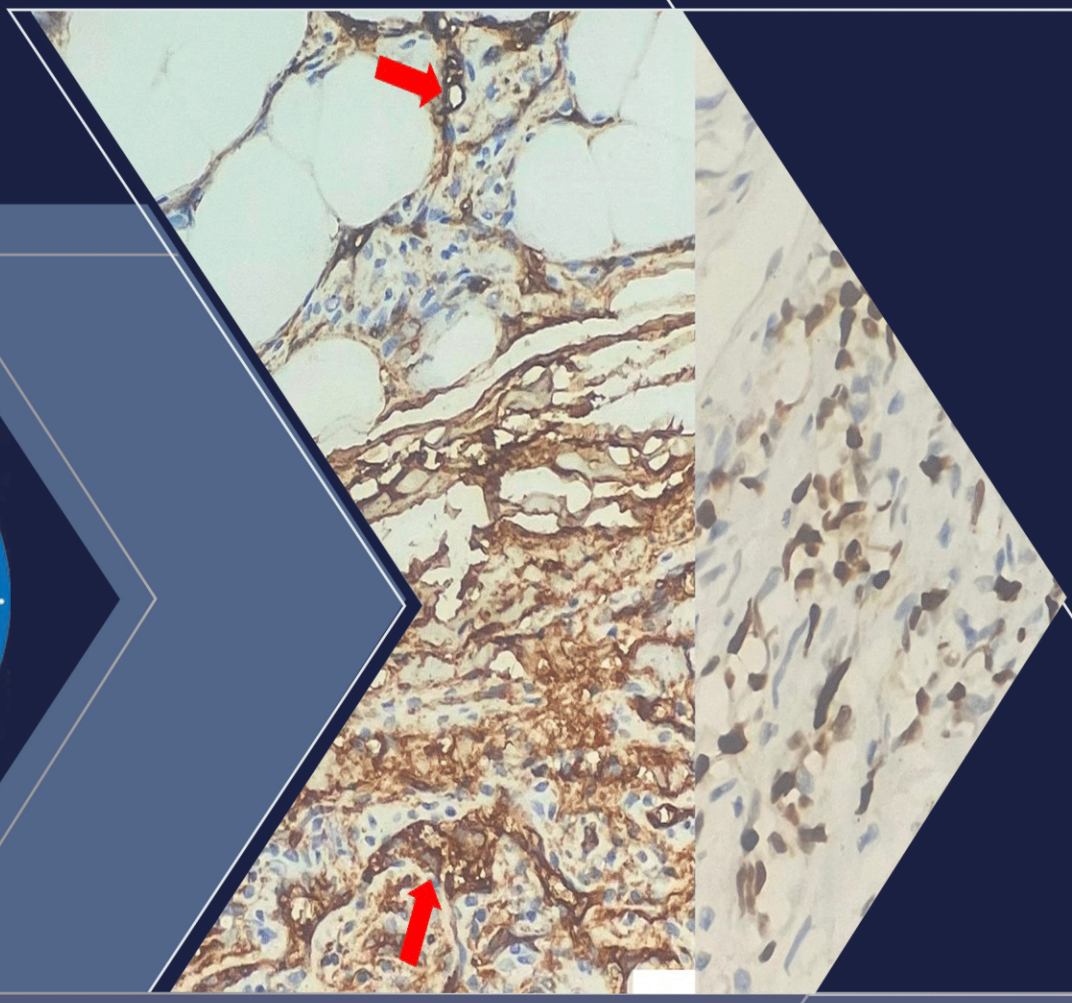
Aksaray Üniversitesi Tıp Bilimleri Dergisi

Aksaray University Journal of Medical Sciences



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ASUJMS 2025; 5(2) :41-47

Research Article

Evaluating The Readability of Websites Providing Information About Monkeypox

Maymun Çiçeği Virüsü Hakkında Bilgi Sunan Web Sitelerinin Okunabilirliğinin Değerlendirilmesi

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Abstract

Aim: The aim of this study is to evaluate the readability, reliability, and quality of the content on websites providing information about the monkeypox virus.

Material and Method: The Google search engine (www.google.com.tr) was used with the keyword 'monkeypox,' and websites from the first 15 pages of search results that were English-language websites, which did not require membership and were freely accessible were included in the study, , from the first 15 pages of search results were included in the study totaling 44 websites. The websites were categorized into four groups: news sites, professional health organizations, government websites, and others. The readability of the texts on the websites was assessed using the Flesch Reading Ease Score (FRES), Gunning Fog Index (GFI), Coleman-Liau Index (CLI), and Simple Measure of Gobbledygook Index (SMOG). The content quality of the texts was evaluated using the JAMA and DISCERN tools.

Results: Of the websites examined, 54.5% were news sites, and only 15.9% were affiliated with professional health organizations. It was found that 56.8% of the websites had a FRES readability level of 'Difficult to read,' 47.7% had a CLI readability level of a 'Fairly difficult,' a 68.2% had a SMOG readability level of 'Undergraduate,' and a 57.8% had a GFI readability level of 'College graduate.' The average JAMA score of the websites was 2.09, and the average DISCERN score was 40.61.

Conclusion: The readability level of the information provided on websites regarding monkeypox was moderately difficult, with inadequate quality and weak reliability. Based on these findings, our study underscores the importance of considering the readability, quality, and reliability of websites that provide information about monkeypox, stating that these factors should not be overlooked. Keywords: Monkeypox, internet, readability

Keywords: Monkeypox, internet, readability

Öz

Amaç: Bu çalışmanın amacı, maymun çiçeği virüsü hakkında bilgi sağlayan web sitelerinin okunabilirliğini, güvenilirliğini ve içerik kalitesini değerlendirmektir.

Gereç ve Yöntem: Google arama motoru (www.google.com.tr) kullanılarak 'maymun çiçeği' anahtar kelimesiyle arama yapılmıştır. İlk 15 sayfa içerisindeki İngilizce dilinde olan, üyelik gerektirmeyen ve serbest erişilebilen web siteleri çalışmaya dahil edilmiştir. Toplamda 44 web sitesi incelenmiştir. Web siteleri dört gruba ayrılmıştır: haber siteleri, profesyonel sağlık kuruluşları, hükümet web siteleri ve diğerleri. Web sitelerindeki metinlerin okunabilirliği, Flesch Okuma Kolaylığı Puanı (FRES), Gunning Fog İndeksi (GFI), Coleman-Liau İndeksi (CLI) ve Simple Measure of Gobbledygook İndeksi (SMOG) ile değerlendirilmiştir. İçerik kalitesi ise JAMA ve DISCERN araçları kullanılarak değerlendirilmiştir.

Bulgular: İncelenen web sitelerinin %54,5'i haber sitelerinden oluşmaktadır ve yalnızca %15,9'u profesyonel sağlık kuruluşlarıyla ilişkilidir. Web sitelerinin %56,8'inin FRES okunabilirlik seviyesi "Okunması Zor" olarak belirlenmiştir. %47,7'si CLI'ye göre "Oldukça Zor," %68,2'si SMOG'a göre "Lisans" ve %57,8'i GFI'ye göre "Üniversite Mezunu" seviyesinde bulunmuştur. Web sitelerinin ortalama JAMA skoru 2,09 ve ortalama DISCERN skoru 40,61 olarak hesaplanmıştır.

Sonuç: Maymun çiçeği hakkında bilgi sağlayan web sitelerinin okunabilirlik seviyesi orta derecede zor, içerik kalitesi ise yetersiz ve güvenilirliği zayıf olarak bulunmuştur. Bu bulgulara dayanarak, bu tür web sitelerinin okunabilirlik, kalite ve güvenilirlik unsurlarının göz ardı edilmemesi gerektiği vurgulanmaktadır.

Anahtar Kelimeler: Maymun çiçeği, internet, okunabilirlik

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INTRODUCTION

Human monkeypox (MPX) is a disease caused by the monkeypox virus (MPXV), a member of the Orthopoxvirus family, and is primarily confined to a few endemic countries in Central and West Africa (1). Monkeypox was first identified in African monkey colonies in 1958, and the first human case was reported in 1970 in the Democratic Republic of the Congo (2). The modes of transmission of monkeypox include direct contact with infected skin and mucocutaneous lesions, respiratory droplets, or through contaminated objects, all of which can facilitate human-to-human transmission. Although monkeypox is not classified as a sexually transmitted infection, it has been observed that the majority of cases are associated with men who engage in unprotected sex. Monkeypox presents symptoms similar to those of chickenpox. After an incubation period of 10-14 days in infected individuals, symptoms such as malaise, fever, chills, and reactive lymphadenopathy emerge, followed by the appearance of rashes, 1-3 days later. The maculopapular rash typically begins on the torso and, as it intensifies, spreads to other parts of the body. Between the 2nd and 4th weeks, lesions evolve from papules to vesicles and then pustules. Infectiousness persists for up to two weeks after the appearance of the rash (3). Human monkeypox cases have been on the rise since the 1970s, with outbreaks occasionally occurring outside Africa due to importations and travel-related spread since 2003 (4). In May 2022, the UK and the European Centre for Disease Prevention and Control, along with the Centers for Disease Control and Prevention in the United States, reported an increase in the number of monkeypox cases in several countries across Europe and the Americas (5).

The internet hosts a vast array of medical resources aimed at informing both patients and healthcare professionals (6). A national survey conducted by the Pew Internet & American Life Project found that 80% of internet users in the United States search for health-related information online (7). Individuals with serious health conditions or limited access to healthcare often turn to the internet for medical information (8). Online medical resources can assist healthcare professionals in educating the public and helping individuals access essential information to protect and improve their health. However, significant deficiencies exist in users' ability to find, understand, and utilize medical information available online, and the quality of such information often lacks standardization (9). The essential criteria for evaluating health-related information sources on the internet are defined in the Journal of the American Medical Association (JAMA) evaluation tool, which includes authorship, attribution, disclosure, and currency (6). Another widely used tool for assessing online medical resources is the DISCERN scale, which consists of 16 questions that evaluate the quality of written information regarding health issues and treatments (10).

Readability is defined as the ease with which a text can be read and understood (11). It is a fundamental requirement for ensuring that information is useful and of high quality. Poor readability of online health information may result in misinformation and adversely affect individuals' health (12). Studies evaluating the readability of medical information on the internet have revealed significant variations in the readability levels (13, 14). To assess the readability of online texts, various measurement tools are used, including the Flesch Reading

Ease Score (FRES), Gunning Fog Index (GFI), Coleman-Liau Index (CLI), and the Simple Measure of Gobbledygook (SMOG) Index (15).

People who have not fully recovered from the residual effects of the COVID-19 pandemic express serious concerns about the potential emergence of a monkeypox pandemic on a global scale (16). In this context, literature includes studies evaluating the readability (17, 18) and content quality of information (19) available on the internet regarding the COVID-19 pandemic. The aim of our study is to analyze the readability, reliability, and quality of the content on websites providing information about the monkeypox virus.

MATERIALS AND METHODS

This study did not require ethical approval as it utilized publicly available information from websites. The research was conducted in accordance with the principles of the Helsinki Declaration of Human Rights (3, 20). On August 19, 2024, Google Trends was used to identify the primary keyword for the study. The terms “monkeypox virus,” “monkeypox disease,” and “monkeypox virus disease” were searched globally using the web search option over the past seven days, across all categories. The selection of the past seven days as the timeframe was based on the dynamic nature of public health concerns and internet search trends. Previous studies analyzing rapidly evolving health topics have demonstrated that search trends fluctuate significantly over short periods. By selecting a recent and relevant timeframe, our study aimed to capture the most up-to-date public interest and search behavior, reducing the risk of outdated data skewing the results (21). The search revealed that the term “monkeypox virus” was most frequently used. The keyword was subsequently entered into the Google search engine (www.google.com.tr, Google LLC, Mountain View, California, USA), with the “past seven days” filter applied, and the first 15 pages of results were reviewed. To

ensure the reliability of the results, the researcher logged out of their personal Google account and cleared the browser cache and cookies.

The study included English-language, publicly accessible websites that provide information about monkeypox virus and which do not require membership for access. The exclusion criteria were as follows: non-English websites, academic articles, chat and forum sites, websites not intended to provide informational content, commercial and advertising sites, duplicate websites, sites that require membership or acceptance of cookie settings, websites offering only video and/or visual content, social media-based sites, and websites that do not provide information about monkeypox virus. Based on their content, the websites included in the study were categorized into four groups: news sites, professional health organizations, government websites, and other sources.

Readability Measurement

Four validated readability tools were used in the study: Flesch Reading Ease Score (FRES), Gunning Fog Index (GFI), Coleman-Liau Index (CLI), and Simple Measure of Gobbledygook Index (SMOG) (Table 1). The data for these tools were obtained through publicly accessible online applications. Specifically, the FRES (https://charactercalculator.com/flesch-reading-ease/) and CLI (https://www.readabilit.com/readability/coleman-liau-index) data were collected by one researcher (E.T.A.), the GFI (https://charactercalculator.com/gunning-fog-index/) data by another researcher (H.Y.), and the SMOG (https://charactercalculator.com/smog-readability/) data by a third researcher (E.G.).

Content Evaluation

The study used the DISCERN Scale and the JAMA Score to evaluate the reliability and quality of the information. The DISCERN Scale, developed by Charnock et al. (10), is designed to evaluate the adequacy and quality of written information regarding treatment options. This scale includes 16 questions: eight on reliability and independence, seven on treatment adequacy, and one on overall content quality. Each question is rated on a scale from 1 to 5, where 1 represents “definitely no” and 5 represents “definitely yes.” The total score on the scale is classified into five categories: 63-75 (excellent), 51-62 (good), 39-50 (fair), 28-38 (poor), and 15-27 (very poor).

JAMA Score

The JAMA Score is a globally recognized tool for evaluating the quality, reliability, and usability of online medical information. (22) This scoring system is based on four key criteria, scored as either "present = 1" or "absent = 0". The total score ranges from 0 to 4, with scores ≥ 3 indicating “high reliability” and scores ≤ 2 indicating “low reliability.” The criteria are as follows:

- Author Information: Details about the authors, contributors, their affiliations, and expertise.
- Citations: References and copyright information included within the content.
- Transparency: Disclosure of site ownership, sponsorship, advertising, and funding. Timeliness: Indication of publication and update dates.

The websites included in the study were evaluated using the DISCERN Scale by researcher E.G. and the JAMA Score by researcher E.T.A. The readability analyses, along with the data obtained from the DISCERN Scale and JAMA Score, were transferred to Microsoft Excel (Microsoft Corporation, Redmond, Washington, USA) for further analysis.

Table 1: Readability tool

READABILITY TOOLS	FEATURES		
FRES	**Index Score**	**Grade**	**Summary**
	90-100	5th Grade	Very Easy
	80-90	6th Grade	Easy
	70-80	7th Grade	Fairly Easy
	60-70	8-9th Grade	Plain English
	50-60	10-12th Grade	Fairly Difficult
	30-50	College	Difficult
	10-30	College Graduate	Very Difficult
	0-10	Professional	Exremely Difficult
CLI	**Index-Score**	**School Level**	**Comprehension**
	5&Below	5th Grade and below	Very Easy
	6	6th Grade	Easy
	7	7th Grade	Fairly Easy
	7-10	8th,9th,10th Grade	Conversational English
	11-12	11th,12th Grade	Fairly Difficult
	13-16	College	Difficult
	17+	Professional	Exremely Difficult
GFI	**Fox Index**	**Grade**	
	6	Sixth Grade	
	7	Seventh Grade	
	8	Eighth Grade	
	9	High School Freshman	
	10	High School Sophomore	
	11	High School Junior	
	12	High School Senior	
	13	College Freshman	
	14	College Sophomore	
	15	College Junior	
	16	College Senior	
	17	College Graduate	
SMOG	**Score**	**Education Level**	
	4,9 or lower	Elementary School	
	5-8,9	Middle School	
	9-12,9	High School	
	13-16,9	Undergraduate	
	17 or higher	Graduate	

Statistical Analysis

All statistical analyses were performed using IBM SPSS 22 (SPSS Inc., Chicago, IL, USA). The websites were categorized by source and described using frequency and percentage distributions. For website text data metrics such as characters, words, sentences, syllables, FRES Index Score, GFI Fog Index, CLI Index Score, and others, appropriate software must be used for accurate analysis.

The SMOG Score was analyzed for mean, standard deviation, minimum, and maximum values. The readability levels for the FRES and CLI, SMOG, and GFI were reported using frequency and percentage distributions. The JAMA and DISCERN scores were analyzed for mean, standard deviation, minimum, and maximum values.

RESULTS

A total of 150 websites from the first 15 pages of Google (Google LLC, Mountain View, California, USA) for the keyword “monkeypox virus” was evaluated. Based on the inclusion criteria, 44 websites were included in the study. When examining the sources of these websites, it was found that 54.5% (n=24) were news websites, 27.3% (n=12) were government websites, 15.9% (n=7) were professional health organizations, and 2.3% (n=1) fell into the “other” category (Figure 1).

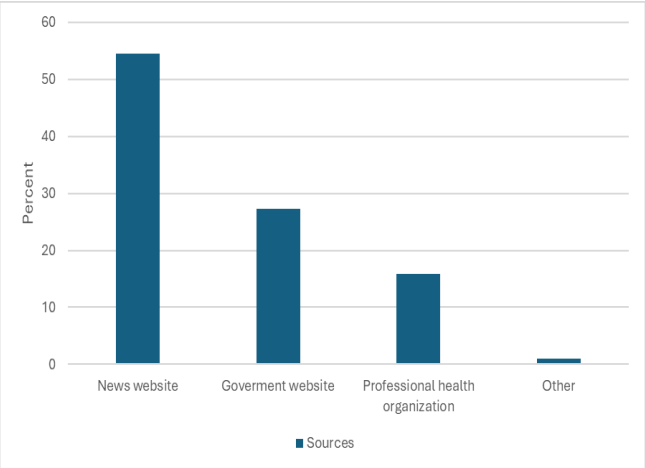

Figure 1: Distribution of websites by source type

The readability data for the included websites are presented in Table 2. The average readability scores were as follows: FRES = 38.29, CLI = 12.66, GFI = 18.23, and SMOG = 15.75.

