis in 6%, and acute renal failure in 4% (21). A study conducted in India found that almost half of the reasons for interhospital transfer of newborns were due to prematurity, followed by respiratory distress syndrome, sepsis, growth retardation, and meconium aspiration (22). In our study, respiratory distress and prematurity were among the most common diagnoses, although not as common as in India and Iran. Congenital anomaly, jaundice, and meconium aspiration followed the other two diagnoses more homogeneously. While it is a surprising result that nutritional deficiencies are not seen in the top-ranked neonates, it may suggest that the existing breastfeeding solidarity in this geography (23) may cause this effect. In addition, it is conceivable that differences between countries in prenatal follow-up rates, hospital facilities, and postnatal living conditions of newborns influence both the conditions and the reasons for the transfer.

The Canadian Institutes of Health Sciences national database reports that approximately 10% of patients admitted for acute cardiovascular disease were transferred to another center. Transferred patients were found to have lower all-cause mortality compared to non-transferred patients. NSTEMI and STEMI patients were also more likely to be transferred (24).

In contrast, a national cohort study in South Korea showed that patients transferred 30 days and 1 year after AMI had higher mortality. However, the elderly and patients with other comorbidities were more likely to be transferred to another emergency department. These patients with STEMI or NSTEMI were less likely to survive in the short and long term, even after adjustment for baseline characteristics and AMI severity. In addition, transferred patients were less likely to receive thrombolysis before interhospital transfer and less likely to receive immediate reperfusion therapy (25).

In our study, patients with coronary artery disease were among the most common diagnoses in patient referrals. Especially in the elderly, MI is the most common diagnosis. In the literature and our study, it was observed that MI patients were transferred to an advanced center because of concerns about mortality and the need for treatment. In northern Syria, patients are transferred to the appropriate intensive care unit after diagnosis, whereas for emergency invasive procedures, this support is provided by referral to hospitals in Turkey. Although each region has its characteristics, it can be seen that they are trying to provide the most ideal care for MI patients according to current treatment guidelines.

Westfall's assessment of inpatient databases in the United States suggests that the COVID-19 pandemic has highlighted

the challenges faced by hospitals. During the COVID-19 pandemic, there was an overall increase in mortality from non-COVID-19 diseases. In urban hospitals, mortality from acute myocardial infarction and gastrointestinal bleeding increased during the COVID-19 pandemic, while in rural hospitals, mortality from hip fracture increased during the COVID-19 pandemic. Mortality from pneumonia and sepsis increased in both rural and urban hospitals, suggesting that hospitals were unable to provide the same timeliness and level of care to non-COVID-19 patients in the face of the overwhelming number and severity of COVID-19 cases. The sheer volume of severe illness has been associated with increased mortality compared to pre-COVID-19. It has been hypothesized that the increased mortality may be due to the combined effects of resource constraints, particularly access to intensive care and mechanical ventilation; delayed care due to hospital overcrowding; and delayed care due to patient concerns about being admitted to the hospital with a COVID-19 infection (26). Our study shows that COVID-19 has the greatest impact on inter-hospital transfers. As is the case throughout the world, the periodic effects of COVID-19 on patient transfers, patient care and hospital organization are evident regardless of geography.

In a study of referrals to a hospital considered the main referral center in the capital of the sub-Saharan country of Malawi, delayed inter-institutional transfer was found to be an independent predictor of poor postoperative outcomes in patients transferred to a referring hospital for abdominal surgical emergencies. Each additional day to transfer was associated with an 18% increase in the likelihood of postoperative complications and a 19% increase in the likelihood of postoperative mortality. Another study examining the relationship between transfer status and in-hospital mortality in the same region showed that indirect transfer patients to the trauma centre had a significantly higher crude mortality rate than direct transfer patients. However, although indirect transfer patients arrived at the central trauma hospital an average of 2.69 days later than direct transfer patients, the longer time from injury to arrival was not associated with a higher risk of death (27). In our study, transfer of trauma patients was high in all age groups. The lack of health care personnel and equipment, especially in underdeveloped countries, creates the need for transfer of trauma patients. Adding the risk of transfer to inherently unstable trauma patients, can increase mortality.

An observational study of patient transfers between hospitals in the US found that lower socioeconomic status and being Hispanic or black were associated with fewer transfers. It has been suggested that this situation is indicative of disparities in access to health care (28). In the regions covered by our study, Turkey is attempting to provide access to healthcare for patients regardless of race, religion, language and gender by opening reference hospitals in the region.

Limitations

As there was no automation system in the healthcare facilities involved in the study, data were recorded manually on the data collection form. Manually recorded transfer records had insufficient and meaningless data and were excluded from the study. Due to the wide variety of reasons for transfer and transfer diagnoses, the evaluation was made based on the ten most common diagnoses and reasons.

Conclusion

In northwestern Syria, increasing hospital capacity and qualifications of hospitals within the humanitarian response and increasing the number of specialists, may be considered to reduce inter-hospital transfers of emergency patients.

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Ethical Approval: This retrospective study involving human participants was in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Local Ethics Committee approved this study. The study received approval from the Non-Interventional Research Ethics Committee of Hatay Mustafa Kemal University (date: 18.02.2021, decision number: 11)

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ORIGINAL ARTICLE / ÖZGÜN ARAŞTIRMA MAKALESİ

The Relationship Between Body Mass Index and Abdominal Circumference with Intraabdominal Organ Injury in High Energy Blunt Abdominal Trauma

Yüksek Enerjili Künt Karın Travmalarında Vücut Kitle İndeksi ve Karın Çevresi ile Karın İçi Organ Yaralanması Arasındaki İlişki

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ABSTRACT

Aim: The aim of this study was to determine the impact of body mass index (BMI) and abdominal circumference on intra-abdominal organ injury in high energy blunt trauma patients presenting to the emergency department.

Material and Methods: This prospective, cross-sectional, and analytical study included patients who presented to the Ankara Bilkent City Hospital Emergency Medicine Clinic between June 15, 2022, and December 31, 2022, due to high-energy blunt trauma and underwent contrast-enhanced abdominal computed tomography (CT). Patient demographics, vital signs, height, weight, BMI, mechanism of injury, abdominal injuries, injuries to other systems, abdominal circumference measurements, emergency department outcomes, and laboratory results were recorded in the data collection form. CT images were evaluated by a single radiology specialist, and abdominal circumference and subcutaneous fat tissue thickness were measured.

Results: A total of 374 patients were included in the study. 71.9% of the patients were male (n=269). The average age of the patients was 40 ± 16 years. Intra-abdominal injury was observed most frequently (30.8%) in patients with a BMI <18.5 (p=0.017). Although patients with intra-abdominal injury had lower sagittal abdominal diameter (SAD), transverse external diameter (T-ext), subcutaneous fat (Sc-fat), and BMI averages, these findings were not statistically significant (p=0.321, p=0.666, p=0.172, p=0.595, respectively). Patients admitted to the intensive care unit had lower SAD (20.6 ± 4.0 cm), T-ext (30.7 ± 3.9 cm), Sc-fat (2.0 ± 1.0 cm), and BMI (24.9 ± 4.4 kg/m2) averages (p=0.003, p=0.009, p=0.006, p=0.007, respectively).

Conclusion: Patients with a BMI <18.5 were found to be more susceptible to intra-abdominal injury. Patients with lower abdominal circumference (SAD, T-ext), Sc-fat, and BMI values were more likely to be admitted to the intensive care unit. Therefore, it is important to be cautious regarding abdominal injuries and injuries requiring intensive care admission in underweight and normal-weight patients who have experienced high-energy blunt trauma.

Keywords: High energy, blunt abdominal trauma, body mass index, abdominal circumference, subcutaneous fat thickness, emergency medicine

ÖZ

Amaç: Bu çalışmanın amacı, acil servise başvuran yüksek enerjili künt travma hastalarında vücut kitle indeksi (VKİ) ve karın çevresinin karın içi organ yaralanması üzerindeki etkisini belirlemektir.

Gereç ve Yöntemler: Bu prospektif, kesitsel ve analitik çalışmaya, 15 Haziran 2022 ile 31 Aralık 2022 tarihleri arasında Ankara Bilkent Şehir Hastanesi Acil Tıp Kliniğine yüksek enerjili künt travma nedeniyle başvuran ve kontrastlı abdominal bilgisayarlı tomografi (BT) çekilen hastalar dahil edilmiştir. Hastaların demografik bilgileri, yaşamsal bulguları, boy, kilo, VKİ, yaralanma mekanizması, karın yaralanmaları, diğer sistem yaralanmaları, karın çevresi ölçümleri, acil servis sonlanımı ve laboratuvar sonuçları veri toplama formuna kaydedildi. BT görüntüleri tek bir radyoloji uzmanı tarafından değerlendirildi, karın çevresi ve deri altı yağ dokusu kalınlığı ölçüldü.

Bulgular: Çalışmaya toplam 374 hasta dahil edildi ve %71,9'u (n=269) erkekti. Hastaların yaş ortalaması 40 ± 16 idi. İntraabdominal yaralanma en sık (%30,8) VKİ <18,5 olan hastalarda gözlendi (p=0,017). Karın içi yaralanması olan hastaların sagittal karın çapı (SKÇ), transvers dış çapı (TDÇ), deri altı yağ ve VKİ ortalamaları daha düşük olmasına rağmen, bu bulgular istatistiksel olarak anlamlı değildi (sırasıyla p=0.321, p=0.666, p=0.172, p=0.595). Yoğun bakım ünitesine kabul edilen hastaların SKÇ (20,6 ± 4,0 cm), TDÇ (30,7 ± 3,9 cm), deri altı yağ (2,0 ± 1,0 cm) ve VKİ (24,9 ± 4,4 kg/m2) ortalamaları daha düşüktü (sırasıyla p=0,003, p=0,009, p=0,006, p=0,007).

Sonuç: VKİ <18,5 olan hastalar karın içi yaralanmaya daha yatkın bulundu. Daha düşük karın çevresi (SKÇ, TDÇ), deri altı yağ ve VKİ değerlerine sahip hastaların yoğun bakım ünitesine kabul edilme olasılığı daha yüksekti. Bu nedenle, yüksek enerjili künt travma geçiren zayıf ve normal kilolu hastalarda karın yaralanmaları ve yoğun bakıma yatış gerektiren yaralanmalar konusunda dikkatli olmak önemlidir.

Anahtar Kelimeler: Yüksek enerji, künt karın travması, vücut kitle endeksi, karın çevresi, cilt altı yağ doğu kalınlığı, acil servis

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Introduction

Trauma is the leading cause of death in children and adults under the age of 46 worldwide (1). Each year, more than 5 million people die as a result of trauma (2). Abdominal trauma accounts for approximately 20% of all trauma-related deaths (3). The liver and spleen are the most commonly injured intra-abdominal organs (4). Forces such as compression, stretching, acceleration, and deceleration affect the abdominal cavity and intra-abdominal structures, leading to injuries of the abdominal wall, solid organs, and hollow organs (5). Computed tomography (CT) examinations are almost exclusively used in the diagnosis of abdominal injuries. CT has been shown to be superior to clinical evaluation and diagnostic peritoneal lavage in diagnosing significant abdominal injuries (6). Whole-body CT (head, neck, chest, abdomen, and pelvis) plays a crucial role in determining injury severity and deciding on the sequence of treatment for patients with multiple traumas (6).

The amount of abdominal visceral fat tissue measured by CT is a critical finding related to the risk of metabolic diseases associated with abdominal obesity. Abdominal circumference is one of the methods used to measure the amount of abdominal visceral fat tissue accumulation (7). Body mass index (BMI) is an index that measures body fat based on a person's height and weight. It is calculated by dividing a person's weight in kilograms by the square of their height in meters. Body mass index = weight (kg) / height (m) x height (m). However, due to individual differences, BMI may be insufficient to classify a person as obese or underweight. In certain populations such as athletes and bodybuilders, increased weight due to intensive muscle mass may not be directly associated with the person's health status, rendering BMI calculations inadequate (8).

Obesity is a chronic disease that is becoming increasingly prevalent and a global epidemic. Epidemiological studies have shown an association between high BMI and chronic diseases that negatively impact quality of life, such as cardiovascular diseases, diabetes, malignancies, and chronic kidney disease (9). While numerous studies have demonstrated the relationship between obesity and chronic diseases, there are limited studies on the effect of obesity on trauma patients (10). In this study, we aimed to determine the impact of BMI, abdominal circumference and subcutaneous fat thickness on intra-abdominal organ injury in high-energy blunt trauma patients presenting to the emergency department.

