Mayıs / May 2024
Cilt / Volume 29
Sayı / Issue 2

ISSN:2149-5254
e-ISSN:2458-8849

Anatolian Clinic Journal of Medical Sciences
Anadolu Kliniği
Tıp Bilimleri Dergisi

HAYAT SAĞLIK VE SOSYAL HİZMETLER VAKFI

Anatolian Clinic
Journal of Medical Sciences
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The Journal of Medical Sciences

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Baskı–Cilt / Printing–Binding
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0212 544 5877

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ISSN: 2149-5254 / **e-ISSN:** 2458-8849

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Derginin eski (1933–1954) adı / Previously (1933–1954) named: Anadolu Kliniği
Derginin kısa adı / Abbreviated: Anadolu Klin / Anatol Clin

Yer aldığı indeksler / Indexed by
TR Dizin (TR Index), Turkiye Citation Index, Google Scholar, The Index Copernicus International World of Journals, EBSCO, TürkMedline Pleksus, SCILIT, Scientific World Index, AcademicKeys, ResearchBib, J-Gate, ScopeMed, OAJI, MIAR

HAYAT SAĞLIK VE SOSYAL HİZMETLER VAKFI

Editörden

"İlim, ilim bilmektir
İlim kendin bilmektir
Sen kendini bilmezsin
Ya nice okumaktır"

İlim, sonsuz bir okyanustur. Her insan, bu ummandan kapasitesi kadar faydalanabilir ya da bu ummana damlalar bırakabilir. Maalesef her yenilik ya da her buluş, insanların huzuruna, mutluluğuna, rahatlığına hizmet etmiyor. Bilimin ve bilginin bu derece ilerlediği ve arttığı günümüzde yeryüzünde nice insanlık dışı uygulamalara şahit oluşumuz sözlerin ustası Yunus Emre'nin bu veciz dörtlüğünü akla getiriyor. Bilim, insanın acı ve ızdırabını değil refah ve esenliğinin arttırılması için kullanılmalıdır.

Değerli yazar ve okurlarımız,

Anadolu Kliniği Tıp Bilimleri Dergisi, siz değerli okuyucularımıza 15 araştırma makalesinden oluşan yeni sayımızı sunmanın mutluluğunu yaşıyor.

Anadolu Kliniği Tıp Bilimleri Dergisi; temel tıp bilimleri, klinik bilimler ve diğer sağlık alanlarından gelen orijinal araştırmaları, davetli yazıları, derlemeleri, olgu sunumlarını, teknik raporları ve editöre mektupları içeren bilimsel yazıları yayımlamaktadır. Gönderilen tüm bilimsel yazılar için intihal raporu talep edilmekte olup, benzerlik indeksinin %20 ve üzerinde olması durumunda değerlendirme sürecine alınmadan yazara geri gönderilmektedir. Yazı gönderimlerinde dikkat edilmesi gereken unsurlar; başlıklar, yazar adları, yazar sıralamaları, ilişkili kurum bilgileri, yazışma yazarı bilgileri, ORCID bilgileri, öz ve abstract yapılandırması, anahtar sözcükler, çıkar çatışmaları ve finansman bildirimleridir. Anahtar sözcüklerde İngilizce «Medical Subject Headings (MESH)", Türkçe ise Türkiye Bilim Terimleri (TBT) uygun olarak alfabetik sıra ile verilmelidir. Bu unsurlar, makale değerlendirme sürecini hızlandırmak, daha özgün yazıların yayımlanmasını sağlamak, atıf almayı kolaylaştırmak ve böylece uluslararası saygın indekslerde daha geniş bir okuyucu kitlesine ulaşmak açısından son derece önemlidir.

Anadolu Kliniği Tıp Bilimleri Dergisi'nin uyguladığı yayın politikası, makalelerin tarafsız ve saygın bir şekilde gelişimine katkı sağlamaktadır. Bu doğrultuda uygulanan çok katmanlı değerlendirme süreçleri, yazarların çalışmalarının kalitesine doğrudan yansımaktadır. Bilimsel yazının ilk gönderildiği aşamadan yayınlanmasına kadar olan süreçte, yazarlar, okuyucular, araştırmacılar, yayıncı, hakemler ve editörler gibi tüm paydaşların etik ilkelere uyum göstermesi büyük önem taşımaktadır. Standartları yükseltmek adına kapak sayfası, editöre sunum sayfası ve *Basıma Onam ve Telif Hakkı Devir Formu* güncellenmiştir. Bu nedenle, siz değerli yazarlarımızın eserlerinizi gönderirken güncel formları kullanmanızı rica ediyoruz.

Son olarak, değerli yazarlarımız ve okuyucularımız başta olmak üzere, tüm yoğunluklarına rağmen özveriyle çalışmalarını sürdüren hakemlerimize, editörlerimize ve teknik ekibimize verdikleri destek için teşekkür ederiz. Katkı ve desteklerinizin artarak devam etmesini temenni eder, yeni yılın insanlığa sağlık, mutluluk ve huzur getirmesini dileriz.

Saygılarımızla,

Doç. Dr. Sedat Akbaş

TIP DALLARINDAKİ GELİŞMELERİN TARİHİ

EDİTÖRLER

HAKAN ERTİN, AHMET SALDUZ
ZEYNEB İREM YÜKSEL SALDUZ

Tıp, saf bilimden ziyade, bilim ile sanatın birleşmesiyle oluşan bir disiplindir. Pozitif bilimlerin çoğu alanını tanımlamayı amaçlarken, tıp bilimsel metod ve prensipleri insanlığın yararına kullanılan bir maharete dönüştürür. Bir başka deyişle, tıp başlı başına bir şifa verme sanatıdır.

Hekimlik mesleğini bütün bu öğeleri ile hakkını vererek yapabilme, yaşadığımız anı idrak edebilme, geçmişte yapılan hataları tekrarlamama ve bir ölçüde ileriyi öngörebilme söz konusu olduğunda tıp tarihine vakıf olmanın önemi inkar edilemez. Mesleğinin teknik yönleri kadar tarihini de öğrenmek için çaba gösterenler başarıya ulaşma yolunda bir adım önde olacaklardır. Herakleitos'un yüzyıllar öncesinden ifade ettiği *'Değişmeyen tek şey değişimin kendisidir'* sözü uyarınca bilginin de dönüşüp değiştiği, zaman içinde evrildiği aşikardır. Bir bilimi oluşturan teoriler, keşifler, yenilikler insanlığın binlerce yılda oluşturduğu bilgi birikiminin ürünüdür. Günümüz tıbbı da geçmişten bu yana basamak basamak çıkılan bir merdiven gibi, gerçeğe ulaşan yoldaki tüm bilgi ve tecrübelerin sentezidir. Yarının bilimine ise bugünden aktardığımız bilgi ve tecrübelerimiz temel olacaktır.

Alanında ehil, değerli bilim insanı hocalarımızın katkılarıyla ortaya çıkan ve tıp dallarının tarihini hekim gözüyle anlatmayı hedefleyen bu kitabın tıbba, hekimliğe ve sağlığa ilgi duyan tüm okurlar için bir kaynak eser olmasını umuyoruz.

BETİM KİTAPLIĞI

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Three-dimensional geometric analysis of facial symmetry in skeletal class I individuals

İskelet sınıf I bireylerde yüz simetrisinin üç boyutlu geometrik analizi

Nihal Gurlek Celik[1], Burcu Akman[2], Rabia Koca[3]

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Abstract

Aim: Our aim in this study is to determine anatomical points to detect asymmetry on both sides of the face, to make morphometric measurements according to age/sex, and to compare facial asymmetry index values according to sex.

Methods: Three-dimensional (3D) Computed Tomography (CT) images of 90 individuals of both sexes (45 female, 45 male) were included in our study. Morphometric measurements of the face were made using the 3D Slicer software package on these images. To evaluate facial asymmetry in more detail, measurements were made using 3D-CT, and asymmetry index values were calculated.

Results: When we analyzed according to sex, female right Condylion-Gonion-Menton angle (CoGoMe_R^) values were statistically higher than males (p=0.049). There was no statistical difference between the asymmetry index values of males and females (p>0.05). According to the Pearson correlation test, a statistically weak positive correlation was found between age with CoGoMe_R^, left Condylion-Gonion-Menton angle (CoGoMe_L^) (in both r=0.228, p=0.031), and Condylion-Menton (CoMe) asymmetry (r=0.237, p=0.024). According to the Pearson correlation test, a statistically weak negative correlation was found between age and Condylion-Subspinale (CoSs) asymmetry (r=-0.209, p=0.048).

Conclusions: It is observed that the measurements around the mandible show more changes with age. In sex comparisons, although most of the facial morphometric measurements of males were significantly larger than those of females, no significant difference was found in the asymmetry index values.

Keywords: Facial asymmetry; sex; three-dimensional imaging; tomography

Öz

Amaç: Bu çalışmadaki amacımız yüzün her iki tarafındaki asimetriyi tespit edebilmek için anatomik noktaları belirlemek, yaşa/cinsiyete göre morfometrik ölçümleri yapmak ve yüz asimetri indeks değerlerini cinsiyete göre karşılaştırmaktır.

Yöntemler: Çalışmamıza her iki cinsiyete ait 90 bireyin (45 kadın, 45 erkek) üç boyutlu (3D) Bilgisayarlı Tomografi (BT) görüntüleri dahil edilmiştir. Bu görüntüler üzerinden 3D Slicer yazılım paketi kullanarak yüzün morfometrik ölçümleri yapılmıştır. Yüz asimetrisinin daha ayrıntılı değerlendirilebilmesi için 3D-CT kullanılarak ölçümler yapıldı ve asimetri indeks değerleri hesaplandı.

Bulgular: Cinsiyete göre incelediğimizde, kadınların sağ Condylion-Gonion-Menton açı değerleri erkeklerden istatistiksel olarak yüksekti (p=0.049). Erkek ve kadınların asimetri indeks değerleri arasında istatistiksel olarak fark bulunmadı (p>0.05). Yaş ile sağ Condylion-Gonion-Menton açısı, sol Condylion-Gonion-Menton açısı (her ikisinde r=0.228, p=0.031) ve Condylion-Menton asimetrisi (r=0.237, p=0.024) arası Pearson korelasyon testine göre istatistiksel olarak anlamlı zayıf pozitif korelasyon bulundu. Yaş ile Condylion-Subspinale asimetrisi arası Pearson korelasyon testine göre istatistiksel olarak anlamlı zayıf negatif korelasyon bulundu (r=-0.209, p=0.048).

Sonuçlar: Mandibula etrafındaki ölçümlerin yaşla birlikte daha çok değişiklik gösterdiği gözlenmektedir. Cinsiyet karşılaştırmalarında ise, erkeklerin yüz bölgesindeki morfometrik ölçümlerinin birçoğu kadınlara göre anlamlı olarak büyük olmasının yanında asimetri indeks değerlerinde anlamlı fark bulunmadı.

Anahtar Sözcükler: Cinsiyet; tomografi; üç boyutlu görüntüleme; yüz asimetrisi

Received/*Geliş* : 14.11.2023
Accepted/*Kabul*: 11.03.2024

DOI: 10.21673/anadoluklin.1390504

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INTRODUCTION

Symmetry is equality around a center and axis or on both sides of the body (1). Asymmetry is the deterioration and incompatibility of the ratio between the tissues. Facial asymmetry is the deterioration of proportion and harmony on both sides of the face (2). There is no completely symmetrical human face due to different reasons such as genetic factors, environmental conditions, and various diseases (3,4). Mild facial asymmetries are considered normal and do not pose a problem in terms of both aesthetics and function (5). Significant asymmetries may occur due to differences in bone structure and surrounding soft tissues. However, it can cause a decrease in facial attractiveness, deterioration of various functions, and psychosocial problems (6).

As it moves away from the cranium, asymmetry increases in the lower parts of the face (7). Due to the different growth rates of the mandible, the deviation in the lower parts of the face is higher in terms of amount and frequency than the deviation in the upper parts of the face (8). Mandibular condyle height inequality is the most important cause of lower facial asymmetries (9). For this reason, it causes the chin tip to be shaped towards the short condyle side (10).

One of the most important causes of facial asymmetry is the nose in the middle of the face (11). The nose is important in determining facial symmetry, and the curved nose is effective in facial development. In addition, researchers have argued that nasal curvature and facial asymmetry can be seen together (12).

The ideal proportions of the face are a subject that artists and health professionals often research. In recent years, it has begun to attract the attention and research of many professional groups. In particular, orthodontists try to achieve proper facial symmetry and provide a fully balanced occlusion (13). The angle measured between the Subspinale (A), Nasion (N), and Supramental (B) points is called the ANB angle. This angle gives information about the anteroposterior position of the maxilla and mandible bones (14,15). The place of ANB measurement is important in a person's skeletal classification. In the studies conducted, ANB angle measurement between 0˚ and 4˚ is stated as Class I (normal jaw development) (16,17). While malocclusion can be treated if it is caused by face type, congenital face proportions cannot be changed (18).

In recent years, three-dimensional (3D) imaging methods have been used to analyze different body structures (19,20). Because 3D images provide accurate and detailed information, especially in evaluating asymmetric facial structures, allowing the structures to be observed from every angle. The use of Computed Tomography (CT) has become one of the methods that provide the most comprehensive and accurate results in evaluating craniofacial structures (21).

This study, it was aimed to determine the presence of asymmetry on both sides of the face using 3D-CT images, to make morphometric measurements according to sex/age, and to compare facial asymmetry index values according to sex. Data obtained from the article is thought will be helpful for similar studies to be carried out in fields such as plastic surgery, dentistry, and maxillofacial surgery.

MATERIALS AND METHODS

Participants

CT images of 90 healthy individuals (45 female, 45 male) aged 18-57 years were included in the study. CT data are between June 2022 and August 2022. Sample size calculation was calculated with the G*Power program (version 3.1.9.6, Franz Faul, Universität Kiel, Germany) as an effect size of 0.6, alpha level of 0.05, and a study power of 0.80, with a minimum number of samples of 90 (45 in each group). In addition, individuals who have not undergone brain and maxillofacial surgery, have no congenital or traumatic craniofacial deformity, have no pathology in the facial bones, and have an ANB angle between 0-4º (Class I, normal jaw development) were included in the study (Figure 1).

The approval of the Amasya University Non-Interventional Clinical Research Ethics Committee (Date: 02.03.2023, Approval Decision No: 2023/21) was obtained.

CT-scan Acquisition

CT scans of all individuals were performed on 128-slice GE Healthcare Revolution EVO CT (GE Medical Systems; Milwaukee, WI) and multi-detector CT scanners. Tube voltage, 120 kVp; tube current, 100–450

mA; scanning direction, craniocaudal; rebuild kernel, standard; section thickness, 0.625 mm; and section overlap, 0.625 mm. After shooting, axial and sagittal multi-plane reformat (MPR) images were obtained with a section thickness of 0.625 mm.

3D Image Processing

This study was a retrospective analysis of head computed tomography (CT) scans of individuals admitted to the radiology department. Images of all individuals were recorded in DICOM (Digital Imaging and Communications in Medicine) format. These recorded DICOM data were transferred to a personal computer, and free, open-source software, 3D Slicer (https://www.slicer.org/, version 4.11.20210226) was used for analysis (22).

CT images of the people were loaded into the 3D Slicer program. The loaded images were reconstructed in 3D and oriented in three planes (Threshold Range= 200/3070 HU). Planes Ryckman et al. (23) was created based on. The horizontal plane was determined as the lowest border of the orbital bone with the bilateral porion point. The midsagittal plane was determined as the border passing through the sella and nasion perpendicular to the ground. Finally, the coronal plane oriented perpendicular to these two planes was created (Figure 2). The reference points we determined on the images were indicated as left and right, and their positions on the planes were confirmed (Table 1) (Figure 3,4,5). Measurements were made by a single person (NGC). One month later, the measurements of 10 randomly selected participants were re-evaluated (Intra-class correlation coefficient was used).

The asymmetry index gives information about the differences in body sides. In our study, the asymmetry index of the measurement results of the facial morphometry of both sides was calculated according to sex. Habets et al. (24) used the formula of Asymmetry Index= |(R-L) / (R+L)| * 100 (%) (AI: Asymetry Index, R: Right, L: Left). The values calculated with this formula provide a value for the symmetry/asymmetry specific to each individual by reducing extreme values to average values. As the calculated asymmetry index values moved away from zero, that region was considered asymmetrical.

Statistical Analyses

The data were evaluated in Statistical Package for the Social Sciences package program, version 26, IBM Corp., Armonk, New York, USA. Descriptive statistics were given as mean ± standard deviation (mean ± sd). The Pearson correlation coefficient evaluated the relationships between age and the measured and asymmetry index values of the face. According to sex, the face's measured and asymmetry index values were compared with the independent samples t-test. A value of $p<0.05$ was considered statistically significant.

RESULTS

A total of 90 individuals, 45 male and 45 female, were included in the study. The individuals were 18-57 years, and the mean age was 29.1±10.8 years.