Table 2: Readability data of the websites

	Minimum	Maximum	Mean	Standart Deviation
Characters	547	37028	6823,75	6810,50
Words	80	5543	1088,84	1055,62
Sentences	3	241	43,32	45,64
Syllables	156	10042	1822,68	1837,66
FRES	1,41	65,60	38,29	15,20
GFI	9,80	32,15	18,23	4,63
CLI	8,66	17,10	12,66	1,84
SMOG	11,36	22,24	15,75	2,73

**FRES: Flesch Reading Ease Score, GFI: Gunning Fog Index, CLI: Coleman-Liau Index, SMOG: Simple Measure of Gobbledygook Index*

Table 3 presents the readability levels of the texts on the websites based on FRES and CLI according to FRES, the majority (56.8%) of texts were categorized as 'College/Difficult to read', while according to CLI, the largest proportion (47.7%) fell into the '11-12th Grade/Fairly difficult to read' category.

Table 3: FRES and CLI readability levels and categories of the texts on the websites

FRES			CLI		
Grade	**Summary**	**N**	**School Level**	**Comprehesion**	**N**
5th Grade	Very Easy	0	5th Grade and below	Very Easy	0
6th Grade	Easy	0	6th Grade	Easy	0
7th Grade	Fairly Easy	0	7th Grade	Fairly Easy	0
8-9th Grade	Plain English	2	8-10th Grade	Conversational English	4
10-12th Grade	Fairly Difficult	8	11-12th Grade	Fairly Difficult	21
College	Difficult	25	College	Difficult	16
College Graduate	Very Difficult	7	Professional	Exremely Difficult	3
Professional	Exremely Difficult	2			

**N: Number, FRES: Flesch Reading Ease Score, CLI: Coleman-Liau Index*

The SMOG readability levels of the texts on the websites are shown in Figure 2. It was found that 68.2% (n=30) of the websites' texts were classified as 'Undergraduate' level, 20.5% (n=9) as 'Graduate' level, and 11.4% (n=5) as '7th Grade' level.

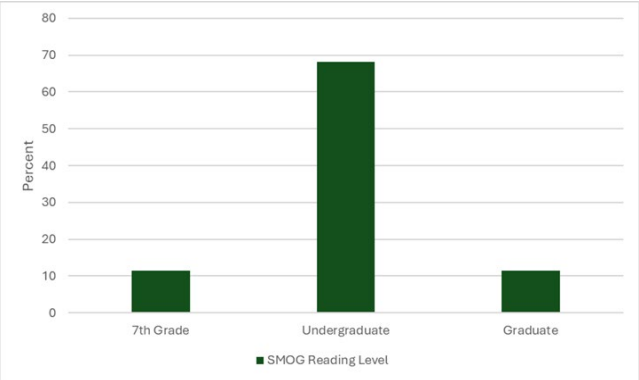

Figure 2: SMOG readability levels of the texts on the websites

The GFI readability levels of the websites texts revealed the following distribution: 57.8% (n=26) were at the 'College graduate', 15.9% (n=7) at the 'College Senior', 6.8% (n=3) at the 'College Junior', 6.8% (n=3) at the 'College Sophomore', 4.5% (n=2) at the 'High School Senior', 4.5% (n=2) at the 'College Freshman', 2.3% (n=1) at the 'High School Junior', and 2.3% (n=1) at the 'High Scholl Freshman'.

The GFI readability levels are shown in Figure 3.

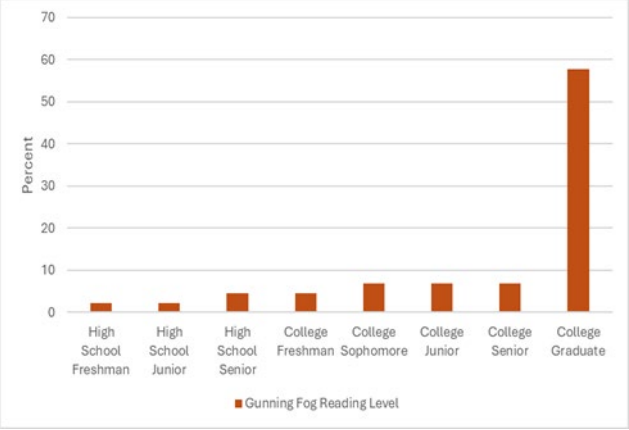

Figure 3: GFI readability levels of the texts on the websites

The JAMA and DISCERN scores of the evaluated websites are presented in Table 4. The average JAMA score of the websites was found to be 2.09, while the average DISCERN score was 40.61.

Table 4. JAMA and DISCERN scores on the websites

	Minimum	Maximum	Mean	Std. Deviation
JAMA	1	4	2,09	0,96
DISCERN	20	66	40,61	15,63

When the websites were grouped based on their average DISCERN scores, it was observed that 29.5% (n=13) were classified as "very poor," 22.7% (n=10) as "fair," 18.2% (n=8) as "poor," 15.9% (n=7) as "good," and 13.6% (n=6) as "excellent."

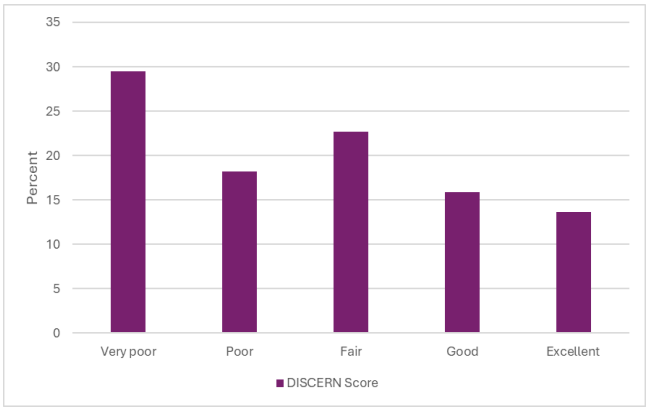

Figure 4: DISCERN score groups of the websites

DISCUSSION

Human monkeypox is a zoonotic disease caused by the monkeypox virus, which emerged as a multinational outbreak in 2022, spreading rapidly among young men who have sex with men. It is a significant health concern due to its clinical symptoms, including classical vesicular-pustular rashes and associated signs (1). Over the past decade, significant technological advancements have been made in the field of information technology have made the internet a ubiquitous phenomenon. A study in the literature evaluates the readability of information provided on websites about the monkeypox virus (3). However, there is no study that concurrently evaluates the readability, reliability, and quality of information on websites about the monkeypox virus. The aim of our study is to analyze the readability, reliability, and quality of the content found on websites about the monkeypox virus. It is the first comprehensive and systematic evaluation of the information available on websites about the monkeypox virus.

The internet offers an accessible and flexible platform, encouraging patients to seek information about their health issues due to its ease and practicality (23). Advances in communication technologies are transforming how individuals access health information, understand their health conditions, and make healthcare decisions. Research shows that the internet is an effective platform for sharing health information with a wide audience, including those with lower income and education levels (13). Health literacy, closely linked to general literacy, refers to the ability and motivation to acquire, understand, and evaluate health information, helping individuals access healthcare services, prevent diseases, and make informed decisions in daily life (22).

Frost and Baldwin (3) emphasize the importance of health literacy in effectively disseminating information about infectious diseases. In their study, they evaluated the readability of 50 English-language websites containing patient education materials related to monkeypox. Among the readability scales used in the study—FRES, GFI, and CLI—no website met the target readability score. However, the FKGL and SMOG tools identified one (2%) and two (4%) websites, respectively, that met the target level. According to FRES, approximately 56.8% of the websites were categorized as 'College/Difficult to read', while 47.7% were classified, based on CLI, as '11-12th Grade/Fairly difficult to read'. For SMOG readability levels, 68.2% (n=30) of the websites were at the 'Undergraduate' level, 20.5% (n=9) at the 'Graduate' level, and 11.4% (n=5) at the '7th Grade' level. Regarding GFI readability levels, 57.8% (n=26) of the websites were at the 'College graduate' level.

In May 2022, the initial reporting of monkeypox cases led to a significant increase in internet searches related to the disease (24, 25). The primary sources of information about the Mpox virus infection included the internet, social media, radio, and television (26). Studies on medical and pharmacy students (27, 28) revealed that these students primarily relied on social media and the internet for their information about monkeypox. This highlights the importance of the quality of information available on social media and the internet, as individuals increasingly turn to these platforms for health-related information.

Numerous studies have examined the content of YouTube videos and social media posts related to monkeypox. Studies evaluating YouTube videos about monkeypox found that most of the videos analyzed were from news channels (16, 29). In alignment with these findings, our study determined that 54.5% of websites providing information about monkeypox were news sites. A study found that 20% of YouTube videos about monkeypox contained misleading information (29). Similarly, in a study assessing the content quality of TikTok videos on monkeypox using the DISCERN and JAMA tools, the quality of the videos was found to be low (30). In contrast, Yapıcı et al. reported that all the YouTube videos they analyzed related to monkeypox were deemed useful (31). Videos uploaded by healthcare professionals on YouTube and TikTok had a higher quality of content compared to other sources (31, 32).

In our study, the low DISCERN and JAMA scores of the texts on the websites we examined may be attributed to the fact that only 15.9% of these websites were affiliated with professional health organizations. The higher content quality of information shared by health professionals highlights the need for users to consider the source of health information when evaluating online content.

CONCLUSION

In our study, it was concluded that the information provided on websites related to monkeypox was written above the recommended reading level, and the quality and reliability of the content on these sites were found to be insufficient. This study demonstrates the need for information presented on websites about monkeypox to be written in clear and simple language that is accessible to all.

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Research Article

Evaluation of Cases Admitted to Emergency Service Due to Domestic Violence Against Women: A Retrospective Study

Kadına Yönelik Aile İçi Şiddet Nedeniyle Acil Servise Başvuran Vakaların Değerlendirilmesi: Retrospektif Bir Çalışma

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Abstract

Aim: One of the most important public health problems in our country is domestic violence against women. One of the first places that people who are exposed to violence apply to is the emergency services. This study aimed to retrospectively evaluate female cases who applied to a training and research hospital due to domestic violence.

Material and Method: The data of 25 women who were exposed to violence between January 1, 2018 and December 31, 2020 at Aksaray University Training and Research Hospital were analyzed retrospectively. Descriptive statistics were used in the presentation of the data.

Results: Of the women exposed to violence, 48.0% were in the 21-30 age group, and 90.0% experienced domestic violence from their spouses. Of the perpetrators, 30.0% were primary school graduates and 44.0% were in the 21-30 age group. One-fifth of women (20.0%) had suicidal ideation and 12.0% attempted suicide. After being exposed to violence, all of them applied to an official institution. Of women, 40.0% were threatened with death, 52.0% applied to the emergency department between 08.00-16.00, and the highest number of applications was in March (24.0%) and April (16.0%).

Conclusion: Majority of the women have been exposed to physical violence and some of them have experienced mental distress such as suicidal ideation and attempt. It has been suggested to determine the health service that the woman needs physically and mentally and to provide her physical and mental treatment.

Keywords: Abused woman; domestic violence; emergency room; retrospective study.

Öz

Amaç Ülkemizde en önemli toplum sağlığı sorunlarından biri kadına yönelik aile içi şiddettir. Şiddete maruz kalan kişilerin ilk başvurduğu yerlerden biri de acil servislerdir.: Bu çalışmada aile içi şiddet nedeniyle bir eğitim ve araştırma hastanesine başvuran kadın olguların retrospektif olarak değerlendirilmesi amaçlanmıştır.

Gereç ve Yöntem: Aksaray Üniversitesi Eğitim ve Araştırma Hastanesi'nde 1 Ocak 2018 ile 31 Aralık 2020 tarihleri arasında şiddete maruz kalan 25 kadının verileri retrospektif olarak analiz edilmiştir. Verilerin sunumunda tanımlayıcı istatistikler kullanılmıştır.

Bulgular: Şiddete maruz kalan kadınların %48,0'i 21-30 yaş grubunda olup, %90,0'nı eşlerinden aile içi şiddet görmüştür. Şiddet uygulayanların %30,0'u ilkokul mezunu ve %44,0'ü 21-30 yaş grubundadır. Kadınların beşte biri (%20,0) intihar düşüncesi taşımaktadır ve %12,0'si intihar girişiminde bulunmuştur. Şiddete maruz kaldıktan sonra hepsi resmi bir kuruma başvurmuştur. Kadınların %40,0'ı ölümle tehdit edildi, %52,0'si acil servise 08.00-16.00 saatleri arasında başvurdu ve en fazla başvuru Mart (%24,0) ve Nisan (%16,0) aylarında oldu.

Sonuç: Kadınların büyük çoğunluğu fiziksel şiddete maruz kalmış ve bir kısmı intihar düşüncesi ve girişimi gibi ruhsal sıkıntılar yaşamıştır. Kadının fiziksel ve ruhsal olarak ihtiyaç duyduğu sağlık hizmetinin belirlenmesi ve fiziksel ve ruhsal tedavisinin sağlanması önerilmiştir.

Anahtar Kelimeler: Şiddete uğramış kadın; aile içi şiddet; acil servis; retrospektif çalışma.

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INTRODUCTION

One of the most important public health problems in our country, as well as all over the world, is domestic violence against women. Domestic violence against women is a human rights violation and a global crisis. World Health Organization (2021) data shows that approximately 1 in 3 (30%) of women worldwide have experienced either physical and/or sexual intimate partner violence or non-partner sexual violence in their lifetime (1). Most of this violence is intimate partner violence. According to the data of the Organization for Economic Co-operation and Development (2019), Turkey ranks second after Argentina in terms of violence against women. In other words, 38.0% of women in Turkey are subjected to physical or sexual violence by their partners (2).

Violence negatively affects women's physical, mental, sexual and reproductive health and increases the risk of sexually transmitted diseases (1). The impact of violence lasts a lifetime. Approximately one quarter of women who are subjected to violence suffer from mental health deterioration. Mental health disorders and suicidal thoughts and attempts are also increasing (3). The quality of life and mental health of women exposed to violence deteriorate. In addition, violence committed by a person with whom one has a close relationship further impairs the quality of life (4). The likelihood of unwanted pregnancy, the number of abortions and the number of terminated pregnancies increases among women who experience sexual violence. Additionally, the risk of sexually transmitted infections increases by 77% with sexual violence and 44% with emotional violence in women exposed to violence (5). Therefore, due to these negative health problems, the rate of women's use of health services is also increasing.

The health sector has an important role as an entry point to provide comprehensive health care to women experiencing violence and to direct women to other support services they may need (1). Health workers also have responsibilities in diagnosing violence against women, providing appropriate care to women victims of violence, and preventing violence (6). For this reason, defining the demographic information of those who are exposed to violence and those who perpetrate it, the characteristics of violence and the path followed after violence will guide both the prevention studies to be carried out and the policies to be created.

Aim

This study aimed to retrospectively evaluate female cases who applied to a training and research hospital due to domestic violence.

MATERIALS AND METHODS

Design

This study is a retrospective descriptive type of registry research.

Population and Sample

The population of this study is women who applied to the emergency department of Aksaray University Training and Research Hospital due to domestic violence between 01 January 2018 and 31 December 2020. The sample consisted of the files of 25 women who were recorded to have been subjected to violence between the specified dates.

Instruments

In the study, the judicial records of women who applied to the emergency department due to domestic violence at Aksaray University Training and Research Hospital retrospectively and were found to have been subjected to violence, the standard forms filled out by doctors or nurses working in the emergency department by talking to the patients, and all data in the hospital records were evaluated. The data of 25 women who were reported and exposed to violence between 01 January 2018 and 31 December 2020 were evaluated. In the study, the data covering the last 5 years was intended to be examined, but the records of the last 3 years of data could only be accessed in the system.

An attempt was made to obtain demographic information about both the woman exposed to violence and the person who committed violence from the records. Additionally, information regarding violence was collected. This information includes the age of the woman victim of violence, marital status, educational status, number of children, whether she has suicidal thoughts and suicide attempts, kinship status with the person who commits violence, the person who commits violence and the age of this person, educational status and substance use status, type and number of violence. , the situation, time and month of applying to the official institution after violence, the situation of children witnessing violence and the situation of being threatened with death.

Ethical Consideration

Before starting this research, written permission was obtained from the Human Research Ethics Committee of a university (Date: February 22, 2021, Decision No: 01/16) and the Chief Physician of the relevant Training and Research Hospital. Since it was a retrospective study, informed consent could not be obtained. The research was conducted in accordance with the principles of the Declaration of Helsinki.

Data Collection

The data of the study was collected by two researchers by examining previously recorded files. Data was collected between March and June 2021. The data was extracted and transferred to the data analysis program.

Data Analysis

Statistical Package for Social Sciences for Windows SPSS 24.0 software was used to evaluate the data. Descriptive statistics such as numbers and percentages were used in the presentation of the data.

RESULTS

Table 1 shows the demographic characteristics of women exposed to domestic violence and perpetrators by years. Of women exposed to violence, 70.0% are married, 40.0% are primary school graduates, 48.0% are in the 21-30 age group, and 36.0% are in the 31-40 age group. The majority of women (90.0%) have experienced domestic violence from their spouses. Of people who commit violence, 30.0% are primary school graduates and 44.0% are in the 21-30 age group. Of women, 32.0% have two children and 24.0% have one child. Of women who were victims of violence, 20.0% had suicidal thoughts and 12.0% attempted suicide. Of the violent spouse, 32.0% is a relative of the woman, 60.0% smokes, and 36.0% uses alcohol.

Table 2 shows the characteristics related to violence. Of women, 80.0% have been exposed to physical violence and 80.0% have been exposed to violence more than once. After being exposed to violence, all of them applied to an official institution. Of their children, 68.0% have witnessed violence against women and 40.0% have been threatened with death. Fifty-two percent of women applied to the emergency room between 08.00 and 16.00. While there were no applications in May, September and December, the highest number of applications were in March (24.0%) and April (16.0%).