Material and Methods

This study was conducted between June 15, 2022, and December 31, 2022 at the Emergency Medicine Clinic of Ankara Bilkent City Hospital, a tertiary care hospital where all surgical and interventional procedures are available 24/7, serving approximately 470,000 patients annually. The study was approved by the Ankara Bilkent City Hospital Ethics Committee (Approval No: E1-22-2690, dated June 15, 2022). Our study is a prospective, cross-sectional, and analytical study. Patients who met the inclusion criteria during the specified dates were consecutively enrolled. Power analysis was not performed. Patients were enrolled in the study according to the Helsinki Protocol.

Patients aged 18 and older who met the Advanced Trauma Life Support (ATLS) 10 high-energy trauma criteria, who underwent contrast-enhanced abdominal CT, and volunteered to participate in the study were included. Patients with penetrating trauma, a history of laparotomy, diastasis recti, and those for whom e-nabız data were not accessible were excluded from the study.

Patients were evaluated in the red zone of our emergency department by a research assistant with at least two years of emergency medicine training. Patient data including age, gender, vital signs, height, weight, BMI, mechanism of injury, abdominal injuries, other system injuries, abdominal circumference measurements, emergency department outcomes, and laboratory results were recorded on the study form. Height and weight of the patients were obtained from the e-nabız system, an application of the Turkish Ministry of Health, to calculate BMI. For the calculation, the formula Body Mass Index = weight (kg) / height (m) x height (m) was used (11). Patients were classified as underweight (BMI <18.5), normal weight (BMI 18.5-24.9), overweight (BMI 25-29.9), and obese (BMI >30). CT images were evaluated and measurements of abdominal circumference and subcutaneous fat tissue thickness were performed by a single radiology specialist responsible for reading abdominal CT at Ankara Bilkent City Hospital Radiology Clinic.

The technique for measuring abdominal circumference and subcutaneous fat tissue thickness was based on the reference by Daniel et al. (12). The L4-L5 interval on CT images was used, and measurements were made on sagittal abdominal images corresponding to these intervals. Sagittal abdominal diameter (SAD) is the vertical longest anteroposterior length measured in the midline from skin to skin, without considering the umbilical fold. Transverse external diameter (T-ext) is measured horizontally from skin to skin passing through the vena cava and aorta. Subcutaneous fat tissue thickness (Sc-fat) is measured vertically from just beside the umbilical fold to the anterior surface of the abdominal wall (13). An example of abdominal circumference and subcutaneous fat tissue measurement for a patient presenting to our emergency department with motor vehicle accident (MVA) is shown in Figure 1.

The SAD, T-ext, and Sc-fat measurements used in our study were obtained with two devices with 128-detector and 64-detector multi-slice CT scanner systems. (GE Revolution EVO, GE Medical Systems, Milwaukee, WI, USA). Scans were reformatted to a 1.25 mm thickness and analysis was done on a remote workstation (Sarus 3.1, Teknoritma Inc., Ankara, Türkiye PACS Viewer (Teknoritma PACS Viewer, v5, Teknoritma Software, Ankara, Türkiye).

Statistical analysis

Statistical analyses were performed using IBM SPSS Statistics for Windows, Version 20.0 (Armonk, NY). Firstly, demographic data were analyzed, and frequencies of categorical variables were given as sample size and percentage. Pearson's Chi-square test and Fisher's Exact test were used for comparison of categorical data according to appropriateness. Distribution analysis of numerical continuous data was performed using the histogram and Shapiro-Wilk test, and for data not following normal distribution, median and interquartile range were used.

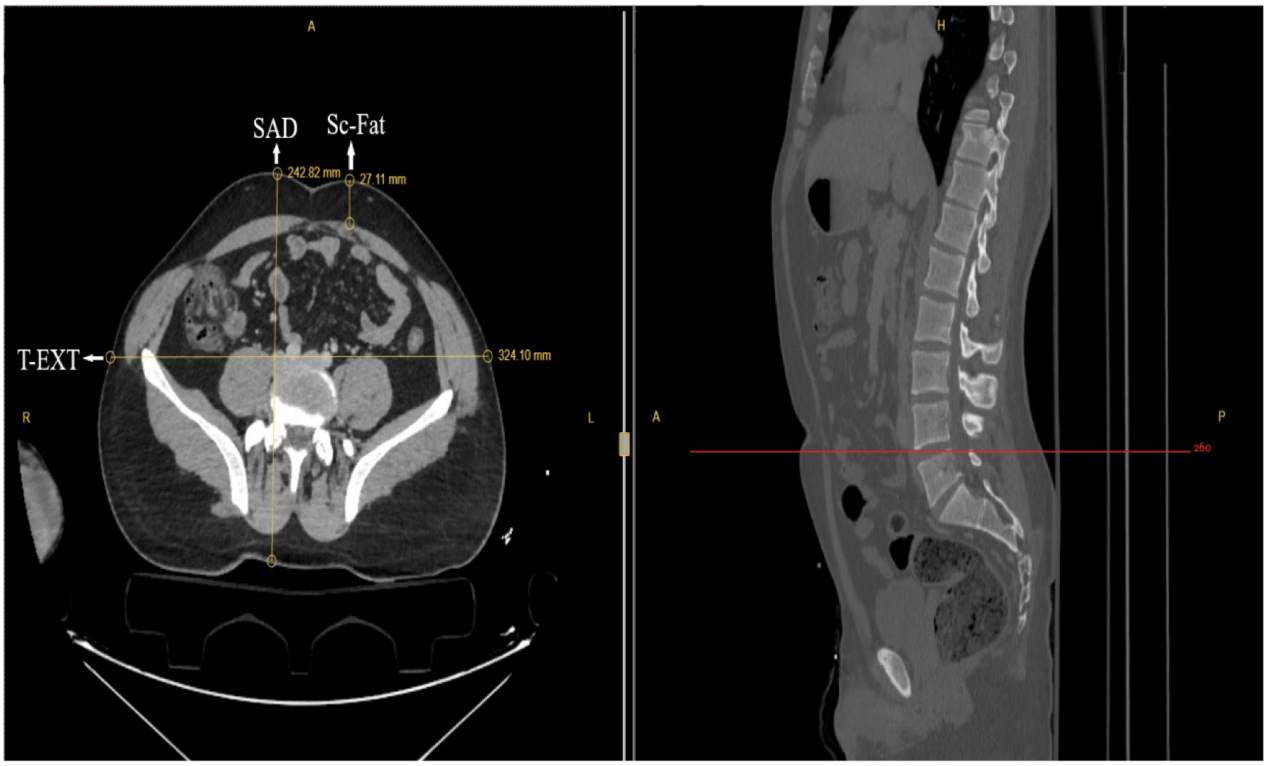

Figure 1. The example of abdominal circumference and subcutaneous fat tissue thickness in a patient admitted to our emergency department and treated for motor vehicle accident
Sc-Fat: subcutaneous fat tissue thickness SAD: sagittal abdominal diameter, T-ext: transverse external diameter

Mann-Whitney U test was used to compare the medians between two independent groups of data not following normal distribution. A p value was used for statistical significance, and a significance level of $p < 0.05$ was considered significant.

Results

A total of 374 patients were included in our study, with 71.9% being male (n=269). The mean age of the patients was 40 ± 16 years. The mean systemic blood pressure was 129±20 mmHg, the mean pulse rate was 87±13 beats per minute and the mean respiratory rate of the patients was 19±5 breaths per minute. Demographic datas and laboratory results of our patients are presented in Table 1. When examining the mechanisms of trauma, it was found that 51.9% of the patients were injured in motor vehicle accidents (n=194), 23% in pedestrian injuries (PI) (n=86), and 25.1% from falls from height (n=94). The mean BMI of the patients was calculated as 26.6. Among the patients, 3.5% had a BMI less than 18.5 (n=13), 39.3% had a BMI between 18.5 and 24.9 (n=147), 33.4% had a BMI between 25 and 29.9 (n=125), and 23.8% had a BMI greater than 30 (n=89). The mean measurements of subcutaneous fat tissue thickness (Sc-fat), sagittal abdominal diameter (SAD), and transverse external diameter (T-ext) were found to be 2.4 ± 1.1 cm, 22.4 ± 4.7 cm, and 32.3 ± 4.6 cm, respectively.

When examining the relationship between laboratory values and the presence of abdominal injury, it was observed that patients with abdominal injury had higher aspartat aminotransferaz (AST), alanin aminotransferaz (ALT), and lipase values compared to those without. These findings were statistically significant ($p < 0.001$ for AST, $p < 0.001$ for ALT, $p < 0.001$ for lipase).

The relationship between the presence of abdominal injury and gender, BMI groups, mechanism of trauma, and patient outcome is presented in Table 2. While intra-abdominal injury was not detected in 92.2% of the patients (n=345), it was found in 7.8% (n=29) of the patients. Head and neck injuries were present in 22.2% (n=83) of the patients, thoracic injuries in 32.1% (n=120), vertebral injuries in 17.1% (n=64), and extremity injuries in 25.7% (n=96). Intra-abdominal injury was more common in patients with a BMI less than 18.5 (p=0.017).

The relationship between BMI, abdominal circumference, subcutaneous fat tissue thickness, and abdominal injury is presented in Table 3. The mean SAD, T-ext, Sc-fat, and BMI were lower in patients with intra-abdominal injuries, but these findings were not statistically significant (p=0.321, p=0.666, p=0.172, p=0.595, respectively).

The relationship between BMI, abdominal circumference, subcutaneous fat tissue thickness, and intensive care unit (ICU) admission is presented in Table 4. A total of 67.1% of the patients were discharged (n=251), 18.7% were admitted to the general ward (n=70), and 14.2% required ICU admission (n=53). There were no fatalities. It was found that patients with intra-abdominal injuries were more likely to require ICU admission (p<0.001). Patients who required ICU admission had lower mean SAD, T-ext, Sc-fat, and BMI (p=0.003, p=0.009, p=0.006, p=0.007, respectively).

Variable		n (%) or mean ± SD
Age (year, mean ± SD)		40 ± 16
BMI (kg/m^2, mean ± SD)		26.6 ± 5.1
Sc-Fat (cm, mean ± SD)		2.4 ±1.1
SAD (cm, mean ± SD)		22.4 ± 4.7
T-ext (cm, mean ± SD)		32.3 ± 4.6
Sex, male (n,%)		269 (71.9)
Vital Signs (mean ± SD)	SBP (mmHg)	129 ± 20
	PR (beat/minute)	87 ± 13
	RR (breaths/minute)	19 ± 5
Laboratory Results (mean ± SD)	Hemoglobin (g/dL)	14.3 ± 1.5
	Hematocrit (%)	43.2 ± 4.3
	Urea (mg/dL)	33 ± 9
	Creatinin (mg/dL)	0.8 ± 0.2
	AST (U/L)	46 ± 52
	ALT (U/L)	39 ± 36
	Amylase (U/L)	64 ± 28
	Lipase (U/L)	38 ± 19
Mechanism (n, %)	MVA	194 (51.9)
	PI	86 (23.0)
	Fall from height	94 (25.1)
BMI group (n, %)	<18,5	13 (3.5)
	18,5-24,9	147 (39.3)
	25-29,9	125 (33.4)
	>=30	89 (23.8)
Abdominal Injury (n, %)		29 (7.8)
Outcome (n, %)	Discharged	251 (67.1)
	Admission	70 (18.7)
	ICU	53 (14.2)
Exitus (n, %)		0 (0)

Table 1. Demographic Data
BMI: Body Mass Index ScFat: Subcutaneous Fat Tissue Thickness SAD: Sagittal Abdominal Diameter Text: Transverse External Diameter PR: Pulse Rate RR: Respiratoryr ate MVA: Motor Vehicle Accident PI: Pedestrian Injury ICU: Intensive Care Unit

		Abdominal injury		
		Absent (n,%)	**Present (n,%)**	**P-value**
Sex	Women	99 (94.3)	6 (5.7)	0.357
	Men	246 (91.4)	23(8.6)	
BMI group	<18,5	9 (69.2)	4 (30.8)	0.017
	18,5-24,9	138 (93.9)	9 (6.1)	
	25-29,9	116 (92.8)	9 (7.2)	
	>=30	82 (92.1)	7 (7.9)	
Mechanism	MVA	184 (94.8)	10 (5.2)	0.149
	PI	77 (89.5)	9 (10.5)	
	Fall from height	84 (89.4)	10 (10.6)	
Outcome	Discharged	249 (99.2)	2 (0.8)	<0.001
	Admission	67 (95.7)	3 (4.3)	
	ICU	29 (54.7)	24 (45.3)	

Table 2. The relationship between the presence of abdominal injury and gender, BMI groups, mechanism of trauma, and patient outcome
BMI: Body Mass Index MVA: Motor Vehicle Accident PI: Pedestrian Injury ICU: Intensive Care Unit

Discussion

Trauma is one of the leading causes of mortality worldwide. It is the most common cause of death and disability in individuals under 35 years of age. Particularly, traffic accidents are the predominant mechanism of injury in developing and underdeveloped countries (14). The type and severity of injury vary depending on factors such as the mechanism of injury, deceleration at the time of injury, the use of seat belts, and the effect of airbags.