CoGoMe_Rˆ values of females were statistically higher than males (p=0.049). Although female's CoGoMe_Lˆ values were higher than males, this difference was not statistically significant (p=0.09). The values of males were statistically higher than females in all other measurements ($p<0.05$) (Table 2).

According to the Pearson correlation test, a statistically significant weak positive correlation was found between age and right Condylion-Gonion-Menton angle (CoGoMe_Rˆ), left Condylion-Gonion-Menton angle (CoGoMe_Lˆ) (r=0.228, p=0.031 in both) and Condylion-Menton (CoMe) asymmetry (r=0.237, p=0.024). According to the Pearson correlation test, a statistically significant weak negative correlation was found between age and Condylion-Subspinale (CoSs) asymmetry (r=-0.209, p=0.048) (Table 3).

There was no statistical difference between the asymmetry index values of males and females ($p>0.05$) (Table 4).

DISCUSSION AND CONCLUSION

In the literature, many reasons cause facial asymmetry in humans. Various factors such as contralateral hemispheric control, development rates of facial muscles, genetic factors, weather conditions, gravity, bone resorption, and displacement of subcutaneous tissues cause asymmetry (25,26). Penke et al. (27) stated in

Table 1. Definition of the landmarks

Landmark	Definition
Condylion (Co)	Upper midpoint of the mandibular condyle
Gonion (Go)	The middle point of the part where ramus mandibula and corpus mandibula connect to each other
Menton (Me)	Symphysis is the lowest point of the mandible
Nasion (Na)	Midpoint of nasofrontal suture
Frontomalare orbitale (Fmo)	The junction of the zygomaticofrontal suture and the lateral edge of the orbit
Frontomaxillary (Fm)	Point where the frontomaxillary suture meets the medial edge of the orbit
Subspinale (Ss)	Point below the spina nasalis anterior
Supmentale (Sm)	The deepest point of the anterior alveolar bone recess in the mandible
Condylion-Gonion-Menton Angle (CoGoMeˆ)	Angle between Condylion, Gonion and Menton

Table 2. Comparisons between measured values of the face by sex

		Sex		Test statistics†	
Variables		**Male**	**Female**	**Test value**	***p***
Distance between Condylion-Gonion (*mm*)	R	64.891±5.372	56.495±4.925	7.729	***<0.001***
	L	64.970±6.257	56.621±4.521	7.256	***<0.001***
Distance between Gonion-Menton (*mm*)	R	85.286±5.284	77.975±5.657	6.336	***<0.001***
	L	83.996±4.825	77.896±6.369	5.122	***<0.001***
Condylion-Gonion-Menton (angle=ˆ)	R	117.989±4.749	119.901±4.460	3.975	***0.049****
	L	118.888±5.343	120.608±4.290	2.933	0.090*
Distance between Condylion-Menton (*mm*)	R	128.282±4.855	116.996±7.108	8.796	***<0.001***
	L	128.000±5.075	116.862±7.212	8.473	***<0.001***
Distance between Condylion-Nasion (*mm*)	R	105.718±4.109	97.972±3.661	9.443	***<0.001***
	L	105.165±3.890	97.675±3.177	10.004	***<0.001***
Distance between Condylion-Subspinale (*mm*)	R	102.812±3.922	95.324±4.535	8.378	***<0.001***
	L	102.228±4.102	95.352±4.635	7.453	***<0.001***
Distance between Frontomalare Orbitale-Frontomaxillary (*mm*)	R	38.558±1.481	36.467±2.409	4.958	***<0.001***
	L	38.709±2.029	36.689±2.104	4.636	***<0.001***
Distance between Frontomalare Orbitale-Menton (*mm*)	R	127.367±6.491	116.465±5.938	8.313	***<0.001***
	L	127.189±5.927	117.329±5.942	7.881	***<0.001***
Distance between Frontomalare Orbitale Right- Frontomalare orbitale Left (mm)		101.734±3.761	95.593±4.144	7.362	***<0.001***
Distance between Subspinale-Menton (*mm*)		60.783±5.936	55.166±3.887	5.310	***<0.001***
Distance between Nasion-Menton (*mm*)		123.053±7.625	110.261±6.378	8.632	***<0.001***

Data are given as mean±standard deviation. †: Independent samples *t* test, *: Adjusted for age. The parts determined in bold are statistically significant (p<0.05). R: Right, L:Left

their study that cognitive decline is associated with facial asymmetry. A deviation in the nasal septum in the middle of the face affects the development of many bone structures around it. Studies have reported that facial asymmetries occur due to developmental differences (28,29,30,31).

Studies in the literature report that the age factor affects the asymmetry. Soft tissues weaken with age (32), gravity reshapes the face with age (33), and repetitive contraction of facial muscles and redistribution of subcutaneous tissues over the years (34) are among the effects of age on asymmetry. Skomina et al. (35) reported that facial asymmetry increases, facial convexity decreases, forehead angle and distance between eyes increase with aging in both sex. Ferrario et al. (12) stated that facial asymmetry mainly was in adolescents, but there was no significant difference. Our study found a statistically weak positive correlation between age and CoGoMe_Rˆ, CoGoMe_Lˆ and CoMe asymmetry. A statistically weak negative corre-

Table 3. Correlations between age and variables

Variables	Age					
	Facial side				Asymmetry Index (%)	
	Right		Left			
	r	*p*	*r*	*p*	*r*	*p*
Distance between Condylion-Gonion (*mm*)	-0.003	0.980	-0.004	0.970	0.170	0.109
Distance between Gonion-Menton (*mm*)	-0.184	0.082	-0.193	0.069	0.111	0.297
Condylion-Gonion -Menton (angle=ˆ)	0.228	***0.031***	0.228	***0.031***	0.139	0.190
Distance between Condylion -Menton (*mm*)	-0.024	0.819	-0.014	0.894	0.237	***0.024***
Distance between Condylion-Nasion (*mm*)	-0.002	0.986	-0.043	0.685	0.072	0.498
Distance between Condylion-Subspinale (*mm*)	-0.096	0.370	-0.039	0.713	-0.209	***0.048***
Distance between Frontomalare Orbitale-Frontomaxillary (*mm*)	0.054	0.613	-0.028	0.794	-0.061	0.568
Distance between Frontomalare Orbitale-Menton	0.036	0.735	0.038	0.720	0.041	0.701

Variables	Age	
	r	*p*
Distance between Frontomalare Orbitale Right-Frontomalare Orbitale Left (mm)	-0.055	0.605
Distance between Subspinale -Menton (*mm*)	0.090	0.397
Distance between Nasion-Menton (*mm*)	0.080	0.454

r: Pearson correlation coefficient The parts determined in bold are statistically significant (p<0.05).

Table 4. Comparisons between Asymmetry Index Values by Sex

Variables	Sex		Test statistics†	
	Male	Female	Test value	*p*
Condylion-Gonion asymmerty (%)	1.475±1.139	1.656±1.155	0.749	0.456
Gonion-Menton asymmetry (%)	1.477±1.200	1.511±1.206	0.137	0.891
Condylion-Gonion-Menton asymmetry (%)	1.094±0.898	0.985±0.693	0.641	0.523
Condylion--Menton asymmetry (%)	0.924±0.718	0.891±0.668	0.055	0.815*
Condylion-Nasion asymmetry (%)	1.077±0.736	1.363±0.960	1.589	0.116
Condylion- Subspinale asymmetry (%)	1.856±1.496	2.210±1.738	1.103	0.297*
Frontomalare Orbitale -Maxillofrontale asymmetry (%)	1.630±1.302	1.762±1.091	0.523	0.602
Frontomalare Orbitale -Menton asymmetry (%)	0.735±0.625	0.819±0.885	0.522	0.603

Data are given as mean±standard deviation. †: Independent samples *t* test, *: Adjusted for age

lation existed between age and CoSs asymmetry. There was no statistically significant relationship between age and other facial measurements and asymmetry index values (p>0.05). In our study, it was observed that age mostly affected the measurements around the mandible. Various environmental factors cause mandibular height inequality. It is thought that this height inequality causes age-related measurements and asymmetry values. D'Antò et al. (36) study, CoGoMeˆ angle measurement was made on lateral cephalogram images of individuals aged 8-53. In the study, the average angle value of the Class I group was 127.09±7.8 and it was reported that it decreased by 0.6° every year with age. We think that the differences in findings are due to differences in methodology.

In previous studies, it has been reported that the facial width of males is greater than that of females in measurements made in the viscerocranium (37,38,39). Ferrario et al. (40) reported that males' faces were longer and wider than females' in their study, in which the basic face height was proportional to the width of the face according to the sex. Hodges-Simeon et al. (41) examined face length and width in their study. They said that because of the elongation in the lower face, the length of the face changes more than its width. It has been stated that this lower facial elongation is more prominent in males. Dividing the individuals in the 17-90 age group into three groups according to their age groups, Butovskaya et al. (42) explained sex differences in their regional studies. They named the 17-29

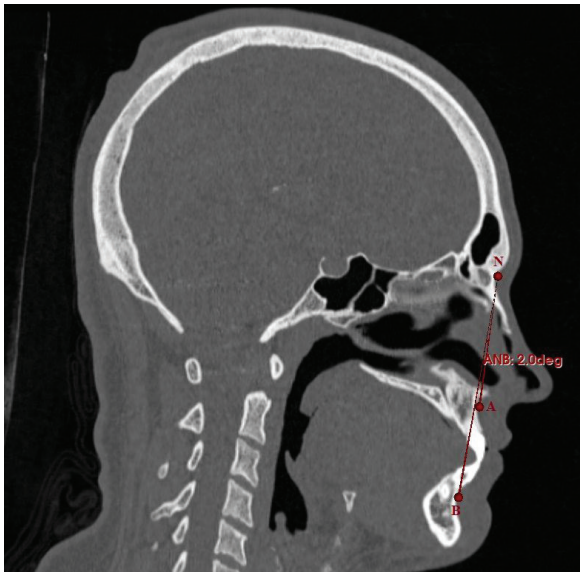

Figure 1. ANB (A: Subspinale, N: Nasion, B Supramental) angle view over sagittal section

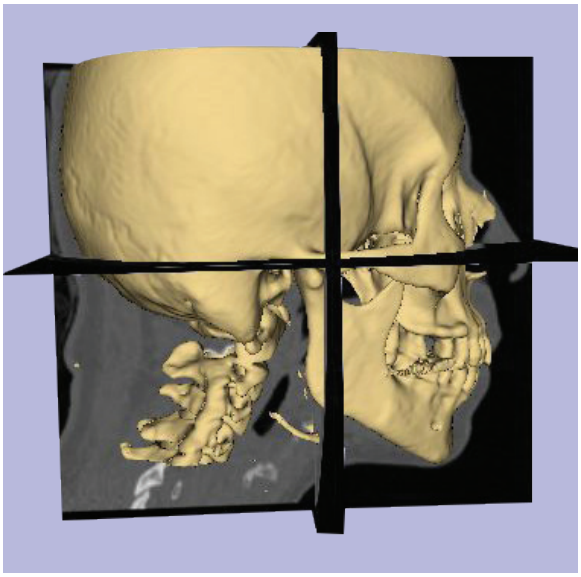

Figure 2. Planes used as a reference in the coordinate system

age group as the young group, the 30-50 age group as the middle group, and the 51 and over age group as the elderly. They stated that the sex differences in facial morphology were less in the younger age group, this difference increased with increasing age, but the sex difference in the elderly group was not significant. According to Skomina et al. (35), male faces were found to be more asymmetrical and wider, and it was stated that the difference between the sexes increased more in older adults. Toneva et al. (43) estimated sex from differences in shape and size in the viscerocranium. They argued that there was a significant difference in shape in all eye, nose, maxillary and zygomatic regions, and the sizes were significantly larger in males. Similarly, in our study, the measurements were higher in males than in females. Smith (44) reports in his study that the left sides of males and the right sides of females are wider than the opposite sides, but the difference is not significant. This difference may be due to differences in the cognitive processing of two different brain hemispheres. Ferrario et al. (12) divided the participants in their study into three groups adolescents, young adults and adults. They determined the points in the soft tissue of the face with an electromagnetic device and detected the asymmetries. They stated that there was no significant difference in the measurements and asymmetries depending on sex and that this asymmetry difference was higher in females of the same age group than in males. They reported that the greatest asymmetry values were in the adolescent group. They stated that tragion, gonion and zygion are the most asymmetric landmarks in the body. In our study, the facial morphometric measurements of males were found to be significantly larger than those of females, in line with the literature, in comparing face measurement values according to sex ($p<0.05$). Only CoGoMe_Lˆ did not differ significantly between sex ($p>0.05$).

Facial asymmetry is the deterioration of proportion and harmony on both sides of the face (2). Ferrario et al. (45) reported that the right side of the face is larger than the left side, while Maheswari et al. (2) stated that the left side of the face is larger than the right side in the vast majority of individuals with normal appearance. Peck et al. (46) reported that 3.54 mm of facial asymmetry was most frequently encountered in the mandibular region, followed by the zygomatic region (2.25 mm) and the orbital region (0.87 mm) respectively. Shaner et al. (47) reported that the normal limits of asymmetry in the upper and middle regions of the face were not more than 5 mm in males and 6 mm in females. In the lower regions, it was stated that the difference between the right and the left was 6 mm or more. Ferrario et al. (12) showed that this difference was at most 2.5 mm. In the same study, he reported that asymmetry, considered normal, is more common in females than males. On the other hand, Ercan et

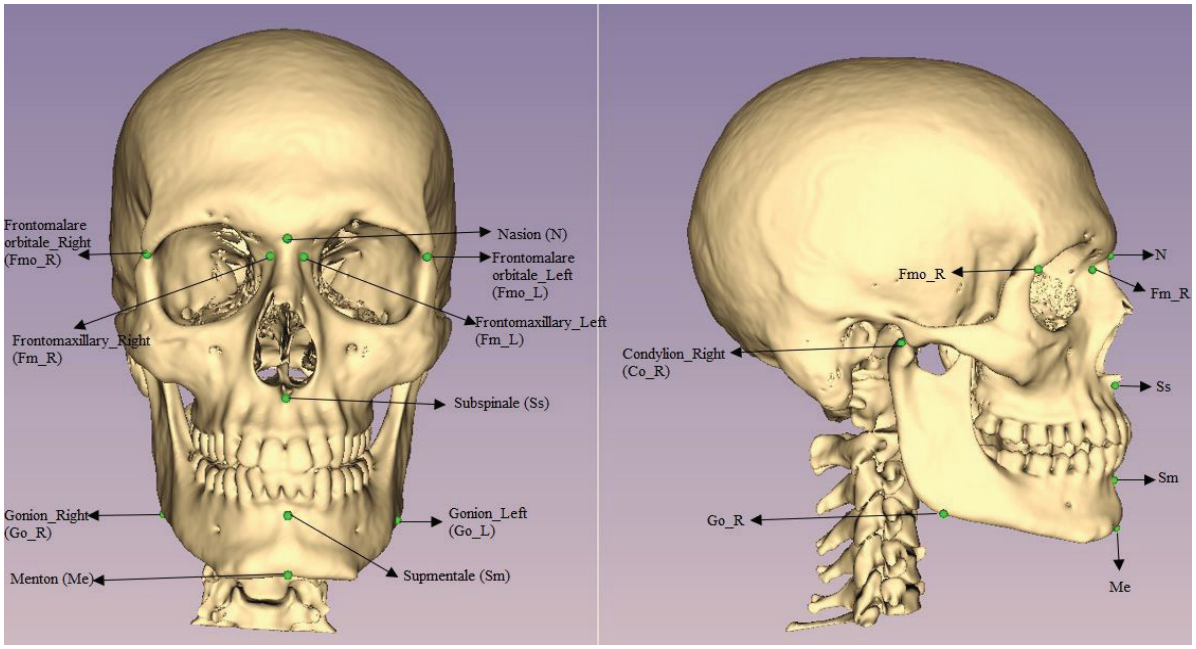

Figure 3. Front and right side view of landmarks

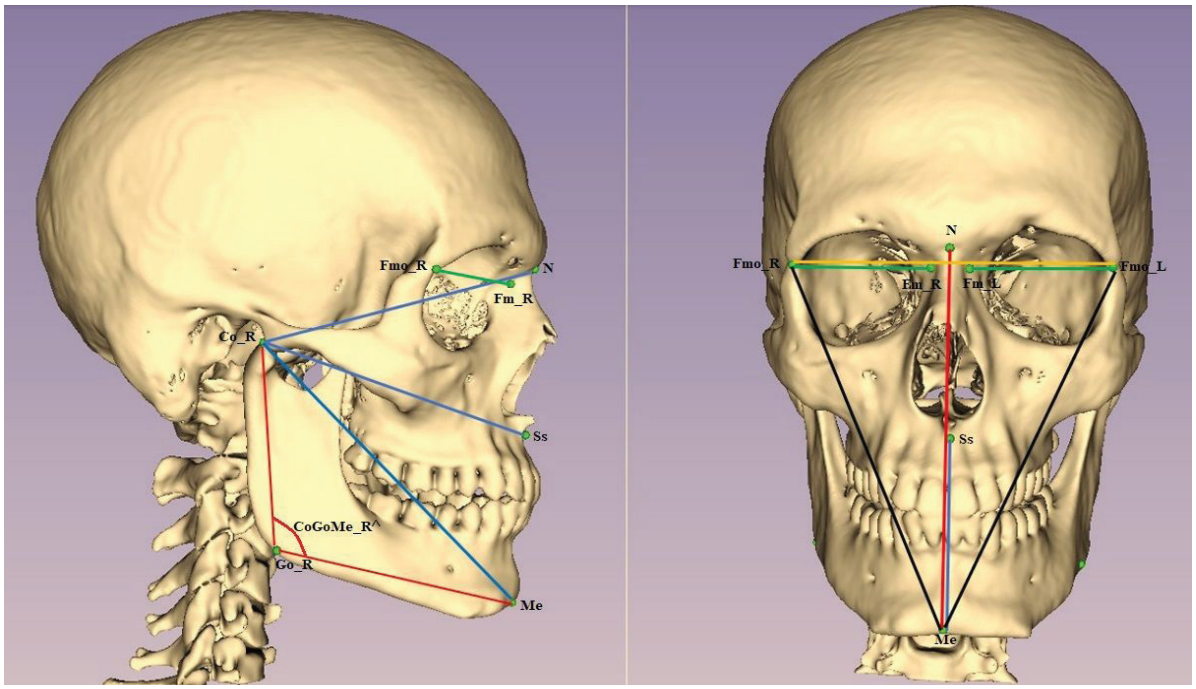

Figure 4. View of vertical and horizontal parameters together with the angle of the mandible (right side and front view) (Fmo_R: Frontomalare orbitale_Right, Fm_R: Frontomaxillary_Right, N: Nasion, Co_R: Condylion_Right, Go_R: Gonion_Right, Me:Menton, CoGoMe_R^: Condylion-Gonion-Menton_Right Angle, Ss: Subspinale Fmo_L: Frontomalare orbitale_Left, Fm_L: Frontomaxillary_Left)