Table 1: Demographic Characteristics of Women Exposed to Domestic Violence and Perpetrators by Years

	2018		2019		2020		Total	
Marital status	n	%	n	%	n	%	n	%
Married	7	70.0	5	71.4	7	87.5	19	76.0
Single	1	10.0	1	14.3	1	12.5	3	12.0
Divorced	2	20.0	-	-	-	-	2	8.0
Widow	-	-	1	14.3	-	-	1	4.0
Educational status								
Illiterate	-	-	-	-	1	12.5	1	4.0
Literate	2	20.0	-	-	1	12.5	3	12.0
Primary school	4	40.0	3	42.9	3	37.5	10	40.0
Secondary school	2	20.0	1	14.2	1	12.5	4	16.0
High school	2	20.0	3	42.9	2	25.0	7	28.0
Age								
≤ 20 years	-	-	1	14.3	-	-	1	4.00
21-30 years	4	40.0	3	42.9	5	62.5	12	48.0
31-40 years	4	40.0	3	42.9	2	25.0	9	36.0
41-50 years	2	20.0	-	-	-	-	2	8.0
≥ 51 years	-	-	-	-	1	12.5	1	4.0
Educational status of the perpetrator								
Illiterate	1	10.0	-	-	-	-	1	4.0
Literate	3	30.0	2	28.6	1	12.5	6	24.0
Primary school	1	10.0	3	42.9	5	62.5	9	36.0
Secondary school	3	30.0	2	28.6	-	-	5	20.0
High school	2	20.0	-	-	2	25.0	4	16.0
Age of perpetrator								
21-30 years	4	40.0	4	57.1	3	37.5	11	44.0
31-40 years	3	30.0	1	14.3	3	37.5	7	28.0
41-50 years	3	30.0	1	14.3	1	12.5	5	20.0
Perpetrator								
Victim's spouse	9	90.0	7	100	7	87.5	23	92.0
Spouse's relative	1	10.0	-	-	1	12.5	2	8.0
Number of children								
None	2	20.0	-	-	-	-	2	8.0
1	2	20.0	2	28.6	2	25.0	6	24.0
2	2	20.0	3	42.9	3	37.5	8	32.0
3	3	30.0	2	28.6	2	25.0	7	28.0
≥ 4	1	10.0	-	-	1	12.5	2	8.0
Suicidal ideation								
Yes	3	30.0	2	28.6	-	-	5	20.0
No	7	70.0	5	71.4	8	100	20	80.0
Suicide attempt								
Yes	2	20.0	1	14.3	-	-	3	12.0
No	8	80.0	6	85.7	8	100	22	88.0
Relationship status with spouse								
Yes	4	40.0	2	28.6	2	25.0	8	32.0
No	6	60.0	5	71.4	6	75.0	17	68.0
Habits of the spouse								
Cigarette	6	60.0	3	42.9	6	75.0	15	60.0
Alcohol	3	30.0	4	57.1	2	25.0	9	36.0
Drug	1	10.0	-	-	-	-	1	4.0

Table 2: Characteristics Related to Violence

	2018		2019		2020		Total	
Type of violence	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Physical violence	8	80.0	7	100	5	62.5	20	80.0
Psychological violence	-	-	-	-	1	12.5	1	4.0
Physical and psychological violence	-	-	-	-	2	25.0	2	8.0
Sexual violence	1	10.0	-	-	-	-	1	4.0
Physical and sexual violence	1	10.0	-	-	-	-	1	4.0
Number violence								
First time	2	20.0	2	28.6	1	12.5	5	20.0
More than one	8	80.0	5	71.4	7	87.5	20	80.0
Applying to an official institution after violence								
Yes	10	100	7	100	8	100	25	100
No	-	-	-	-	-	-	-	-
Have their children witnessed violence?								
Yes	7	70.0	4	57.1	6	75.0	17	68.0
No	3	30.0	3	42.9	2	25.0	8	32.0
Being threatened with death								
Yes	6	60.0	3	42.9	1	12.5	10	40.0
No	4	40.0	4	57.1	7	87.5	15	60.0
Time of application								
08.00-16.00	8	80.0	2	28.6	3	37.5	13	52.0
16.00-24.00	1	10.0	4	57.1	4	50.0	9	36.0
24.00-08.00	1	10.0	1	14.3	1	12.5	3	12.0
Month of application								
January	-	-	-	-	2	25.0	2	8.0
February	-	-	-	-	2	25.0	2	8.0
March	4	40.0	-	-	2	25.0	6	24.0
April	2	20.0	2	28.6	-	-	4	16.0
May	-	-	-	-	-	-	-	-
June	-	-	2	28.6	-	-	2	8.0
July	2	20.0	1	14.3	-	-	3	12.0
August	-	-	1	14.3	-	-	1	4.0
September	-	-	-	-	-	-	-	-
October	1	10.0	1	14.3	-	-	2	8.0
November	1	10.0	-	-	2	25.0	3	12.0
December	-	-	-	-	-	-	-	-

Figure 1 shows the applications for violence by years. While there was a decrease in the number of violence in 2019, it increased again in 2020.

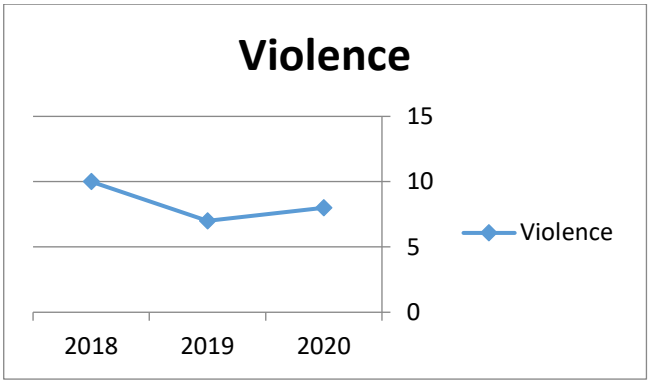

Figure 1: Applications of violence by years

Figure 2 shows the types of violence experienced by years. While physical violence and sexual violence were also seen in 2018, there were no cases of sexual violence in subsequent years. In the applications in 2019, there were only physical violence applications. In 2020, physical violence was accompanied by psychological violence.

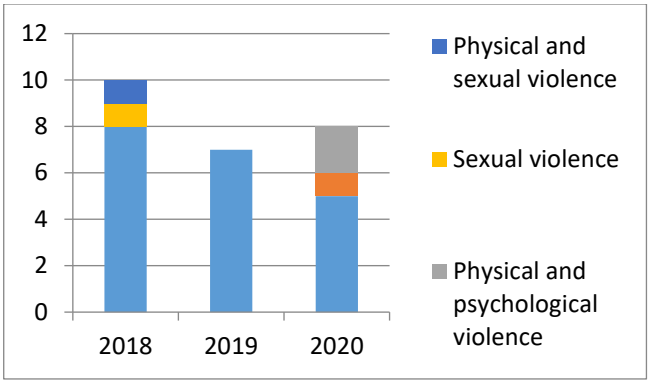

Figure 2: Type of violence experienced by years

Figure 3 shows the number of violence experienced over the years. From 2018 to 2020, there was a decrease in the number of people experiencing violence for the first time. While the number of people subjected to multiple violence decreased in 2019, it increased again in 2020.

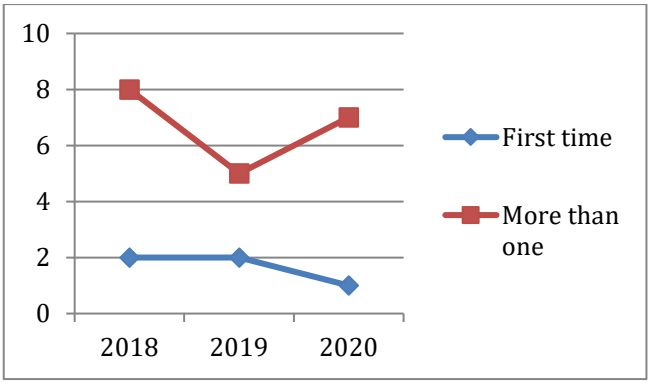

Figure 3: Number of violence experienced by years

DISCUSSION

In this study, it was determined that the majority of women who applied to the emergency department due to domestic violence were in the 21-30 and 31-40 age groups. In a similar study examining women who applied to the emergency department due to domestic violence, the average age of the women was 35.70±12.53 years (7). In the field research conducted by Ediz and Altan (8), the majority of women subjected to violence were in the 30-40 and 41-50 age groups. In a study examining women victims of violence who applied to the Violence Prevention and Monitoring Center (VPMC) in a province, the average age of the women was 35.65±11.98 years (9). In a study conducted abroad in Erbil, the average age of women who were victims of domestic violence was 33.16±9.28 years (10). When we look at the studies, it can be said that, similar to this study, mostly women in the middle age group demand services.

In this study, 40.0% of women who applied to the emergency department due to domestic violence were primary school and 28.0% were high school graduates. Similarly, in the study conducted by Canpolat and Demir (7) with women who applied to the emergency room due to domestic violence, 35.8% of the women were primary school graduates and 22.6% were high school graduates. In a field research conducted on women exposed to violence, 36.0% of women were primary school and 24.1%were secondary school graduates (8). In another study, 33.9% of women applying to the VPMC were primary school and 23.3% were high school graduates (9). In the study conducted with women exposed to violence in Erbil, it was reported that 40.0% of women were secondary school and 30.5% were high school graduates (10). In line with the findings, we can say that women from all education levels are exposed to domestic violence, but the rates of exposure to violence are higher among primary and high school graduates.

In this study, the majority of people who committed violence were primary school graduates (36.0%) and literate (24.0%). In a similar study, 35.8% of spouses were primary school and 22.6% were high school graduates (7). In another study, the majority of the husbands of women who were subjected to physical violence were illiterate, and the husbands of women who were not exposed to physical violence had higher education level (11). In some studies, no relationship was found between the violent behavior against women and the education level of their husbands (12,13). As a result, although the majority of people in this study are people with low education levels, we can say that the people who commit violence come from all levels of education.

In this study, one in five women had suicidal thoughts and approximately one in ten women attempted suicide. In a study conducted in Iraq, 57.1% of women who were victims of violence had thoughts of death, 35.2% had a suicide plan, and 17.1% attempted suicide (10). In a case-control study conducted in Iran, women who attempted suicide were more controlled and forced by their spouses. They were subjected to physical violence and threatened with physical violence (14). Women exposed to domestic violence experience more mental illness than women who are not exposed to violence (15). As a result, we can say that women exposed to domestic violence may experience mental problems such as suicide and therefore they should be referred to psychiatric outpatient clinics for a good psychiatric evaluation and treatment.

In this study, the majority of women were exposed to physical violence and violent behavior more than once. In a similar study, the majority of women who applied to the emergency room due to domestic violence were also exposed to physical violence and violent behavior more than once (7). In a study conducted in Iraq, the majority of women were raped within marriage, with physical violence taking the second place. In the same study, the majority of women were exposed to violent behavior constantly, once a week or once a month (10). In line with the study findings, we can say that women who use emergency services are more exposed to domestic physical violence.

In this study, 68.0% of the children witnessed violence. In another study, 30.2% of children witnessed violence (7). It is a very risky situation for children to witness violence within the family. Their mental health deteriorates, and behavioral and emotional problems occur in these children (15). In addition, children who witnessed domestic violence in childhood tend to both commit violence and are exposed to more violence in dating relationships when they grow up (16). For this reason, it is important to provide psychological guidance and counseling services to the children of women exposed to domestic violence and to support them psychologically until they become adults.

In this study, approximately half of the women visited the emergency department during daylight hours and in the spring. Similarly, in a study, women who exposed to domestic violence mostly applied to the emergency room during daytime and spring (7). In a study conducted abroad, cases of sexual violence in the city of Rotterdam occurred most in the spring (17). More studies and record reviews are needed to comment on this issue.

Limitations

This study has some limitations. Since this study was a retrospective record review study, analyzes could only be made on recorded data. This situation poses an obstacle to

in-depth analysis of the problem. Since the data is not collected directly from individuals, the reliability of the data cannot be tested. In the study, the data covering the last 5 years was intended to be examined, but the records of the last 3 years of data could only be accessed in the system. Finally, the research results can only be generalized for the sample studied.

CONCLUSION

As a result, approximately half of the women exposed to violence were in the 21-30 age group and the majority exposed to domestic violence from their spouses. People who committed violence were mostly primary school graduates and in the 21-30 age group. One in five women had suicidal thoughts and 12.0% attempted suicide. Women were most exposed to physical violence. After being exposed to violence, all of them applied to an official institution. A significant portion of the women were threatened with death. More than half of women applied to the emergency department during daylight hours, and the highest number of applications occurred in March and April, that is, in the spring.

In line with these results, we can say that healthcare professionals have important responsibilities in the protection and treatment of women victims of violence. Unfortunately, considering that the violence experienced remains within the home and is not reflected in institutions, it has been suggested to reach a much larger audience by organizing home visits. It has been suggested to determine the health care the woman needs physically and psychologically, to provide physical and psychological treatment, to request psychiatric consultation for further psychological evaluation and treatment, to protect the woman from possible violence, and to ensure that she benefits from her legal rights.

Declarations

Ethics Committee Approval: Ethics committee approval was obtained from the Human Research Ethics Committee of a university (Date: February 22, 2021, Decision No: 01/16)). This study was conducted according to the principles of the Declaration of Helsinki.

Authorship Contributions: Concept: AY, HM, EBY. Design: AY., Data Collection or Processing: AY, HM., Analysis or Interpretation: AY, HM, And Literature Search: EBY, Writing: EBY, and AY. All authors approved the final version of the manuscript.

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Research Article

Investigation of Faecal-Oral Transmitted Parasites in Communal Toilets

Ortak Kullanılan Tuvaletlerde Fekal-Oral Yolla Bulaşan Parazitlerin Araştırılması

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Abstract

Purpose: The aim of the study was to determine the parasites transmitted by the faecal-oral route in communal toilets and to study the personal hygiene habits of the users of these toilets.

Material and Method: A total of 96 swab samples, 24 each from water containers, door handles, faucet heads and sink edges used for anogenital cleaning in toilets, were investigated for parasites transmitted by fecal-oral route. DNA was isolated from these samples using the DNeasy PowerSoil kit and real-time PCR analysis was performed using parasite-specific primer-probes. A survey was also conducted to determine the personal hygiene habits of students using the toilets, including questions such as hand washing and flushing.

Results: In 24 swab samples (n=24) taken from water containers used for anogenital cleansing in toilets, *C. parvum* was detected in 16.7% (4/24), *E. histolytica* in 8.3% (2/24) and *G. lamblia* in 12.5% (3/24), while no parasites were found in 62.5% (15/24). In 24 swab samples taken from door handles, *C. parvum* was detected in 8.3% (2/24), *E. histolytica* in 4.2% (1/24) and *G. lamblia* in 8.3% (2/24), while no parasites were detected in 79.2% (19/24). In 24 swab samples taken from door handles, *C. parvum* was detected in 8.3% (2/24), *E. histolytica* in 4.2% (1/24) and *G. lamblia* in 8.3% (2/24), and no parasites were detected in 79.2% (19/24). In 24 swab samples taken from tap heads, *C. parvum* was detected in 12.5% (3/24) and *G. lamblia* in 4.2% (1/24), while no parasites were detected in 83.3% (20/24). In 24 swab samples taken from the sink edges, *C. parvum* was detected in only 4.2% (1/24) and no parasites were detected in 95.8% (23/24). According to the survey results, it was found that girls paid more attention to hand washing hands and flushing toilets than boys ($p<0.05$), and it was found that these hygiene habits were first acquired in the family ($p<0.05$). However, it was found that students were not sufficiently informed about the possibility of contracting diseases through communal toilet facilities.

Conclusion: Communal toilets in large centres such as schools and hospitals play an important role in the transmission of faecal-oral parasites and the spread of intestinal parasitic diseases. However, families play the primary role in helping people to adopt personal hygiene habits in toilets.

Keywords: Toilet, personal hygiene, parasites

Öz

Amaç: Çalışmada ortak kullanılan tuvaletlerde fekal-oral yolla bulaşan parazitleri belirlemek ve bu tuvaletleri kullanan kişilerin kişisel hijyen alışkanlıklarını araştırmak amaçlanmıştır.

Gereç ve Yöntem: Tuvaletlerde anogenital temizlikte kullanılan su kapları, kapı kolları, musluk başlıkları ve lavabo kenarlarından alınan 24'er adet olmak üzere toplam 96 adet sürüntü örneği fekal-oral yolla bulaşan parazitler açısından incelendi. Bu örneklerden DNAeasy PowerSoil kiti kullanılarak DNA izole edilmiş ve parazitlere özgü primer-problar ile Real-Time PCR analizi yapılmıştır. Ayrıca, tuvaletleri kullanan öğrencilerin kişisel hijyen alışkanlıklarını belirlemek için el yıkama, sifon çekme gibi soruları içeren bir anket yapılmıştır.

Bulgular: Tuvaletlerde anogenital temizlikte kullanılan su kaplarından alınan 24 adet sürüntü örneğinde (n=24) %16,7 (4/24) oranında *C. parvum*, %8,3 (2/24) oranında E. histolytica ve %12,5 (3/24) oranında *G. lamblia* tespit edilmişken, %62,5 (15/24)'inde herhangi bir parazit bulunmamıştır. Kapı kollarından alınan 24 adet sürüntü örneğinde ise %8,3 (2/24) *C. parvum*, %4,2 (1/24) *E. histolytica* ve %8,3 (2/24) *G. lamblia* saptanmış, %79,2 (19/24)'inde parazit saptanmamıştır. Musluk başlıklarından alınan 24 adet sürüntü örneğinde %12,5 (3/24) *C. parvum* ve % 4,2 (1/24) *G. lamblia* tespit edilirken, %83,3 (20/24)'ünde parazit tespit edilmemiştir. Lavabo kenarlarından alınan 24 adet sürüntü örneğinde sadece %4,2 (1/24) *C. parvum* saptanmış, %95,8 (23/24)'inde parazit saptanmamıştır. Anket sonuçlarına göre, kızların erkeklere göre daha çok el yıkamaya ve sifon çekmeye özen gösterdikleri tespit edilmişken ($p<0.05$), bu tür hijyen alışkanlıklarını ilk ailede aldıkları belirlenmiştir ($p<0.05$). Bununla beraber öğrencilerin tuvaletlerde ortak kullanılan aletlerden hastalık bulaşabileceği hakkında yeterli bilgilerinin olmadığı tespit edilmiştir ($p<0.01$).

Sonuç: Okul, hastane gibi büyük merkezlerde ortak kullanılan tuvaletler fekal-oral yolla bulaşan parazitlerinin bulaşmasında ve bağırsak paraziter hastalıklarının yayılmasında önemli rol oynamaktadır. Bununla beraber kişilerin tuvaletlerdeki kişisel hijyen alışkanlıklarının kazanılmasında önce aileleri etkilidir.