Similarly, individual characteristics such as height and weight may also be associated with the severity of injury (15). Our study revealed a higher incidence of abdominal injuries in the underweight BMI group patients.

When trauma patients were examined, it has been observed that men are more exposed to trauma than women both in our country and worldwide. In a study conducted by Liu et al. involving 140,000 patients, 71% of the patients were male, and 29% were female (16). Zhu et al. found that 76% of the patients were male and 24% were female in their study (17). Similarly, Bolandparvaz et al. reported that 73% of the patients were male and 27% were female in their study (18). In our study, a total of 374 patients were included, with 71.9% being male and 28.1% female. Consistent with the literature, our study also found that men are more exposed to trauma compared to women. This may be due to men being engaged in heavier work and being exposed to occupational accidents, the majority of drivers being male, and men being more socially active.

In the study by Zhu et al., the mean age of the patients was 45.6 years (16). Srivastava et al. reported a mean age of 30.6 years for their patients (19). Sierink et al. found a mean age of 42 years among their patients (20), while Jones et al. reported a mean age of 36 years in their study (21). Consistent with the literature, we found the mean age of patients in our study to be 40 $\pm$ 16 years.

In the study conducted by Ditillo et al. on blunt trauma patients aged 18 and over, the mean systolic blood pressure (SBP) value was 130 $\pm$ 27.3 mmHg, and the mean pulse rate was 91 $\pm$ 19 beats per minute (bpm) (22).

	Abdominal injury				
	Absent (%92.2, n=345)		Present (%7.8, n=29)		P-value
	Mean ± SD	Median (%25 - %75)	Mean ± SD	Median (%25 - %75)	
Sc-Fat (cm)	2.5 ± 1.2	2.4 (1.8 - 3.1)	2.2 ± 1.0	2.0 (1.5 - 3.0)	0,172
SAD (cm)	22.5 ± 4.6	22.3 (18.9 - 25.6)	21.5 ± 4.8	20.9 (18.6 - 25.0)	0,321
Text (cm)	32.3 ± 4.6	32.1 (29.2 - 35.2)	31.6 ± 4.4	31.6 (29.2 -34.2)	0,666
BMI (kg/m^2)	26.7 ± 5.0	25.9 (23.4 - 29.4)	25.9 ± 5.6	25.4 (22.1-29.0)	0,595

Table 3. The relationship between BMI, abdominal circumference, and subcutaneous fat thickness with abdominal injury
Sc-Fat: Subcutaneous Fat Tissue Thickness SAD: Sagittal Abdominal Diameter T-ext: Transverse External Diameter BMI: Body Mass Index

	ICU				
	Absent		Present		P-value
	Mean ± SD	Median (%25 - %75)	Mean ± SD	Median (%25 - %75)	
Sc-Fat (cm)	2.5 ± 1.2	2.4(1.8 - 3.2)	2.0 ± 1.0	1.9 (1.4 – 2.9)	0,006
SAD (cm)	22.7 ± 4.7	22.4 (19.1 – 25.8)	20.6 ± 4.0	20.5 (17.6 – 23.4)	0,003
Text (cm)	32.6 ± 4.6	32.2 (29.4 – 35.3)	30.7 ± 3.9	30.7 (27.7 – 33.3)	0,009
BMI (kg/m^2)	26.9 ±5.1	26.2 (23.5 – 30.0)	24.9 ± 4.4	24.7 (22.1- 27.3)	0,007

Table 4. The relationship between BMI, abdominal circumference, and subcutaneous fat thickness with intensive care unit admission
Sc-Fat: Subcutaneous Fat Tissue Thickness SAD: Sagittal Abdominal Diameter T-ext: Transverse External Diameter BMI: Body Mass Index

Alvarez et al., in a study with 200 patients, found that all blunt trauma patients had SBP > 90 mmHg, with 77% of patients having a respiratory rate (RR) of 10-29 breaths per minute (bpm) (23). Bouzat et al. reported in their study of 3260 patients that the mean SBP was 124 mmHg, the mean pulse rate was 90 bpm, and the mean RR was 20 breaths per minute (24). In our study, the mean SBP was 129 ± 20 mmHg, the mean pulse rate was 87 ± 13 bpm, and the RR was 19 ± 5 breaths per minute, which is consistent with the literature.

In the study conducted by Ion et al., the mean Hb was 11.8 ± 2.7 g/dL, mean Hct was 34.9% ± 7.6, with median AST of 59.3 IU/L, median ALT of 48 IU/L, median creatinine of 0.86 mg/dL, and median urea of 35 mg/dL. In this study, ALT, AST, urea, and Hb values were found to be statistically associated with mortality (25). In the study by Musalar et al., the median Hb was 14.2 g/dL, median ALT was 22 IU/L, median AST was 24 IU/L, median amylase was 65 IU/L, and median lipase was 32 IU/L. In this study, Hb, ALT, AST, amylase, and lipase were found to be statistically associated with intra-abdominal injury (26). In our study, the mean Hb was 14.3 ± 1.5 g/dL, with median AST of 32 IU/L, median ALT of 28 IU/L, median amylase of 59 IU/L, and median lipase of 34 IU/L. We found statistically significant differences between AST, ALT, and lipase levels and intra-abdominal injury. These findings are consistent with the literature.

In a study conducted by Choi et al., out of 28,479 blunt trauma patients included in the study, 2.9% had a BMI <18.5, 35.8% had a BMI of 18.5-24.9, 32.4% had a BMI of 25-29.9, and 28.8% had a BMI >30 (27). Our study found that 3.5% of patients had a BMI <18.5, 39.3% had a BMI of 18.5-24.9, 33.4% had a BMI of 25-29.9, and 23.8% had a BMI >30. These findings are consistent with the literature.

In the study by Christensen et al., abdominal injuries were detected in 2.7% of 35,564 patients (28), while Bolandparvaz et al. found abdominal injuries in 8.8% of 47,295 patients (16). In our study, abdominal injuries were detected in 7.8% of patients, which is consistent with the literature.

Boulanger et al. reported that obese trauma patients were more likely to experience thoracic and extremity injuries compared to non-obese patients, but less likely to experience head-neck and abdominal injuries (29). Similarly, Arbabi et al. found that obese patients had more extremity injuries but fewer abdominal injuries (15). In our study, it was observed that the group with a BMI <18.5 was more likely to experience abdominal injuries, which is consistent with the literature.

In the study by Wang et al., an increase in subcutaneous fat thickness in adult blunt trauma patients was found to be associated with a decrease in the severity of abdominal injuries (30). Although our study found lower values of Sc-fat, SAD, and T-ext measurements in patients with abdominal injuries compared to those without, this difference was not statistically significant. However, the assumption that subcutaneous fat thickness may be associated with the severity of abdominal injuries is a common point in both studies.

Conclusion

According to the findings of this study, we observed that patients in the BMI <18.5 group were more prone to abdominal injury as a result of blunt trauma. Additionally, we found that patients presenting to the emergency department due to high-energy blunt trauma with lower abdominal circumference, subcutaneous fat tissue thickness, and BMI were more likely to be admitted to intensive care.

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Authors' Contribution: AÜ: Conceptualization, Data curation, Investigation, Methodology, Resources, Visualization, Writing - original draft, Writing - review & editing. AÖ: Project administration, Software, Supervision, Validation, Writing - original draft, Writing - review & editing. EÇ: Resources, Writing - original draft, Writing - review & editing. AŞ: Formal Analysis, Methodology. ME: Data curation, Visualization. ŞG: Validation.

Ethical Approval: The study was approved by the Ankara Bilkent City Hospital Ethics Committee (Approval No: E1-22-2690, dated June 15, 2022).

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ORIGINAL ARTICLE / ÖZGÜN ARAŞTIRMA MAKALESİ

Retrospective Evaluation of Falls From Height Cases Admitted to the Pre-Hospital Emergency Healthcare System

Hastane Öncesi Acil Sağlik Hizmetlerine Başvuran Yüksekten Düşme Vakalarinin Retrospektif Değerlendirmesi

Ramiz Yazıcı[1]

ABSTRACT

Aim: The aim of this study is to analyze the demographic characteristics, timing aspects (time of occurrence, emergency response time, ambulance arrival time), and hospital arrival times in pre-hospital cases of falls in Ankara.

Material and Methods: This cross-sectional observational epidemiological study examined data from patients who received pre-hospital emergency care due to fall-related trauma in Ankara between January 1, 2019, and December 31, 2023. Patients were identified through calls made to the central 112 Call Center and documented in the Emergency Health Automation System. Demographic details, injury epidemiology (ICD-10 codes, injury mechanism, incident timing), and emergency response times (command response time, time from ambulance dispatch to scene arrival, transport time) were collected.

Results: This study includes 16,136 patients, of whom 6,346 are female and 9,790 are male, with an average age of 38.3 ± 24.3 years. The predominant ICD-10 diagnosis codes are W03, W10, W12, W13, W14, W17, Y30, and X80. The year 2019 saw the highest number of incidents (n=4,014), with a decrease observed in 2020 (n=2,790). The highest number of falls occurred in July, while the lowest was in February, with the fewest falls reported in winter and the most in summer throughout the five years. Most incidents occurred between 08:00 and 15:59 (n=8,366), followed by 16:00 to 23:59 (n=6,456); 1,314 incidents occurred between 00:00 and 07:59. Falls occurred most frequently during working hours (61.9%, n=9,983). The average command center response time was 216.4 ± 203.6 seconds, station response time was 39.6 ± 47.8 seconds, and transport time was 371.6 ± 249.9 seconds. Most patients were transported to Training and Research Hospital (n=7,827), followed by State Hospital (n=3,422), University Hospital (n=2,210), and Private Hospital (n=249). Secondary transfers were mostly related to Training and Research Hospital (n=1,387), primarily for specialist needs (n=1,165). There were 32 patients who received on-scene intervention and 231 patients who died. Significantly increased response times were observed from 2019 to 2023 (p<0.001).

Conclusion: Future research focusing on pre-hospital factors affecting mortality rates in fall victims could enhance triage strategies, thereby reducing the burden on tertiary healthcare facilities. Prevention of falls is crucial in reducing deaths associated with this traumatic injury.

Keywords: Falls from height, prehospital emergency care, emergency medical services

ÖZ

Amaç: Bu çalışmanın amacı, Ankara'da düşme sonucu meydana gelen olaylara yönelik hastane öncesi vakalarında demografik özellikleri, zamanlama yönlerini (olayın meydana gelme zamanı, acil müdahale süresi, ambulans varış süresi) ve hastane varış sürelerini analiz etmektir.

Gereç ve Yöntemler: Bu kesitsel gözlemsel epidemiyolojik çalışma, 1 Ocak 2019 - 31 Aralık 2023 tarihleri arasında Ankara'da düşme sonucu travma nedeniyle hastane öncesi acil bakım alan hastaların verilerini incelemiştir. Hastalar, merkezi 112 Çağrı Merkezi'ne yapılan çağrılar sonucunda Acil Sağlık Otomasyon Sistemi'nde tanımlanmıştır. Demografik detaylar, yaralanma epidemiyolojisi (ICD-10 kodları, yaralanma mekanizması, olay zamanlaması) ve acil yanıt süreleri (komuta reaksiyon süresi, ambulans gönderiminden olay yerine varma süresi, taşıma süresi) toplanmıştır.