al. (1) reported that asymmetrical differences on the right and left sides of the face were more common in females in their study of late adults, while Rajpara and Shyagali (13) emphasized that facial asymmetry is more common in males. Sajid et al. (48) also examined facial asymmetry by sex and ethnicity. They stated that asymmetry varies according to ethnicity, and males' faces are more asymmetrical than females'. In our study, it was determined that the asymmetry value did not differ according to sex. It is thought that our study

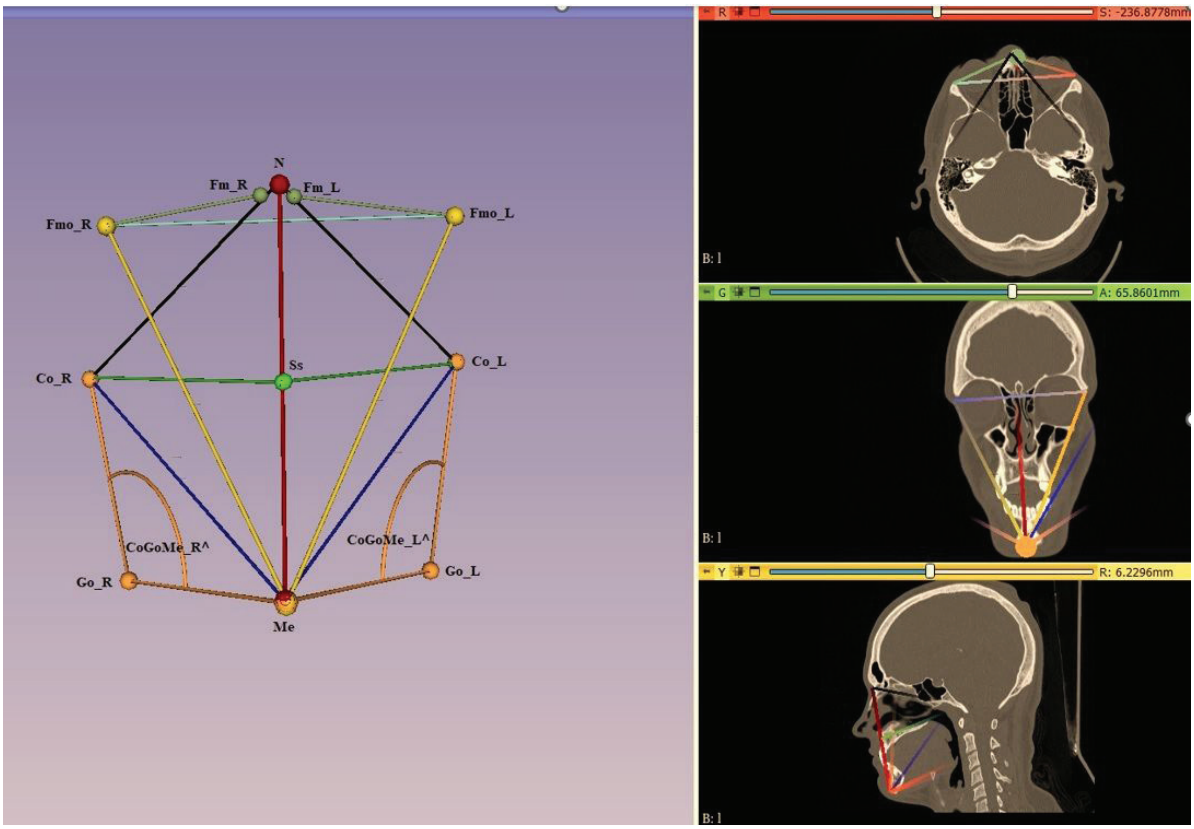

Figure 5. Geometric representation of anatomical measuring points (Fmo_R: Frontomalare orbitale_Right, Fm_R: Frontomaxillary_Right, N: Nasion, Co_R: Condylion_Right, Go_R: Gonion_Right, Me:Menton, CoGoMe_R^: Condylion-Gonion-Menton_Right Angle, Ss: Subspinale Fmo_L: Frontomalare orbitale_Left, Fm_L: Frontomaxillary_Left, Co_L: Condylion_Left, Go_L: Gonion_Left, CoGoMe_L^: Condylion-Gonion-Menton_Left Angle)

differs from the literature because of sample size, differences in asymmetry index calculations.

When the literature is examined, some researchers have calculated the facial asymmetry index by examining the face and marking certain points to evaluate the asymmetry with numerical data. There are different types of computation in various studies. Huang et al. (49) took 3D facial images of the participants. Sixteen facial signs were selected in each image, and they stated that the asymmetry in the lower parts of the face was more. Blasi et al. (50) calculated the facial asymmetry index with 3D-CT imaging. They found the asymmetry index in the lower third of the face to be higher than in the upper parts of the face.

Nakamura et al. (51) used PA cephalograms and front-view photographs to evaluate facial asymmetry and found the AI values with the calculated formula. Headache, neck stiffness or pain, and shoulder stiffness or pain compared the facial asymmetry index of the patient and healthy control groups. They could not find a significant difference (51). Our study found no significant difference when asymmetry values were compared according to sex ($p>0.05$). Of our results, Nakamura et al. (51) were found to be compatible with. We think this may be due to the similarity of the method we used to calculate the asymmetry index.

In recent years, 3D-CT imaging has overtaken the traditional cephalography-based method for a more detailed evaluation of facial asymmetry. Morphometric analyses and asymmetry index calculations are made to measure facial asymmetry. Our aim in this study was to determine the presence of asymmetry on both sides of the face, to make morphometric measurements according to sex/age, and to compare facial asymmetry index values according to sex. It is observed that the measurements around the mandible show more variation with age. In sex comparisons, although most of the facial morphometric measure-

ments of males are significantly larger than females, there is no significant difference in the asymmetry index values. Correct detection and definition of reference points in the measurements made, especially the fact that the asymmetry index values are even at minimal levels, suggests the existence of asymmetry. For this reason, we believe that our study will be important for clinicians.

Limitations

Since our study is single-centered, it does not include different ethnicities, the sample size is small and analysis cannot be made by dividing it into age groups, and finally, since our study belongs to a healthy population and the ANB angle, which is an indicator of normal jaw development, is between 0-4°, can be considered as our limitation.

Conflict-of-interest and financial disclosure

The authors declare that they have no conflict of interest to disclose. The authors also declare that they did not receive any financial support for the study.

Author Contributions

N Gurlek Celik: Project development, data collection, data interpretation, visualization, writing- reviewing and editing. B Akman: Data collection, data interpretation, and approval of the version to be published. R Koca: visualization, writing- reviewing and editing and approval of the version to be published.

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Risk factors of peri-intubation cardiovascular collapse in critically ill patients

Yoğun bakım hastalarında endotrakeal entübasyon esnasında gelişen kardiyovasküler kollapsa etki eden risk faktörleri

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Abstract

Aim: Peri-intubation cardiovascular collapse is a common side effect of tracheal intubation and is associated with increased mortality in critically ill patients. We aimed to determine the potential risk factors associated with peri-intubation cardiovascular collapse.

Methods: This is a prospective observational study of patients who were critically ill and undergoing tracheal intubation from August 1, 2022 to February 28, 2023. The primary outcome was peri-intubation cardiovascular collapse. Peri-intubation cardiovascular collapse was defined as systolic blood pressure <65 mm Hg or new or increased need for vasopressors between induction and 2 minutes after tracheal intubation, or cardiac arrest or death between induction of anesthesia and 1 hour after tracheal intubation.

Results: A total of 87 eligible patients were included. Of them, 37 (42.5%) had peri-intubation cardiovascular collapse. Multivariate logistic regression analysis showed that a shock index ≥ 0.90 (odds ratio [OR] 9.87, 95% confidence interval [CI] 2.98–32.70, p<0.001) and older age (OR 1.07, 95%CI 1.01–1.13, p=0.013) were independent risk factors for peri-intubation cardiovascular collapse. The mortality rate was similar in patients with and without peri-intubation cardiovascular collapse (56.8% vs. 42.0%; p=0.198).

Conclusion: The incidence of peri-intubation cardiovascular collapse is high in critically ill patients. Precautions should be taken because of the increased risk of peri-intubation cardiovascular collapse in elderly patients and patients with a shock index ≥ 0.90.

Keywords: Airway management; cardiovascular collapse; intensive care unit; intubation; mortality; shock index.

Öz

Amaç: Kardiyovasküler kollaps, yoğun bakım hastalarında trakeal entübasyon esnasında sıklıkla meydana gelen ve mortaliteyi arttıran bir komplikasyondur. Biz bu çalışmada, trakeal entübasyon esnasında kardiyovasküler kollapsa neden olan risk faktörlerini araştırmayı amaçladık.

Yöntemler: Bu çalışma, 1 Ağustos 2022 ile 28 Şubat 2023 tarihleri arasında yoğun bakımda yatan ve trakeal entübasyon uygulanan hastalar üzerinde yapılan prospektif gözlemsel bir çalışmadır. Çalışmanın primer sonlanım noktası kardiyovasküler kollapstı. Kardiyovasküler kollaps, indüksiyonun başlangıcından trakeal entübasyondan sonraki 2. dakikaya kadar olan sürede sistolik kan basıncının 65 mm Hg altına düşmesi veya yeni vazopresör ihtiyacının ortaya çıkması veya zaten vazopresör alanlarda ihtiyacın artması veya indüksiyonun başlangıcından trakeal entübasyondan sonraki 1. saate kadar olan sürede kardiyak arrest veya ölüm saptanması olarak tanımlandı.

Bulgular: Toplam 87 hasta çalışmaya dahil edildi. Bu hastaların 37'sinde (%42,5) kardiyovasküler kollaps meydana geldi. Lojistik regresyon analizinde, şok indeksinin 0,90 ve/veya üzerinde olması (OR 9,87, %95CI 2,98–32,70, p<0,001) ve ileri yaş (OR 1,07, %95CI 1,01–1,13, p=0,013) kardiyovasküler kollaps için bağımsız risk faktörleri olarak bulundu. Mortalite oranı kardiyovasküler kollaps olan (%56,8) ve olmayan hastalarda (%42,0) benzer bulundu (p=0,198).

Sonuç: Yoğun bakım hastalarında trakeal entübasyon esnasında gelişen kardiyovasküler kollaps insidansı yüksektir. Yaşlı hastalarda ve şok indeksi ≥ 0.90 olan hastalarda kardiyovasküler kollaps riskinin artması nedeniyle uygun önlemler alınmalıdır.

Anahtar Sözcükler: Endotrakeal entübasyon; hava yolu yönetimi; kardiyovasküler kollaps; mortalite; şok indeks; yoğun bakım ünitesi.

Received/*Geliş* : 05.06.2023
Accepted/*Kabul*: 20.02.2024

DOI: 10.21673/anadoluklin.1310223

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INTRODUCTION

Tracheal intubation is a routine and life-saving procedure applied in the intensive care units (ICU) (1) complication rates may also differ. We undertook a prospective, observational study of tracheal intubation performed by critical care doctors in Scotland to identify practice, complications, and training. Methods. For 4 months, we collected data on any intubation performed by doctors working in critical care throughout Scotland except those in patients having elective surgery and those carried out before admission to hospital. We used a standardized data form to collect information on pre-induction physical state and organ support, the doctor carrying out the intubation, the techniques and drugs used, and complications noted. Results. Data from 794 intubations were analysed. Seventy per cent occurred in ICU and 18% occurred in emergency departments. The first-time intubation success rate was 91%, no patient required more than three attempts at intubation, and one patient required surgical tracheostomy. Severe hypoxaemia (<80%. Critically ill patients are more vulnerable to tracheal intubation procedures than non-critically ill patients due to limited physiologic reserve (2). Serious complications, including cardiovascular instability/collapse and cardiac arrest, can occur during the tracheal intubation procedure in this fragile population (3)as well as the association of ICU intubation–related cardiac arrest with 28-day mortality. Design: Retrospective analysis of prospectively collected data. Setting: Sixty-four French ICUs. Patients: Critically ill patients requiring intubation in the ICU. Interventions: None. Measurements and Main Results: During the 1,847 intubation procedures included, 49 cardiac arrests (2.7%. The most common cardiovascular instability during or immediately after tracheal intubation is hypotension (4). Cardiovascular instability/collapse/hypotension due to tracheal intubation has been studied with different definitions in various critically ill populations (5–9)2010, to December 31, 2014. We defined immunocompromised as patients with any solid organ or nonsolid organ malignancy or transplant, whether solid organ or not, requiring current chemotherapy. Postintubation hypotension was defined as a decrease in systolic blood pressure to less than 90 mm Hg or a decrease in mean arterial pressure to less than 65 mm Hg or the initiation of any vasopressor medication. Patients were then stratified based on development of postintubation hypotension. Potential risk factors and intensive care unit (ICU.

Cardiovascular collapse has been defined as systolic blood pressure (SBP) <65 mmHg or new or increased need for vasopressors between induction and two minutes after intubation, or cardiac arrest or death between induction and one hour after tracheal intubation (8,9)cardiac arrest, or death remains uncertain. Objective: To determine the effect of fluid bolus administration on the incidence of severe hypotension, cardiac arrest, and death. Design, Setting, and Participants: This randomized clinical trial enrolled 1067 critically ill adults undergoing tracheal intubation with sedation and positive pressure ventilation at 11 intensive care units in the US between February 1, 2019, and May 24, 2021. The date of final follow-up was June 21, 2021. Interventions: Patients were randomly assigned to receive either a 500-mL intravenous fluid bolus (n = 538. Peri-intubation cardiovascular collapse has been reported with an incidence of 18.0-43.4% in critically ill patients (7–9)systolic arterial pressure <65 mm Hg [once] or <90 mm Hg for >30 minutes; new/increased vasopressor requirement; fluid bolus >15 ml/kg, or cardiac arrest. Cardiovascular collapse increases mortality in critically ill patients (7)systolic arterial pressure <65 mm Hg [once] or <90 mm Hg for >30 minutes; new/increased vasopressor requirement; fluid bolus >15 ml/kg, or cardiac arrest. As nearly half of the critically ill patients who undergo tracheal intubation experience this complication, and it increases the risk of mortality, identifying the risk factors associated with cardiovascular collapse gains more importance.

Our primary outcome was peri-intubation cardiovascular collapse. The secondary outcome was the risk factors associated with the peri-intubation cardiovascular collapse in the critically ill population.