Anahtar Kelimeler: Tuvalet, kişisel hijyen, parazitler

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INTRODUCTION

Diseases caused by intestinal parasites transmitted by the faecal-oral route are a major public health problem in developing countries. Parasites transmitted by the faecal-oral route include *Balantidium coli, Blastocystis spp., Cytoisopora, Cryptosporidium parvum* (*C. parvum*), *Dientamoeba fragilis, Entamoeba histolytica* (*E. histolytica*), *Enterobius vermicularis* and *Giardia lamblia* (*G. lamblia*). Many geographical, geological, climatic, biological, social, cultural and economic factors influence the transmission and spread of these parasites. Among the most important factors for transmission are inadequate sanitation (leading to open defecation) and poor hygiene practices (1).

According to the World Health Organization, the "F-chart" was published in 1958 to prevent and control diseases transmitted by the faecal-oral route. This diagram shows that faecal-oral transmission occurs via water, hands, arthropods, and soil. Words beginning with the letter "F" were used (fluid, fingers, flies, food, fields, fomites) have been used to memorise the factors in this arrangement. The F-chart is used to illustrate that sanitation, especially toilets, hygiene, and hand washing, can act as effective barriers against the faecal-oral route of disease transmission (2).

Using contaminated toes, touching surfaces that everyone touches in public toilets (door handles, sink edges), using communal water containers to clean the anogenital after using the toilet, contact with people whose hands are contaminated with faeces, children who eat faeces due to mental disorders (coprophagia) and people who do not pay attention to hand hygiene rapidly increase the spread of parasites transmitted via the faecal-oral route. Toilet and hand hygiene are very important in the spread of parasites transmitted by the faecal-oral route. In our country and around the world, children are usually introduced to the toilet between 18 and 24 months of age (3,4). After toilet training, children's personal hygiene education begins in the home and continues in primary school.

The most important factor in the spread of parasites transmitted by the faecal-oral route is toilet use and people's personal hygiene habits after using the toilet. In our study, the parasites transmitted by the faecal-oral route in toilets communal by primary school children were investigated in swab samples taken from water containers, door handles, faucet heads and sink edges that everyone touches. In addition, the children's personal hygiene habits after using the toilet were assessed through questionnaires.

MATERIALS AND METHODS

Sample Collection

The study was conducted in a primary school in Adana province in the Çukurova region, which is considered to have a low socio-economic status, after obtaining permission from the school principal and the parents of the students. Samples were collected from communal toilets used by a total of 280 students aged 6-10 between March 2024 and June 2024. Samples were collected with sterile swabs from water containers, door handles, faucet heads, and sink edges used to clean the anogenital where parasites may be present, using sterile swab sticks.

DNA Isolation and Real-Time PCR Reaction

Streak swab samples were transferred to physiological serum water and extracted using the DNAeasy PowerSoil Kit (Cat No:12888, Qiagen, Germany). For real-time PCR analysis, multiplex real-time PCR was performed using primer probes specific to parasite species (*Entamoeba histolytica, Giardia lamblia, Cryptosporidium parvum*) that can be transmitted the faecal-oral route and are found in toilets.

The primer-probes used in the study were designed according to the studies of Haque et al., and *C. parvum* parasite Cp-583F: CAA ATT GAT ACC GTT TGT CCT TCT G; Cp733R: GGC ATG TCG ATT CTA ATT CAG CT; Cp-TRT-P:TGC CAT ACA TTG TTG TCC TGA CAA ATT GAA T-DDQ2), for *E. histolytica* parasite (Eh-F: AAC AGT AAT AGT TTC TTT GGT TAG TAA AA; Eh-R: CTT AGA ATG TCA TTT CTC AAT TCA T; Eh-YYT-P: ATT AGT ACA AAA TGG CCA ATT CAT TCA-Dark Quencher) ve for *G. lamblia* (Gd-80F: GAC GGC TCA GGA CAA CGG TT; Gd-127R: TTG CCA GCG GTG TCC G; Gd-FT-P: FAM-CCC GCG GCG GTC CCT GCT AG-DDQ1); primer-probes were used (5).

For the reaction mixture, a total of 25 µL of a mixture was prepared containing 2x QuantiTaqMan PCR Buffer (Qiagen, Hilden, Germany), 0.4 µmol/L each of Eh-f and Eh-r primers, 0.08 µmol/L of Eh-YYT-P probe, 0.4 µmol/L of Gd-80F and Gd-127R primers, 0.12 µmol/L of Gd-FT-P probe, 1 µmol/L of Cp-583F and Cp-733R primers, 0.5 µmol/L of Cp-TRT-P probe 3 µL of DNA sample and 4 µL of purified water. DNA samples were amplified using a thermal cycling programme consisting of 35 cycles (95°C 5 min, 55°C 1 min, 72°C for 10 min) with an initial denaturation at 95°C for 5 min and a final extension at 72°C for 10 min. When evaluating the results of the real-time PCR reaction, samples with a threshold cycle value (Ct ≤26) were

considered positive and samples with a threshold cycle value (Ct>26) were considered negative.

Evaluation of Students' Toilet Habits

A short survey was carried out to assess the personal hygiene habits of students using the toilets, including questions on hand washing and toilet flushing.

No sampling was used in the study, and all students who volunteered to participate in the study were included in the study. A "Personal Hygiene Questionnaire", developed from the literature, was used to measure students' knowledge of personal hygiene. The questionnaire form includes the socio-demographic characteristics of the students and their level of knowledge about personal toilet use (6). The personal hygiene information form was prepared according to the descriptive research model and consists of 5 questions (a. I wash my hands after using the toilet, b. I always wash my hands with soap and water, c. I flush the toilet after using the toilet, d. Where did you first learn how to use the toilet, e. I know that I can get diseases from toilets). The validity and reliability study of the survey was conducted by Başkaya et al (6).

Statistical Analysis

The data obtained in the study were entered into the SPSS 21.0 computer program (SPSS Inc., Chicago, IL, USA) and statistical analysis was performed. The distribution of parasites found in the environmental samples taken from the toilets and the numerical data obtained from the survey results showing the toilet habits of the students included in the study were expressed as frequencies and percentages. In addition, the X2 test was used to determine the suitability of the data for normal distribution. The statistical significance of the results was evaluated at $p<0.05$ level and 95% confidence interval.

RESULTS

A total of 96 swab samples, 24 each from water containers, door handles, faucet heads and sink edges used for anogenital cleansing in toilets, were investigated for parasites transmitted by the faecal-oral route. In swab samples taken from 24 water containers (n=24), *C. parvum* was detected in 16.7% (4/24), *E. histolytica* in 8.3% (2/24) and *G. lamblia* in 12.5% (3/24), while no parasite was detected in 62.5% (15/24). Of the 24 swab samples taken from door handles, *C. parvum* was found in 8.3% (2/24), *E. histolytica* in 4.2% (1/24) and *G. lamblia* in 8.3% (2/24), while no parasites were found in 79.2% (19/24). In 24 swab samples taken from tap heads, *C. parvum* was found in 12.5% (3/24) and *G. lamblia* in 4.2% (1/24), while *E. histolytica* was not found in these samples and no parasite was detected in 83.3% (20/24). *C. parvum* was detected in 4.2% (1/24) of 24 swab samples taken from the sink edges and no other parasites were found in these swab samples (Table 1).

Table 1. Parasites detected in swab samples taken from communal toilets (The percentages given in the table are row percentages).

Sample taken region (n=24)	*C. parvum* (%)	*E. histolytica* (%)	*G. lamblia* (%)	No parasite (%)	Total (%)
Water containers	16.7 (4/24)	8.3 (2/24)	12.5 (3/24)	62.5 (15/24)	100 (24/24)
Door handles	8.3 (2/24)	4.2 (1/24)	8.3 (2/24)	79.2 (19/24)	100 (24/24)
Faucet heads	12.5 (3/24)	0 (0/24)	4.2 (1/24)	83.3 (20/24)	100 (24/24)
Sink edges	4.2 (1/24)	0 (0/24)	0 (0/24)	95.8 (23/24)	100 (24/24)

A survey was conducted on the toilet use habits of the pupils in the primary school where the toilet samples were taken. The age of the students included in the study (n=280) ranged from 6 to 13 years, with a mean age of 7.4±1.12 years. The socio-demographic characteristics of the families of the students included in the study and the distribution of the students' responses to the "Personal Hygiene Questionnaire" are shown in Table 2.

Table 2. Socio-demographic characteristics of students using toilets according to survey results

Socio-demographic characteristics	n=280	%
Gender		
Male	100	35.7
Female	180	64.3
Mother's education status		
İlliterate	10	3.5
Primary education	190	67.9
High school	68	24.3
Licence	12	4.3
Father's education status		
İlliterate	2	0.7
Primary education	192	68.6
High school	72	25.7
Licence	14	5.0
Mother's employment status		
Officer	23	8.2
Employee	102	36.4
Does not work	155	55.4
Father's employment status		
Officer	89	31.8
Employee	166	59.3
Does not work	25	8.9

When comparing the hand washing and flushing habits of male and female students after using the toilets were compared, it was found that girls washed their hands and flushed the toilets more ($p<0.05$). It was found that most of the students received their first toilet training from their families and learnt the habits of hand washing and toilet flushing habits the toilet from their families ($p<0.05$). No significant relationship was found between the income level of the students' parents and their toilet habits ($p>0.05$). However, an increase in the percentage of students washing their hands was observed as the level of education of their

parents increased ($p<0.05$). It was also found that students did not have sufficient knowledge about the transmission of diseases through toilets ($p<0.01$) (Table 3).

Table 3. Results obtained from the evaluation of personal hygiene habits of students using toiltes.

Hygiene behaviors	n=280	%
Hand washing		
After toilet	103	36.8
After toilet, after meals	121	43.2
After toilet, after meals, after the game	56	20.0
How to wash hands		
With water	100	35.7
With soap	180	64.3
I flush the toilet after		
Yes	194	69.3
No	86	30.7
Where did you learn to use the toilet?		
Home	196	70.0
School	84	30.0
Do you know which diseases are transmitted through toilets?		
Yes	79	28.2
No	201	71.8

DISCUSSION

Intestinal parasitic diseases caused by parasites transmitted by the faecal-oral route are widespread both in our country and worldwide. The prevalence of intestinal parasitic diseases in society depends on people's toilet habits and hygiene behaviour. These diseases affect all segments of the population, especially children growing. Faecal-oral transmitted parasites, which are usually asymptomatic, can cause mental and physical retardation and damage a country's economy through loss of labour (7). Ecological factors such as temperature, humidity, soil and vegetation, which vary according to climatic conditions, as well as the toilet habits of infected people, play an important role in the life cycle of these parasites. Poor hygiene in public toilets also contributes to the spread of these parasites (7,8).

Several studies on the epidemiology of intestinal parasitic diseases have been carried out at different times and in different geographical regions. According to these studies, the prevalence of parasites causing intestinal parasitic diseases has been reported to be 9.3-36.4% (9). This rate may vary depending on the diagnostic methods used to detect intestinal parasites, whether or not non-pathogenic species are included and whether or not patients have symptoms. In studies conducted in our country, the most common causes of intestinal parasitic diseases were *Blastocystis spp., Entamoeba spp*. and *G. lamblia* parasites transmitted by the faecal-oral route (10).

Bedir et al. found *Entamoeba spp*. (1.15%) most frequently in stool samples from a hospital in Kars province, followed by *G. lamblia* (0.48%) (11). In their study conducted in İzmir to determine the prevalence of intestinal parasitic diseases, Gürbüz et al. reported that the incidence rate of *E. histolytica* (0.7%) and *G. lamblia* (0.3%) was higher than that of other parasites (12). Günbey et al. investigated the prevalence of intestinal parasites in patients attending a university hospital in Elazıg province and reported that *G. lamblia* was the most common (46.6%) (13). Eren et al. investigated intestinal parasites in patients undergoing endoscopy and colonoscopy and reported a rate of 4.5% for *G. lamblia* and 2.3% for *E. histolytica* (14). The incidence of *G. lamblia*, a parasite transmitted by the faecal-oral route, has been reported to be 1.9-37.7% in our country, and studies have reported that *G. lamblia* is more common than other parasites (15). In our study, swab samples were taken from communal toilets and the most common species found was *G. lamblia*, which supports the results of other studies. Because this parasite has a cyst form that is resistant to standard chlorination processes under outdoor chlorination procedures, it should be considered as an important pathogen in areas where there is inadequate sanitation and personal hygiene are inadequate.

Parasites transmitted by the faecal-oral route can continue their life cycle in drinking water and environmental water samples. Therefore, transmission to humans can occur from these sites. Sağlam et al. investigated the presence of parasites transmitted by faecal-oral route in drinking and environmental water samples in Denizli province and reported 25% *C. parvum* and 14.28% *G. lamblia* in their study (16). Ogundere et al. highlighted that *C. parvum* and *G. lamblia* species are the major parasites causing waterborne diseases in tropical coastal waters in Nigeria and that they can pose serious health risks to humans (17). In our study, *C. parvum* and *G. lamblia* were detected on faucet heads and sink edges. This shows that these parasites are resistant to chlorination and are likely to be transmitted to humans during hand washing. In particular, *C.parvum* is a parasite that is resistant to physical and chemical inactivation and is likely to be found on faucet heads due to the small diameter of its oocysts.

Diseases caused by parasites transmitted by the faecal-oral route cause economic losses in our country due to loss of labour and treatment costs. Due to reasons such as rapid urbanisation, migration and infrastructure problems that have continued in recent years, these parasites still pose a threat to public health today. Failure to wash hands after performing anal hygiene and contamination with parasites of water containers, door handles, faucet heads and sink edges commonly used in toilets also result in the rapid spread of parasites transmitted by the faecal-oral route. Toilet use is very important for ensuring personal hygiene, and in our country, toilet training starts at an earlier age (28.44 ± 9.04 months) than in developed countries (18). Gün et al. investigated the personal hygiene habits of adolescents in Aydın province and reported that girls paid more attention to personal hygiene than boys (19). Şimsek et al. investigated hand hygiene behaviours in children and found that 39.1%

of children paid attention to hand hygiene (20). Both studies emphasised, it was emphasized that personal hygiene education starts in the family and that school education is important for its spread. Toilet training is one of the most important stages in a child's development and usually the first training starts in the family. Our study results confirm that toilet training and personal hygiene behaviours are first acquired in the family. The fact that our study was conducted in a single school and with a small number of students is the limitation of the study. It would be beneficial to work in more schools with more students to increase the accuracy of our results.

In countries with young populations like ours, children's poor personal hygiene habits in children can lead to disease. One of the areas where this personal hygiene is most effective is in communal toilets. The materials used for personal hygiene in toilets can unwittingly contribute to the spread of disease. For this reason, regular education about the faecal-oral parasites that can be transmitted in communal areas will be effective in preventing the spread of disease. Regular sterilisation of communal areas and materials will also be beneficial.

Declarations

Ethics Committee Approval: Ethics committee approval was obtained from the Aksaray University, Health Sciences Scientific Research Ethics Committee (Date: February 13, 2025, Decision No: 2025/33)). This study was conducted according to the principles of the Declaration of Helsinki.

Authorship Contributions: Concept: FE, DA, OS, HO. Design: FE, DA, OS, HO. Data Collection or Processing: DA, OS, HO. Analysis or Interpretation: FE, DA. And Literature Search: DA, OS, HO. Writing: FE. All authors approved the final version of the manuscript.

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Research Article

Outcomes of Transurethral Deep Lateral Incision in Bladder Neck Contractures

Mesane Boynu Darlıklarında Transüretral Derin Lateral İnsizyonun Sonuçları

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Abstract

Aim: Bladder neck contractures (BNC) are a significant complication following prostate surgeries. The aim of this study is to evaluate the outcomes of transurethral deep lateral incision without intralesional agents in the management of recurrent BNC and to compare the results with existing literature.

Material and Method: A retrospective analysis of 12 patients who underwent transurethral deep lateral incision for recurrent BNC between January 2023 and June 2024 was performed. Data collected included demographic characteristics, surgical details, and postoperative outcomes. Success was defined as the absence of dilation requirements and a lack of obstructive uroflowmetric patterns within 6 months. Complications were classified according to the modified Clavien-Dindo system.

Results: The mean age of the patients was 68.25 years. Etiologies included radical prostatectomy (5 patients), transurethral resection of the prostate (5 patients), and combined radical prostatectomy with radiotherapy (2 patients). The mean operative duration was 32.67 minutes, and the overall success rate was 83.3%. Two patients (16.6%) experienced recurrence requiring additional intervention. Postoperative incontinence was observed in 16.6% of cases and was managed conservatively. No intralesional agents were used, and the procedure achieved comparable success rates to more complex techniques with fewer associated complications.

Conclusion: Transurethral deep lateral incision is an effective and minimally invasive technique for managing recurrent BNC, offering high success rates without the need for intralesional agents. This approach can be considered a primary treatment option before resorting to more invasive surgical methods.

Keywords: Bladder neck contracture, Deep lateral incision, Transurethral incision

Öz

Amaç: Mesane boynu kontraktürleri (MBK), prostat ameliyatlarından sonra görülen önemli bir komplikasyondur. Bu çalışma, tekrarlayan MBK yönetiminde intralezyonel ajanlar kullanılmadan gerçekleştirilen transüretral derin lateral insizyonun sonuçlarını değerlendirmeyi ve mevcut literatürle karşılaştırmayı amaçladı.

Gereç ve Yöntem: Ocak 2023 ile Haziran 2024 arasında tekrarlayan mesane boynu kontraktürü (MBK) nedeniyle transüretral derin lateral insizyon geçiren 12 hastanın retrospektif analizi gerçekleştirildi. Toplanan veriler demografik özellikler, cerrahi detaylar ve postoperatif sonuçları içeriyordu. Başarı, 6 ay içinde dilatasyon gereksiniminin olmaması ve obstrüktif üroflometrik desenlerin bulunmaması olarak tanımlandı. Komplikasyonlar, modifiye Clavien-Dindo sistemi kullanılarak sınıflandırıldı.

Bulgular: Hastaların ortalama yaşı 68,25 yıl idi. Etiyolojiler arasında radikal prostatektomi (5 hasta), transüretral prostat rezeksiyonu (5 hasta) ve radyoterapi ile kombine radikal prostatektomi (2 hasta) yer almaktaydı. Ortalama operasyon süresi 32,67 dakika olup, genel başarı oranı %83,3 olarak bulundu. İki hasta (%16,6) ek müdahale gerektiren rekürrens yaşadı. Postoperatif inkontinans vakaların %16,6'sında gözlendi ve konservatif yöntemlerle yönetildi. İntralezyonel ajanlar kullanılmadı ve prosedür, daha karmaşık tekniklerle karşılaştırılabilir başarı oranlarına, ancak daha az komplikasyona sahip olarak gerçekleştirildi.