Bulgular: Bu çalışma, 16.136 hasta içermektedir; bunların 6.346'sı kadın ve 9.790'ı erkektir ve yaş ortalaması 38,3 ± 24,3 yıldır. Hakim ICD-10 tanı kodları W03, W10, W12, W13, W14, W17, Y30 ve X80'dir. Olayların en yoğun olduğu yıl 2019'dur (n=4.014), 2020'de ise azalma gözlenmiştir (n=2.790). En fazla düşme olayı Temmuz ayında görülürken, en az Şubat ayında gerçekleşmiştir, beş yıl boyunca yaz aylarında ve kış aylarında en az düşme olayı bildirilmiştir. Olayların çoğunluğu 08:00-15:59 saatleri arasında meydana gelmiştir (n=8.366), bunu 16:00-23:59 saatleri arasında gerçekleşenler takip etmiştir (n=6.456); 1.314 vakada ise olay 00:00-07:59 saatleri arasında gerçekleşmiştir. Düşmelerin %61,9'u (n=9.983) çalışma saatlerinde gerçekleşmiştir. Komuta merkezi reaksiyon süresi ortalama 216,4 ± 203,6 saniye, istasyon reaksiyon süresi 39,6 ± 47,8 saniye ve taşıma süresi 371,6 ± 249,9 saniyedir. Hastaların çoğu Eğitim ve Araştırma Hastanesi'ne taşınmıştır (n=7.827), onu devlet hastanesi (n=3.422), Üniversite Hastanesi (n=2.210) ve Özel Hastane (n=249) izlemiştir. İkincil transferler genellikle Eğitim ve Araştırma Hastanesi ile ilgili olup (n=1.387), bunların çoğu uzman ihtiyacı için yapılmıştır (n=1.165). Olay yerinde müdahale alan 32 hasta ve hayatını kaybeden 231 hasta bulunmaktadır. 2019'dan 2023'e kadar önemli ölçüde artan cevap süreleri gözlemlenmiştir (p<0,001).

Sonuç: Düşme kurbanlarında mortalite oranlarını etkileyen hastane öncesi faktörlere odaklanan gelecekteki araştırmalar, triyaj stratejilerini daha da geliştirerek üçüncü basamak sağlık tesislerinin yükünü azaltabilir. Sonuç olarak, düşmelerin önlenmesi, bu travmatik yaralanma ile ilişkili ölümleri azaltmada temel öneme sahiptir.

Anahtar Kelimeler: Yüksekten düşme, hastane öncesi acil bakım, acil sağlık hizmetleri

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Introduction

Trauma is a major public health problem worldwide. According to the World Health Organization, trauma claims the lives of 4.4 million people annually and accounts for nearly 8% of all deaths (1).

Falls from height result in multi-organ and multi-system trauma. Given their high energy nature and the involvement of multiple organs, these injuries are associated with a significant morbidity and mortality rate. The care provided to patients who have experienced high-level falls, both before and after hospital admission, has a significant impact on mortality and morbidity rates. Various studies have explored the relationship between different factors and patient outcomes (2-6). Nevertheless, we have been unable to locate any prehospital epidemiological studies focusing on fall-from-height injuries conducted within our country.

This study aims to examine cases of fall-from-height injuries who received prehospital emergency medicine services in terms of demographics, time of occurrence, reaction time of the 112 command and control center, departure and arrival times of the ambulance, vital interventions applied at first contact with emergency health services, and time of arrival of the case to the hospital.

Material and Methods

Study Design and Setting

This study was designed as a cross sectional observational epidemiological study and included every patient who received pre-hospital emergency health care due to fall-from-height trauma and who was registered in the Emergency Health Automation System (ASOS) after 112 Call Center calls between January 1, 2019 and December 31, 2023, in Ankara.

In Turkey, a single centralized dispatch center handles all ambulance calls, both from the public and for inter-hospital transfers. This system aligns with the European emergency response model, utilizing the universal emergency number 112. When someone dials 112 for medical assistance, their location is automatically identified. A dedicated EMS call-taker then verifies the address and dispatches the closest ambulance to respond to the emergency. Upon arrival at the scene, the emergency medical services (EMS) team conducts a patient assessment, including a medical history and physical examination. Subsequently, they consult to medical doctor from 112 command center to determine the most appropriate healthcare facility for patient transfer based on the patient's condition.

Demographic information (age and sex) of the patients was collected. Variables focused on injury epidemiology including ICD-10 diagnosis codes, the mechanism of injury, time of occurrence (year, season, month, day of week, time of day, working hour/out of hours) were collected for all patients. Other parameters such as command reaction time (time duration between call and team assignment), station reaction time (team assignment-ambulance departure), duration to reach trauma scene after ambulance departure (transport time), types of hospitals which patients were transferred, the reason for interfacility transport were collected.

Ethics Committee Approval and Patient Consent

The study was conducted in accordance with the Declaration of Helsinki and approved by the ethics committee permission of the Medical Research Scientific and Ethical Evaluation Board of Ankara Bilkent City Hospital (Approved no: TABED 2-24-295 and date: 12/06/2024). As neither the images nor the accompanying text contained potentially identifying markers or patient identifiers, the ethic committee did not require patient consent for the review of their medical records.

Statistical Analysis

Data analysis was performed using the statistical package program IBM SPSS 27.0 (Armonk, NY: IBM Corp.). While evaluating the study data, in addition to descriptive statistical methods (frequency, percentage, mean, standard deviation, median, quartile separation), the Chi-Square test was used to compare qualitative data. In cases where differences were found in multiple comparisons, post-hoc Bonferroni correction was used. The suitability of the data for normal distribution was evaluated with the Kolmogorov-Smirnov test, skewness-kurtosis and graphical methods (histogram, Q-Q Plot, Stem and Leaf, Boxplot). One-Way Anova test was used to compare normally distributed quantitative data between groups, and post-hoc Tukey test was used in cases where there was a difference. Statistical significance level was accepted as $p<0.05$.

Results

In this study, 16136 patients were included, of whom 6346 cases were female and 9790 cases were male. The average age of the participants was 38.3±24.3 years. The ICD-10 diagnosis codes of the cases participating in this study are W03, W10, W12, W13, W14, W17, Y30, X80. (Table 1)

While the highest number of cases was seen in 2019 (n=4014), the lowest number of cases was seen in 2020 (n=2790). EMS applications for falls from height were highest in July and least in February for 5 years. When the number of cases was examined according to seasons, it was seen that the most cases were in the summer season and the fewest cases were in the winter season. While most fall cases occur between 08:00-15:59 (n=8366), the second most common fall occurs between 16:00-23:59 (n=6456) (Table 1).

There were 1314 cases in the remaining time-period (00:00-07:59). 61.9% (n=9983) of the fall cases occurred during working hours, while 38.1% (n=6153) occurred outside working hours. Command center reaction time (interval from call to team assignment) was determined as 216.4 ± 203.6 seconds. Station reaction time (the time between the commander's team assignment and the ambulance's departure) was found to be 39.6 ± 47.8 seconds. Transport time from ambulance departure to the scene was determined as 371.6 ± 249.9 seconds (Table 1).

Of the cases taken from the scene, 7827 cases were transferred to Training and Research Hospital (TRH), 3422 cases to State Hospital (SH), 2210 cases to University Hospital (UH), and 249 cases to Private Hospital (PH). 1537 cases were transferred to another hospital after secondary triage for specific reasons. These transfers were mostly made from SH (n=1309), followed by TRH (n=211). While 9 cases from UH were transferred to another hospital, 8 cases were transferred from PH (Table 2).

		n =16136	Percentage
Years	2019	4014	24.9
	2020	2790	17.3
	2021	3025	18.7
	2022	3292	20.4
	2023	3015	18.7
Months	January	1076	6.7
	February	1014	6.3
	March	1222	7.6
	April	1129	7.0
	May	1431	8.9
	June	1696	10.5
	July	1718	10.6
	August	1318	8.2
	September	1454	9.0
	October	1610	10.0
	November	1281	7.9
	December	1187	7.4
Season	Spring	3782	23.4
	Summer	4732	29.3
	Autumn	4345	26.9
	Winter	3277	20.3
Days of Week	Monday	2285	14.2
	Tuesday	2518	15.6
	Wednesday	2396	14.8
	Thursday	2419	15.0
	Friday	2333	14.5
	Saturday	2137	13.2
	Sunday	2048	12.7
Weekdays/Weekend	Weekdays	11951	74.1
	Weekend	4185	25.9
Time Range	00:00 - 07:59	1314	8.1
	08:00 - 15:59	8366	51.8
	16:00 - 23:59	6456	40.0
Shift	Working Hours	9983	61.9
	Out of Hours	6153	38.1
Command Center Reaction Time (seconds)*		216.4 ± 203.6	151.0 (94.0 – 257.0)
Station Reaction Time (seconds)*		39.6 ± 47.8	36.0 (20.0 – 53.0)
Transport Time (seconds) (ambulance departure-case scene arrival)*		371.6 ± 249.9	314.0 (217.0 – 450.0)
Gender	Female	6.346	39.3
	Male	9.790	60.7
Age (year)*		38.3 ± 24.3	37.0 (18.0 – 57.0)

Table 1. Characteristics of Research Participants
*: Mean ± SD / Median (IQR)

			n =16136	%
Features of Transfer		Transport to Hospital	13708	85.0
	Transported Hospital	TRH	7827	57.1
		SH	3422	25.0
		UH	2210	16.1
		PH	249	1.8
		Interfacility Transport	1537	9.5
	Reason for Interfacility Transport From	TRH	211	13.7
		SH	1309	85.2
		UH	9	0.6
		PH	8	0.5
		TRH	1387	90.2
		SH	20	1.3
		UH	108	7.0
		PH	22	1.4
		Need for Specialist	1165	75.8
		Need for Medical Equipment	186	12.1
		Need for ICU	117	7.6
		Lack of Empty Bed	48	3.1
		Patient's wish	21	1.4
		Refusal of EMS service	628	3.9
		Exitus (Left at scene)	231	1.4
		Intervention at Scene	32	0.2
ICD-10 code		W17- Other fall from one level to another	6446	39.9
		W10- Fall on and from stairs and steps	5868	36.4
		Y30- Falling. jumping or pushed from a high place. undetermined intent	963	6.0
		W13- Fall from. out of or through building or structure	690	4.3
		W14- Fall from tree	700	4.3
		W03- Other fall on same level due to collision with another person	618	3.8
		W12- Fall on and from scaffolding	435	2.7
		X80- Intentional self-harm by jumping from a high place	294	1.8

Table 2. Characteristics of Transport
TRH: Training and Research Hospital, SH: State Hospital, UH: University Hospital, PH: Private Hospital, ICU: Intensive care unit, EMS: Emergency Medical Services

Most of the secondary transfers were made to TRH (n=1387). While 108 cases were transferred to UH, 22 cases were transferred to PH and 20 cases were transferred to SH. The reasons for secondary transfers are need for specialist (n=1165), need for medical equipment (n=186), need for intensive care unit (n=117), lack of empty bed (n=48), and patient's wish (n=21). Some cases (n=628) refused EMS service. When the EMS team arrived at the scene, 231 cases were found dead. Thirty-two cases were intervened at the scene (Table 2).