MATERIALS AND METHODS

Patients and Setting

We conducted a prospective observational study. This study was in line with the ethical principles of the Dec-

laration of Helsinki. This study was approved by the Tekirdağ Dr. Ismail Fehmi Cumalıoglu State Hospital Clinical Research Ethics Committee (date: 29.08.2022, decision number: 2022/726). All participants included in our study provided written informed consent. In cases where the patient was unable to give informed consent, informed consent was obtained by the representative. Between August 1, 2022 and February 28, 2023, all patients (18 years and older) who underwent tracheal intubation during ICU follow-up were assessed. All beds are monitored in the ICU. Invasive arterial monitoring is performed in most patients, especially when vasopressors are indicated. The exclusion criteria of the study were as follows: (1) tracheal intubation before admission to the ICU; (2) tracheal intubation for cardiac arrest; and (3) SBP <65 mmHg before induction of anesthesia regardless of vasopressor administration.

Variables

The following data were recorded for this study: (1) the demographic data (chronic underlying disease, Charlson Comorbidity Index [CCI], sex, age, and body mass index); (2) main critical events during the entire stay of ICU (sepsis, acute kidney injury [AKI], and vasopressor use); (3) mortality; (4) results of biochemical tests on the day of tracheal intubation and arterial blood gas measurement results immediately before or within six hours of intubation; (5) the main indication for intubation, tracheal intubation medications, hemodynamic and respiratory data immediately before induction of anesthesia and components of cardiovascular collapse.

Outcomes and Definitions

Our primary outcome was the peri-intubation cardiovascular collapse, defined as SBP <65 mm Hg or new or increased need for vasopressors between induction and two minutes after tracheal intubation, or death or cardiac arrest between induction of anesthesia and 1 hour after tracheal intubation (8,9)cardiac arrest, or death remains uncertain. Objective: To determine the effect of fluid bolus administration on the incidence of severe hypotension, cardiac arrest, and death. Design, Setting, and Participants: This randomized clinical trial enrolled 1067 critically ill adults undergoing tracheal intubation with sedation and positive pressure ventilation at 11 intensive care units in the US between February 1, 2019, and May 24, 2021. The date of final follow-up was June 21, 2021. Interventions: Patients were randomly assigned to receive either a 500-mL intravenous fluid bolus (n = 538. The secondary outcome was ICU mortality. The shock index was defined as a ratio of heart rate recorded just before induction divided by SBP recorded just before induction (10)conducted in eligible 140 adult intensive care unit (ICU. The choice of intubation drugs depended on the patient's history and clinical condition.

Statistical Analysis

All statistical analyses were performed using SPSS 25.0 (Statistical Package for the Social Sciences. IBM Corp. Armonk, NY). The categorical data were presented as count/percentage. Categorical variables between participants were compared with the Chi-Squared or Fisher's Exact Tests. The continuous data were presented as median and interquartile range. Continuous variables between the two groups were compared with Mann–Whitney U-test. Multivariate Logistic Regression Analysis was performed to assess the independent risk factors of peri-intubation cardiovascular collapse. A purposeful variable selection method was used to construct the model. A two-tailed p-value less than 0.05 was considered statistically significant.

RESULTS

Characteristics of Patients

Eighty-seven eligible patients who underwent tracheal intubation during ICU follow-up were included in the study. Of them, 37 (42.5%) had peri-intubation cardiovascular collapse. The median age of the study population was 72.0 (63.0-82.0) years, and 36 (41.4%) were women **(Table 1).**

Compared with the no cardiovascular collapse group, patients in the cardiovascular collapse group were significantly older (78.0 [67.5–86.0] vs. 67.0 [59.0–77.3] years; p = 0.001). Compared with the no cardiovascular collapse group, the percentage of patients with hypertension and congestive heart failure

Table 1. Demographic and clinical characteristics in patients with and without peri-intubation cardiovascular collapse.

Characteristics	All cases	Cardiovascular collapse	No cardiovascular collapse	p value
	(n=87)	(n=37)	(n=50)	
Age, years	72.0 (63.0-82.0)	78.0 (67.5-86.0)	67.0 (59.0-77.3)	**0.001**
Gender				
Female	36 (41.4)	16 (43.2)	20 (40.0)	0.827
Male	51 (58.6)	21 (56.8)	30 (60.0)	
Body mass index, kg/m²	24.7 (21.3-28.0)	22.4 (20.0-26.0)	26.2 (22.2-28.8)	**0.013**
Comorbidities				
Hypertension	50 (57.5)	27 (73.0)	23 (46.0)	**0.016**
Congestive heart failure	19 (21.8)	13 (35.1)	6 (10.0)	**0.017**
Diabetes Mellitus	27 (31.0)	12 (32.4)	15 (30.0)	0.819
Coronary artery disease	22 (25.3)	10 (27.0)	12 (24.0)	0.806
Chronic kidney disease	22 (25.3)	13 (35.1)	9 (18.0)	0.084
Malignancy	21 (24.1)	6 (16.2)	15 (30.0)	0.250
Dementia	17 (19.5)	10 (27.0)	7 (14.0)	0.173
COPD	14 (16.1)	7 (18.9)	7 (14.0)	0.567
Cirrhosis	3 (3.4)	1 (2.7)	2 (4.0)	1.000
Main reason for ICU admission				
Respiratory failure	40 (46.0)	19 (51.4)	21 (42.0)	0.514
Sepsis / septic shock	25 (28.7)	14 (37.8)	11 (22.0)	0.150
Neurological disease	7 (8.0)	1 (2.7)	6 (12.0)	0.231
Postoperative	6 (6.9)	1 (2.7)	5 (10.0)	0.234
Trauma	3 (3.4)	0 (0)	3 (6.0)	0.258
Other	6 (6.9)	1 (2.7)	5 (10.0)	0.234
APACHE II	24.0 (17.0-30.0)	28.0 (20.0-31.0)	20.5 (14.8-28.5)	**0.025**
SOFA[1]	7.0 (6.0-10.0)	8.0 (6.0-11.0)	7.0 (4.8-9.3)	0.131
CCI	6.0 (4.0-8.0)	7.0 (5.0-8.0)	5.0 (3.0-8.0)	0.059
Laboratory data within 24 h before tracheal intubation				
BUN, mg/dL	35.0 (23.5-59.0)	54.0 (30.3-78.3)	30.7 (16.3-54.1)	**0.001**
Creatinine, mg/dL	1.05 (0.71-2.02)	1.39 (0.88-2.25)	0.91 (0.59-1.80)	**0.011**
Albumin, g/dL	2.51 (2.31-2.97)	2.39 (2.19-2.59)	2.60 (2.39-3.23)	**0.002**
CRP, mg/L	153 (73-224)	161 (115-256)	115 (41-208)	**0.024**
ALT, U/L	25.0 (13.0-41.0)	20.0 (12.0-52.5)	25.5 (14.8-40.3)	0.747
Hemoglobin, g/dL	10.6 (9.7-12.5)	10.6 (9.6-12.7)	10.6 (9.7-12.4)	0.918
Arterial blood gas analysis just before tracheal intubation or within 6 h before tracheal intubation				
pH	7.38 (7.30-7.44)	7.33 (7.25-7.43)	7.41(7.34-7.46)	**0.006**
HCO_3, mmol/L	24.3 (21.0-28.0)	22.0 (18.0-28.0)	25.0 (22.8-28.2)	**0.032**
Lactate, mmol/L	2.10 (1.30-3.20)	2.60 (1.40-4.15)	1.70 (1.18-2.70)	**0.030**
PaO_2/FiO_2	124 (97-164)	124 (99-144)	122 (94-177)	0.293
Events/therapies during the entire ICU stay				
Sepsis	69 (79.3)	33 (89.2)	36 (72.0)	0.063
Vasopressor requirement	62 (71.3)	31 (83.8)	31 (62.0)	**0.032**
Acute kidney injury	35 (40.2)	16 (43.2)	19 (38.0)	0.663
Renal replacement therapy	18 (20.7)	8 (21.6)	10 (20.0)	1.000
Successful weaning	47 (54.0)	17 (45.9)	30 (60.0)	0.277
ICU length of stay (days)	10.0 (4.0-19.0)	9.0 (4.5-21.0)	10.5 (4.0-16.3)	0.850
ICU mortality	42 (48.3)	21 (56.8)	21 (42.0)	0.198

All values are expressed as numbers (percentages) or median (interquartile range).

APACHE II, Acute Physiology and Chronic Health Evaluation II; ALT, alanine transaminase; BUN, blood urea nitrogen; CCI, Charlson Comorbidity Index; COPD, chronic obstructive pulmonary disease; CRP, C-reactive protein; FiO_2, fraction of inspired oxygen; ICU, intensive care unit; LDH, lactate dehydrogenase; LVEF, left ventricular ejection fraction; PaO_2, partial pressure of arterial oxygen; $PaCO_2$, partial pressure of arterial carbon dioxide; SOFA Score, The Sequential Organ Failure Assessment Score.

1. Calculated on the day of tracheal intubation.

Table 2. Variables obtained before, during, and immediately after tracheal intubation.

Characteristics	All cases (n=87)	Cardiovascular collapse (n=37)	No cardiovascular collapse (n=50)	p value
Main indication for intubation				
Hypoxic respiratory failure	52 (59.8)	25 (67.6)	27 (54.0)	0.270
Hypercarbic respiratory failure	9 (10.3)	4 (10.8)	5 (10.0)	1.000
Altered mental status	13 (14.9)	2 (5.4)	11 (22.0)	**0.037**
Haemodynamic instability	8 (9.2)	5 (13.5)	3 (6.0)	0.277
Other	5 (5.7)	1 (2.7)	4 (8.0)	0.389
Tracheal intubation medications				
Midazolam, n (%)	64 (73.6)	27 (73.0)	37 (74.0)	1.000
Midazolam dose (mg/kg)	0.04 (0.03-0.06)	0.04 (0.03-0.06)	0.04 (0.03-0.06)	0.859
Propofol, n (%)	23 (26.4)	10 (27.0)	13 (26.0)	1.000
Propofol dose (mg/kg)	0.48 (0.37-0.64)	0.51 (0.34-0.64)	0.47 (0.35-0.60)	0.828
Fentanyl, n (%)	46 (52.9)	19 (51.4)	27 (54.0)	0.831
Fentanyl dose (mcg/kg)	1.60 (1.10-1.85)	1.60 (1.37-2.20)	1.50 (1.00-1.70)	0.077
Rocuronium, n (%)	83 (95.4)	35 (94.6)	48 (96.0)	1.000
Rocuronium dose (mg/kg)	0.83 (0.61-1.06)	0.90 (0.70-1.20)	0.80 (0.60-1.00)	0.116
Tracheal intubation events				
Difficult airway (=2 attempts)	8 (9.2)	3 (8.1)	5 (10.0)	1.000
Video laryngoscopy use	5 (5.7)	2 (5.4)	3 (6.0)	1.000
Medications administered within 24 hours before tracheal intubation, n (%)				
Diuretics	30 (34.5)	15 (40.5)	15 (30.0)	0.365
Calcium channel blockers	17 (19.5)	8 (21.6)	9 (18.0)	0.786
Beta-blockers	16 (18.4)	10 (27.0)	6 (12.0)	0.096
ACE-inhibitors and ARBs	6 (6.9)	3 (8.1)	3 (6.0)	0.696
Nitrates	2 (2.3)	2 (5.4)	0 (0)	0.178
Anti-arrhythmic agents	5 (5.7)	5 (13.5)	0 (0)	**0.012**
Alfa-blockers	2 (2.3)	1 (2.7)	1 (2.0)	1.000
Dexmedetomidine	18 (20.7)	8 (21.6)	10 (20.0)	1.000
Other sedative drugs	17 (19.5)	9 (24.2)	8 (16.0)	0.415
Fentanyl or other narcotics	8 (9.2)	2 (5.4)	2 (12.0)	0.458
Clinical data before tracheal intubation				
Use of vasopressors immediately before induction	39 (44.8)	22 (59.5)	17 (34.0)	**0.029**
Norepinephrine dose (mcg/kg/minute)	0.00 (0.00-0.10)	0.07 (0.00-0.16)	0.00 (0.00-0.08)	**0.034**
Receipt of NIV in 6 hours before intubation	58 (66.7)	25 (67.6)	33 (66.0)	1.000
Negative fluid balance in 6 hours before intubation	10 (11.5)	3 (8.1)	7 (14.0)	0.507
Presence of atrial fibrillation rhythm before intubation	19 (21.8)	15 (40.5)	4 (8.0)	**<0.001**
Hemodynamic and respiratory data immediately before induction of anesthesia				
SBP (mm Hg)	121 (105-143)	110 (104-121)	134 (116-151)	**<0.001**
DBP (mm Hg)	65 (57-78)	60 (51-69)	70 (60-84)	**0.001**
MAP (mm Hg)	83 (74-98)	76 (69-87)	94 (77-106)	**<0.001**
Heart rate (BPM)	109 (89-128)	116 (103-136)	101 (82-119)	**0.005**
Shock index	0.85 (0.72-1.07)	1.01 (0.82-1.18)	0.77 (0.63-0.87)	**<0.001**
Shock index ≥ 0.90, n (%)	36 (41.4)	26 (70.3)	10 (20.0)	**<0.001**
Respiratory rate (per minute)	29 (24-31)	30 (27-31)	27 (18-31)	0.070
Sp02, %	93 (86-98)	91 (85-95)	94 (88-100)	0.054
Body temperature, °C	36.8 (36.4-37.4)	37.0 (36.7-37.4)	36.8 (36.4-37.4)	0.351

All values are expressed as numbers (percentages) or median (interquartile range). ACE: Angiotensin converting enzymes, ARB: Angiotensin receptor blockers, BPM: Beats per minute, DBP: Diastolic blood pressure, MAP: Mean arterial blood pressure, NIV: Non-invasive ventilation, N/A: Not applicable, SBP: Systolic blood pressure, SpO2: Peripheral oxygen saturation.

Table 3. Data of cardiovascular collapse.

Characteristics	All cases	Cardiovascular collapse	No cardiovascular collapse	p value
	(n=87)	(n=37)	(n=50)	
Data of measurements between induction and 2 min after intubation				
Lowest SBP (mm Hg)	95 (68-120)	64 (60-76)	114 (100-133)	**<0.001**
Lowest DBP (mm Hg)	55 (41-65)	40 (36-46)	62 (57-72)	**<0.001**
Lowest MAP (mm Hg)	69 (52-82)	51 (43-54)	79 (73-93)	**<0.001**
Lowest Sp02, %	93 (86-98)	91 (85-95)	94 (88-100)	0.187
Components of the cardiovascular collapse				
New systolic blood pressure <65 mm Hg between induction and 2 min after intubation	19 (21.8)	19 (51.4)	N/A	N/A
New vasopressor between induction and 2 min after intubation	15 (17.2)	19 (40.5)	N/A	N/A
Increased vasopressor between induction and 2 min after intubation	22 (25.3)	22 (59.5)	N/A	N/A
Cardiac arrest within 1 h of intubation	2 (2.3)	2 (5.4)	N/A	N/A
Death within 1 h of intubation	1 (1.1)	1 (2.7)	N/A	N/A

All values are expressed as numbers (percentages) or median (interquartile range).

DBP: Ddiastolic blood pressure, MAP: Mean arterial blood pressure, N/A: Not applicable, SBP: Systolic blood pressure, SpO2: Pulse oxygen saturation.

Table 4. Logistic regression analysis for risk factors of peri-intubation cardiovascular collapse.

Risk Factors	OR (95% CI)	p value
Shock index ≥ 0.90	9.87 (2.98-32.70)	**<0.001**
Age, years	1.07 (1.01-1.13)	**0.013**
Gender	0.75 (0.22-2.60)	0.651
APACHE II	0.99 (0.92-1.07)	0.835
Congestive heart failure	1.68 (0.34-8.33)	0.529
Vasopressor use (Immediately before induction of anesthesia)	2.49 (0.76-8.12)	0.130
pH	0.07 (0.01-14.48)	0.333
Creatinine, mg/dL	0.95 (0.65-1.40)	0.801

APACHE II: Acute Physiology and Chronic Health Evaluation II, CI: confidence interval, OR: Odds ratio.

was higher in the cardiovascular collapse group (73.0% vs. 46.0%; p=0.016) and (35.1% vs. 10.0%; p=0.017) respectively. Patients with cardiovascular collapse had a higher Acute Physiology and Chronic Health Evaluation (APACHE) II score than patients without cardiovascular collapse (28.0 [20.0–31.0] vs. 20.5 [14.8–28.5]; p = 0.025). ICU mortality was 56.8% (n=21) in the cardiovascular collapse group and 42.0% (n=21) in the no cardiovascular collapse group (p = 0.198).

Laboratory Findings

Creatinine levels were higher in the cardiovascular collapse group than in the no cardiovascular collapse group (54.0 [30.3–78.3] vs. 30.7 [16.3–54.1] mg/dL; p = 0.001). Blood urea nitrogen levels were higher in the cardiovascular collapse group than in the no cardiovascular collapse group (1.39 [0.88–2.25] vs. 0.91 [0.59–1.80] mg/dL; p=0.011). C-reactive protein levels were higher in the cardiovascular collapse group than in the no cardiovascular collapse group (161 [115–256] vs. 115 [41–208] mg/dL; p = 0.024).

pH was lower in the cardiovascular collapse group when compared to the no cardiovascular collapse group (7.33 [7.25–7.43] vs. 7.41 [7.34–7.46]; p = 0.006). HCO3 was lower in the cardiovascular collapse group when compared to the no cardiovascular

collapse group (22.0 [18.0–28.0] vs. 25.0 [22.8–28.2] mmol/L; p = 0.032). Lactate levels were higher in the cardiovascular collapse group than in the no cardiovascular collapse group (2.60 [1.40–4.15] vs. 1.70 [1.18–2.70] mmol/L; p = 0.030).