Sonuç: Transüretral derin lateral insizyon, tekrarlayan mesane boynu kontraktürünün yönetiminde etkili ve minimal invaziv bir tekniktir. İntralezyonel ajanlara ihtiyaç duymadan yüksek başarı oranları sunar. Bu yaklaşım, daha invaziv cerrahi yöntemlere başvurulmadan önce birinci basamak tedavi seçeneği olarak değerlendirilebilir.

Anahtar Kelimeler: Mesane boynu kontraktürü, Derin lateral insizyon, Transüretral insizyon

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INTRODUCTION

Bladder neck contractures are observed in 1-12% of patients following transurethral prostate surgeries and in 0.5-17.5% of men undergoing radical prostatectomy (1). Treatment options include urethral dilation, self-catheterization, endoscopic interventions, and reconstructive surgeries (2). Additionally, antifibrotic agent injections can be utilized to prevent recurrence (3).

In this study, we present our clinical experience in the surgical management of recurrent bladder neck contractures using a standard endoscopic approach with transurethral deep lateral incision, without the use of intralesional agents. The outcomes of this method were evaluated and compared with the existing literature

MATERIALS AND METHODS

Following institutional ethical committee approval, a retrospective review was conducted, evaluating 12 patients who underwent transurethral deep lateral incision for bladder neck contracture between January 2023 and June 2024. All patients had a prior diagnosis of bladder neck contracture and had been previously treated with endoscopic methods other than lateral deep incision. Patients with concomitant urethral stricture were excluded from the study.

Data collected included age, comorbidities, post-void residual urine volume, previous surgeries, prior dilations, energy modality used for incision, type of incision, and operative duration. Early postoperative complications were assessed within 30 days and classified according to the modified Clavien-Dindo classification. Late complications were evaluated for up to 6 months. Success was defined as the absence of a need for urethral dilation within 6 months and the lack of an obstructive pattern in uroflowmetric assessments.

Demographic characteristics and clinical parameters of the patients were summarized using descriptive statistics. For comparisons of baseline and outcome variables, the paired t test and Shapiro-Wilk test were used. Statistically significant differences were assumed at a P value lower than .05. IBM SPSS 23.0 statistical package programs were used in the analysis of the data.

All information presented in the study was obtained retrospectively from the hospital registry system. Ethics committee approval was received from Aksaray University (February 13, 2025, Ethics approval number: 2025/36).

Procedure

All surgeries were performed by a single urology specialist. Under general or spinal anesthesia, patients were placed in the lithotomy position and evaluated with cystourethroscopy, during which a guidewire was inserted to maintain lumen access. Initially, the bladder neck was incised at the 3 o'clock and 9 o'clock positions using a cold knife. Subsequently, a deep incision was made at the same positions using a 26-Fr resectoscope with a Collings knife, applying 30-50 watts of energy. The incision was extended to the perivesical adipose tissue (Figure 1).

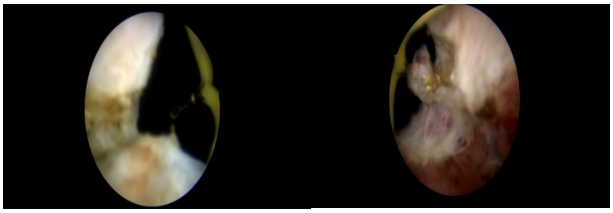

Figure 1. Bladder neck incision at the 3 o'clock and 9 o'clock positions

No local antifibrotic agents, such as mitomycin C or steroids, were injected. The procedure was concluded after achieving adequate lumen patency, allowing the resistance-free passage of the 26-Fr resectoscope, and ensuring hemostasis. A 22-Fr three-way catheter was then inserted to complete the procedure.

RESULTS

A total of 12 patients were included in the study. The mean age of the patients was 68.25 years (range: 61-77). Regarding the etiology of bladder neck contracture, it was observed that 5 cases developed after radical prostatectomy, 5 cases after transurethral resection of the prostate, and 2 cases had a history of both radical prostatectomy and subsequent radiotherapy. Additionally, 3 patients had a history of radiotherapy.

Ten of the patients presented after unsuccessful prior interventions for bladder neck contracture, either at our center or elsewhere. These 10 patients had a history of transurethral resection and incisions performed with a cold knife. Among these, 7 had undergone urethral dilation postoperatively. The mean duration of catheterization was 3.2 days (range: 2-5). The overall success rate was 83.3%.

One patient underwent repeat transurethral incision at 6 months postoperatively, with subsequent improvement in

symptoms. Another patient underwent urethral dilation after the procedure, but symptoms persisted, leading to bladder neck reconstruction surgery at another center. The urinary incontinence rate was 16.6%, and these cases were managed successfully with exercise and medical therapy. Detailed findings are summarized in Table 1.

Table-1. Baseline characteristics and perioperative and follow-up results of patients

Patients	N:12
Age (mean)	68.25
Etiology	
Radical prostatectomy	5
Radical prostatectomy + Radiation	2
Transurethral procedure for benign prostatic hyperplasia	5
Previous procedure for BNC	
Cold knife incision	10
Transurethral procedure	10
Urethral dilation	7
Operative time (minutes)	32.67 ± 11.50
Bladder irrigation time (hours)	20.41 ± 5.3
Postoperative catheter duration (days)	3.2 (2-5)
Postoperative hospital stays (days)	2.00 (1.00-4.00)
Success rate (%)	%83.3
30- days complications, n (%)	2 (% 16.6)
Urinary tract infection (Clavien 2)	1 (% 8.3)
Continuous bladder washout for persistent haematuria (Clavien 2)	1 (%8.3)
Delayed complications (up to 6 months), n (%)	2 (%16.6)
Urethroplasty for recalcitrant bladder neck stenosis	1 (%8.3)
Bladder neck stenosis, repeat incision	1 (% 8.3)
Overall postoperative incontinence, n (%)	2 (% 16.6)
Follow up (months)	11.2 ± 6.7

The uroflowmetric measurements and symptom scores recorded in the preoperative and postoperative periods are summarized in Table 2.

Table – 2. Data at baseline and 3- and 6-months after surgery.

Variable	Mean ± SD	Mean Difference	P value
Ipss Baseline	25.08 ± 2.35		
Ipss - 3. months	14.83 ± 3.27	10.25 ± 2.26	P<0.001
Ipss - 6. months	14.58 ± 2.81	10.5 ± 1.67	P<0.001
Qmax Baseline (mL/sec)	5.91 ± 1.83		
Qmax – 3. months	21.28 ± 4.48	15.36 ± 3.37	P<0.001
Qmax - 6. months	19.6 ± 4.47	13.68 ± 3.54	P<0.001
Pvr baseline (mL)	73.08 ± 25.5		
Pvr – 3. months	39.16 ± 14.89	-33.91 ± 13.76	P<0.001
Pvr – 6. months	27.08 ± 9.4	-46 ± 20.87	P<0.001

IPSS = International Prostate Symptom Score, Qmax = Peak Urinary Flow, Pvr = Post Voiding Residual volume

DISCUSSION

Bladder neck contracture (BNC) is a serious complication that can occur following surgeries for benign prostatic hyperplasia or prostate cancer. It typically develops within the first two months after the transurethral resection (4). Although the diagnosis of BNC can take longer, a study has shown that half of the patients presenting with symptoms of BNC do so within six months (5). The mechanisms behind bladder neck contracture following transurethral prostate resection remain unclear. However, excessive resection and fulguration of the bladder neck are likely contributing factors (6). Treatment options for BNC include urethral dilation with or without self-dilation, cold knife incision, transurethral resection, and reconstructive surgery. Additionally, intralesional mitomycin C injections following incision have demonstrated high success rates. However, these injections carry the risk of significant complications such as anaphylaxis, extravasation, or bladder neck necrosis (7). On the other hand, urethral dilation can lead to complications like false passage formation, urethral pain (urethralgia), and urinary tract infections (8). In our patient series, we observed a high success rate of 83.3% using the standardized procedure of transurethral deep lateral incision without the need for intralesional injections. This approach not only achieved comparable success rates to those reported in the literature but also avoided additional complications and costs associated with intralesional therapies.

In cases of recurrent bladder neck contractures, open reconstructive surgeries and transurethral lateral incision techniques can be utilized. A study demonstrated that a second incision procedure was successful in approximately half of the patients (9). In our series, one patient underwent reconstructive surgery, a more invasive option. For refractory cases where endoscopic methods fail, techniques such as YV-plasty and TV-plasty are recommended (10). These methods can now be performed robot-assisted laparoscopically, offering a minimally invasive alternative. A study reported a success rate of over 80% for robot-assisted laparoscopic YV-plasty. However, these procedures are not considered first-line treatments and are generally reserved for refractory cases (11).

The limitations of this study include its retrospective nature, and the relatively small number of patients included in the follow-up. Additionally, the short follow-up duration represents another limitation.

CONCLUSION

Most patients who develop bladder neck contractures following prostate surgeries can be treated with the transurethral bilateral deep lateral incision technique alone, without the need for intralesional drug injections or intermittent self-dilation. Lateral incision is one of the minimally invasive treatment methods with a high success rate for non-obliterative bladder neck contractures. This technique can be offered to patients after explaining the risks of urinary incontinence and recurrence, and it can be considered prior to more invasive treatment options.

Declarations

Ethics Committee Approval: Ethics committee approval was obtained from Aksaray University Health Sciences Scientific Research Ethics Committee (Date: February 13, 2025, Ethics approval number: 2025/36). This study was conducted according to the principles of the Declaration of Helsinki.

Authorship Contributions: Concept: MB, SG, VB. Design: MB, SG, VB. Data Collection or Processing: MB, SG. Analysis or Interpretation: VB, And Literature Search: MB, Writing: VB and MB. All authors approved the final version of the manuscript.

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Research Article

The Role of Platelet Mass Index in Predicting Short-Term Mortality in Community-Acquired Pneumonia: An Analytical Study

Trombosit Kütle İndeksinin Toplum Kökenli Pnömonide Kısa Dönem Mortaliteyi Öngörmedeki Rolü: Analitik Bir Çalışma

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Abstract

Purpose: Community-acquired pneumonia (CAP) is a major cause of morbidity and mortality worldwide, particularly among elderly patients and those with comorbidities. Early risk stratification is crucial for optimizing treatment decisions. Platelets play a key role in hemostasis and inflammation, and platelet-related indices have been investigated as potential prognostic markers. The Platelet Mass Index (PMI), calculated as platelet count × mean platelet volume (MPV), has been proposed as a marker of inflammatory severity. This study aims to evaluate the prognostic value of PMI in predicting short-term mortality in hospitalized CAP patients.

Material and Method: This retrospective observational study included adult patients diagnosed with CAP and hospitalized between January 1, 2023, and January 1, 2024. Demographic data, clinical parameters, laboratory findings, and severity scores (PSI, CURB-65) were collected. PMI values were compared between survivors and non-survivors. Statistical analyses included Mann-Whitney U tests, chi-square tests, and logistic regression. The predictive performance of the model was assessed using ROC curve analysis.

Results: A total of 174 CAP patients (67% male, median age 77 years) were analyzed. The most common symptom was dyspnea (82%). No significant difference in PMI was observed between survivors and non-survivors (p=0.33). Higher PSI and CURB-65 scores, lower albumin levels, and elevated respiratory rates were associated with increased mortality. The predictive model for mortality demonstrated an AUC of 0.814.

Conclusion: PMI was not a significant predictor of short-term mortality in hospitalized CAP patients. The inflammatory response in severe cases and potential confounders may have influenced the results. Further prospective studies in broader patient populations are needed to clarify PMI's prognostic role.

Keywords: Community-acquired pneumonia, pneumonia, mortality, platelet, mean platelet volume

Öz

Amaç: Toplum kökenli pnömoni (TKP), özellikle yaşlı hastalar ve komorbiditesi olan bireyler arasında dünya çapında önemli bir morbidite ve mortalite nedenidir. Erken risk sınıflandırması, tedavi kararlarının optimize edilmesi açısından kritik öneme sahiptir. Trombositler, hemostaz ve inflamasyonda kilit rol oynar ve trombositle ilgili indeksler potansiyel prognostik belirteçler olarak araştırılmıştır. Trombosit Kütle İndeksi (TKİ), trombosit sayısı × ortalama trombosit hacmi (OTH) olarak hesaplanır ve inflamatuar şiddetin bir belirteci olarak önerilmiştir. Bu çalışma, hastaneye yatırılan TKP hastalarında TKİ'nin kısa dönem mortaliteyi öngörme değerini değerlendirmeyi amaçlamaktadır.

Gereç ve Yöntem: Bu retrospektif gözlemsel çalışma, 1 Ocak 2023 ile 1 Ocak 2024 tarihleri arasında toplum kökenli pnömoni (TKP) tanısı almış ve hastaneye yatırılmış yetişkin hastaları içermektedir. Demografik veriler, klinik parametreler, laboratuvar bulguları ve hastalık şiddeti skorları (PSI, CURB-65) toplanmıştır. Trombosit Kütle İndeksi (TKİ) değerleri, hayatta kalanlar ve hayatını kaybedenler arasında karşılaştırılmıştır. İstatistiksel analizler arasında Mann-Whitney U testi, ki-kare testi ve lojistik regresyon yer almaktadır. Modelin öngörü performansı ROC eğrisi analizi kullanılarak değerlendirilmiştir.

Bulgular: Toplamda 174 toplum kökenli pnömoni (TKP) hastası analiz edilmiştir (%67 erkek, medyan yaş 77 yıl). En yaygın semptom dispne olup %82 oranında gözlenmiştir. Hayatta kalanlar ile hayatını kaybedenler arasında trombosit kütle indeksi (TKİ) açısından anlamlı bir fark bulunmamıştır (p=0,33). Daha yüksek PSI ve CURB-65 skorları, düşük albümin seviyeleri ve artmış solunum hızları, artan mortalite ile ilişkilendirilmiştir. Mortalite tahmin modeli, 0,814 AUC değerine sahip olarak değerlendirilmiştir.

Sonuç: Trombosit Kütle İndeksi (TKİ), hastaneye yatırılan toplum kökenli pnömoni (TKP) hastalarında kısa dönem mortalitenin anlamlı bir prediktörü olarak bulunmamıştır. Şiddetli vakalarda inflamatuar yanıt ve olası kafa karıştırıcı değişkenler sonuçları etkileyebilir. TKİ'nin prognostik rolünü netleştirmek için daha geniş hasta popülasyonlarında ileriye dönük çalışmalar gereklidir.

Anahtar Kelimeler: Bruselloz, Coombs aglütinasyon testi, Seroprevalans

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INTRODUCTION

Pneumonia remains a significant public health concern worldwide, leading to high morbidity and mortality rates. According to the World Health Organization, pneumonia is one of the most common causes of death, particularly among elderly individuals, immunocompromised patients, and those with underlying chronic diseases. Even in developed countries, pneumonia is a major cause of hospital admissions and intensive care unit (ICU) requirements (1-4). In addition to its detrimental effects on individual health, pneumonia also imposes a substantial economic burden due to workforce loss, prolonged hospital stays, and high treatment costs.

A study conducted in the United States reported that the annual cost of community-acquired pneumonia (CAP) exceeds $10 billion in direct healthcare expenditures alone. Furthermore, indirect costs, such as productivity loss and work absenteeism, further amplify this economic burden (5,6). These findings underscore the critical importance of early diagnosis and appropriate treatment of pneumonia at both individual and societal levels.

Platelets play a fundamental role in hemostasis and thrombosis; however, they are also involved in key pathophysiological processes such as inflammation, immune response, and endothelial dysfunction (7,8). Platelets play a crucial role in the pathophysiology of pneumonia beyond their traditional function in hemostasis. They actively contribute to the immune response by recognizing and responding to pathogens through toll-like receptors and inflammatory mediators. During pneumonia, platelets interact with immune cells, endothelial cells, and pathogens, leading to thromboinflammation, which can exacerbate lung injury. Increased platelet activation and aggregation have been associated with disease severity, contributing to microvascular thrombosis and impaired oxygenation. Conversely, platelet-derived factors such as platelet-derived growth factor (PDGF) and transforming growth factor-beta (TGF-β) may support tissue repair. Understanding platelet involvement in pneumonia pathogenesis could lead to novel therapeutic targets for modulating the immune-thrombotic response. Recent studies suggest that platelet count, and platelet-related parameters not only help assess disease severity but may also provide valuable prognostic insights into short-term mortality (9-12). In this context, the Platelet Mass Index (PMI), calculated as the product of platelet count and mean platelet volume (MPV), has emerged as a novel hematological parameter of interest.

PMI reflects both platelet activity and total platelet mass, potentially serving as an indicator of inflammatory severity and microvascular complications (13-17). Although growing evidence supports the prognostic value of PMI in various cardiovascular and inflammatory diseases, its role in predicting short-term mortality in CAP within the emergency department setting remains insufficiently explored.

This study aims to evaluate the role of PMI in predicting short-term mortality among adult patients presenting to the emergency department with CAP. We hypothesize that PMI, as a simple and accessible biomarker, may contribute to the early identification of high-risk patients, ultimately improving clinical decision-making and patient management.

MATERIALS AND METHODS

Study Design and Data Collection

This study was conducted as a retrospective observational analysis using data from patients diagnosed with CAP at an education hospital between January 1, 2023 - January 1, 2024. Patient records were reviewed through the hospital's electronic medical database. The STrengthening the Reporting of OBservational studies in Epidemiology (STROBE) Statement checklist was adhered to in reporting the results and writing the article (18).

Demographic characteristics, clinical symptoms (e.g., cough, dyspnea, fever), vital signs (e.g., Glasgow Coma Scale, respiratory rate, blood pressure, heart rate, peripheral oxygen saturation), laboratory parameters (e.g., albumin, pH, blood urea nitrogen, creatinine, inflammatory markers), and severity scores (e.g., Pneumonia Severity Index, CURB-65) were recorded.

The Inclusion criteria were hospitalized adult patients (≥18 years old) with a confirmed diagnosis of CAP and available laboratory and clinical data. Patients with missing key data, prior advanced directives limiting treatment, or transferred from another facility without complete records were excluded from the analysis.

Statistical Analysis

The data set was created in the excel program. Statistical analysis was performed using Jamovi (version 2.3). Continuous variables were expressed as median (interquartile range, IQR) due to their non-normal distribution, which was assessed using the Kolmogorov-Smirnov test. Categorical variables were presented as frequencies and percentages.