		2019 (n=4014)	2020 (n=2790)	2021 (n=3025)	2022 (n=3292)	2023 (n=3015)	P	Difference
ICD-10 code	W17- Other fall from one level to another.	2104 (52.4)	1180 (42.3)	1130 (37.4)	1156 (35.1)	876 (29.1)	**<0.001** [a]	All
	W10- Fall on and from stairs and steps.	1112 (27.7)	893 (32.0)	1152 (38.1)	1362 (41.4)	1349 (44.7)	**<0.001** [a]	All
	Y30- Falling. jumping or pushed from a high place. undetermined intent	168 (4.2)	166 (5.9)	197 (6.5)	195 (5.9)	237 (7.9)	**<0.001** [a]	2019 vs others
	W13- Fall from. out of or through building or structure	76 (1.9)	147 (5.3)	176 (5.8)	143 (4.3)	148 (4.9)	**<0.001** [a]	2019 vs others
	W14- Fall from tree	198 (4.9)	153 (5.5)	138 (4.6)	121 (3.7)	90 (3.0)	**<0.001** [a]	2020 vs 2023
	W03- Other fall on same level due to collision with another person.	214 (5.3)	77 (2.8)	72 (2.4)	130 (3.9)	125 (4.1)	**<0.001** [a]	2019 vs2021
	W12- Fall on and from scaffolding.	43 (1.1)	85 (3.0)	101 (3.3)	93 (2.8)	113 (3.7)	**<0.001** [a]	2019 vs others
	X80- Intentional self-harm by jumping from a high place	89 (2.2)	59 (2.1)	42 (1.4)	61 (1.9)	43 (1.4)	**0.060** [a]	--
Command Reaction Time (seconds)		191.3 ± 202.7	248.8 ± 231.9	221.6 ± 216.9	197.1 ± 180.3	235.9 ± 178.9	**<0.001** [b]	2019-2022 vs 2020-2021-2023
Station Reaction Time (seconds)		37.1 ± 45.1	38.2 ± 38.6	40.4 ± 56.1	41.2 ± 51.5	41.5 ± 45.6	**<0.001** [b]	2019 vs 2021-2022-2023
Transport Time (seconds) (ambulance departure -case scene arrival)		347.6 ± 238.2	377.7 ± 255.0	379.1 ± 255.2	372.0 ± 241.3	390.2 ± 261.8	**<0.001** [b]	2019 vs others

Table 3. Comparisons of ICD-10 codes, Command Reaction Time, Station Reaction Time and Transport Time by Years
a: Chi-Square Test (n / %), b: One-Way Anova Test (Mean ± SD)

	Hospital Transferring Patient			
Transfer Reason	**TRH (n=211)**	**SH (n=1309)**	**UH (n=9)**	**PH (n=8)**
Need for Specialist	112 (53.1%)	1047 (80.0%)	2 (22.2%)	4 (50.0%)
Need for Medical Equipment	15 (7.1%)	167 (12.8%)	2 (22.2%)	2 (25.0%)
Need for ICU	49 (23.2%)	65 (5.0%)	2 (22.2%)	1 (12.5%)
Lack of Empty Bed	34 (16.1%)	13 (1.0%)	1 (11.1%)	0 (0.0%)
Patient's wish	1 (0.5%)	17 (1.3%)	2 (22.2%)	1 (12.5%)

Table 4. Transfer Reason by Type of Hospital
TRH: Training and Research Hospital, SH: State Hospital, UH: University Hospital, PH: Private Hospital, ICU: Intensive care unit

The highest number of fall incidents occurred in 2019. There was no significant difference in the number of suicide-related falls from height (ICD-10 code X80) across the years. A significant increase was observed between 2019 and 2023 in command response time, station response time, and transport time ($p<0.001$) (Table 3).

The most common reason for patient transfers from both TRH and SH was the need for specialist care. For TRH, the second and third most frequent reasons were the need for intensive care and lack of available beds, respectively. In SH, the primary reasons for transfers were the need for medical equipment and the need for intensive care (Table 4).

Discussion

This study sheds light on the epidemiological situation of pre-hospital fall-from-height cases in Ankara, the capital of Turkey, and examines certain parameters of the pre-hospital services provided by 112 emergency services.

In Turkey, accidental falls were the second leading cause of death between 2018 and 2023 (7). Similarly, a separate study conducted in Japan between 2014 and 2018 yielded comparable results (8). Our study revealed that between 2019 and 2023, 16136 cases of falls from heights in Ankara received 112 EMS services.

Falls from heights are a trauma etiology with high mortality and morbidity due to their mechanism. In our study, a significant proportion of patients were found deceased at the scene (n=231, 1.4%). Unfortunately, post-hospital admission mortality and morbidity data for these patients were not included in this study. Compared to patients experiencing cardiac arrest due to underlying heart conditions, individuals who suffer a traumatic cardiac arrest typically face a poorer prognosis. Despite of advancements in medical care, the survival rate to discharge for patients experiencing traumatic out-of-hospital cardiac arrest remains comparatively low (9,10). In patients with cardiac arrest secondary to trauma, the etiology of the trauma influences the mortality rate. Jun et al. found that the rate of return of spontaneous circulation was significantly lower in patients who experienced cardiac arrest following a fall from height compared to those who suffered cardiac arrest secondary to a traffic accident (11). Therefore, the primary objective lies in implementing effective interventions to minimize preventable trauma deaths.

Identifying factors associated with injury severity prior to hospitalization holds promise for improving patient outcomes. Evaluating these factors through a robust pre-hospital assessment system could facilitate more effective triage. Ultimately, such a system could contribute to a reduction in mortality rates by directing patients to the most appropriate healthcare facilities based on their individual needs (12). An analysis of 112 emergency response system data revealed that a significant proportion of high-fall patients initially presenting at state hospital were subsequently transferred to TRH or UH due to the need for specialized care after secondary triaging. These results cast doubt on the adequacy of the prehospital triage process and

hospital destination selection conducted by prehospital EMS and the command center. It is conceivable that EMS teams and command center should consider incorporating additional parameters beyond vital signs and initial assessment into their triage protocols and may benefit from developing a specialized algorithm for high-fall incidents.

It has been demonstrated that transporting patients in accordance with the "Golden Hour" concept optimizes survival and morbidity (13,14). In this study, the average time from the initial call to scene arrival was calculated to be 9.6 minutes. Similar time intervals have been reported in studies conducted in developed countries (15). However, our study revealed a significant increase in command response, station response, and transport times between 2019 and 2023. This discrepancy is attributed to factors such as reduced traffic due to pandemic-related lockdowns, increasing traffic congestion over the years, and a surge in 112 call center activity and ambulance utilization rates.

Studies conducted in countries with varying levels of development and across different age groups consistently show that the majority of fall cases from heights involve males (16-19). Similarly, in our study majority of patients were male. Middle-aged males are the most frequent demographic group affected by falls from height (20). This finding is consistent with our study, where a similar population was predominant.

In our study, a significant portion of falls from height occurred during working hours. Jagnoor et al. (21) and Fujii et al. (12) reported similar findings concordant with our study, associating falls from height during this timeframe with middle-age male construction workers. Consistent with findings from the existing literature, studies have observed variations in the seasonal distribution of fall incidents across different geographical regions (22-25). Our study identified summer as the season with the highest incidence of falls.

In Ojima et al.'s study on the impact of the COVID-19 pandemic on major traumas, an increase in fall cases was observed in 2020. However, our study found a lower number of fall cases during the same period (26). Farooq et al.'s review demonstrated an increase in suicidal attempts and ideation during the COVID-19 pandemic (27). In our study, however, the yearly distribution of cases involving suicide attempts by jumping from a height did not show a significant difference.

Limitations

It is necessary to acknowledge limitations in our study. These include the absence of vital signs and initial trauma scores of patients, as well as our inability to access information on procedures performed in the emergency department and patient follow-up.

Conclusion

Future studies aiming to elucidate prehospital protective or adverse factors associated with mortality in high-level fall victims would provide a solid foundation for field triage. Appropriate triage protocols can significantly reduce mortality and morbidity rates by directing patients to facilities best equipped to provide the necessary care, thereby alleviating the burden on higher-level hospitals. Based on the findings of this study and the literature, the most effective way to prevent fatalities from falls is to prevent falls themselves, which can only be achieved by addressing the underlying causes of falls.

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CASE REPORT / OLGU SUNUMU

Fitz Hugh Curtis Syndrome in a Patient Presenting with Right Upper Quadrant Pain: A Case Report

Sağ Üst Kadran Ağrısı ile Başvuran Hastada Fitz Hugh Curtis Sendromu: Bir Olgu Sunumu

Reyhan Irem MUTLU [1], Ayhan ÖZHASENEKLER [1]

ABSTRACT

Aim: Fitz-Hugh-Curtis is a syndrome whose diagnosis may be missed because it is not a common condition and presents with non-specific right upper quadrant pain. In this article, we aimed to analyze the syndrome in a patient presenting with right upper quadrant pain and elevated liver function tests and to draw a road map for differentiation from other diagnoses.

Case: A twenty-two-year-old female patient was admitted to the emergency department with right upper quadrant pain and fever. She was found to have elevated liver function test (LFT) in a previous hospital admission and was referred to us for further diagnosis and treatment. Her medical history revealed that her pain started 20 days ago. Physical examination revealed tenderness in the right upper quadrant. Ultrasonography and tomography showed a small amount of fluid in the perihepatic region and 10 cm of fluid in the Douglas cavity. No hepatic or biliary pathology was detected. Elevated LFT was detected in blood results. Since the patient was sexually active and described vaginal secretions, pelvic inflammatory disease was considered and she was consulted to the Gynecology and Obstetrics department. After hospitalization, antibiotherapy was started with piperacillin-tazobactam, but the drug was revised due to persistent pain and fever. Despite this, the patient remained symptomatic and laparoscopy was performed for both diagnosis and treatment. The patient was discharged on the 15th day of hospitalization with control recommendations.

Conclusion: It is a syndrome that responds well to treatment when diagnosed. It should be considered in patients presenting to the emergency department with abdominal pain and elevated LFT when no liver pathology is found. When the diagnosis is suspected, consultation with the Gynecology and Obstetrics department is necessary for both identification of the causative agent and treatment arrangement. Screening tests for other sexually transmitted diseases should also be performed in patients with the diagnosis.

Keywords: Fitz-Hugh-Curtis Syndrome, perihepatitis syndrome, pelvic inflammatory disease

ÖZ

Amaç: Fitz-Hugh-Curtis (FHC) Sendromu hem sık karşılaşılan bir durum olmaması hem de spesifik olmayan sağ üst kadran ağrısı ile prezente olması nedeniyle tanısı atlanabilen bir sendromdur. Bu yazımızda sağ üst kadran ağrısı ve karaciğer fonksiyon testleri (KCFT) yüksekliği ile başvuran hasta üzerinden sendromu incelemek ve diğer tanılardan ayrımı için yol haritası çizmek amaçlanmıştır.

Olgu: Yirmi iki yaş kadın hasta acil servise sağ üst kadran ağrısı ve ateş ile başvurdu. Daha önceki hastane başvurusunda KCFT yüksekliği saptanmış ve ileri tanı ve tedavi amacıyla tarafımıza yönlendirilmiş. Hastadan alınan öyküsünde ağrılarının 20 gün önce başladığı öğrenildi. Fizik bakısında sağ üst kadranda hassasiyet saptandı. Kan tetkikleri alındı, ultrasonografi ve kontrastlı abdomen tomografisi planlandı. Kan sonuçlarında KCFT yüksekliği saptandı. Yapılan ultrasonografi ve tomografi sonucunda perihepatik bölgede sıvama tarzında, Douglasta ise 10 cm mayi görüldü. Karaciğer ya da safra patolojisi saptanmadı. Hastanın cinsel aktif olması ve vajinal akıntı tariflemesi nedeniyle pelvik inflamatuar hastalık düşünülerek Kadın Hastalıkları ve Doğum bölümüne danışıldı. Hastaya yatış sonrası piperasilin-tazobactam ile antibiyoterapisi başlanan hastanın ağrı ve ateşinin devam etmesi nedeniyle ilaç revizyonu yapıldı. Buna rağmen semptomatik seyreden hastaya hem tanı hem de tedavi amaçlı laparoskopi yapıldı. Hasta yatışının 15. gününde kontrol önerileri ile taburcu edildi.

Sonuç: Fitz-Hugh-Curtis Sendromu tanı aldığında tedaviye iyi yanıt veren bir sendromdur. Acil servise karın ağrısı ve KCFT yüksekliği ile başvuran hastalarda karaciğer patolojisi bulunamadığında akla gelmelidir. Tanıdan şüphelenildiğinde hem etken belirlenmesi hem de tedavi düzenlemesi için Kadın Hastalıkları ve Doğum bölümüne konsülte etmek gereklidir. Tanıyı alan hastalarda diğer cinsel yolla bulaşan hastalıklar için de tarama testleri yapılmalıdır.