Clinical characteristics before, during, and after tracheal intubation

The main indication for tracheal intubation was acute hypoxic respiratory failure with a rate of 59.8% (n=52; **Table 2**). Tracheal intubation was required in 13 patients (14.9%) due to altered mental status. Of these 13 patients, 2 (5.4%) patients had cardiovascular collapse, while 11 (22.0%) did not (p=0.037). The two most commonly used drugs for tracheal intubation were midazolam (73.6%) and rocuronium (95.4%). All medications and doses used for tracheal intubation were similar between groups.

The percentage of patients who received a vasopressor immediately before induction of anesthesia was higher in the cardiovascular collapse group compared to the no cardiovascular collapse group (59.5% vs. 34.0%; p = 0.029). The proportion of patients with atrial fibrillation rhythm immediately before induction of anesthesia was higher in the cardiovascular collapse group compared to the no cardiovascular collapse group (40.5% vs. 8.0%; p< 0.001).

SBP, DBP, and MAP measured immediately before induction of anesthesia was lower in the cardiovascular collapse group than in the no cardiovascular collapse group (110 [104–121] vs. 134 [116–151] mm Hg; p<0.001), (60 [51–69] vs. 70 [60–84] mm Hg; p=0.001), and (76 [69–87] vs. 94 [77–106] mm Hg; p<0.001) respectively.

SBP measured immediately before induction of anesthesia was lower in the cardiovascular collapse group than in the no cardiovascular collapse group (110 [104–121] vs. 134 [116–151] mm Hg; p<0.001). DBP measured immediately before induction of anesthesia was lower in the cardiovascular collapse group than in the no cardiovascular collapse group (60 [51–69] vs. 70 [60–84] mm Hg; p=0.001). MAP measured immediately before induction of anesthesia was lower in the cardiovascular collapse group than in the no cardiovascular collapse group (76 [69–87] vs. 94 [77–106] mm Hg; p<0.001). Heart rates recorded immediately before induction of anesthesia was higher in the cardiovascular collapse compared to the no cardiovascular collapse group (116 [103–136] vs. 101 [82–119] beats per minute; p=0.005).

The proportion of patients with a shock index ≥ 0.90 immediately before induction of anesthesia was higher in the cardiovascular collapse compared to the no cardiovascular collapse group (70.3% vs. 20.0%; p<0.001). Two patients had cardiac arrest during tracheal intubation and one of them died (**Table 3**).

Independent risk factors of cardiovascular collapse

In Multivariate Logistic Regression Analysis (**Table 4**), a shock index ≥ 0.90 (OR 9.87, 95%CI 2.98–32.70, p <0.001) and older age (OR 1.07, 95%CI 1.01–1.13, p=0.013) were significant factors that independently increased the risk of cardiovascular collapse.

DISCUSSION AND CONCLUSION

This prospective observational study addresses the possible risk factors for the peri-intubation cardiovascular collapse in critically ill patients and has three significant results. First, peri-intubation cardiovascular collapse incidence is 42.5% in this population. Second, advanced age and shock index ≥ 0.90 calculated immediately before induction of anesthesia independently increase the risk of peri-intubation cardiovascular collapse. Third, peri-intubation cardiovascular collapse does not increase the ICU mortality.

Peri-intubation cardiovascular collapse has been reported with an incidence of 18.0-43.4% in critically ill patients (7–9)systolic arterial pressure <65 mm Hg [once] or <90 mm Hg for >30 minutes; new/increased vasopressor requirement; fluid bolus >15 ml/kg, or cardiac arrest. The relatively higher incidence of cardiovascular collapse in this study may be attributed to the fact that our study population is older than other studies (8,9)cardiac arrest, or death remains uncertain. Objective: To determine the effect of fluid bolus administration on the incidence of severe hypotension, cardiac arrest, and death. Design, Setting, and Participants: This randomized clinical trial enrolled 1067 critically ill adults undergoing tracheal intubation with sedation and positive pressure ventilation at 11 intensive care units in the US between February 1, 2019, and May 24, 2021. The date of final follow-up was June 21,

2021. Interventions: Patients were randomly assigned to receive either a 500-mL intravenous fluid bolus (n = 538. Elderly patients have less organ reserves than younger ones (11). Additionally, hemodynamic compensatory mechanism becomes impaired with aging (12). Therefore, they are at higher risk for post-intubation hemodynamic instability (5)2010, to December 31, 2014. We defined immunocompromised as patients with any solid organ or nonsolid organ malignancy or transplant, whether solid organ or not, requiring current chemotherapy. Postintubation hypotension was defined as a decrease in systolic blood pressure to less than 90 mm Hg or a decrease in mean arterial pressure to less than 65 mm Hg or the initiation of any vasopressor medication. Patients were then stratified based on development of postintubation hypotension. Potential risk factors and intensive care unit (ICU. In this study, age was an independent predictor of peri-intubation cardiovascular collapse, similar to the literature (13). On the other hand, significant changes occur in the cardiovascular system and the incidence of hypertension and congestive heart failure increases with age (12). In a study conducted on patients with ST-elevation myocardial infarction, hypertension was a significant risk factor for post-intubation hypotension when Midazolam was used as an induction agent (14)136 patients (66 male and 70 females, mean age 72.25 ± 7.33 years. In this study, the comorbidities of hypertension and heart failure were risk factors for peri-intubation cardiovascular collapse. However, the independent effect of hypertension or congestive heart failure on peri-intubation cardiovascular collapse has to be further investigated as the aging process affects their incidence (12).

The relationship between sepsis and increased risk of hypotension during intubation has been shown in the literature (15,16)little is known about the relationship between pre-existing peripheral microvascular alteration and post-intubation hemodynamic instability (PIHI. In this study, sepsis-related parameters such as hemodynamic parameters (low SBP, DBP, and MAP), global perfusion parameters (increased arterial lactate levels), use of vasopressors, and higher dose of norepinephrine immediately before induction were risk factors for hypotension during intubation procedure. The shock index has been suggested as a bedside "easy-to-use" tool to assess the presence of hemodynamic compromise (10)conducted in eligible 140 adult intensive care unit (ICU. An elevated shock index may be an early sign of shock (17). The clinical significance of the shock index has been studied in critically ill patients, and it has been shown that a shock index ≥ 0.90 significantly increases the risk of post-intubation hypotension (6,10)conducted in eligible 140 adult intensive care unit (ICU. In this study of critically ill patients, we demonstrated that a shock index ≥ 0.90 independently predicts the risk of cardiovascular collapse during tracheal intubation.

The presence of atrial fibrillation may cause loss of atrial systole, tachycardia, and acute heart failure. As a result, cardiac output may decrease (18)but there is limited information regarding their temporal relations and the combined influence of these conditions on mortality. Methods and Results - We studied participants in the Framingham Study with new-onset AF or CHF. Multivariable Cox proportional hazards models with time-dependent variables were used to evaluate whether mortality after AF or CHF was affected by the occurrence and timing of the other condition. Hazard ratios (HRs. The higher incidence of cardiovascular collapse in patients with atrial fibrillation can be explained by these multifactorial effects of atrial fibrillation on the heart.

Albumin plays a crucial role in maintaining intravascular colloidal osmotic pressure. Hypoalbuminemia leads to the movement of fluids from blood vessels to tissues (19,20). Patients with septic shock may experience a further decline in their intravascular volume status due to fluid exchange (21)morphology, cell biology, biochemistry, immunology, and circulation. In our study, the correlation between low albumin levels and peri-intubation cardiovascular collapse may be explained by the lowered intravascular colloidal pressure.

Cardiovascular collapse during the intubation procedure is associated with increased mortality in ICU setting (7)systolic arterial pressure <65 mm Hg [once] or <90 mm Hg for >30 minutes; new/increased vasopressor requirement; fluid bolus >15 ml/kg, or cardiac arrest. In this study, there was no significant relationship between ICU mortality and peri-intubation cardiovascular collapse. It is possible that these findings were due to the limited size of our study population. Additionally,

mortality was higher in our entire population compared to the literature due to advanced age and multiple pre-existing complicated comorbid diseases (7,8)systolic arterial pressure <65 mm Hg [once] or <90 mm Hg for >30 minutes; new/increased vasopressor requirement; fluid bolus >15 ml/kg, or cardiac arrest. Due to high mortality rates, especially in the cardiovascular collapse group, patients had shorter ICU stays.

This research has several limitations. First, the echocardiographic evaluation was not performed during the intubation procedure to show volume status. Second, long-term outcomes and hospital mortality were not analyzed. Third, the results of this study cannot be generalized due to the relatively small sample size of our study. However, the study has some strengths. Tracheal intubation procedures were performed by expert physicians in the ICU setting. All patients were monitored, and most were under invasive arterial pressure monitoring which provides instant and accurate data on abrupt changes in blood pressure.

In conclusion, the frequency of peri-intubation cardiovascular collapse is high in the critically ill population. Intubation procedures should be performed with caution, especially in elderly patients. Shock index is a practical tool that can be calculated easily, quickly and inexpensively at the bedside before endotracheal intubation. A pre-intubation shock index ≥0.90 can be used to predict the risk of peri-intubation cardiovascular collapse.

Conflict-of-interest and financial disclosure

The authors declare that they have no conflict of interest to disclose. The authors also declare that they did not receive any financial support for the study.

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Investigation of the relationship between glucose potassium ratio and insulin resistance in polycystic ovary syndrome infertile women

Polikistik over sendromlu infertil kadınlarda glukoz potasyum oranı ile insülin direnci arasındaki ilişkinin araştırılması

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Abstract

Aim: The aim of this study was to evaluate the relationships between glucose potassium (Glu/K^+) ratio and insulin resistance (IR) in infertile women with polycystic ovary syndrome (PCOS). It is necessary to identify a new diagnostic parameter such as Glu/K^+ ratio for IR in PCOS patients.

Methods: A total of 198 reproductive-aged women were included in this retrospective case–control study. Women aged 20-39 years diagnosed with infertility and PCOS constituted the PCOS group. Women who were diagnosed with infertility but not PCOS formed the control group.

Result: The age and body mass index (BMI) of the participants were 30.31±4.68 and 26.53±4.80, respectively. Fasting blood glucose was found to be higher in those with a diagnosis of PCOS ($p<0.05$). Homeostatic model assessment for insulin resistance (HOMA-IR) and fasting insulin were found to be higher in those with a diagnosis of PCOS ($p<0.05$). Serum Glu/K^+ ratio was found to be higher in those diagnosed with PCOS ($p<0.05$). A positive correlation was found between fasting insulin and Glu/K^+ ratio in PCOS women ($p<0.05$). The area under the ROC curve for the Glu/K^+ ratio was found to be 0.719, close to the insulin.

Conclusion: Our outcomes indicate that the serum Glu/K^+ ratio is favorable and closely related to insulin, which has diagnostic properties for PCOS. We believe the serum Glu/K^+ ratio may be a valuable biomarker for insulin resistance in PCOS.

Keywords: Glucose; insulin resistance; polycystic ovary syndrome; potassium

Öz

Amaç: Bu çalışmanın amacı, polikistik over sendromlu (PKOS) infertil kadınlarda glukoz potasyum (Glu/K^+) oranı ile insülin direnci (İR) arasındaki ilişkiyi değerlendirmektir. PKOS'lularda insulin direnci için Glu/K^+ oranı gibi yeni bir tanı parametresinin tanımlanması gereklidir.

Yöntemler: Bu retrospektif vaka kontrol çalışmasına üreme çağındaki toplam 198 kadın dahil edildi. PKOS grubunu 20-39 yaş arası infertilite ve PKOS tanısı almış kadınlar oluşturdu. Kontrol grubunu infertilite tanısı almış ancak PKOS olmayan kadınlar oluşturdu.

Bulgular: Katılımcıların yaş ve vücut kitle indeksi sırasıyla 30.31±4.68 ve 26.53±4.80 idi. Açlık kan şekeri PKOS tanısı olanlarda daha yüksek bulundu ($p<0.05$). İnsülin direnci için homeostatik model değerlendirmesi (HOMA-IR) ve açlık insülini PKOS tanısı olanlarda daha yüksek bulundu ($p<0.05$). PKOS tanısı olanlarda serum Glu/K^+ oranı daha yüksek bulundu ($p<0.05$). PCOS'lu kadınlarda açlık insülini ile Glu/K^+ oranı arasında pozitif bir ilişki bulundu ($p<0.05$). Glu/K^+ oranı için işlem karakteristiği (ROC) eğrisi altında kalan alan insüline yakın 0.719 olarak bulundu.

Sonuç: Sonuçlarımız serum Glu/K^+ oranının olumlu olduğunu ve PKOS için tanısal özellikleri olan insüline yakın olduğunu göstermektedir. Serum Glu/K^+ oranının PKOS'ta inslin direnci için değerli bir biyobelirteç olabileceğini düşünmekteyiz.

Anahtar Sözcükler: Glukoz; insulin rezistansı; potasyum; polikistik over sendromu

Received/*Geliş* : 02.10.2022
Accepted/*Kabul*: 11.05.2023

DOI: 10.21673/anadoluklin.1183228

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INTRODUCTION

Polycystic ovary syndrome (PCOS) is a complex common metabolic disorder among women, with 8-13% prevalence dependent on the studied population and the applied diagnostic criteria, and is characterized by a heterogeneous presentation of hair loss, menstrual irregularity, hyperandrogenism, insulin resistance (IR), reduced quality of life, hirsutism, obesity, and polycystic ovaries (1-3). In addition, there is evidence that PCOS women are highly exposed to IR, abdominal obesity, cardiovascular disease (CVD), dyslipidemia, type 2 diabetes mellitus (DM), and infertility (4). Obesity plays an effective role in enhancing oxidative stress as one of the common disorders in PCOS women, which contributes to IR while aggravating hypergonadism (5-7). The PCOS diagnosis has lifelong implications, increasing the risk for infertility, type 2 DM, metabolic syndrome, endometrial carcinoma, and CVD (8).

There are different diagnostic criteria for PCOS, but the Rotterdam criterion is now used more widely in its diagnosis (9). Based on this criterion, the presence of two of the following three cases can help diagnose PCOS. These cases include 1) biochemical or clinical signs of hyperandrogenism 2) amenorrhea or oligomenorrhea and 3) sonography evidence of PCOS (10).

Although the pathophysiology of this disease has not yet been correctly determined, several factors alone or together can be considered as the main causes of it, including increased gonadotropin-releasing hormone, increased release of androgenic hormones, IR, genetic factors, and oxidative stress. Oxidative stress has attracted the attention of toxicologists over the last two decades as one of the etiological factors of chronic diseases, and its relationship at the preclinical level with several chronic diseases such as DM, CVD, cancer, and PCOS has been cited in the sources. The researchers are still interested in finding diagnostic criteria, and identifying new diagnostic criteria paves the way for more innovative and more effective treatments (6,11-13). In this study, the glucose-potassium (Glu/K^+) ratio besides insulin was evaluated as a new diagnostic criterion for IR in PCOS.

Several studies have confirmed the importance of insulin rates in PCOS women. This study evaluated the role of the Glu/K^+ ratio in these patients. Potassium and serum glucose are two important blood indicators that have common clinical applications (14). Glucose is important for maintaining cellular metabolism as the main source of energy for cells in the human body. Potassium ion plays a role in the physiological processes including muscle contraction, cardiac pulsation, normal renal function maintenance, and neural conduction as the most abundant ion in the cells. The serum glucose level is divided by the serum potassium level to yield Glu/K^+ ratio (14).

There is a need for a better understanding and proper screening of women with PCOS to reduce the long-term risks and to provide effective interventions to minimize metabolic complications. This study discussed whether IR is specific to PCOS and is associated with obesity alone or with both factors. The need for alternative diagnostic parameters for this disease, such as metabolic syndrome, has not yet been met. This study determines the IR rate by analyzing and matching fasting insulin and potassium glucose values. It is essential to identify new diagnostic parameters for PCOS to propose new treatment methods.

This study aimed to examine the association between PCOS and Glu/K^+ ratio as a new clinic value and to examine the association between IR and Glu/K^+ ratio among infertile PCOS women.

MATERIAL AND METHODS

The retrospective case-control study was designed as a single-centered, between January 2019 and March 2021, for PCOS infertile patients who applied to Samsun MedicalPark Hospital gynecology and obstetrics clinic.

This study was started after the ethical approval of the study was obtained from Ondokuz Mayıs University Faculty of Medicine Clinical Researches Ethics Committee (Date: 22.06.2022, Decision No: 2022/173). All study processes were conducted under the principles of the Declaration of Helsinki and ethical rules.