Comparisons between groups were conducted using the Mann-Whitney U test for continuous variables and the chi-square or Fisher's exact test for categorical variables, as appropriate. The relationship between independent variables and mortality was evaluated using univariate and multivariate logistic regression analyses. To avoid multicollinearity, arterial blood pressure values and renal function parameters were excluded from the multivariate model. The results of the logistic regression analysis were presented as odds ratios with 95% confidence intervals.

The predictive performance of the PMI and the developed model for predicting septic shock was assessed using receiver operating characteristic (ROC) curve analysis. The area under the curve was calculated to determine discriminative ability. The optimal cut-off value was determined using the Youden index. Sensitivity, specificity, positive predictive value, negative predictive value, positive likelihood ratio, and negative likelihood ratio were reported with their respective 95% confidence intervals.

Model fit was evaluated using deviance, Akaike Information Criterion (AIC), and McFadden's R^2. A p-value of <0.05 was considered statistically significant.

Ethical Considerations

This study was approved by the Clinical Research Ethics Committee of the relevant hospital. (ethics committee decision number/date: 554/02.27.2025) and was conducted in accordance with the ethical principles of the Declaration of Helsinki. Since patient data were retrospectively analyzed, the requirement for individual informed consent was waived by the ethics committee. Patient identities were kept confidential, and all data were anonymized and used solely for scientific purposes. Data access was restricted to the researchers, and the highest level of personal privacy and data security was maintained. All procedures were carried out in compliance with the Personal Data Protection Law and Good Clinical Practice guidelines to ensure the protection of patient rights

RESULTS

A total of 174 patients were included in the study, of whom 117 (67%) were male and 57 (33%) were female. The median age of the study population was 77 years (IQR: 67–82). The most common symptom was dyspnea, observed in 143 patients (82%), followed by cough in 69 patients (40%) and fever in 33 patients (19%). Regarding comorbidities, hypertension was the most prevalent (58%), followed by diabetes mellitus (33%), coronary artery disease (29%), chronic obstructive pulmonary disease (26%), and active malignancy (30%). Other baseline characteristics of the study population are presented in Table 1.

Table 1. Descriptive characteristics of patients included in the study and comparison of mortality and survivorship groups.

Characteristic	N = 174	Survivor group N = 95 (55%)	Mortality group N = 79 (45%)	p-value
Age	77 (67-82)	77 (70-82)	76 (66-81)	0.20
Gender				0.97
Male	117 (67%)	64 (67%)	53 (67%)	
Female	57 (33%)	31 (33%)	26 (33%)	
Cough	69 (40%)	22 (23%)	47 (59%)	<0.001
Dyspnea	143 (82%)	86 (91%)	57 (72%)	0.002
Fever	33 (19%)	10 (11%)	23 (29%)	0.002
Hypertension	101 (58%)	57 (60%)	44 (56%)	0.57
Diabetes Mellitus	57 (33%)	35 (37%)	22 (28%)	0.21
Chronic Obstructive Pulmonary Disease	45 (26%)	24 (25%)	21 (27%)	0.84
Coronary Artery Disease	51 (29%)	29 (31%)	22 (28%)	0.70
History of Stroke	37 (21%)	20 (21%)	17 (22%)	0.94
Chronic Kidney Disease	17 (9.8%)	11 (12%)	6 (7.6%)	0.38
Congestive Heart Failure	28 (16%)	16 (17%)	12 (15%)	0.77
Active Malignancy	52 (30%)	34 (36%)	18 (23%)	0.062
Alzheimer's Disease	27 (16%)	14 (15%)	13 (16%)	0.76
Glasgow Coma Scale	15 (13-15)	15 (13-15)	15 (15-15)	0.011
Systolic Blood Pressure	121 (105-144)	120 (98-142)	124 (112-144)	0.046
Diastolic Blood Pressure	70 (60-80)	70 (52-80)	70 (62-80)	0.40
Heart Rate	98 (85-120)	105 (86-120)	96 (85-111)	0.041
Peripheral Oxygen Saturation	85 (80-89)	80 (79-86)	88 (85-91)	<0.001
Respiratory Rate	24 (20-30)	28 (22-30)	22 (20-24)	<0.001
Serum Albumin Level	32 (28-36)	30 (26-35)	34 (30-38)	<0.001
Aspartate Aminotransferase Level	21 (15-32)	23 (16-32)	20 (15-32)	0.48
Alanine Aminotransferase Level	17 (14-26)	17 (14-24)	18 (12-30)	0.83
C-Reactive Protein Level	118 (58-221)	131 (56-243)	117 (59-203)	0.35
Blood Glucose Level	144 (112-195)	150 (120-222)	140 (102-179)	0.073
Blood Urea Nitrogen Level	48 (36-75)	53 (41-100)	40 (30-64)	<0.001
Serum Creatinine Level	0.90 (0.65-1.35)	1.00 (0.64-1.56)	0.90 (0.67-1.17)	0.27
Serum Sodium Level	136 (133-140)	136 (133-140)	136 (134-139)	0.71
Serum Potassium Level	4.40 (3.99-4.80)	4.40 (3.99-4.90)	4.40 (4.00-4.70)	0.99
White Blood Cell Count	12 (8-18)	12 (8-20)	12 (10-16)	0.73
Neutrophil Count	10 (6-15)	9 (6-16)	10 (8-14)	0.78
Lymphocyte Count	1.02 (0.59-1.59)	0.98 (0.51-1.65)	1.06 (0.72-1.48)	0.49
Hemoglobin Level	11.40 (9.83-12.90)	11.00 (9.70-12.70)	11.60 (10.45-13.75)	0.072
Hematocrit Level	35 (31-40)	35 (30-40)	35 (32-40)	0.45
Platelet Count	264 (192-338)	231 (187-336)	275 (196-342)	0.37
Mean Platelet Volume	9.70 (8.70-10.47)	9.70 (8.70-10.40)	9.70 (8.70-10.55)	0.87
Blood Acidity Level (pH)	7.40 (7.34-7.44)	7.39 (7.29-7.44)	7.42 (7.39-7.45)	<0.001
Partial Pressure of Oxygen	52 (45-56)	48 (42-54)	55 (50-60)	<0.001
Pneumonia Severity Index Score	150 (122-175)	165 (144-188)	123 (102-152)	<0.001
CURB-65 Score				<0.001
0	6 (3.4%)	2 (2.1%)	4 (5.1%)	
1	16 (9.2%)	4 (4.2%)	12 (15%)	
2	81 (47%)	35 (37%)	46 (58%)	
3	44 (25%)	32 (34%)	12 (15%)	
4	22 (13%)	17 (18%)	5 (6.3%)	
5	5 (2.9%)	5 (5.3%)	0 (0%)	
Platelet Mass Index	2,401(1,852-3,330)	2,253 (1,876-3,247)	2,767 (1,788-3,322)	0.33

Univariate analysis revealed significant differences between the two groups. Patients in the mortality group had a higher prevalence of cough (59% vs. 23%, p<0.001), whereas dyspnea (91% vs. 72%, p=0.002) and fever (11% vs. 29%, p=0.002) were more common in the survivor group. Glasgow Coma Scale scores were significantly higher in the positive outcome group [15 (15–15) vs. 15 (13–15), p=0.011]. Among vital signs, systolic blood pressure [124 (112–144) vs. 120 (98–142), p=0.046] and peripheral oxygen saturation [88% (85–91) vs. 80% (79–86), p<0.001] were significantly higher in the positive outcome group, whereas heart rate [96 (85–111) vs. 105 (86–120), p=0.041] and respiratory rate [22 (20–24) vs. 28 (22–30), p<0.001] were lower. There was no significant difference in the PMI between the groups (p = 0.33). The median PMI value was 2,401 (IQR: 1,852–3,330) in the overall study population,

2,253 (IQR: 1,876–3,247) in survivor group, and 2,767 (IQR: 1,788–3,322) in mortality group.

Among laboratory parameters, serum albumin levels were significantly higher in the positive outcome group [34 (30–38) vs. 30 (26–35), p<0.001], whereas blood urea nitrogen levels were lower [40 (30–64) vs. 53 (41–100), p<0.001]. Additionally, blood acidity level (pH) [7.42 (7.39–7.45) vs. 7.39 (7.29–7.44), p<0.001] and partial pressure of oxygen [55 (50–60) vs. 48 (42–54), p<0.001] were significantly higher in the positive outcome group.

The Pneumonia Severity Index (PSI) score was significantly lower in the positive outcome group [123 (102–152) vs. 165 (144–188), p<0.001]. Similarly, the CURB-65 score distribution showed significant differences between the groups (p<0.001), with a higher proportion of patients in the negative outcome group having scores of 3 or higher. The detailed comparison of all parameters between the groups is presented in Table 1.

A multivariate logistic regression analysis was performed to identify independent predictors (Table 2). To avoid multiple collinearity, scores were not included in the model and only respiratory rate was included as a proxy for respiratory parameters.

Table 2. Multivariate Logistic Regression Analysis of Independent Predictors

Predictor	Estimate	SE	Z	p	Odds ratio	Lower 95% Confidence Interval	Upper 95% Confidence Interval
Intercept	171.250	158.338	1.08	0.279	2.74e+7	9.11e-7	8.22e+20
Cough	12.049	0.3873	3.11	0.002	33.364	1.562	7.127
Dyspnea	-0.7373	0.5757	-1.28	0.200	0.4784	0.155	1.479
Fever	0.9820	0.5241	1.87	0.061	26.698	0.956	7.457
Glasgow Coma Scale	0.1439	0.0962	1.50	0.135	11.547	0.956	1.394
Respiratory Rate	0.1124	0.0442	2.54	0.011	11.189	1.026	1.220
Serum Albumin Level	-0.0868	0.0313	-2.78	0.005	0.9168	0.862	0.975
Blood Acidity Level (pH)	-29.932	20.886	-1.43	0.152	0.0501	8.36e-4	3.006
Age	0.0245	0.0175	1.40	0.161	10.248	0.990	1.060

The predictive performance of the developed model for mortality prediction was evaluated. The model demonstrated an accuracy of 69.5%, with a specificity of 64.6% and a sensitivity of 73.7%. The area under the receiver operating characteristic curve was calculated as 0.814, indicating good discriminatory power (Figure 1). The cut-off value was set at 0.5 for classification. These results suggest that the model provides a reliable balance between sensitivity and specificity in predicting mortality.

The model fit analysis indicated that the developed model had a deviance value of 179, an AIC of 197, and a McFadden's R^2 value of 0.254. These results suggest that the model demonstrates a statistically significant fit, with moderate explanatory power.

DISCUSSION

This study evaluated the role of PMI in predicting short-term mortality among adult patients presenting to the emergency department with CAP. The findings revealed no significant difference in PMI between the survivor and mortality groups. To the best of our knowledge, this is the first study to assess the role of PMI in predicting short-term mortality in adult patients with CAP.

Pneumonia remains a leading cause of morbidity and mortality worldwide, particularly among elderly patients and those with comorbid conditions. It is characterized by an acute infection of the lung parenchyma, leading to inflammation, alveolar consolidation, and impaired gas exchange (19,20). The etiology of pneumonia is diverse, including bacterial, viral, fungal, and atypical pathogens. Streptococcus pneumoniae remains the most common bacterial cause, while viral pneumonias, such as those due to influenza and SARS-CoV-2, have gained increasing recognition, especially in the context of recent pandemics (21-25). The differential diagnosis of pneumonia is broad and includes conditions such as acute bronchitis, congestive heart failure with pulmonary edema, pulmonary embolism, and interstitial lung diseases. Clinical presentation, radiological findings, and laboratory parameters help distinguish pneumonia from these mimicking conditions (26,27). However, overlapping symptoms such as dyspnea, cough, and fever can complicate diagnosis, necessitating the use of biomarkers, imaging modalities, and microbiological studies for confirmation. Given the significant disease burden, accurate risk stratification remains essential for optimizing treatment decisions, including hospitalization criteria and antimicrobial therapy selection (28,29). Various scoring systems, such as the CURB-65 and Pneumonia Severity Index (PSI), assist in this process, yet additional prognostic markers are still being investigated to improve patient outcomes.

Platelets are increasingly recognized as key mediators of inflammation, bridging hemostasis with immune system activation in various disease states, including infectious and non-infectious inflammatory conditions (30-32). Beyond their role in coagulation, platelets actively participate in the immune response by releasing pro-inflammatory cytokines, interacting with leukocytes, and modulating endothelial function. In infections such as pneumonia, platelet activation enhances neutrophil extracellular trap formation, contributing to bacterial clearance. However, excessive platelet activation can lead to endothelial injury, microvascular thrombosis, and organ dysfunction,

exacerbating disease severity. Similar mechanisms are observed in sterile inflammatory conditions such as acute pancreatitis, where platelet-derived mediators amplify the systemic inflammatory response, promoting microcirculatory disturbances and worsening disease outcomes (33,34). Platelet indices, particularly MPV and platelet-to-lymphocyte ratio, have been associated with disease severity in both infectious and inflammatory conditions. In pneumonia, elevated MPV has been linked to increased mortality risk, likely reflecting heightened platelet activation and consumption in severe inflammation. These findings suggest that platelet parameters could serve as valuable biomarkers in predicting outcomes in inflammatory diseases, yet their precise role requires further investigation (30-34). Understanding platelet involvement in inflammation may offer new insights into disease pathophysiology and potential therapeutic targets.

Platelets play a crucial role not only in hemostasis and thrombosis but also in immune response and inflammation, making them significant contributors to the pathophysiology of CAP. Several studies have highlighted the prognostic value of platelet-related parameters in predicting mortality and disease severity in CAP patients. Cho et al. investigated the relationship between the MPV to platelet ratio (MPR) and short-term mortality in CAP patients. Their findings demonstrated that higher MPR levels were significantly associated with increased mortality, suggesting that platelet indices could serve as prognostic markers in CAP (35). Similarly, Golcuk et al. examined the combination of MPV, and the CURB-65 score to predict 28-day mortality. Their study revealed that incorporating MPV into the CURB-65 score improved its predictive accuracy, underscoring the potential of platelet indices in risk stratification (36). Moulis et al. explored the impact of platelet counts within the normal range on CAP prognosis. Their analysis of 12,905 patients found that platelet counts at both the lower and upper ends of the normal spectrum were associated with altered mortality risks. These findings suggest that even within normal limits, platelet levels may reflect underlying disease severity and systemic inflammatory responses in CAP patients (37). ElMaraghy et al. further emphasized the role of platelets in CAP severity and outcomes. Their study demonstrated a significant relationship between platelet abnormalities—thrombocytopenia and thrombocytosis—and the CURB-65 score, respiratory complications, and overall mortality. This suggests that platelet count deviations may serve as valuable markers of disease progression (38). Finally, Huang et al. assessed the diagnostic value of various blood parameters, including platelet-to-lymphocyte ratio and neutrophil-to-lymphocyte ratio, in CAP patients. Their findings indicated that elevated platelet-to-lymphocyte ratio and neutrophil-to-lymphocyte ratio levels correlated with higher disease severity and prolonged hospitalization (39). This supports the growing evidence that platelet indices and related hematological markers can aid in the early identification of high-risk CAP patients. While platelet count abnormalities have been shown to be associated with CAP severity and mortality, they do not fully capture the functional and dynamic aspects of platelet involvement in systemic inflammation.

Collectively, these studies highlight the clinical significance of platelet-related parameters in CAP prognosis. The findings suggest that platelet indices, including MPV, MPR, and platelet-to-lymphocyte ratio, could serve as valuable biomarkers for mortality prediction and disease severity assessment. Future research should focus on integrating these parameters into clinical decision-making models to enhance risk stratification and optimize patient management strategies.

In our study, no significant relationship was found between PMI and CAP prognosis. There may be several possible reasons for this result. First of all, our study included only hospitalized CAP patients, and since this group of patients usually has a more severe clinical course, their inflammatory responses may be more homogeneous. This may have made possible variations that may clarify the prognostic value of PMI. In addition, factors such as the development of sepsis, coagulopathy, and bone marrow suppression in severe CAP cases may cause changes in the relationship between platelet count and MPV. It is thought that PMI may cease to be a significant prognostic indicator, especially in critically ill patients, due to platelet consumption or dysfunction. In addition, accompanying comorbidities (e.g. chronic kidney disease, liver cirrhosis, hematological diseases) may have created additional variability in PMI values by affecting platelet production and function. Our results suggest that the use of PMI as a prognostic marker in CAP may vary depending on the patient population and the severity of the disease. Further studies in larger patient groups and different CAP subtypes may contribute to a better understanding of this relationship.

Our study has some limitations. First, there is a risk of information bias due to its retrospective design. Since the data were obtained from hospital records, incomplete or incorrect records may have made it difficult to correctly evaluate some variables. In particular, variability between laboratory results and clinical evaluations may affect data integrity. Secondly, selection bias is an important limitation of our study. Including only hospitalized CAP patients may have excluded milder cases and limited the generalizability of our results to the general CAP population. This may lead us to ignore the possibility that the prognostic value of PMI may be different, especially in mild and outpatient patients. Thirdly, confounding bias should be considered. Although multivariate analysis was performed for some variables such

as age, comorbidities, and severity of infection in our study, it was not possible to eliminate the effect of other potential confounding factors (e.g., antibiotic use, concomitant inflammatory diseases, or immune status). With prospective and larger-scale studies, the impact of these factors can be better evaluated, and more definitive conclusions can be reached regarding the true prognostic value of PMI.

In conclusion, no statistically significant relationship was found between PMI and short-term mortality in hospitalized CAP patients in our study. This situation can be explained by the fact that our study included only hospitalized severely ill patients, the inflammatory response varied in different stages of the disease, and the inability to fully control possible confounding factors. However, there are studies in the literature showing that platelet parameters may have prognostic value in CAP patients. Prospective and large-scale studies covering different patient groups are necessary to better understand the prognostic value of PMI.

Declarations

Ethics Committee Approval: Ethics committee approval was obtained from Clinical Research Ethics Committee of the relevant hospital. (ethics committee decision number/date: 554/02.27.2025). This study was conducted according to the principles of the Declaration of Helsinki.

Authorship Contributions: Concept: SO, IA, AO. Design: SO, IA, AO. Data Collection or Processing: SO, IA, AO. Analysis or Interpretation: SO, IA, AO. Literature Search: SO, IA, AO. Writing: SO, IA, AO. All authors approved the final version of the manuscript.