Anahtar Kelimeler: Fitz-Hugh-Curtis sendrom, perihepatit sendromu, pelvik inflamatuar hastalık

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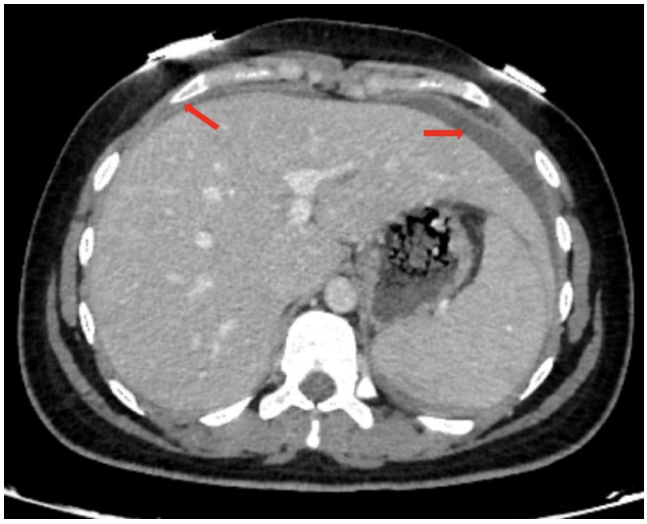
Giriş

Fitz Hugh Curtis sendromu pelvik inflamatuar hastalığın perihepatit olarak görülebilen komplikasyonudur. Bu sendromda karaciğerin parankim tutulumu olmadan karaciğer kapsülünün inflamasyonu görülür (1). Bu yüzden sağ üst kadran ağrısı ile prezente olur. Ağrı lokalizasyonu nedeniyle bu hastalar öncelikli olarak kolesistit ya da piyelonefrit olarak değerlendirilirler (2).

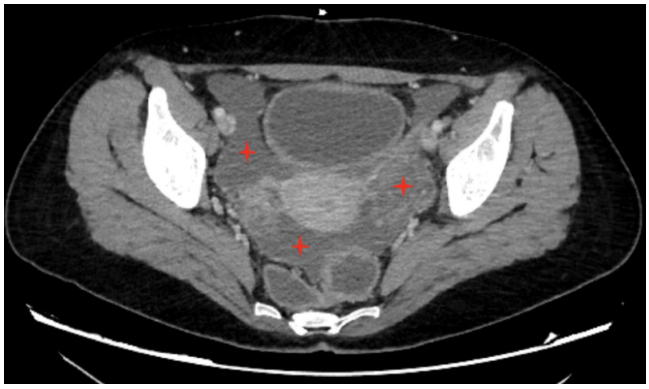
Olgumuzda sağ üst kadran ağrısı ile acil servise başvuran kadın hastada Fitz Hugh Curtis sendromunu irdeledik.

Olgu Sunumu

Yirmi iki yaş gravida: 0 parite: 0 Abortus: 0 kadın hasta, acil servise 20 gündür olan ve 5 gündür artan bulantı, kusma, karın ağrısı ve ateş şikayeti ile başvurdu. Daha önce bu şikayetleri nedeniyle başka bir acil servise başvurmuş ve karaciğer fonksiyon testi (KCFT) yüksekliği olması nedeniyle tarafımıza yönlendirildi. Hastadan alınan öyküde 20 gün önce evlendiği ve şikayetlerinin o zamandan sonra başladığı öğrenildi. Hastanın herhangi bir herbal ya da ilaç kullanımı, mantar yeme öyküsü yoktu. Fizik bakısında bilinci açık, oryante, koopere idi. Vital bulguları; kan basıncı:120/80 mmHg, nabız:76 atım/dakika, ateş:37,5^{0}C ölçüldü. Hastanın batın muayenesinde yaygın hassasiyeti ve sağ üst kadranda derin palpasyonda defansı mevcuttu. Hastanın kan tetkikleri alındı ve abdominal ultrasonografisi (USG) yapıldı. Hastanın laboratuvar sonuçlarında AST: 279 U/L, ALT: 146 U/L, LDH: 658 U/L, Amilaz: 548 U/L, Lipaz: 354 U/L, prokalsitonin: 6,14 mikrogram/L, total-hCG: <2, WBC: 17,48X10^9/L, CRP: 185 mg/L görüldü. Hepatit markerları HBsAG: 0,1 (Negatif), Anti HBs: 15,64 mIU/mL, Anti HCV: 0,08 (Negatif), Anti HAV IgM: 0,13 (Negatif) olarak sonuçlandı (Tablo 1). USG perihepatik alanda sıvama tarzında, Douglasta ise en derin yerinde 6 cm hemorajik sıvı şeklinde raporlandı. Hastaya intravenöz hidrasyon tedavisi başlandı. Hastanın yapılan tetkiklerinde kesin tanısı konulamadığı için ileri görüntüleme yöntemi olarak kontrastlı abdomen bilgisayarlı tomografisi (BT) çekildi. BT sonucunda hepatobiliyer ve pankreatik sistemde sıvama tarzı sıvı harici karaciğer patolojisine rastlanmadı (Şekil 1), Douglasta 10 cm hemorajik mayi görüldü (Şekil 2). Hastanın Douglastaki mayisi, cinsel aktif olması ve derinleştirilen öyküsünde vajinal akıntısının olması nedeniyle pelvik inflamatuar hastalık (PİH) ön tanısı ile Kadın Hastalıkları ve Doğum bölümüne konsülte edildi. Yapılan transvajinal USGde sağ tuba ödemli görüldü. Bu ultrasonografi ve muayene sonuçları ile birlikte PİH'ye sekonder Fitz-Hugh-Curtis Sendromu ön tanısı ile Kadın Hastalıkları ve Doğum kliniğine yatışı yapıldı. Alınan kan ve idrar kültürlerinde herhangi bir üreme olmadı. Yatış sonrası piperasilin-tazobactam ile antibiyoterapisi başlanan hastanın ateş yüksekliği ve şikayetlerinin devam etmesi üzerine meropenem ve tetrasiklin ile tedavi revizyonu yapıldı. Yatışının 6. gününde antibiyotik revizyonuna rağmen ateşi gerilemeyen hastaya tanı ve tedavi amaçlı laparoskopi yapıldığı öğrenildi. Laparoskopi sonucunda tubal apse ve batın içi yoğun mayi görüldü. Batın içi yıkama ve abse drenajı sonrası tedaviye yanıt veren hasta yatışının 15. gününde poliklinik kontrolü önerileriyle taburcu edildi. Bu olgu sunumunun ve eşlik eden görüntülerin yayınlanması için hastadan yazılı bilgilendirilmiş olur alınmıştır.



Şekil 1: Kontrastlı abdomen BT'de perihepatik sıvama tarzı mayi görüntüsü (Kırmızı ok).



Şekil 2: Kontrastlı abdomen BT'de Douglastaki serbest mayi görüntüsü (Kırmızı yıldız).

Laboratuvar testi adı	Düzey	Birim	Laboratuvar testi adı	Düzey	Birim
AST	279	U/L	WBC	17,48	X10^9/L
ALT	146	U/L	CRP	185	Mg/L
LDH	658	U/L	HBsAG	0,1	(Negatif)
Amilaz	548	U/L	Anti HBS	15,64	Mıu/ml
Lipaz	354	U/L	Anti HCV	0,08	(Negatif)
Prokalsitonin	6,14	Mkgram/L	Anti HAV IgM	0,13	(Negatif)
Total Hcg	<2				

Tablo 1. Laboratuvar sonuçları
AST: Aspartat aminotransferaz, ALT: Alanin aminotransferaz, LDH: Laktat dehidrogenaz, WBC: Beyaz kan hücresi , CRP: C-reaktif protein, HBsAg: Hepatit B yüzey antijeni, Anti-HBs: Hepatit B yüzey antikorları, Anti-HCV: Hepatit C virüs antikoru, Anti-HAV IgM: Hepatit A virüs IgM antikoru, Total HCG: İnsan koryonik gonadotropin.

Tartışma

Acil servise başvuruda sağ üst kadran ağrısı için geniş bir tanı yelpazesi vardır. Acil hekimi için öncelikli olan bütüncül bir değerlendirme yaparak hayatı tehdit edici nedenleri dışlamaktır. Hastanın öyküsü ve fizik bakısına göre hareket ederek görüntüleme ve diğer tetkikler planlanır. Sağ üst kadran ağrısının ayırıcı tanıları arasında akut kolesistit, koledokolitiazis, piyelonefrit, pnömoni, pulmoner emboli ve hepatit tanıları bulunur (2). USG, akciğer grafisi ve gereklilik halinde kontrastlı abdomen BT çekilerek bu tanılar dışlanır. FHC sendromu yaygın bir sendrom olmadığı için acil hekimi tarafından bu tanılar dışlandıktan sonra akla gelmelidir.

Fitz Hugh Curtis sendromu ilk defa 1930 yılında Thomas Fitz-Hugh ve Arthur Curtis tarafından tanımlanmıştır. Salpenjit tanılı ve sağ üst kadran ağrısı olan kadın hastalarda karaciğer kapsülünde hastalığın klasik bulgusu olan "keman yayı" adhezyonlar görülmesi ile tanı almıştır (3). Sendrom pelvik inflamatuar hastalığın hematojen ya da lenfatik yolla yayılımıyla karaciğer kapsülünün inflamasyonu sonucu oluşur. Hastalarda serviksten ve karaciğer kapsülünden alınan örneklerde en sık saptanan etkenler Neisseria gonorhea ve Chlamydia trachomatistir (4).

Bu hastalar acil servislere en sık sağ üst kadran ağrısı ile başvururlar. Ağrı pozisyonel değişiklik veya solunumla şiddetini değiştirir. Ateş, bulantı, disparoni ve vajinal akıntı da başvuru sırasında olabilir (5). Bizim hastamızda da bu bulgulardan ateş, karın ağrısı, bulantı ve vajinal akıntı mevcuttu. Muayene sonrası hem diğer tanıları dışlamak hem de FHC tanısını doğrulamak için laboratuvar ve görüntüleme tetkikleri planlanır. Laboratuvar parametrelerinde ılımlı aminotransferaz yüksekliği görülür. Bizim hastamızda da KCFT değerlerinde ılımlı yükseklik tespit ettik. Akciğer grafisi ile pnömoni, pnömotoraks ve perforasyon gibi tanılar dışlanır. Hastamızın çekilen akciğer grafisi normal olarak değerlendirildi. Abdomen USG'de karaciğer patolojileri dışlanırken batın içi mayi gösterilir (6). Arteriyel fazda çekilen kontrastlı BT ile karaciğer kapsülündeki adhezyonlar gösterilebilir. Bizim hastamızda USG'de perihepatik alanda ve douglasta mayi görülmüştür. Çekim arteriyel fazda olmadığı için adhezyonlar görülememiş olup, batın içi yaygın mayi görülmüştür. Tedavi için başlangıç antibiyoterapide en sık etkenler olan N. gonorhea ve C. trachomatisi ayrıca gram negatif enterik basilleri kapsayan kombine bir tedavi tercih edilir (7). Devam tedavisini ise alınan kültür sonuçları belirler. Hastamızdan alınan kan ve batın içi mayi kültürlerinde etken saptanmamıştır.

Tanı için bir diğer yöntem laparoskopi olup invaziv bir işlem olduğu için sadece tedaviye cevap vermeyen olgularda önerilir. Laparoskopi ile hem tubal veya ovaryen abse hem de karaciğerdeki adhezyonlar görülebilir ve aynı zamanda tedaviye yönelik girişimler de yapılabilir (8). Olgumuzda da antibiyotik tedavisine yanıtsızlık nedeniyle laparoskopi yapıldı ve sonucunda batında yaygın püy içeriği ile kontamine serbest mayi, uterus ve her iki tuba yaygın ödemli görüldü. Omentum batın ön duvara yapışık olduğu için karaciğer değerlendirilemedi.

Sonuç

Fitz Hugh Curtis sendromu tanı aldıktan sonra tedaviye çok iyi yanıt veren bir sendromdur. Ama acil hekimi için işi zorlaştıran hastalığın spesisfik bulguları olmaması ve sağ üst kadran ağrısı nedeniyle karaciğer ve safra patolojileri ile karıştırılabilmesidir (2). Doğurganlık çağındaki cinsel olarak aktif kadınlarda sağ üst kadran ağrısı ile başvuruda karaciğer enzim yüksekliği karaciğer ve safra patolojileri ile açıklanamadığında FHC sendromu akla gelmelidir. Klinik şüphe doğduğunda tedavi ve etkenin belirlenebilmesi için Kadın Hastalıkları ve Doğum konsültasyonu gerekir. FHC sendromu tanısı alan hastalara cinsel yolla bulaşan hastalıklar için tanı tetkikleri de yapılmalı ve saptanan etkene göre gereklilik halinde partner tedavisi de başlanmalıdır (7).