This study included 99 women in the control group and 99 women with PCOS included in the case group. The inclusion criteria were: (1) women between the ages of 20 and 39, (2) women with PCOS according

Table 1. Main characteristics of women with PCOS and healthy controls included in the study

Study parameters	Case(n=99) Mean±SD	Control(n=99) Mean±SD	*p*-value
Age(yrs)	30.32±4.89	30.31±4.48	0.843**
BMI	26.72±5.09	26.35±4.51	0.681**
HOMA-IR	3.59±2.25	1.74±0.81	**<0.001****
FSH	5.65±1.96	6.06±1.81	0.131*
LH	8.74±6.75	5.26±2.07	**<0.001****
Estradiol	71.71±62.07	54.91±49.28	**<0.001****
Free T4	1.24±0.31	1.25±0.89	0.957**
TSH	2.75±1.43	1.81±0.85	**<0.001****
Prolactin	27.00±20.91	23.18±10.74	0.741**
Fasting blood glucose (mg/dl)	95.04±8.32	88.79±6.72	**<0.001****
Fasting insulin	15.25±9.15	8.01±3.81	**<0.001****
Total cholesterol	175.60±41.10	206.87±56.69	**<0.001****
LDL	101.75±36.48	121.22±42.15	**<0.001****
HDL	53.45±15.37	64.80±16.92	**<0.001****
Triglyceride	100.61±50.70	101.60±51.50	0.955**
Sodium	140.60±1.51	140.03±2.48	0.108**
Potassium	4.06±0.27	4.13±0.32	0.064**
Blood urea nitrogen	20.09±5.86	17.80±4.94	**0.003****
Creatine	0.71±0.10	0.68±0.10	0.057**
ALT	14.13±3.58	14.43±6.99	0.190**
AST	16.42±5.37	16.82±6.08	0.727**
Serum Glu/K^+ ratio	23.49±2.54	21.59±2.41	**<0.001***

* Independent t-test

** Mann-Whitney test

BMI:Body mass index , PCOS: Polycystic ovary syndrome, LH: Luteinizing hormone, FSH:Follicle stimulating hormone , TSH:Thyroid stimulating hormone , HOMA-IR: Homeostatic model assessment of insulin resistance , T4: Thyroxine , LDL:Low density lipoprotein , HDL:High density lipoprotein , ALT: Alanine transaminase , AST:Aspartate aminotransferase , Serum Glu/K^+ ratio: Serum glucose/potassium ratio

Table 2. ROC analysis results of PCOS patients and controls

Test result variables	Area	Std Error[a]	Asymptotic Sig[b]	Asymptotic 95% Confidence Interval	
				Lower Bound	Upper Bound
Fasting blood glucose	0.725	0.036	**<0.001**	0.654	0.795
Fasting insulin	0.804	0.030	**<0.001**	0.744	0.863
Glu/K^+ ratio	0.719	0.037	**<0.001**	0.647	0.791

ROC:Receiver Operating Characteristic, PCOS: Polycystic ovary syndrome, Glu/K^+ ratio: Glucose/potassium ratio, Std error: Standard error of mean, Asymptotic sig: Asymptotic significance

Table 3. The correlation between Glu/K^+ ratio and insulin

		Serum Glu/K^+ ratio
Case	Fasting insulin	
	Correlation coefficient	0.280
	p-value	**0.005**
Control	Fasting insulin	
	Correlation coefficient	-0.183
	p-value	0.069

Glu/K^+ ratio: Glucose/potassium ratio

to the Rotterdam diagnostic criteria, (3) women who cannot have children despite having unprotected sexual relations for the last year. The exclusion criteria were: (1) medical or surgical treatment during the last three months, (2) absence of diabetes, thyroid dysfunction, hyperprolactinemia, active liver disease, and systemic diseases. Patient data was obtained from previous laboratory records. The transfer and analysis of the study laboratory data were carried out by a biostatistician.

The samples of the patients were taken early in the morning after 12 hours of fasting and after waiting for at least 15 minutes, they were separated by centrifugation and the serum samples were separated. The samples were studied on the same day and the results were transferred to the hospital automation system via LIS connection. For insulin, glucose, and potassium analysis, kits using the electrochemiluminescent method (Beckman, Los Angeles, CA, USA) were preferred and measured using Beckman DxC clinical biochemistry autoanalyzer (Beckman Diagnostic Products Corporation, Los Angeles, CA, USA). The data obtained were transferred digitally to the EXCEL (MS Office 2016, USA) program and the serum Glu/K^+ ratio was calculated by dividing the serum fasting glucose by the serum potassium levels. The transfer and analysis of the study laboratory data was carried out by an independent biostatistician. Since it was a retrospective study, patients were excluded from the study if there was missing data in their file or if they did not meet the study criteria. While the control group was selected from healthy individuals, they were included in the study in the light of ultrasonography reports, clinical evaluation, and laboratory data.

Statistical Analysis

We performed the Kolmogorov-Smirnov test to investigate the normality, and the nonparametric tests performed given the non-normality of the groups before the statistical analyses. Mean and standard deviations (SD) were measured to check each continuous variable, including age, BMI, HOMA-IR, FSH, LH, Estradiol, Free T4, TSH, prolactin, glucose, insulin, total cholesterol, LDL, HDL, Triglyceride, sodium, potassium, blood urea, nitrogen, creatine, ALT, AST, and Glu/K^+. The Mann-Whitney test and the Independent t-test were performed to study the difference between the two groups. The SPSS Statistics for Windows (Statistical Package for the Social Sciences package program version 22.0, IBM Corp., Armonk, N.Y., USA) is used for statistical analyses. p value< 0.05 was regarded as statistically significant.

To calculate the sample size with the G-Power 3.1 (http://www.gpower.hhu.de/) program, the difference between two independent means(two groups) was measured using the Independent t-test with power of 95%, effect size of 47%, and 0.05 type 1 error for at least 198 patients (15).

RESULTS

In Table 1, the main features of age-matched and BMImatched PCOS women and controls were included in the study. PCOS groups showed a significantly higher serum Glu/K^+ ratio (p-value<0.001). PCOS groups showed significantly higher HOMA-IR (p-value<0.001), LH (p-value <0.001), estradiol (p-value<0.001), fasting insulin (p-value<0.001), fasting blood glucose (p-value< 0.001), total cholesterol (p-value<0.001) levels. LDH (p-value<0.001) and HDL (p-value<0.001) levels were significantly lower in the PCOS groups.

There was not a statistically significant difference between PCOS group and control in terms of FSH (p-value = 0.131), prolactin (p-value = 0.741), triglyceride (p-value = 0.955), sodium (p-value = 0.108), potassium (p-value = 0.064), creatine (p-value = 0.057), ALT (p-value = 0.190), Free T4 (p-value = 0.957) and AST (p-value = 0.727). Figure 1 shows serum Glu/K^+ ratio and fasting insulin levels in control and case groups.

Table 2 and Figure 2 show ROC curves were used for analysis of the different variables' predictive value. The area under the ROC curve shows how accurately the test predicts the result. It was evaluated together with fasting glucose and insulin in the ROC analysis performed to investigate the diagnostic value of the Glu/K^+ ratio for PCOS.

The AUC for glucose was 0.725 (0.036 standard error; 95%CI: 0.654-0.795; p-value<0.001), The AUC for Insulin was 0.804 (0.030 standard error; 95%CI: 0.744-0.863; p-value<0.001). The AUC for Glu/K^+ ratio was 0.719 (0.037 standard error; 95%CI: 0.647-0.791; p-value<0.001).

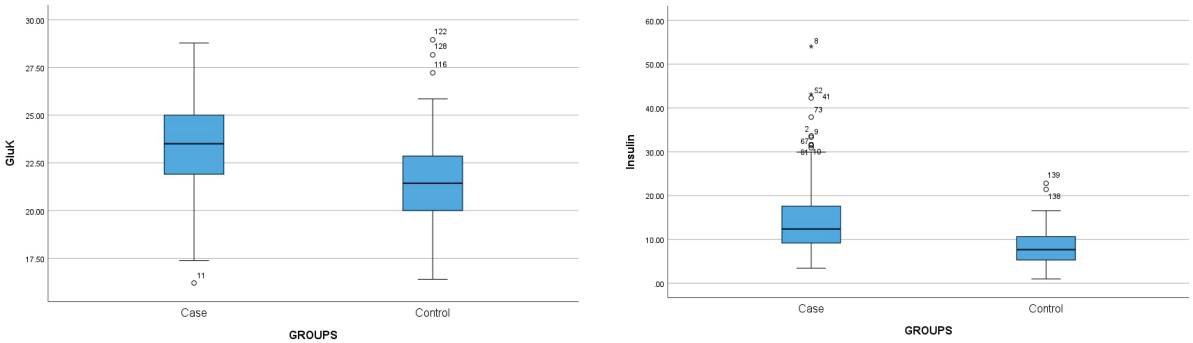

Figure 1. Glu/K⁺ and insulin levels in control and case groups

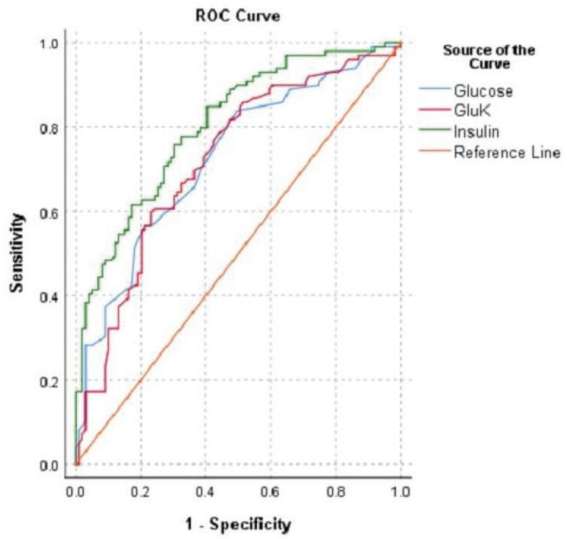

Figure 2. Glucose, Glu/K ratio and ROC analysis of insulin parameters

The relationship between Glu/K⁺ ratio and insulin in case and control groups was determined using Spearman's rank-order correlation. There was a positive moderate correlation between Glu/K⁺ ratio and insulin in women with PCOS, which was statistically significant (r = 0.280, *p*-value = 0.005). There was not a statistically significant correlation between Glu/K⁺ ratio and insulin in the control woman (r = -0.183, *p*-value = 0.069).

DISCUSSION AND CONCLUSION

In our study, we investigated the serum Glu/K⁺ ratio as an alternative and supportive diagnostic parameter to insulin in patients diagnosed with PCOS. In this analysis with a control group created for PCOS independent of age factor, when serum Glu/K⁺ ratio and Insulin were analyzed together, we concluded that serum Glu/K⁺ ratio could be a valuable diagnostic tool with potential for patients with PCOS. According to the results, fasting blood glucose, fasting insulin serum and Glu/K⁺ ratio were significantly higher in the PCOS groups. There was a moderate, positive correlation between Glu/K⁺ ratio and fasting insulin in women with PCOS. The ROC analysis shows that the prediction model by Glu/K⁺ ratio had reasonable accuracy. The accuracy was competitive with fasting insulin.

In our study, PCOS cases showed significantly higher mean fasting blood glucose than the controls. Similar observations were made by Bannigida et al., Liu et al., Zuo et al., and Jabbar et al. (16-19).

In our study, the mean HOMA-IR and fasting insulin were significantly higher in PCOS cases compared to controls. Similar observations were made by Cassar et al, Moghetti et al., and Shang et al. (20-22). Compensatory hyperinsulinemia and IR affect 65–70% of women with PCOS. This rate is higher in obese women with PCOS (23). Fasting insulin and IR assessment are accepted as the definitive diagnosis of PCOS. However, there is an ongoing debate about whether IR is specific to PCOS or is associated with obesity alone or with both factors (24-26). Indeed accurate measurement of IR and compensatory hyperglycemia require "euglycemic hyperinsulinemic clamp" analysis, a technically complex test that is rarely available for routine clinical practice and should be used for research studies. Alternatively, a standard oral glucose tolerance test, which includes measuring insulin and glucose levels, can provide complete information about glucose tolerance while providing a reasonably accurate estimate of IR. However, it should

be noted that precise measurement of insulin serum values needs using reliable immunoassays. Despite all these, there is a need for parameters to support diagnostic insulin measurement. The Glu/K^+ ratio is an influential parameter that needs to be investigated in this sense.

Our study showed a statistically significant difference between the PCOS group and the control in terms of Glu/K^+ ratio. PCOS women showed a significantly higher mean Glu/K^+ ratio. Based on the findings, Glu/K^+ ratio was introduced as a new parameter related to PCOS. Few studies were conducted to identify new clinical and biochemical parameters related to PCOS. Raheem et al. reported that vitamin D deficiency is related to several metabolic chances in women with PCOS (27). Chae et al. reported clinical and biochemical parameters related to PCOS in Korean women (28). Bagheri et al. reported biochemical parameters related to PCOS in Iranian women (29). Shahmoradi et al. studied the relationship of BsmI, TaqI, FokI, and ApaI polymorphisms in the vitamin D receptor gene with PCOS in women (30).

The limitation of this research is in the case and control study design. This problem could cause recall bias. A prospective study with a more significant number of samples is suggested to identify new diagnostic parameters, with the hope that it will become a suitable solution for the timely identification and treatment of PCOS patients. It will also help managers and public officials to make more effective plans and decisions to improve the health of individuals, families, and society.

As a result of this study, insulin presented as a new diagnostic property for PCOS. Identifying new parameters to identify PCOS patients is essential due to the high prevalence and enormous costs of this disease for the health system in countries. According to the study, Glu/K^+ ratio was introduced as a new parameter to identify women with PCOS.

Conflict-of-Interest and Financial Disclosure

The author declares that she has no conflict of interest to disclose. The author also declares that she did not receive any financial support for the study.

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Gelmiş Geçmiş En Büyük Katil:
1918 "İSPANYOL" GRİBİ

İKİNCİ BASKI

Dr. M. Kemal Temel

Grip, her yıl olağan bölgesel grip salgınları sırasında dünya genelinde yaklaşık 500.000 ölüme yol açmasına karşın, yaşlılar ve kronik hastalar gibi gruplar dışında genellikle hafif seyreden bir hastalık olduğundan, bugüne dek pek önemsenmemiştir. Daha seyrek görülen küresel grip salgınları, yani grip pandemileri sırasında ise, çok daha büyük kayıplar kaydedilmektedir. Kayıtlı tarihte onlarca grip pandemisi gerçekleşmiş olduğu bilinmektedir ve bunların en şiddetlisi olan 1918 "İspanyol" gribi pandemisi, bir yıldan kısa süre içinde 40 ila 100 (ortalama 50) milyon insanı ölüme götürmüştür. Üstelik en ağır seyrettiği grup, sıra dışı bir biçimde sağlıklı genç yetişkinler olmuştur. Çok sarsıcı sosyal, demografik ve ekonomik sonuçları nedeniyle 1918 "İspanyol" gribi pandemisi, sağlık otoritelerince solunum yoluyla yayılan salgınlar için olabilecek "en kötü senaryo" kabul edilegelmiştir. Sürmekte olan COVID-19 pandemisi sırasında bu kıyas ve ikaz, T.C. Sağlık Bakanlığı tarafından da yapılmıştır.

Yabancı dillerdeki eserlere karşın, bu yıkıcı pandemiyi ele alan Türkçe çalışmalar oldukça az sayıdadır. İlkin 2015 yılında yayımlanmış olan *Gelmiş Geçmiş En Büyük Katil: 1918 "İspanyol" Gribi,* kapsamlı bir araştırmanın ardından bu konudaki başlıca bilgi ve belgeleri Türkçe literatüre kazandırmayı amaçlayan bir ilk eserdir. Kitapta pandeminin köken, neden ve sonuçlarına; morbidite, mortalite ve üç dalgalı seyrine; Birinci Dünya Savaşı ile ilişkisine; genel küresel yayılımına ve bölgesel farklılıklarına; klinik semptom ve karakteristiklerine; dünyada ve Osmanlı İmparatorluğu'nda pandemiye karşı alınan önlemlere; yabancı kaynaklardan hastalığın teşhis ve tedavisi ile ilgili bildirim, anekdot ve gözlemlere; Osmanlı basınından hastalığın semptomları, seyri, payitaht İstanbul'a gelişi, hasta istatistikleri ile ilgili haberlere ve de yerli doktorların açıklama, karşılaştırma ve otopsi bulgularına yer verilmiştir. Ayrıca, gribin de yeni koronavirüs hastalığının da solunumsal salgın hastalıklar olması paydasında, genişletilmiş ikinci baskı güncel COVID-19 pandemisi ile mukayeseler de içermektedir.