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Research Article

Seroprevalence of Brucellosis in Aksaray Region

Aksaray Bölgesinde Bruselloz Seroprevalansı

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Abstract

Purpose: Brucellosis is the most common bacterial zoonosis in the world caused by brucella genus bacteria and is a significant cause of morbidity and mortality in humans. The definitive diagnosis of the disease is the isolation of the agent in culture, but serological tests are often used in diagnosis. This study aimed to determine the seroprevalence of brucellosis in our region.

Material and Method: The study included 7087 serum samples sent to the medical microbiology laboratory with suspicion of brucellosis from clinics between January 2023 and December 2024 to Aksaray education and research hospital. The Rose-Bengal (RB) and Coombs agglutination test results of sera were retrospectively examined.

Results: Out of the 7087 patients included in the study, 622 (8.8%) had a positive RB test, and 579 patients (8.2%) had a Coombs agglutination test titer of 1/160 and above. The median age of patients with a positive Coombs agglutination test was detected as 41.57 ± 3.9 (min 1 - max 80) and 56.8% (n=329) of these patients were male and 43.2% (n=250) were female. Brucellosis seroprevalence was 47.6% in the 20-50 age range and 69.4% in the 20-60 age range. We also determined the seroprevalence of brucellosis as 17.6% in the 0-20 age range and 9.2% in those over 65 years of age.

Conclusion: Preventing the transmission of brucellosis to humans primarily depends on controlling and eradicating disease in animals. In this context, we believe that success will be achieved through promotional controls, especially through effective policies, measures and projects that will be jointly developed by the Ministry of Agriculture and universities.

Keywords: Brucellosis, Coombs agglutination test, Seroprevalence

Öz

Amaç: Bruselloz, brusella cinsi bakterilerin neden olduğu dünyada en sık görülen bakteriyel zoonozdur ve insanlarda önemli bir morbidite ve mortalite nedenidir. Hastalığın kesin tanısı etkenin kültürde izolasyonudur ancak tanıda sıklıkla serolojik testler kullanılır. Bu çalışmada bölgemizdeki bruselloz seroprevalansının belirlenmesi amaçlanmıştır.

Gereç ve Yöntem: Çalışmaya, Ocak 2023-Aralık 2024 tarihleri arasında Aksaray Eğitim ve Araştırma Hastanesi kliniklerinden bruselloz şüphesi ile tıbbi mikrobiyoloji laboratuvarına gönderilen 7087 serum örneği dahil edildi. Serumların Rose-Bengal (RB) ve Coombs aglütinasyon test sonuçları retrospektif olarak incelendi.

Bulgular: Çalışmaya dahil edilen 7087 hastanın 622'sinde (%8,8) RB testi pozitif iken 579 hastada (%8,2) Coombs aglütinasyon test titresi 1/160 ve üzeri idi. Coombs aglütinasyon testi pozitif olan hastaların ortanca yaşı 41,57 ± 3,9 (min 1 - maks 80) olarak belirlendi ve bu hastaların %56,8'i (n=329) erkek, %43,2'si (n=250) kadındı. Bruselloz seroprevalansı 20-50 yaş aralığında %47,6 iken 20-60 yaş aralığında ise %69,4 olarak idi. Ayrıca Bruselloz seroprevalansını 0-20 yaş aralığında %17,6, 65 yaş üstünde ise %9,2 olarak belirledik.

Sonuç: Brusellozun insanlara bulaşmasının önlenmesi öncelikle hastalığın hayvanlarda kontrol altına alınmasına ve eradikasyonuna bağlıdır. Bu bağlamda özellikle Tarım Bakanlığı ve üniversitelerin ortaklaşa geliştireceği etkili politikalar, önlemler ve projelerle tanıtımsal kontroller temelinde başarı sağlanacağına inanıyoruz.

Anahtar Kelimeler: Bruselloz, Coombs aglütinasyon testi, Seroprevalans

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INTRODUCTION

Zoonotic pathogens are becoming increasingly important worldwide. Brucella spp., one of the most important zoonotic pathogens, causes brucellosis and poses significant public health concerns. Brucellosis is an acute or insidious disease, and patients must have at least one of the following symptoms along with fever: fatigue, loss of appetite, weight loss, headache, intense sweating, especially at night, and widespread muscle and joint pain throughout the body (1).

Brucellosis could be seen all over the world, but it still causes one of the most important health problems in developing countries and is endemic especially in the mediterranean region, the middle east, central Asia and Latin America (1,2). Also, in our country due to factors such as widespread animal husbandry and the use of dairy products, zoonotic pathogens and brucella spp. are becoming increasingly important. In Türkiye, cases are mostly reported from the eastern and southeastern Anatolia regions where animal husbandry is widespread, and it can be seen in other regions, albeit rarely (1).

Brucellosis, which is mainly a disease of large and small cattle, also threatens human health and causes economic and labor losses. There are four types of brucella that cause disease in humans, however, B. abortus and B. melitensis are more frequently detected as the cause of brucellosis (3). Brucellosis is an important occupational disease for veterinarians, butchers, animal husbandry workers and laboratory workers. It is also an important bioterrorism agent due to its low infectious dose, persistence in the environment and host, ability to spread by aerosol and difficulty in treatment (1,4).

Serological and bacteriological methods are usually used to diagnose the disease. The gold standard for diagnosis is the production of the agent in blood, bone marrow or other tissue cultures, but it is difficult to grow this agent in culture. Therefore, serological tests are used in diagnosis. The applicability and evaluation of these tests are easy, cheap and do not require experienced personnel. The most used serological tests in diagnosis today are the Rose Bengal test (RB), Wright test, Coombs test, complement fixation test or immunocapture tests (5,6)

In Türkiye, various control and eradication programs have been implemented for brucellosis since 1930, and it is a notifiable infectious disease (1). According to the data of our country, the incidence of the disease increased again between 2015 and 2019, exceeding 10 per hundred thousand. This makes it more valuable to determine brucellosis seroprevalence on a regional basis (7).

In this study, we aimed to retrospectively examine the RB test and Coombs agglutination test titers in patient serum samples sent to Aksaray training and research hospital medical microbiology laboratory from various services and polyclinics with suspicion of brucellosis between 2023-2024 to determine the seroprevalence of brucellosis in Aksaray.

MATERIALS AND METHODS

The study included 7087 serum samples sent to the medical microbiology laboratory with suspicion of brucellosis from various polyclinics or services affiliated to Aksaray education and research hospital between January 2023 and December 2024. The RB and Coombs agglutination test results of sera were retrospectively examined. This study was approved by the Aksaray University Faculty of Medicine, Clinical Research Ethics Committee (03.10.2024-2024/95).

Rose Bengal Test

After all reagents were brought to room temperature, 50 microliters of patient serum and 50 microliters of saline, one drop of BRUCEL-RB (Tulip Diagnostics, India) antigen suspension was pipetted onto the circle on the slide and rotated for four minutes. During the evaluation phase, the presence of agglutination observed macroscopically indicates the presence of 25 IU/mL brucella antibodies (IgM or IgG) in the patient serum.

Coombs Agglutination Test

After the patient serum and test reagents detected positive in the RB test were brought to room temperature, 50 microliters of patient serum prepared in the 1/40 - 1/1280 dilution range was pipetted into the wells in the REDCELL brucella gel test (Red Cell Biotechnology, Türkiye) plate. The gel matrix was centrifuged for 20 minutes. If there are no brucella antibodies in the serum during the evaluation phase, brucella antigens settle to the bottom of the tube, if there are, the antigen-antibody complex remains on the gel in the form of a pink line. According to coombs agglutination method, titters of 1/160 and above are considered as positive.

Statistical Analysis

After the tests in the study were completed, the data obtained were evaluated in a computer environment using the IBM-SPSS (Version 24.0) statistical package program. For descriptive statistics, number, percentage, mean ± standard deviation (SD), minimum (min), maximum (max) values were used.

RESULTS

Of the 7087 patients included in the study, 622 (8.8%) had a positive RB test, and 579 patients (8.2%) had a Coombs agglutination test titer of 1/160 and above. The median age of patients with a positive Coombs agglutination test was detected as 41.57 ± 3.9 (min 1 - max 80) and 56.8% (n=329) of these patients were male and 43.2% (n=250) were female. Figure 1 demonstrated the distribution of brucella antibody titers according to the number of patients. Also, Figure 2 demonstrated the distribution of Coombs agglutination test positivity according to age ranges.

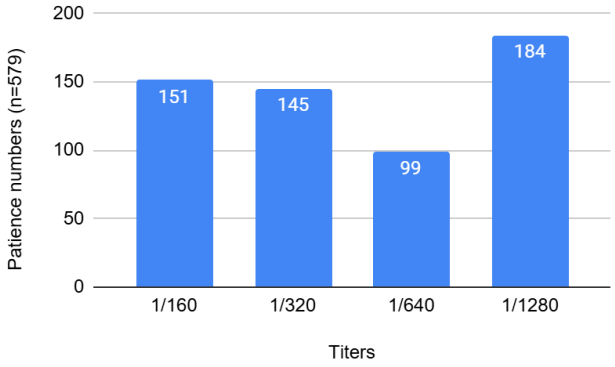

Figure1. Distribution of Brucella antibody titers according to the number of patients

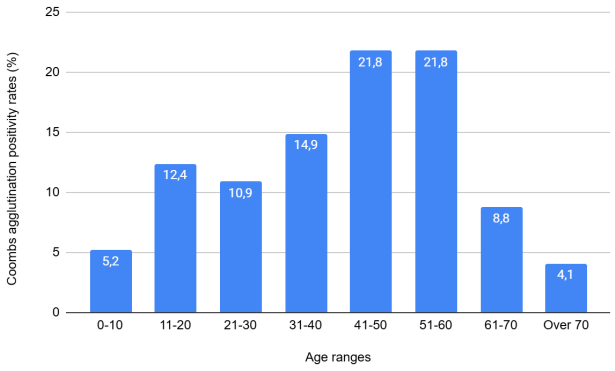

Figure 2. Distribution of Coombs Agglutination Test positivity according to age ranges

DISCUSSION

Brucellosis, first described by Marston in 1859 as "Mediterranean Gastric Fever", is considered the most common zoonotic disease in the world. Although brucellosis has been eliminated in developed countries, it continues to be a significant public health problem in developing countries. According to the World Health Organization (WHO), 500,000 new cases are reported each year in the world. WHO also considers brucellosis to be one of the seven most neglected diseases (8,9).

Brucellosis occurs in humans through the consumption of unpasteurized milk and its products, inhalation of infected aerosols, and direct contact of animal secretions with damaged tissues (10). In this regard, cases in Türkiye are generally reported in regions where animal husbandry is common. Although it is a disease that must be reported in Türkiye, it is estimated that the number of notifications in both animal and human cases is well below the expected number. Despite this, brucellosis is still endemic in Türkiye according to the number of reported cases (1,7).

In seroepidemiological studies, seropositivity rates of 9-25% have been reported in occupational groups at risk for brucellosis, such as butchers, livestock breeders, slaughterhouse and dairy workers, and 1-8 % in those not in the risk group. Brucellosis is more common among young and middle-aged adults. According to Türkiye datas, 50-60% of cases are between the ages of 20-50, 10-15% in children, and 10% in those over the age of 65 (1). In the current study, similar to studies conducted in our country, we observed that the seroprevalence of brucellosis was 47.6% in the 20-50 age range, and 69.4% when we evaluated the age range as 20-60. We detected the seroprevalence of brucellosis to be 17.6% in the 0-20 age range and 12.3% in those over 60 years of age (Figure 2).

The clinical picture of brucellosis in humans is generally non-specific. Not all people who encounter brucella develop active brucellosis. Although most people living in endemic areas have positive brucellosis serological markers, there is no clinical history of infection. The mortality rate due to brucellosis is very low (0.1%). Death is mostly due to brucella endocarditis, meningitis or brain abscess due to late diagnosis and treatment (1,7).

Bacteriological and serological methods are used primarily in the diagnosis of brucellosis. Since clinical symptoms are misleading in the diagnosis of brucellosis, laboratory results play an important role in the diagnosis of the disease. The gold standard for laboratory diagnosis is the growth of the agent in blood or bone marrow or other tissue cultures. However, the growth of the agent in culture takes a long time and the detection rate of the agent is between 40% and 70%. Serological diagnosis is made with tests such as the RB test, wright test, Coombs test, complement fixation test and immunocapture test. Agglutination tests are based on the reactivity of antibodies formed against the smooth lipopolysaccharide of brucella. Rose bengal agglutination test has high sensitivity (>99%); it is a low specificity test (8,11). Serological methods are easier, faster and safer than growing the agent in culture, so they are often preferred in

the diagnosis of brucellosis. Also, they are important in the diagnosis and follow-up of the disease (6,8,12). In the routine serological diagnosis of brucellosis, screening is first performed with the RB test and in this study the RB test positivity rate was 8.8%. However, the Coombs agglutination test positivity rate was 8.2% (Figure 1). This may be because the RB test is a screening test and was performed at lower sera dilutions. In addition, the specificity of the Coombs Agglutination test is higher than the RB test and is more valuable in excluding brucella infection. However, in endemic areas, positivity can be detected at a titter of 1:160 after previous infection. Therefore, the results should be evaluated with clinical findings and a 4-fold increase in titters should be demonstrated in sera taken after 2-4 weeks (6).

In Türkiye, 10,244 cases of brucellosis were reported in 2019, and the incidence of the disease increased from 5.8 to 12.3 per 100,000 between 2014 and 2019. When the distribution of cases is considered, the increase in the Central Anatolia region, as well as the Eastern and Southeastern Anatolia regions is remarkable (1,7). In the current study, the seroprevalence of brucellosis was 8.2% in the patient population admitted to the hospital in Aksaray. In other recent brucellosis seroprevalence studies conducted in Türkiye, seropositivity rates were determined as 6.5% in Diyarbakır, 1.3% in Rize, 3.4% in Samsun, and 3.8% in a university hospital in Istanbul (11,12,13,14). We believe that the reason for the high seropositivity rate in the current study compared to other recent studies may be due to the widespread animal husbandry in Aksaray and the high consumption of dairy products of unknown origin. However, there is a need for current and comprehensive studies conducted in Türkiye, especially in geographical regions where the incidence is high.

Türkiye has a unique geographical, cultural and economic location between Europe and Asia. This situation is a risk factor for the spread of brucellosis, especially from its eastern and southeastern neighbors where it is endemic. The reported incidence of brucellosis in endemic regions of the world varies between <0.01 and >200 per hundred thousand. The incidence of brucellosis in our country is 26 per hundred thousand, in Iran 24, in Iraq 28 and in Syria, where the incidence is highest in the world, it is reported as 161 per hundred thousand, and it is a serious public health problem (8). It is estimated that 57.5% of the population in Africa is at risk of brucellosis, a disease that the whole world overlooks and has difficulty accessing data on. However, brucellosis is historically endemic to Africa but, it is estimated that most cases of brucellosis in Africa go unreported. It has been determined that the countries with the highest population at risk after Africa are in Asia (47.7%), Europe (24.3%) and America (19.4%) continents, respectively (9,15).

Despite advances in diagnostic and therapeutic opportunities, brucellosis remains a serious global public health burden. The epidemiology of brucellosis changes with changing lifestyles and evolving human-animal interactions. “One Health” is a vital concept for effective investigation of the human-animal-ecosystem interface to prevent and control the reemergence of brucellosis (15). The epidemiological features of brucellosis observed in humans vary depending on many social factors. Human brucellosis is continuously increasing in traditionally endemic regions such as the Mediterranean and surrounding countries, and its re-emergence is frequently reported in fully controlled countries in North America and Southern Europe (9,15). Therefore, implementation of surveillance studies and screening tests is crucial to respond promptly to changes in seroprevalence. Reducing human brucellosis requires control of animal brucellosis. For the success of brucellosis programs, surveillance, eradication, vaccination and control programs require strong sectors and international technical and scientific cooperation. In this context, we believe that success will be achieved through promotional controls, especially through effective policies, measures and projects that will be jointly developed by the Ministry of Agriculture and universities.

Declarations

Ethics Committee Approval: Ethics committee approval was obtained from the Aksaray University, Health Sciences Scientific Research Ethics Committee (Date: February 13, 2025, Decision No: 2025/33). This study was conducted according to the principles of the Declaration of Helsinki.

Authorship Contributions: Concept: FE, DA, OS, HO. Design: FE, DA, OS, HO. Data Collection or Processing: DA, OS, HO. Analysis or Interpretation: FE, DA. And Literature Search: DA, OS, HO. Writing: FE. All authors approved the final version of the manuscript.

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Declarations

Ethics Committee Approval: Ethics committee approval was obtained from Aksaray University Health Sciences Scientific Research Ethics Committee (Date: October 3, 2024, Ethics approval number:2024/95). This study was conducted according to the principles of the Declaration of Helsinki.

Authorship Contributions: Concept: FG, YD, ST. Design: FG, ST, AA. Data Collection or Processing: ST, AA. Analysis or Interpretation: FG, YD. Literature Search: ST,

AA. Writing: FG and YD. All authors approved the final version of the manuscript.

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Case Report

A Social Media-Induced Cyanide Poisoning

Sosyal Medya Kaynaklı Bir Siyanür Zehirlenmesi

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Abstract

Fruits such as apples, cherries, peaches, pears and plums are members of the Rosaceae family and are among the most consumed fruits. Although they provide important health benefits to humans, their seeds contain amygdalin, a potential toxin. When the nuclei are broken down by crushing, cyanogenic glycosides interact with endogenous enzymes, causing the formation of hydrogen cyanide. Technological developments and increasing internet use have opened the door to a lot of information for us. Computer and internet usage is generally at very high levels in the young population. In many social platforms, erroneous information in the field of health ranges from unnecessary tips to dangerous claims. In this case, we aimed to show the vital importance of early diagnosis and treatment in a patient who using information learned from the internet attempted suicide with 200 apple seeds.

Keywords: Emergency medicine; poisoning; cyanide; social media

Öz

Elma, kiraz, şeftali, armut ve erik gibi meyveler Rosaceae familyasının üyeleri olup en çok tüketilen meyveler arasındadır. İnsanlara önemli sağlık yararları sağlamalarına rağmen tohumları potansiyel bir toksin olan amigdalin içerir. Çekirdekler ezilerek parçalandığında, siyanojenik glikozitler endojen enzimlerle etkileşime girerek hidrojen siyanür oluşumuna neden olur. Teknolojik gelişmeler ve artan internet kullanımı bizlere birçok bilginin kapısını açmıştır. Bilgisayar ve internet kullanımı genel olarak genç nüfusta oldukça yüksek düzeydedir. Pek çok sosyal platformda sağlık alanındaki hatalı bilgiler, gereksiz tüyolardan tehlikeli iddialara kadar çeşitlilik göstermektedir. Bu olguda internetten öğrenilen bilgilerle 200 elma çekirdeği ile intihar girişiminde bulunan bir hastada erken tanı ve tedavinin hayati önemini göstermeyi amaçladık.