Çıkar çatışması: Bu çalışma ile ilgili olarak yazarların ve/veya aile bireylerinin çıkar çatışması potansiyeli olabilecek bilimsel ve tıbbi komite üyeliği veya üyeleri ile ilişkisi, danışmanlık, bilirkişilik, herhangi bir firmada çalışma durumu, hissedarlık ve benzer durumları yoktur.

Finansal destek: Bu çalışma sırasında, yapılan araştırma konusu ile ilgili doğrudan bağlantısı bulunan herhangi bir ilaç firmasından, tıbbi alet, gereç ve malzeme sağlayan ve/veya üreten bir firma veya herhangi bir ticari firmadan, çalışmanın değerlendirme sürecinde, çalışma ile ilgili verilecek kararı olumsuz etkileyebilecek maddi ve/veya manevi herhangi bir destek alınmamıştır.

Yazarlık katkısı: Tüm yazarlar makalenin yazımına eşit katkı sağlamışlardır. Tüm yazarlar, nihai makaleyi sunulduğu şekliyle onayladılar ve çalışmanın tüm yönlerinden sorumlu olmayı kabul ettiler.

Hasta Onamı: Bu olgu sunumunun ve eşlik eden görüntülerin yayınlanması için hastadan yazılı bilgilendirilmiş olur alınmıştır. Yazılı iznin bir kopyası bu dergide incelenmek üzere mevcuttur.

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REVIEW / DERLEME

The Foundations of Responsibilities for Consultant Physicians and Attending Physicians

Konsültan Hekim ve Müdavi Hekimin Sorumluluklarının Kaynakları

Vehbi Özaydın[1]

ABSTRACT

Within hospital operations, consultation processes represent a critical element, especially as the prevalence of patients with multiple ailments increases, underscoring the growing importance of consultations. Such processes are exemplary instances of horizontal teamwork. The key participants in a consultation include the attending physician, the consulting physician, and the patient. There isn't a unified legal framework specifically dedicated to consultations. Instead, the regulatory aspects of consultations are covered under various statutes as sub-sections. Recent years have seen the implementation of administrative reforms aimed at enhancing the efficiency of emergency department workflows. These reforms have introduced a new dimension to the consultation process within the emergency services. The legal liability for patient care primarily rests with the attending physician. However, for doctors employed in the public sector, there are implications concerning liability for damages and administrative errors due to organizational shortcomings. Jurisprudence provides instances where the failure to seek a consultation was attributed to the negligence of the attending physician.

Keywords: Consultation, consulting physician, medical law, emergency medicine

ÖZ

Hastane içi işleyişlerden biri de konsültasyon işlemleridir. Giderek artan birden fazla rahatsızlığı olan hastalar sebebi ile konsültasyon daha da önem kazanmaktadır. Konsültasyon yatay ekip çalışma örneklerinden biri olarak kabul edilir. Konsültasyon işleminin bileşenleri müdavi hekim, konsültan hekim ve hastadır. Konsültasyon konusu ile ilgili tek bir mevzuat yoktur. Konsültasyon konusunun farklı mevzuatlarda alt başlıklar şeklinde işlendiğini görüyoruz. Son yıllarda özellikle acil servislerdeki işleyişin daha hızlı olması için idare tarafından birtakım düzenlemeler yapıldı. Bu düzenlemeler acil servis işleyişinde konsültasyona yeni bir boyut kattı. Hastanın cezai sorumluluğu müdavi hekimin sorumluluğunda olup kamuda çalışan hekimler için tazminat sorumluluğu ve organizasyon kusuru için idarenin sorumluluğundan bahsedilebilir. İçtihatlarda konsültasyon istenmemesi ile ilgili müdavi hekimin kusurlu bulunduğu örnekler mevcuttur.

Anahtar Kelimeler: Konsültasyon, konsültan hekim, tıp hukuku, acil servis

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Giriş

Tıp biliminin gelişmişlik durumuna bağlı olarak hekimlik birçok farklı branşa(uzmanlaşmaya) ayrılmıştır. Branşlaşmanın avantajları ya da dezavantajları bu makalenin konusu dışındadır. Ancak branşlaşma ile hastaların hastane başvurularında sadece bir branş hekimi tarafından değerlendirildiği dönemler geride kalmıştır. Daha doğru bir tanı ve tedavi için hekimler başka uzmanlık alanlarında çalışan hekimlerden de bilimsel ve teknik bilgi alma ihtiyacı duymaktadırlar. Uzmanlaşmanın derinleşmesi ve aynı anda birden fazla hastalık tanısı olan hastaların mevcudiyeti disiplinler arası iş birliğini daha çok zorunlu kılmaktadır (1).

Hekimin Sorumluluğunun Kaynakları

Vekalet sözleşmesi ve eser sözleşmesi borçlar kanunda yer alan sözleşme türleridir. Her iki sözleşme de iş görme edimi içerir. Eser sözleşmesi yapılan işin anlaşma yapılan koşulu ile sonucu garanti ederken, vekalet sözleşmesi sonucu garanti etmez. Hekim ile hasta arasındaki ilişkinin bir sözleşme ilişkisi olduğu, bunun olaya göre vekalet sözleşmesinden kaynaklanabildiği gibi, olaya göre eser sözleşmesinden de kaynaklanabilir (2,3). Ancak kamuda çalışan hekim ile hasta arasında bir sözleşme ilişkisinden bahsedilemez. Yargıtay vermiş olduğu bir kararda Devlet, üniversite, belediye ve diğer kamu kurum ve kuruluşlarına ait hastaneler ile doktorlar arasındaki ilişki kamusal bir ilişki olduğundan hasta ile doktor arasında sözleşme ilişkisi söz konusu olamayacağına vurgu yapmıştır (4).

Kamu hastanelerinde meydana gelen tıbbi müdahaleden kaynaklı tazminat talepleri (rücu etme hakkı saklı olmak koşulu ile) idarenin sorumluluğunda olacaktır. Bu anlamda idare yürüttüğü kamu hizmetiyle nedensellik bağı kurulabilen zararların tazminiyle yükümlü olup, idari eylem ve işlemlerden doğan zararlar idare hukuku çerçevesinde hizmet kusuru ya da kusursuz sorumluluk gereği tazmin edileceği Danıştay kararında vurgulanmıştır (5).

İş Birliği ve Tıp Mesleği Sırasında Karşılaşılan İş Birliği Tipleri

Aynı saik ve çıkarlar ile bir araya gelmiş kişilerin oluşturduğu organizasyonu iş birliğinin bir tanımı olarak düşünmekteyiz. Tıp mesleğini icra eden hekimler, diğer meslek grupları ile karşılaştırıldığında iş birliğine daha fazla ihtiyaç duyan ve bu ihtiyaç sebebi ile daha fazla iş birliği gerçekleştiren meslek grubu olarak görülebilir. Kamu hizmetinin verildiği hastanelerde hekimlerin hastanın hastaneye başvurusundan taburcu edilinceye kadar olan sürecini tek başına yürütmesi de mümkün değildir. Tek başına hasta yönetiminin mümkün olmadığı durumlarda ekip çalışması daha bir önem kazanmaktadır. Ekip çalışması iki tür üzerinden incelenebilir (6).

Dikey Ekip Çalışması

Hiyerarşinin ekip içerisinde çalışma sistemini ve görev dağılımını belirlediği ekip çalışma biçimidir. Bu çalışma türünde sorumluluk ekibin yöneticilerindedir. Klinik içerisinde anabilim dalı sorumlusunun olması bu anabilim dalı sorumlusunun idaresinde çalışan anabilim dalında görevli hekimlerin olması bu hiyerarşiye örnek olarak verilebilir.

Yatay Ekip Çalışması

Hastane içerisinde yatay ekip çalışması farklı anabilim dallarından hekimlerin bir arada yürüttüğü çalışmadır. Bu türdeki çalışmada ekipte yer alan hekimler arasında bir hiyerarşi bulunmamaktadır. Hasta yararına yapılan konsültasyonlardaki iş birliği yatay ekip çalışmasına örnek teşkil edecek çalışma şekli olarak nitelendirilir.

Tıbbi Konsültasyonda Tanımlar

Tıbbi Konsültasyon

Literatürde ve farklı disiplinlerde kimi farklılıklar içerse de konsültasyon tanım olarak benzerdir. Latince “consultation” kelimesinden türediği varsayılan konsültasyon, tedavi eden (müdavi) hekimin göreceği lüzum ya da ailenin isteği üzerine farklı dallarda uzman kişilerin hasta için görüş belirtmesi olarak tanımlanabilir. Türk Tabipler Birliği (TTB) konsültasyonu, hekimin merkezde hasta olmak üzere farklı bir alanda çalışan hekimlerden bilimsel ve teknik açıdan aldığı yardım ya da danışmanlık olarak tanımlamaktadır (7). Mevzuatta ise konsültasyon işlemi “Müdavi tabibin hastanın tanı, tedavi ve takibinde gerekli gördüğü uzmanlarından yazılı görüş istemi” olarak tanımlanmıştır (8). Hastanın ya da yasal sorumlusunun konsültasyon isteyebilmesi acil servise başvuran hasta içinde geçerlidir. Tıbbi Deontoloji Nizamnamesinin 30. Maddesine göre konsültasyon ayrıca ücretlendirilir. Yönetmelikte, konsültasyon için görüşün yazılı olarak alınmasının istenmesi hem kanıt değeri taşıması hem de olası sorunlarda sorumluluğun sınırlarını belirlemek amacı taşıdığı düşüncesindeyiz. Konsültasyon isteği mevzuatta iki şekilde olmaktadır (9). İlkinde hastanın müdavi hekimi tarafından lüzum üzerine istenirken, ikinci durumda hasta veya yakınları(veli/vasi) tarafından istenebilmektedir. Tıbbi Deontoloji Nizamnamesinin (TDN) 24. Maddesinde “Hasta, konsültasyon yapılmasını arzu ederse, müdavi tabip veya diş tabibi bu talebi kabul eder” der. Uygulamada ise genellikle birinci durumun geçerli olduğunu görüyoruz. İkinci durum daha az olarak hasta ve yakınları(veli/vasi) tarafından talep edildiğini görmekteyiz. Bunun daha çok hekimlerin eski paternalistik yaklaşımların sonucu olarak hasta ve yakınları(veli/vasi) tarafından bilinmediğini düşünmekteyiz.

TDN’nin 24. Maddesine göre müdavi hekim hastanın konsültasyon istediğini yerinde görmediğinde nasıl bir yol izleneceği konusunda bir netlik yoktur. Sadece yataklı tedavi kurumları işletme yönetmeliğinde hastanın konsültasyon isteği yerinde görülmediğinde duruma başhekimin karar vereceği belirtilmiştir (10). Literatürde müdavi hekimin istediği konsültasyon isteği hasta tarafından ret olunduğunda nasıl yol alacağı tartışılmışsa da TDK 24. Maddenin birinci fıkrası müdavi hekim tarafından ret olunduğunda sonuç konusunda bir netlik yoktur (11).

Konsültasyon işlemini isteyen müdavi hekimin, bunu yazılı olarak yapması önemlidir. Yargıtay vermiş olduğu bir kararda konsültasyon işleminin geç istenmesini kusur olarak görmüştür (12). Yargıtay kararlarında konsültasyon istenmemesi de müdavi hekim için kusur olarak değerlendirilmiştir (13). Başka bir kararda yine konsültasyon istenmemesinin tıp kurallarına uygun olmadığı belirtilmiştir (14). Tanı ve tedavi sürecinde, müdavi hekimin başka bir uzmanlık dalının bilgisine başvurması gerektiği ve bunun fiziksel koşulları uygun olduğu halde bunu yapmaması nedeniyle hasta zarar görmüşse, hekim konsültasyon istememesinden dolayı hatalı sayılacaktır. Kanaatimizce bu benzeri kararlar hekimler açısından defansif tıbbi tetikleyen sebeplerden biri olarak görülebilir. Bunun sonucu olarak da müdavi hekim tarafından görülen hastalar için gereksiz konsültasyon istenebilmektedir.