BETİM KİTAPLIĞI

Terrorist attacks in Türkiye: An analysis of counter-terrorism medicine

Türkiye'deki terörist saldırılar: Karşı-terörizm tıbbi analizi

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Abstract

Aim: The objective of this research was to perform a counter-terrorism medicine analysis of terrorist attacks in Türkiye.

Methods: This study is a retrospective cross-sectional research. The study population consisted of terrorist incidents that occurred in Türkiye, as provided by the START Global Terrorism Database for the period from 1970 to 2020. Various characteristics of terror attacks in Türkiye were analyzed and presented in tabular form.

Results: Over the past 51 years, there have been a total of 4,485 terrorist incidents, with 91.2% reaching their intended targets as orchestrated by terrorist organizations in Türkiye. Of these incidents, 2,767 had detrimental economic impacts. Additionally, 17,570 individuals experienced adverse medical effects. Among the 81 provinces in Turkey, Istanbul witnessed the highest number of terrorist incidents and suffered the most significant medical consequences.

Conclusion: Türkiye has been significantly impacted by terrorist incidents over the past fifty years especially within the last decade, particularly in metropolitan provinces like Istanbul. These events have negatively affected both the health and economic well-being of many individuals. In response, while the country has implemented various security measures and preparedness strategies to mitigate such incidents, there is also a critical need to improve the readiness of healthcare services to effectively handle the potential consequences of terrorist attacks. This includes advancing anti-terror medicine and tactical medicine capabilities, as well as strengthening mass casualty management systems. Such improvements will ensure a more effective and coordinated response to large-scale emergencies, ultimately saving lives and reducing the long-term impacts on society.

Keywords: Ambulances, disaster medicine, emergency medical services, Türkiye

Öz

Amaç: Bu araştırmanın amacı, Türkiye'deki terörist saldırılar üzerine bir karşı terörizm tıbbı analizi gerçekleştirmektir.

Yöntemler: Bu çalışma, retrospektif kesitsel bir araştırmadır. Çalışma popülasyonu, 1970 ile 2020 yılları arasında Türkiye'de meydana gelen terörist olayları kapsamaktadır ve bu olaylar START Küresel Terörizm Veritabanı tarafından sağlanmıştır. Türkiye'deki terör saldırılarının çeşitli özellikleri analiz edilmiş ve tablo halinde sunulmuştur.

Bulgular: Geçtiğimiz 51 yıl içinde Türkiye'de toplam 4,485 terörist olay gerçekleşmiş, bu olayların %91,2'si terörist organizasyonlar tarafından planlandığı gibi hedeflerine ulaşmıştır. Bu olaylardan 2,767'si ekonomik olarak zarar verici etkilere sahiptir. Ayrıca, 17,570 kişi yaralanmış veya sağlık açısından olumsuz etkilenmiştir. Türkiye›deki 81 il içinde, en fazla terörist olayın yaşandığı ve en ciddi tıbbi sonuçların görüldüğü il İstanbul olmuştur.

Sonuç: Türkiye, özellikle İstanbul gibi büyükşehirler geçtiğimiz elli yılın özellikle son on yılında terörist olaylardan önemli ölçüde etkilenmiştir. Bu olaylar birçok bireyin sağlık ve ekonomik refahını olumsuz yönde etkilemiştir. Bunlara yanıt olarak, kamu otoritesi çeşitli güvenlik önlemleri ve hazırlık stratejileri uygulamıştır. Aynı zamanda terörist saldırıların olası sonuçlarını etkili bir şekilde ele alabilmek için sağlık hizmetleri hazırlığını artırma da kritik bir ihtiyaçtır. Bu hazırlıklar, karşı-terör tıbbı ve taktik tıp yeteneklerini ilerletmeyi, ayrıca kitlesel yaralanma yönetim sistemlerini güçlendirmeyi içermektedir. Bu iyileştirmeler, büyük çaplı acil durumlara daha etkili ve koordine bir yanıt verilmesine, daha fazla hayat kurtarılmasına ve toplum üzerindeki uzun vadeli etkilerin azaltılmasına katkıda bulunacaktır.

Anahtar Sözcükler: Acil tıbbi hizmetler, afet tıbbı, cankurtaranlar, Türkiye

Received/*Geliş* : 16.04.2024
Accepted/*Kabul*: 09.05.2024

DOI: 10.21673/anadoluklin.1469126

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INTRODUCTION

Terrorist attacks pose unique challenges in various sectors, including the state, society, aid organizations, the healthcare sector, and infrastructure services (1). Terrorism is generally designed to increase fear, panic, and stress in society by targeting vulnerable individuals and infrastructure. While terrorism has a long history, there has been a significant increase in it since 2001 (2). This increase is linked to the terrorist attacks on September 11, 2001, and it is referred to as the beginning of the "new era" of terrorism (3–5). However, an increase in terrorist incidents has also been observed with the onset of the uprising in Syria in 2011 and the emergence of the Islamic State of Iraq and Syria (ISIS) in 2013. Türkiye has been directly and indirectly affected by these events (6).

Türkiye has historically been adversely affected by terrorism due to its geopolitical location (7). As a result, terrorist incidents in Türkiye date back to the 1960s (8). Today, Türkiye continues to be one of the countries frequently targeted in terrorist attacks. According to studies, Türkiye ranks twenty-third among the countries most affected by terrorist attacks worldwide and holds the first position among European and Turkic States (9). One of the reasons for this ranking is the existence of a power vacuum in some countries located in Türkiye's southern region. This power vacuum has led to a significant increase in irregular migrants and refugees attempting to reach Europe through Türkiye, originating from the Middle East. This situation has contributed to the rise in the number of irregular migrants and refugees in Türkiye. Additionally, Türkiye has been adversely affected by events such as the Iran-Iraq and Gulf wars in the Middle East, the Syrian civil war, crises in Bosnia and Kosovo in the Balkans, territorial disputes in the Aegean Sea with Greece, and conflicts in the Caucasus region, including Nagorno-Karabakh, Chechnya/Russia, South Ossetia/Georgia, and Abkhazia/Georgia. These events increase Türkiye's risk of involvement in conflicts and the likelihood of an increase in terrorist incidents (10). Türkiye is adversely affected by various terrorist groups, including those originating from neighboring countries as well as domestic organizations such as the Fethullah Terrorist Organization (FETÖ), the Kurdistan Workers' Party (PKK), the Revolutionary People's Liberation Party/Front (DHKP-C), Al-Qaeda, the Armenian Secret Army for the Liberation of Armenia (ASALA), and the Islamic State of Iraq and Syria (ISIS) (11). Therefore, Türkiye contributes to capacity-building efforts by international and regional organizations, such as the United Nations, to combat terrorism (12). However, to prevent terrorist incidents within its own borders and better prepare the first responders for future terrorist attacks, Türkiye needs to understand the historical context and methodologies of past attacks (13). Therefore, it is important to methodologically examine the frequency of terrorist incidents, types of weapons used, nature of attacks, target groups, and the resulting health issues that have occurred in Türkiye from the past to the present. This study, in this context, aims to conduct an epidemiological analysis of terrorist attacks that occurred in Türkiye between 1970 and 2020, focusing on incident locations, weapons used, types of attacks, property damage, information about target victims, and their medical consequences.

METHODS

This study is a cross-sectional epidemiological research. The study population consists of terrorist attacks that occurred in Türkiye between 1970 and 2020, as documented in the Global Terrorism Database (GTD) data file provided by START (The National Consortium for the Study of Terrorism and Responses to Terrorism). The aim of this study is to conduct an epidemiological analysis of terrorist attacks in Türkiye, focusing on incident locations, weapons used, types of attacks, information about target victims, and their medical consequences.

Data Source

The data source for this study involved downloading the GTD raw data file from the START (The National Consortium for the Study of Terrorism and Responses to Terrorism) website. The GTD is a freely accessible database containing information on terrorist incidents that occurred worldwide between 1970 and 2020 (excluding 1993). This database systematically records information on both national and international terrorist events and currently encompasses over 200,000

incidents. For each event, data is available on variables such as the year, location, number of injuries and fatalities, target, and responsible group (14). Publications generated from GTD data can be regularly accessed from the START website. This study constitutes a secondary analysis of the GTD data.

Definitions

The National Consortium for the Study of Terrorism and Responses to Terrorism, also known as START, is a research and education center that conducts scientific research on the causes and medical consequences of national and international terrorism. The START website hosts various databases, including START Datasets, IVEO Knowledge Matrix, GTD (Global Terrorism Database), Big Allied and Dangerous, TEVUS Portal, PIRUS dataset, and Nuclear Facilities Attack Database, among others (15).

The GTD available on the START website is a database that contains systematic data on national and international terrorist incidents. According to this database, a terrorist attack is defined as the unlawful use of force or violence, threatened or actual, by a non-state actor or group (actor) to attain a political, economic, religious, or social goal through fear, coercion, or intimidation (16). For an event to be included in the GTD, it must be intentional and involve a certain level of violence or an imminent threat of violence.

Inclusion Criteria

An event is included in the raw data file of the GTD if it meets the three pre-defined inclusion criteria set by the GTD for it to be considered a terrorist attack:

- Criterion 1: The act must be aimed at attaining a political, economic, religious, or social goal.
- Criterion 2: There must be evidence of an intention to coerce, intimidate, or convey some other message to a larger audience (or audiences) than the immediate victims.
- Criterion 3: The action must be outside the context of legitimate warfare activities.

When an event fails to meet any of the three inclusion criteria set by the GTD or when there is uncertainty, the events are excluded. It is important to note that these criteria are determined within the database itself, not by the researchers.

In order to achieve the objectives of the study, the researchers developed inclusion criteria among the 135 variables available in the GTD (Table 1). Those events that met the criteria were included in the study.

Data Preparation

The GTD metadata file was downloaded from the START website in August 2022. The downloaded GTD metadata file was then uploaded into IBM SPSS Statistics Version 22, and a search was conducted for terrorist attacks that occurred in Türkiye. As a result of the search, the data that met the inclusion criteria of the study were saved in a Microsoft Excel file. Since the data for the years 2021-2023 were not yet available at the time of downloading the GTD metadata file, the data for those years were not recorded.

Data Analysis and Ethics

Frequency analysis is conducted to determine the number of incidents, deaths, injuries, and property damages caused by terrorist attacks in Türkiye, categorized by year and province. Additionally, frequency distributions are analyzed to determine the number of incidents, deaths, and injuries based on information related to the weapon used, type of attack, target group, and perpetrator for each terrorist event. The study's data were designed for retrospective analysis based on publicly accessible information, aiming to analyze the locations, weapons, types of attacks, target victims, perpetrators, and medical outcomes of those terrorist attacks that occurred in Türkiye. Therefore, ethical review board approval was not required for the study's data. The identities of the attackers from the GTD metadata file were excluded from the study data. No assessment of the accuracy of the GTD data was performed.

RESULTS

General Results

Between 1970 and 2020, there were a total of 4,485 terrorist incidents that met the inclusion criteria of both the GTD and the study. Of these terrorist attacks, 91.2% achieved their intended objectives as planned by different terrorist organizations. These attacks had adverse economic consequences in 61.7% of the cases

Table 1. GTD variables and subcategories in the study

GTD variables and subcategories in the study	
Variables	**Subcategories**
Date	Year (1970-2020)
Inclusion criteria	Crit1, crit2, crit3
Country	Türkiye
City	All
Attack type	Assassination, hijacking, kidnapping, barricade incident, bombing/explosion, armed assault, unarmed assault, facility/infrastructure attack, unknown
Succes of attack	Yes/no
Suicide attack	Yes/no
Weapon type	Biological, chemical, radiological, nuclear, firearms, explosives, fake weapons, incendiary, melee, vehicle, sabotage equipment, other, unknown
Target/victim information	Business, government (general), police, military, abortion related, airports & aircraft, government (diplomatic), educational institution, food or water supply, journalists & media, maritime (includes ports and maritime facilities), NGO, other, private citizens & property, religious figures/institutions, telecommunication, terrorists/non-state militias, tourists, transportation (other than aviation), unknown, utilities, violent political parties,
Casualties and consequences	Total number of fatalities Total number of injured Property damage (yes/no/unknown) Extent of property damage
International - logistical	Yes/no/unknown
International- ideological	Yes/no/unknown
International- miscellaneous	Yes/no/unknown

*GTD = Global terrorist attacks

Table 2. Number of incidents, deaths, injuries and property damage by province

Province	**Incident**	**Injured**	**Death toll**	**Property damage**
Adana	102	154	74	68
Adıyaman	19	19	59	14
Ağrı	59	134	236	37
Amasya	2	6	1	2
Ankara	301	756	383	215
Antalya	33	158	23	21
Artvin	4	2	10	4
Aydın	7	16	6	5
Balıkesir	6	1	8	4
Bingöl	91	204	175	56
Bitlis	64	88	118	30
Burdur	2	2	1	-
Bursa	14	30	13	8
Çankırı	1	10	4	1
Çorum	2	0	2	-
Denizli	2	8	5	2
Diyarbakır	380	1.256	537	141
Edirne	1	0	0	1
Elazığ	32	255	80	25
Erzincan	17	27	23	12

Province	Incident	Injured	Death toll	Property damage
Erzurum	25	13	48	14
Eskişehir	2	0	4	2
Gaziantep	47	247	115	21
Giresun	5	7	2	2
Gümüşhane	6	4	14	3
Hakkâri	335	668	816	125
Hatay	60	272	122	29
Isparta	1	0	0	-
Mersin	32	53	31	23
İstanbul	1.075	2.654	776	824
İzmir	132	177	63	108
Kars	30	11	33	17
Kastamonu	3	0	22	1
Kayseri	12	81	38	5
Kırklareli	1	0	0	1
Kırşehir	1	2	0	1
Kocaeli	8	46	10	5
Konya	9	3	16	6
Kütahya	1	0	5	1
Malatya	17	9	24	14
Manisa	10	1	5	6
Kahramanmaraş	21	43	77	19
Mardin	255	613	485	140
Muğla	12	16	3	8
Muş	36	48	26	24
Nevşehir	1	0	2	-
Niğde	1	6	3	-
Ordu	8	6	9	4
Sakarya	4	97	18	3
Samsun	13	18	23	11
Siirt	97	109	203	56
Sinop	1	7	2	1
Sivas	14	10	23	13
Tokat	14	12	16	6
Trabzon	18	37	31	9
Tunceli	114	174	191	54
Şanlıurfa	78	237	143	39
Uşak	1	1	0	-
Van	129	383	139	74
Zonguldak	4	0	5	4
Kırıkkale	6	45	8	4
Batman	59	92	107	34
Şırnak	367	602	797	196
Bartın	1	2	1	1
Ardahan	5	2	9	4
Iğdır	24	33	43	14
Kilis	70	129	41	51
Osmaniye	14	4	14	7
Bilinmeyen	167	347	802	137
Toplam	4.485	10.447	7.123	2.767

Table 3. Incidents, number of injured, and number of fatalities by attack type

Attack type	Incidents		Injured		Death toll	
	n	%	n	%	n	%
Assassination	440	9,8	279	2,6	552	7,7
Armed assault	1.325	29,6	1.992	19,0	3.863	54,2
Bombing	2.069	46,1	7.825	74,9	2.221	31,2
Hijacking	13	0,3	9	0,8	9	0,1
Hostage taking (Barricade incident)	14	0,3	1	0,0	6	0,1
Hostage taking (kidnapping)	166	3,7	17	0,1	69	1,0
Facility attack	292	6,5	64	0,6	60	0,9
Unarmed assault	13	0,3	28	0,2	21	0,3
Unknown	153	3,4	232	2,2	322	4,5
Total	4.485	100	10.447	100	7.123	100

n: Number, %: Percentage

Table 4. Number of incidents, deaths and injuries by type of weapon

Weapon type	Events		Death toll		Injured	
	n	%	n	%	n	%
Biological	-	-	-	-	-	-
Chemical	2	0,0	21	0,3	-	-
Radiological	-	-	-	-	-	-
Nuclear	-	-	-	-	-	-
Firearms	1.624	36,2	4.232	59,4	1.924	18,4
Explosives	2.177	48,6	2.370	33,3	8.107	77,6
Fake weapons	1	0,0	-	-	-	-
Incendiary	310	6,9	74	1,0	61	0,6
Melee	48	1,1	27	0,4	46	0,4
Vehicle	-	-	-	-	-	-
Sabotage equipment	1	0,0	-	-	-	-
Other	1	0,0	-	-	-	-
Unknown	321	7,2	399	5,6	309	3,0
Total	4.485	100	7.123	100	10.447	100

n: Number, %: Percentage

and negatively affected the health of 17,570 individuals. Among these incidents, 106 were carried out by foreign nationals as perpetrators, 320 involved perpetrators of different nationalities (non-Turkish citizens) than the target country, and 313 instances had foreign nationals as the victims of the attacks. Furthermore, 81 of these incidents included suicide attacks.