Anahtar Kelimeler: Acil tıp; zehirlenme; siyanür; sosyal medya

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INTRODUCTION

Fruits such as apple, cherry, peaches, pears and plums are a member of the Rosaceae family and are one of the most consumed fruits. Although it provides significant health benefits to humans, the seeds contain amygdalin, a potential toxin. Cyanogenic glycosides such as amygdaline are naturally found in more than 2500 plant species. When the nuclei break down through crushing, cyanogenic glycosides interact with endogenous enzymes (B-Glucosidases and A-hydroxinitril lies) and cause hydrogen cyanide formation (1). As a result of this, anxiety, headache, dizziness and confusion may also occur in the process of loss of consciousness, hypotension, bradycardia, paralysis, coma and even death. Similarly, many cyanide poisonings due to almond and apricot seeds have been reported (2,3). Technological developments and increasing internet use have opened the door to information. Especially in individuals between the ages of 16-74, the use of computers and internet in the young population is very high (4). In many social platforms, erroneous information in the field of health ranges from unnecessary tips to dangerous claims (5). In this case, we aimed to show the vital importance of early diagnosis and treatment in a patient who attempted suicide with 200 apple seeds with information obtained from social platforms on the internet.

CASE REPORT

A 26-year-old man applied to the emergency department with new-onset nausea, vomiting and dizziness. His complaints started 3 hours before applying to the hospital after consuming 200 apple seeds crushed and mixed in an energy drink. The patient was using lithium on a regular basis due to known bipolar disorder and had intermittent hospitalizations due to his illness. The patient stated that he tried to commit suicide by using 200 apple seeds after seeing suicide attempts resulting in death with 150-175 apple seeds on the internet. In the first arrival of the patient, the pulse of the patient: 51 beats/min, blood pressure: 90/65mmhg, saturation value: 94 % and no fever; In the physical examination, neurological, respiratory, abdominal and skin system examinations were normal. The electrocardiogram was consistent with sinus bradycardia rhythm (Figure-1). Laboratory tests of the patient revealed Hemoglobin: 13.1 g/dL, Platelet: 189.000/uL, K: 4.5 mmol/L, Na: 140 mmol/L, AST: 23U/L, ALT: 9U/L, Creatinine: 0.9 mg/dL, CRP: 4mg/L, blood gas pH: 7.392, HCO3: 25 mmol/L, COHB: 9.3, METHB: 0.1, LAC: 1.05. Because of the amygdalin contained in the apple seeds and the presence of bradycardia and hypotension in the patient, gastric lavage was performed rapidly considering the possibility of cyanide intoxication. Apple seed pieces were detected in the gastric lavage aspirate (Figure-2). Activated charcoal was given after lavage. The patient was taken to the intensive care unit for close follow-up because of cyanide intoxication due to apple seeds. In the patient who was considered to have cyanide intoxication, 5 g of hydroxycobalamin was performed as intra venous (iv) infusion once a day for 3 days to provide cyanide excretion. Meanwhile, iv hydration support was continued. Metoclopramide HCl was applied as iv. infusion in 100 ml of 0.9% NaCl solution for occasional nausea and vomiting. There was no need for positive inotropes during the intensive care unit follow-up. On the first 3 days, the patient was bradycardic (51-59-58 beats/min) and moderately hypotensive (90/50-85/60-95/55 mmHg), but on the 4th day, the pulse rate was normocardic (75 beats/min) and blood pressure was normotensive (110/75 mmHg). The psychiatry clinic was consulted after his vital values improved and followed a stable course. Since he had no suicidal ideation and clinical and vital values were stable, psychiatry outpatient clinic control was recommended, and he was discharged.

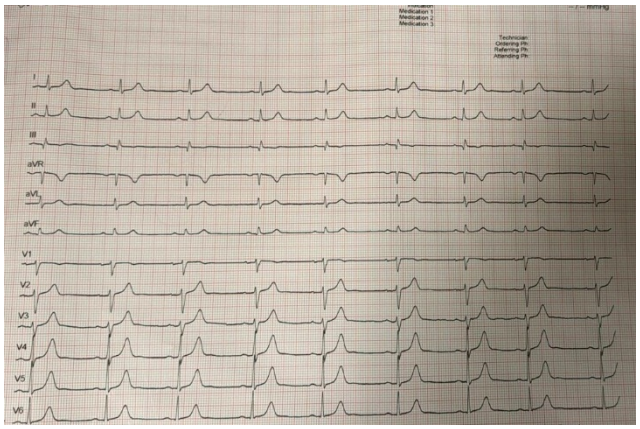

Figure-1: The image of the patient's first ECG

Figure-2: The image of the aspirate during gastric lavage.

DISCUSSION

We report a case with cardiovascular symptoms of cyanide poisoning due to apple seeds. In this case, we aimed to emphasize that easy access to all the right and wrong information on the internet can have bad consequences, that we should listen carefully to the information given by the patient, especially in patients with psychiatric background, and that starting early treatment with a good anamnesis and physical examination can be lifesaving. History and clinical findings are very important in the diagnosis of cyanide poisoning. It is obvious that most of the time we do not have time to wait for blood cyanide level or other laboratory results. In these cases, emergency physicians should rapidly evaluate the process with the clinical findings and anamnesis obtained and start treatment immediately (6).

The negative effects of social media are at the forefront in some suicidal attempts. Especially in the World Health Organization's report on suicides, it was emphasized that social media is responsible for suicides (7). Today, with the rapid development of technology and its use in every field, especially the widespread use of the internet and all communication devices, people can have all information quickly (4,5). In a study conducted in the USA, it was mentioned that more than 25% of the information researched on the internet in the field of health is the knowledge and experiences of individuals and there is no scientific data (5). Similarly, in our case, our patient attempted suicide by obtaining cyanide from apple seeds with the data obtained from the internet. In a worldwide study, it was observed that the 4th most common cause of death between the ages of 15-29 was suicide attempt and males were admitted 2.3 times more frequently (7). In addition, it has been reported in many studies that psychiatric disorders are an important factor in suicide attempts (8-10). The fact that our case was a 26-year-old male with bipolar disorder is similar to the literature.

Even if it is a food consumed in daily life, its excess or other parts such as seeds can threaten human life. Unexpected situations may arise as a result of excessive or improper use of substances found in nature, which have many antioxidant properties and benefits. In a study, it was reported that shyanide poisoning can cause vasoconstriction in coronary and pulmonary vessels, and conditions such as bradycardia, pulmonary edema and cardiogenic shock may develop. In the same study, it was mentioned that hypotension and cardiac blocks may be observed in severe intoxication or advanced clinical conditions (1-3,6). The mainstay of treatment is 100% oxygen, cardiac and pulmonary support, full-time fluid infusion and basic antidote therapy. The importance of giving 100% O2 if necessary, after ABC assessment has been emphasized. Specific antidote treatment is recommended to be started as soon as possible. It was mentioned that cyanide antidote kits prepared for this purpose and containing amyl nitrite, sodium nitrite and sodium thiosulfate; after opening the amyl nitrite ampoule and having the patient smell it for 30 seconds, 10 cc of 3% 300 mg sodium nitrite should be given iv at a rate of 2.5-5 cc/min, and then 50 ml of 25% 12.5 g sodium thiosulfate should be performed. Again, in this study, it was emphasized that hydroxocobalamin had a low potential for side effects and 5 grams (70 mg/kg dose) were infused over 30 minutes (6). The effect of hydroxycobalamin on hypotension and methemoglobinemia is lower than other antidotes. Similarly, in our case, our patient was hypotensive and bradycardic at the initial presentation and during the course of treatment. We consider that the effect of these clinical conditions was prevented by the substitution of the hydroxy group in hydroxycobalamin with cyanide to form nontoxic cyanocobalamin (Vitamin B12) and other medications.

Although symptoms such as nausea and vomiting are observed in many diseases, there is also the possibility of an underlying serious problem (1-3). In line with the information in the literature, although apple is a very beneficial food in terms of health, excessive consumption of the seed, as in our case, led to intoxication and created a situation that could result in death.

Again, we believe that detailed anamnesis and physical examination in our case provided the opportunity to detect the symptoms and signs that may occur after cyanide poisoning and to provide early intervention.

CONCLUSION

Today, inaccurate and unscientific information can be easily accessed through social media. It should be kept in mind that people with a psychiatric history may be prone to suicide attempts. In addition to the excessive consumption of the foods we consume in daily life, cases of suicidal attempts with these foods also come to emergency services. As Paracelsus said, every substance is poison should not be forgotten. In addition, as physicians, we should remember that we are responsible for taking careful anamnesis from each patient and providing treatment in accordance with the literature, and that early recognition and treatment of the signs and symptoms of cyanide toxicity, which is a rare suicidal intervention as in this case, is vital for a successful clinical outcome.

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Case Report

Recurrent Suicide Attempts in a Patient with Chronic Obstructive Pulmonary Disease: A Case Report

Kronik Obstrüktif Akciğer Hastalığı Tanılı Hastada Tekrarlayan İntihar Girişimleri: Bir Olgu Sunumu

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Abstract

Chronic obstructive pulmonary disease (COPD) is characterized by bronchial obstruction and abnormal pulmonary inflammation. Depression prevalence has increased in COPD patients. COPD frequently leads to social isolation and impairments in daily functioning, which contribute as risk factors for suicidal behavior. Although the relationship between COPD and suicide attempts is multifactorial, studies suggest that chronic hypoxia and biochemical factors can lead to increased suicide risk. The association between COPD and suicide has been emphasized in numerous studies, underscoring the need for mental health assessment in COPD patients. Evaluation of suicide risk is critical for all physicians. This case report highlights recurrent suicide attempts in a 70-year-old woman with COPD, aiming to raise awareness about the heightened suicide risk in COPD patients.

Keywords: COPD; suicide; hypoxia

Öz

Kronik obstrüktif akciğer hastalığı (KOAH), bronşiyal obstrüksiyon ve anormal pulmoner enflamasyon ile karakterize bir hastalıktır. KOAH hastalarında depresyon sıklığı artmıştır. KOAH, sosyal izolasyona ve günlük işlevsellikte bozulmalara sıklıkla yol açar ve bu durumlar intihar davranışı için risk oluşturur. KOAH ve intihar girişimleri arasındaki ilişki multifaktöriyel olsada, çalışmalar kronik hipoksi ve biyokimyasal faktörlerin intihar riskinde artışa yol açabileceğini önermektedir. KOAH ve intihar arasındaki ilişki, birçok çalışmada vurgulanmış ve KOAH hastalarında ruh sağlığı değerlendirmesinin gerekliliğini ortaya koymuştur. İntihar riski değerlendirmesi tüm hekimler için kritik öneme sahiptir. Bu vaka bildiriminde, 70 yaşında KOAH tanılı ve tekrarlayan intihar girişimi olan bir kadın sunularak, KOAH hastalarında artan intihar riski konusunda farkındalık amaçlanmaktadır.

Anahtar Kelimeler: KOAH; intihar; hipoksi

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INTRODUCTION

The prevalence of anxiety and depression in patients diagnosed with chronic obstructive pulmonary disease (COPD) is 27.1% (1). COPD is often associated with limitations in daily activities, leading to social isolation, anxiety, which are risk factors for suicide attempts (1). Moreover, studies have shown that chronic hypoxia itself also can increase the risk of suicide (2,3). Additionally, a study reported that chronic inflammation could lead to the development of depression in COPD patients (4). A meta-analysis has shown that patients with COPD have a 1.9 times higher risk of suicide attempts compared to those without COPD (5). Another study found that women with COPD have a higher risk of suicide compared to men (6). However, suicidal behavior in patients with COPD has not been adequately examined, and the risks and protective factors are not fully understood. This case report aims to contribute to the existing literature by addressing repeated suicide attempts in a patient diagnosed with COPD.

CASE REPORT

Ms. N, a 70-year-old housewife, is literate, living with her two children. In her medical history, she has type 2 diabetes, and coronary artery disease in addition to COPD.

She was brought to the emergency room after attempting suicide by cutting parts of her throat, abdomen (Figures 1, 2). After initial treatment, the patient was admitted to our ward for the second time. Eight months ago, she attempted suicide by cutting her throat, chest, and scalp with a sharp object (Figures 3,4). She was treated in our ward for major depressive disorder with psychotic features and attended six outpatient follow-up visits within eight months after her first suicide attempt. At the initial visit, the patient appeared to be stable on olanzapine 10 mg/day and citalopram 20 mg/day. On the second visit, olanzapine was reduced to 7,5 mg/day. On the third visit, she complained of weight gain and increased sadness, having gained 19 kilograms. Consequently, olanzapine was reduced to 5 mg/day and citalopram was increased to 40 mg/day. In the last two visits, the patient was stable, and it was decided to continue the treatment without any changes. One month after the last visit, she attempted to commit suicide again.

She has been followed for COPD for 4 years was recommended continuous nasal oxygen therapy and bilevel positive airway pressure (BPAP) at night. However, the patient has had difficulty complying with COPD treatment.

Figure 1: Patient's Throat

Figure 2: Patient's Umbilicus

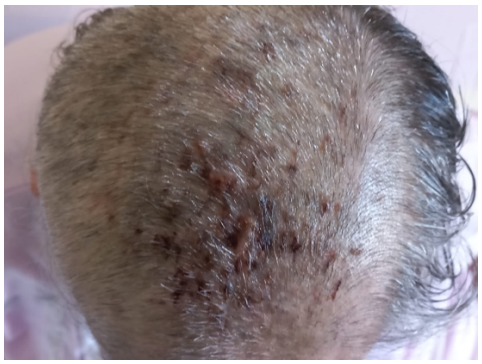

Figure 3: Patient's Scalp

Figure 4: Patient's Chest

In mental status examination, the patient appeared her stated age, with reduced self-care, was reluctant to engage in conversation, and had a defensive attitude towards the interviewer. She had limited eye contact and gave only partially appropriate responses to questions. Her speech rate, volume, and quantity were reduced. Although her psychomotor activity was normal, her reality testing and judgment were impaired. Her mood was anxious, and her affect was depressed. Her thought content included persecutory delusions about her family members and the interviewer. She believed that she was arrested for attempting suicide and thought that she was being interrogated by judges, prosecutors, and police during the examination. She also perceived her hospital admission as a punishment in prison.

After obtaining a detailed history and conducting a mental status examination, the patient was diagnosed with major depressive disorder with psychotic features according to The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) criteria. Since it was uncertain whether she was taking her medications, treatment was adjusted to citalopram 20 mg/day and olanzapine 2,5 mg/day. The Hamilton Depression Rating Scale (HAM-D) score was 35, the Mini-Mental State Examination (MMSE) scored 16, the Brief Psychiatric Rating Scale (BPRS) scored 53 during admission, and the Geriatric Depression Scale (GDS) scored 18. The laboratory findings revealed no pathological findings. As her suicidal thoughts persisted, the citalopram dose was increased to 40 mg/day, and olanzapine was increased to 10 mg/day. The patient was consulted by the pulmonary disease clinic, which recommended continuing the current treatment without interruption. The neurological evaluation conducted by neurologists did not suggest dementia. However, continuous follow-up in the neurology outpatient clinic was recommended.

In the early days of her treatment, the patient stayed in her room alone, refused to eat, and did not communicate with other patients or staff. However, in the later stages of treatment, she began walking around the ward with her oxygen tank and engaging in conversations with others. After a month of treatment, her psychotic symptoms showed significant improvement. Repeated psychometric tests supported this improvement, with HAM-D: 16, MMSE: 23, BPRS: 45, GDS:16. The patient, with no active suicidal thoughts and improved adherence to COPD treatment, was discharged. Two months after discharge, the patient attended one outpatient follow-up visit, reporting feelings of inner distress, sadness, and reluctance to use oxygen therapy. Olanzapine was increased to 12,5 mg/day, and a follow-up appointment was scheduled for one week later, but the patient did not attend. One month after this, her daughter visited, explaining that the patient's son had been in a serious car accident and was in the intensive care unit. She expressed that they were unsure how to share this news with her mother and requested assistance. Following this, the patient and her daughter were asked to return for another visit; however, the patient did not attend and, unfortunately, discontinued follow-up visit. Informed consent for this case report was obtained from the patient and her family.

DISCUSSION

Studies show a strong link between COPD and suicidal behavior (2,5,6). Depressive symptoms are 2.5 times more common in COPD patients, and depression is a major risk factor for suicidal thoughts (8). While depression is recognized as a major risk factor for suicidal thoughts, there is also evidence linking COPD independently to an increased suicide risk (8). Therefore, it's essential to evaluate mental health and suicidal behavior in COPD patients.

Limited mobility in advanced-stage COPD patients, often due to reliance on oxygen devices, can lead to depression and increased suicide risk (1). For this reason, during the patient's hospitalization, adherence to COPD treatment was ensured, and technical support was provided to mobilize her with an oxygen tank. This aimed to increase her mobility and socialization. As a result, the patient was able to socialize with other patients in common areas and participate in garden walks. We believe this contributed to Ms. N's recovery process. Additionally, some studies have presented evidence suggesting that chronic hypoxia caused by COPD may directly increase suicide risk through chronic amine synthesis (2,3). The fact that our patient had two suicide attempts within a year, despite regular psychiatric follow-up, may support these studies.

Another study concluded that COPD itself causes chronic inflammation, which may predict depression (4). Ms. N's frequent hospital admissions to the pulmonary disease ward due to noncompliance with COPD treatment in the past year suggest that her hypoxic condition may have been more severe than that of regularly treated COPD patients. We believe this may be consistent with the aforementioned study.

In conclusion, it is important not to overlook the early detection of suicidal thoughts, and appropriate interventions and referrals are vital. Suicide risk assessment should not only be the responsibility of psychiatric professionals but also be well understood by all physicians involved in the treatment of chronic diseases. While the relationship between COPD and suicide attempts is multifactorial, it is also crucial to consider the underlying biochemical processes. Studies on the subject suggest that inflammation and chronic hypoxia may affect treatment response. We

believe that our case report will contribute to increased awareness on this subject.

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