Müdavi Hekim (Tabip)

Müdavi hekim "Acil serviste hastayı ilk muayene eden ya da hastanın bakımını resmî olarak devir alan ve fiilen acil serviste görev yapan tabip" olarak tanımlanmıştır (8). Acil servis dışında da poliklinik hizmeti sırasında ya da serviste yatan hasta için hastayı ilk değerlendiren ve takibini yapan hasta da müdavi hekim olarak değerlendirilir. Daha da genelleştirilirse hastayı ilk gören ve muayene eden, sonrasında hastanın tanı ve tedavi sürecini takip eden hekim bu anlamda müdavi hekimdir. Kamuda aile hekimleri, poliklinikte hastanın ilk başvurduğu hekim ya da acil servis hizmetinden yararlanmak için başvuran hasta ile ilgilen hekim müdavi hekim olarak kabul edilir (15). Müdavi hekim tıbbi müdahalenin hukuka uygunluk şartlarında biri olan aydınlatma ve sonrasında (rıza) alma sürecini (hastaya olan diğer tıbbi müdahalelerde olduğu gibi) hasta için konsültasyon istemeye karar verdiğinde işletir. Konsültasyon işlemini isteyen müdavi hekiminin bunun yazılı olarak kayıt altına alması gerekir (8).

Konsültan Tabip

Konsültan tabip "Müdavi tabibin hastanın tanı, tedavi ve takibinde görüş istediği uzman tabip" olarak belirtmiştir (8). Konsültan tabip acil şartlarında icapçı hekim de olabilmektedir. İcapçı hekim "Uzman sayısı nöbet tutacak miktardan az olan kurumlarda ev nöbeti tutan uzman tabip" olarak tanımlamıştır (8). İlgili branşta nöbete kalan hekim sayısı belirli bir sayının altında olduğunda bu bölümlerde uzman hekim nöbet tutmamakta icapçı hekim olarak kalmaktadır. Bu durumda müdavi hekim tarafından konsültasyon istenmesi durumunda konsültan tabip olarak hastayı değerlendirmek görevi ile sorumludur. İcap nöbeti tutan hekimin, acildeki müdavi hekimin gerekli görmesi halinde davetine icap etmesi zorunludur (8). Konsültan tabip müdavi hekimin yaptığı tedaviyi uygun görmediğinde bunu konsültasyon belgesine yazar (9). Uygulamada genelde müdavi hekim ile konsültan tabibin tedavi seçenekleri pek çatışmamakla beraber, konsultan tabibi hasta için yapmış olduğu ek öneriler hastanın mevcut durumundan uzak istekler olabilmektedir. Hasta müdavi hekimin sorumluluğundadır. Konsültan hekimin isteklerinin hastanın tedavisine katkısının olmayacağını düşünüyorsa bunu sebepleri ile belirtmesi yasal açıdan yeterli olacaktır. Bu ek öneriler serviste yatan hastalar ya da poliklinik hizmeti sırasında fazla sorun teşkil etmezken, acil serviste bekleyen hastalar için hastanın acil servisteki bekleme süresini arttırabilmektedir. Bu tür sorunların önüne geçmek amaçlı Türkiye Cumhuriyeti Sağlık Bakanlığı yayınladığı tebliğ ile acil serviste konsültan tabipler tarafından gereksiz istenen tetkiklerin önüne geçmek, hem de hastaların acil serviste bekleme sürelerini azaltmak için acil servis müdavi hekimlerine hastayı en ilgili branşa yatırma yetkisi vermiştir (8). Yataklı Sağlık Tesislerinde Acil Servis Hizmetlerinin Uygulama Usul ve Esasları Hakkında Tebliğ'e göre, hastaların acil serviste bekleme süresi 8 saati geçmemelidir. Bekleme süresi 8 saati geçen hastalar, acil servis sorumlu tabibi tarafından ilgili kliniğe yatırılabilir. Acil servis tabibi tarafından hastanenin ilgili kliniğine yatışı verilen hastanın, yatışı verilen klinik tarafından reddi yapılamaz.

Konsültasyon İstenmesi

Konsültasyon talebi genellikle müdavi hekim tarafından istenilir. İlgili mevzuatta hasta konsültasyon isteğini bildirdiğinde bunun hekim tarafından karşılanması gerektiği belirtilir (9). Kamu hastanelerinde bu konu ile ilgili sorun yaşanan yer acil servisler olmaktadır. Özellikle vücudun görünen yerleri ile yüz bölgesindeki kesiklerde hasta plastik cerrahi hekimi tarafından bu kesiklere süture edilmesi istenmektedir. Kimi zaman hasta talebi nedeniyle basit kesiklerde bile plastik cerrahi hekiminin olduğu bir hastaneye gittiğini görüyoruz. Ancak, her kesik vakasının plastik cerrahi tarafından dikileceği anlamına gelmez. Plastik cerrahi hekimi konsültasyon notunda mevcut kesiği özellikli kesi olarak değerlendirmeyip her hekiminin dikebileceği bir kesik olarak değerlendirdiğinde müdavi hekim bu kesiğin sütürasyon işlemini gerçekleştirir. Kanaatimizce TDN 24/1 maddesine getirilecek düzenleme hem hastaya haklarını kullanması açısından bir engel oluşturmayacak hem de gereksiz iş gücü ve maddi kaybın önüne geçecektir.

Konsültasyonun Şekli

Konsültasyonun yazılı olarak müdavi hekim tarafından istenmesi beklenir (8). İcapçı tabipten istenen konsültasyon için önceden belirli olan telefon numarası üzerinden aranarak hasta hakkında gerekli olan bilgiler bildirilir. İcapçı tabibin konsültasyon için davet edildiğinde icapçı hekim tarafından hastanın klinik durumu ve önerileri içeren yazılı belge tutulur (8). İdarenin bu aşamadaki sorumluluğu iş birliğini oluşturacak koşulları önceden oluşturması ve konsültan tabip ile müdavi hekim arasındaki iletişim kanallarını önceden belirleyip gerektiğinde kullanılacak

organizasyonu sağlamaktır. Kanaatimizce bu organizasyon kusurundan kaynaklı gecikmeler idarenin kusuru olarak değerlendirilmelidir.

Konsültasyonun Zamanı

Konsültasyon müdavi hekimin uygun gördüğünde ya da hastanın talebi olduğunda istenmesi gerekir (9). Müdavi hekim uygun zamanı kendisi ayarlaması gerekir. Konsültasyonun geç istenmesine bağlı olarak müdavi hekimin kusurlu görüldüğü içtihatlar mevcuttur.

Konsültan tabibin konsültasyona ne kadar sürede cevap vermesi gerektiği konusunda net bir ifade olmamakla beraber, "en kısa sürede" tabiri kullanılmıştır (8). Kanaatimizce acil servis konsültasyonlarında en kısa süre ibaresi doğru yönetilmekte iken, servis hastaları için bu durum aynı şekilde hızlı işlememektedir. Bu durumda idarenin bu konuda daha net tanımlar yapması daha doğru olacaktır.

Konsültasyonun Sonuçları

Müdavi hekim konsültasyon isteğinde hastanın kimlik bilgileri, hastaneye başvuru sebebi ve mevcut klinik bulguları hakkında doğru ve eksiksiz olarak konsültan tabibi bilgilendirmelidir. Bu bilgilendirmesini idarenin belirlediği kanallar üzerinden şekle uygun olarak yapmalıdır. Müdavi hekim konsültan tabipten tam olarak ne istediğini de konsültasyon notunda yazmalıdır. Uygulamada iletişim hastanelerin yazılım sistemi üzerinden gönderilen konsültasyon notu ve hekimlerin kendi özel telefon numaraları üzerinden olmaktadır. Ancak hekimin telefon numarasına herhangi bir sebepten ulaşılamaması durumunda konsültasyon süresinde gecikme olabilmektedir. Bu türden bir aksaklığı idarenin önceden öngörüp çözmesi gerekir. Mevzuatta idarenin konsültasyon davetlerini çağrı cihazları ve telefon gibi aletlerle idarenin kayıt altına alınması beklenirken, uygulamada çoğu yerde kayıt sisteminin idare tarafından gerçekleştirilmediği, tek kayıt sisteminin hastanenin hasta veri sistemi olduğu görülmektedir (8).

Konsültan tabip en kısa zamanda konsültasyona icap ederek yazılı olarak konsültasyon notunu yazar. Önerileri net öneriler olmalıdır. Hasta için takip, taburculuk ya da hastanın hastaneye yatışı ile ilgili net ifadeler olmalıdır (8). Konsultan tabip yapılan tedaviyi uygun görmediğinde mutlak suretle bunu konsültasyon notunda belirtmelidir.

Kamu hastanelerinde sıklıkla karşılaşılan problemlerin başında, hastanın acil servisten hangi bölüme yatacağının belirlenmesi gelir. Özellikle birden fazla hastalığı olan hastaların birden fazla branş hekimi ile konsültasyonu gerekmektedir. 2022 yılından önce, acil serviste bekleyen ve eve gidemeyecek kadar hasta olan kişilerin hangi branşa yatacağı sorunu sıkça yaşanmaktaydı. 2022 yılında çıkarılan tebliğ ile bu durum çözüm getirilmiştir (8). Eve gidemeyecek durumda olan ve hastanede herhangi bir kliniğe yatışı verilmeyen hastaların acil serviste beklemelerini önlemek amacıyla acil servis hekimlerine tanınan yetkinin olumlu katkıları olmuştur. Bu tebliğ konsültan tabiplerin ve müdavi hekimin daha net iş birliği için yararlı olmuştur.

Konsültasyon Sürecinin Hukuki Sonuçları:

Konsültasyon istediği mevzuatta belirtilmiş bazı özel durumlar haricinde zorunlu bir uygulama değildir. Danışmak için yapılmaktadır. TTB de Hekimlik Meslek Etiği Kurallarında konsültasyonu gerekli hallerde ekip çalışmasının bir bileşeni olarak belirtmiştir. Konsültasyon sürecinde konsültan tabibin müdavi hekim ile sorumluluğu olmakla beraber, hastanın birincil olarak tedavisinden sorumlu olduğundan hastanın tanı ve tedaviden kaynaklı kusur olduğunda ceza sorumluluğu bakımından müdavi hekim sorumlu olacaktır. Kamu hastanelerinde çalışan hekimler için tazminat sorumluluğu idarede olup, ancak rücu söz konusu olduğunda müdavi hekime rücu edilmesi gerekir.

Acil servise başvuran herhangi bir hasta ile ilgili gerekli konsültasyonlar yapılmasına rağmen hastanın poliklinikten takibi öneriliyorsa müdavi hekimin sorumluluğundan bahsedilemez. Yine de hastayı taburcu eden müdavi hekim hastayı neden taburcu ettiğini hasta dosyasına yazmalıdır. Ancak eve gidemeyecek kadar kötü olan bir hastanın ilgili birimler ile konsültasyonuna rağmen hastanın branş servisine yatışı yapılması konusunda ya da taburcu edilmesi konusunda branş uzmanı not yazmamasına rağmen müdavi hekimin idare tarafından kendisine verilen ve Yataklı Sağlık Tesislerinde Acil Servis Hizmetlerinin Uygulama Usul ve Esasları Hakkında Tebliği'nde belirtilen yetkisini kullanmaması durumunda hastanın tedavisinden ve sonrasında oluşacak zararından kanaatimizce müdavi hekimin sorumlu olması gerektiğidir.

Sonuç

Kamu hastanelerinin çalışma sisteminin düzenlenmesi idarenin sorumluluğundadır. Bu sorumluluk hekimler arasındaki iş birliğinin bir türünü oluşturan konsültasyon süreçlerinin denetlenmesini de içerir.

Konsültasyon süreci mevzuatta hasta tarafından da başlatılabileceğinden bahsedilmişse de çoğunlukla müdavi hekimin sorumluluğunda yürütülen bir süreçtir. Ancak bu sürecin başlangıcından bitimine kadar tıbbi müdahalenin hukuka uygunluk sebeplerinden biri olan aydınlatma ve sonrasında rızanın (onam) alınması tıbbi müdahalenin hukuka uygunluğu açısından gereklidir.

Müdavi hekim branş uzmanından konsültasyon ister. Bu hastanın tanı ve tedavi sürecini daha doğru yönetmek içindir. Yani hasta için başka bir uzman hekime danışır. Bu anlamda hasta müdavi hekimin hastasıdır ve sorumlulukta müdavi hekimdedir.

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Yazarlık Katkısı: VÖ- Çalışma ve konsept tasarımı, veri toplama, analiz ve verilerin yorumlanması, yazım, hakem revizyon cevabı.

Etik Beyan: Yazar araştırma ve yayın etiğine uyduklarını beyan eder. Derleme yazısı olduğu için etik kurul onamı alınmadı.

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