Medical Outcomes, and Property Damage by Year Distribution and Provinces

Supplement 1 provides incident, fatality, injury counts, and property damage in Türkiye based on the year distribution. In Türkiye, the highest number of incidents occurred in the past 11 years (n=1,732; 38.6%), while the lowest number of incidents was observed between

Table 5. Incidents, fatalities, and injuries by attacker's target type

Target type	Incident (%)	Death toll (%)	Injured (%)
Business	652 (14,5)	414 (5,8)	1.284 (12,3)
Government (general)	470 (10,5)	395 (5,6)	617 (5,9)
Police	714 (15,9)	1.279 (18,0)	2.069 (19,8)
Military	1.033 (23,0)	2.896 (40,7)	2.381 (22,8)
Abortion related	-	-	-
Airports & aircraft	38 (0,8)	76 (1,1)	379 (3,6)
Government (diplomatic)	88 (2,0)	29 (0,4)	262 (2,5)
Educational institution	162 (3,6)	89 (1,2)	171 (1,6)
Food or water supply	5 (0,1)	2 (0,0)	0 (0)
Journalists & media	78 (1,7)	44 (0,6)	63 (0,6)
Maritime (includes ports and maritime facilities)	4 (0,1)	4 (0,0)	6 (0,1)
Non-governmental organization (NGO)	9 (0,2)	3 (0,0)	5 (0,0)
Other	4 (0,1)	0 (0)	0 (0)
Private citizens & property	728 (16,2)	1.338 (18,8)	2.196 (21,0)
Religious figures/institutions	42 (1,0)	68 (1,0)	351 (3,6)
Telecommunication	11 (0,3)	9 (0,1)	1 (0,0)
Terrorists/non-state militias	48 (1,1)	74 (1,0)	63 (0,6)
Tourists	17 (0,4)	61 (0,9)	80 (0,8)
Transportation (other than aviation)	152 (3,4)	263 (3,7)	404 (3,9)
Unknown	110 (2,4)	39 (0,5)	40 (0,4)
Utilities	71 (1,6)	21 (0,3)	52 (0,5)
Violent political parties	49 (1,1)	19 (0,3)	23 (0,2)
Total	4.485 (100)	7.123 (100)	10.447 (100)

n: Number, %: Percent

1980 and 1989 (n=340; 7.6%). Over the last 51 years, the highest number of fatalities occurred between 1990 and 1999 (n=3,656; 50.0%), while the highest number of injuries was recorded between 2010 and 2020 (n=5,612; 53.7%). Out of the 4,485 terrorist attacks that occurred between 1970 and 2020, 61.7% resulted in property damage.

Table 2 presents the incidents, fatalities, injuries, and property damages of terrorist attacks in Türkiye by provinces. Between 1970 and 2020, terrorist attacks occurred in 68 provinces of Türkiye, while 13 provinces did not experience any terrorist attacks. Istanbul had the highest number of terrorist incidents, the most significant property damages, and the highest medical impact among the 68 provinces. Among these provinces, Istanbul also had the highest number of injuries, while Hakkari province had the highest number of fatalities.

Medical Outcomes by Attack Types, Weapon Types and Property Damage

Table 3 provides the number of incidents, fatalities, and injuries by attack type for terrorist attacks that occurred in Türkiye. Among the attack types, bombing (with 2,069 incidents, 46.1% of total incidents) was the most frequent attack type and resulted in the highest number of injuries (7,825 incidents, 74.9%). The least common attack type was hijacking (13 incidents, 0.3%). Among these attack types, armed assaults (3,863 fatalities, 54.2%) had the highest number of fatalities, while hostage-taking (barricade incidents) had the lowest number of fatalities and injuries (6 incidents, 0.1%).

Among the 13 types of weapons selected for carrying out terrorist attacks in Türkiye, four weapon types were not used, including biological, radiological,

nuclear, and vehicle weapons. Among the nine weapon types used by terrorist organizations, explosive weapons were the most frequently chosen, with 2,177 incidents. The least preferred weapon types were fake weapons, sabotage weapons, and other weapons. There were no injuries or fatalities reported in seven weapon types: biological, radiological, nuclear, fake weapons, vehicles, sabotage equipment, and others. Among the weapon types, the highest number of fatalities occurred in firearms (4,232 incidents, 59.4%), while the highest number of injuries was associated with explosive weapons (8,107 incidents, 77.6%) (Table 4).

Medical Outcomes by Attacker's Target Type

Table 5 provides the number of incidents, fatalities, and injuries in terrorist attacks in Türkiye based on the attacker's choice of target type among 22 target categories. The attackers did not prefer to carry out attacks related to 'Abortion-related' targets. The most preferred target type by the attackers (1,033 incidents, 23.0%) and the target type with the highest number of fatalities (2,896 incidents, 40.7%) and injuries (2,280 incidents, 22.8%) were 'Military (Army)' targets. Following attacks on the military, the target types with the highest number of incidents, fatalities, and injuries were 'Private Citizens & Property' (Incidents=728; 16.2%; Fatalities=1,338; 18.8%; Injuries=2,196; 21.0%), 'Police' (Incidents=714; 15.9%; Fatalities=1,279; 18.0%; Injuries=2,069; 19.8%), and 'Business' (Incidents=652; 14.5%; Fatalities=414; 5.8%; Injuries=1,284; 12.3%)

DISCUSSION

This study is significant as it represents the first epidemiological analysis of 4,485 terrorist attacks that occurred in Türkiye between 1970 and 2020, encompassing weapon types, attack types, target types, and medical outcomes. Furthermore, the study discusses the medical outcomes and material damage by year and province, medical outcomes by weapon and attack type, and medical outcomes by attacker's target type. These three subcategories are analyzed collectively to provide a holistic understanding of the impact of terrorism during the specified period.

Terrorism encompasses events designed by terrorist organizations or individuals/groups inspired or supported by certain countries (state-sponsored) with the aim of causing violence, disruption, and autonomy through criminal means (17) It is stated that these events have developed due to various factors such as demographic changes in the country, migration and the rise of xenophobic policies (18). In other words, acts of terrorism are shaped by factors such as a country's geographical location, economic status, sociodemographic changes, incoming migrations, and xenophobia. Due to its geopolitical location, conflicts or wars in neighboring countries, internal clashes among different ethnic groups, and sociodemographic changes (8), Türkiye has become the country with the highest number of terrorist attacks among European countries and Turkic states (9).

Türkiye is composed of seven regions: the Mediterranean, Eastern Anatolia, Aegean Sea (Islands), Southeastern Anatolia, Central Anatolia, Black Sea, and Marmara. It consists of eighty-one provinces. In Türkiye, between 1970 and 2020, there were at least one and up to 1,075 terrorist attacks in 68 provinces (Supplement 1). Among these terrorist attacks, explosives and firearms were the most commonly used weapons, while fake weapons, sabotage equipment, and other weapons were used the least (Table 4). In the literature, firearms and explosives are widely observed as the types of weapons that terrorist organizations commonly use against the general population (19–25). In a study examining terrorist incidents in an African country, it was found that firearms (45%) and explosives (31%) were frequently used (1). The reasons behind the widespread use of these weapon types include their ease of transport, facilitating the escape of terrorists, and their effectiveness in causing harm to human life from a considerable distance (26). Additionally, the production and ease of crossing international borders and their ready availability have led to an increase in their use in recent years (26). This increase results in greater medical consequences for individuals at the scene and a higher number of casualties.

Firearms and explosive weapon types lead to numerous medical problems. For example, they can cause mass injuries, disabilities, and fatalities in an instant. While firearms resulted in the highest number of

deaths in terrorist attacks in Türkiye, explosive weapons caused the most injuries (Table 3). Similar results were obtained in a cross-sectional study conducted on terrorism in Türkiye (27,28). A similar outcome was also observed in a study focused on an African country (29). In another study, it was noted that firearms used in terrorist incidents caused the highest number of mass casualties, with explosives being the second most lethal weapon type (30). There are various types of injuries associated with explosion wounds. These injuries vary depending on the variability from the primary to the quaternary effect areas generated by the explosion mechanism (31). However, the severity and type of injuries resulting from explosions differ based on the causes of the explosion, the power of the explosion, the open or closed configuration, damage to structures, and various factors (32). Nevertheless, it was concluded that head and lung injuries caused by explosions were among the leading causes of death in terrorist attacks (32).

Medical intervention is a crucial component of responding to terrorist attacks. However, various factors limit the ability of healthcare professionals to respond to such incidents. These factors include mass casualties and fatalities, the hostage-taking by the perpetrator, the lack of safety at the scene, and healthcare professional's inadequate experience and knowledge (33). These factors can vary depending on the type of attack. Terrorism incidents encompass different types of attacks, including armed assaults, vehicle attacks, bombings, hijackings, assassinations, unarmed attacks, abductions, and similar events. Although there may be differences in the mechanisms of these attack types, the severity of injuries resulting from terrorist attacks and the hospital mortality rate are very similar (34). In Türkiye, the most preferred types of attacks by terrorists in terrorist incidents are bombings, armed assaults, and assassinations. When considering the medical aspect of attack types in Türkiye, the highest number of fatalities is observed in armed assaults, while the highest number of injuries occurs in bombing attacks (Table 3). A study conducted on terrorist attacks in Scandinavian and Baltic countries also found that the armed assault type resulted in the highest number of fatalities and injuries compared to other attack types (25). In a global study on terrorist attacks worldwide, it was observed that among the attack types, the most deadly injuries occurred in bombing and armed assault incidents (35). As a result, bombings and armed assaults can be considered the most commonly used and medically impactful types of attacks in terrorist incidents. However, in terrorist attacks that occurred in Türkiye, it is observed that the most preferred and medically affected target type by terrorists is attacks on the military. A study on terrorist attacks in Africa also found that terrorists commonly prefer the target type of private citizens and property (29). Similarly, a study on terrorist attacks in Eastern Europe yielded a similar result (19). In Türkiye, after the military, this target type is the second most preferred by terrorists (Table 5).

Terrorist incidents not only affect individuals, communities, and the state from a medical perspective but also have negative social and economic implications. Terrorism can impact a country's economy in various ways, diminishing its economic prosperity, development, and both human and physical capital, potentially leading to increased military spending (36). These economic effects can slow down a country's progress. For example, following the September 11 attacks, it was reported that economic investments in the United States significantly decreased compared to previous years (37). In the case of Türkiye, it was concluded that 61% of terrorist incidents had a detrimental impact on the country's economy (Supplement 1). Therefore, it can be stated that Türkiye has been adversely affected by terrorism both economically and medically when compared to other European countries and the Turkic States. Consequently, Türkiye has been engaged in combating terrorism on multiple fronts for many years (7).

Türkiye is involved not only in the field but also in various regional and global counter-terrorism projects. For instance, Türkiye has participated in one of the largest national and international development projects, the Southeastern Anatolia Project (8). Furthermore, Türkiye is engaged in capacity-building programs with requesting countries, facilitating security cooperation agreements, and conducting negotiations for new agreements (12). However, Türkiye must effectively prepare its healthcare services for potential terrorist incidents (7). To achieve this, training pro-

grams for pre-hospital healthcare professionals should be established within the scope of counter-terrorism, and the content of these training programs should be regularly updated according to various terrorist factors. For instance, emergency planning should be tailored to the types of attacks and weapons that have the most significant medical impact in Türkiye. Furthermore, an educational program should cover triage and the various injury types and complications resulting from these attacks, along with the development of corresponding strategies (38). However, both healthcare professionals and institutions responsible for responding to terrorist incidents should be trained in areas such as terrorism awareness and supported through drills to enhance their preparedness (39). These trainings can reduce complications among casualties of mass-casualty terrorist incidents and lower the hospital mortality rate (32).

LIMITATIONS

This study has several limitations. First, as mentioned in the methodology, the data for this study was obtained from the GTD database. GTD aims to comprehensively record global terrorism events. This database relies on media reports to gather data related to terrorist incidents. Therefore, there is a possibility of bias and data gaps in the existing data, and the study constitutes a secondary analysis of the GTD data. Additionally, since the database focuses on terrorist attacks carried out by non-state actors, it may not include all terrorist incidents that occurred in Türkiye between 1970 and 2020. Finally, the GTD database covers terrorist attacks that took place between 1970 and 2020, which means that terrorist incidents in Türkiye from the last three years were not included in the study.

CONCLUSION(s)

Türkiye has grappled with terrorism for many years due to its geopolitical location, conflicts in neighboring countries, and various other factors. In the past 51 years, Türkiye witnessed 4,485 terrorist incidents, impacting 17,570 individuals negatively from a medical perspective. Istanbul, the largest province in Türkiye, saw the highest number of terrorist incidents and was the most affected in terms of medical consequences. Explosive weapons were the most commonly used type of weapon in terrorist attacks (48.6%), causing significant medical consequences for a large number of people compared to other weapon types. When comparing terrorist incidents based on target types, it was observed that the military was the primary target of terrorists in Türkiye, likely due to conflicts near the country's borders. In a year-to-year comparison, there was an increase in terrorist incidents in the last decade. This increase could be attributed to factors such as power vacuums in neighboring countries and the influx of refugees. In light of these challenges, Türkiye should develop enhanced security strategies to combat terrorism and take measures and preparedness initiatives to strengthen its healthcare services. In this context, integrating theoretical and practical courses on Disaster and War Medicine and Chemical, Biological, Radiological, and Nuclear (CBRN) issues into the medical education curriculum is crucial. Additionally, the expansion of disaster-emergency hospital capacities and the frequent conducting of disaster-emergency drills at the provincial and hospital levels—with active participation from emergency coordinators of central health authorities and subsequent reporting of deficiencies—should be prioritized.

Conflict-of-interest and financial disclosure

The authors declare that they have no conflict of interest to disclose. The authors also declare that they did not receive any financial support for the study.

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Determining the relationship between gastrointestinal symptoms and comfort in inflammatory bowel patients

İnflamatuvar bağırsak hastalarında gastrointestinal semptomlar ile konfor arasındaki ilişkinin belirlenmesi

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Abstract

Aim: This study aimed to reveal the effect of gastrointestinal symptoms on comfort levels in patients diagnosed with inflammatory bowel disease.

Methods: A cross-sectional study design was used. 115 patients diagnosed with inflammatory bowel disease between January 15, 2023, and May 15, 2023, were included in this study. Comfort level was evaluated using the General Comfort Scale Short Form. The data were analyzed using descriptive statistics, and regression analyses.

Results: The mean age in the study was The mean age in the study was 41.29 (standard deviation (SD)= 12.81) year. The mean comfort level was 98.93 (SD=19.06). There was a difference between gastrointestinal symptom burden scores according to gender (t = 3.048, p = 0.003), marital status There was a difference between gastrointestinal symptom burden scores according to gender (independent sample t-test (t) = 3.048, p = 0.003), and the presence of chronic disease (t = -4.115, p < 0.001). There is a weak negative relationship between age and comfort level There is a weak negative relationship between age and comfort level (pearson correlation (r) = -0.191, p = 0.041).

Conclusion: This study emphasized that gastrointestinal symptom burden is an important determinant of comfort level in patients diagnosed with inflammatory bowel disease and comfort decreases as gastrointestinal symptom load increases.

Keywords: Crohn disease; inflammatory bowel diseases; patient comfort; symptom assessment; ulcerative colitis

Öz

Amaç: Bu çalışma, inflamatuar bağırsak hastalığı tanısı olan hastalarda gastrointestinal semptomların konfor düzeyine etkisini ortaya koymayı amaçladı.

Yöntemler: Kesitsel bir çalışma tasarımı kullanıldı. 15 Ocak 2023 ile 15 Mayıs 2023 tarihleri arasında inflamatuar bağırsak hastalığı tanısı almış 115 hasta bu çalışmaya dahil edildi. Konfor düzeyi, Genel Konfor Ölçeği Kısa Formu kullanılarak değerlendirildi. Veriler, tanımlayıcı istatistikler ve regresyon analizleri kullanılarak analiz edildi.

Bulgular: Çalışmada yaş ortalaması 41,29 (standart sapma (SD)= 12,81) idi. Ortalama konfor düzeyi 98.93 (SD=19.06) idi. Cinsiyet (bağımsız örneklem t testi (t)=3.048, p=0.003), medeni durum (t=-2.156, p=0.033) ve kronik hastalık varlığına (t=-4.115, p<0.001) göre gastrointestinal semptom yükü puanları arasında fark saptandı. Yaş ile konfor düzeyi arasında zayıf bir negatif ilişki bulundu Yaş ile konfor düzeyi arasında zayıf bir negatif ilişki bulundu (pearson korelasyon (r) = -0,191, p = 0,041).

Sonuç: Bu çalışmada inflamatuar bağırsak hastalığı tanısı olan hastalarda gastrointestinal semptom yükünün konfor düzeyinin önemli bir belirleyicisi olduğu ve gastrointestinal semptom yükü arttıkça konforun azaldığı vurgulanmıştır.

Anahtar Sözcükler: Crohn hastalığı; hasta konforu; inflamatuar bağırsak hastalıkları; semptom değerlendirmesi; ülseratif kolit

Received/*Geliş* : 03.07.2023
Accepted/*Kabul*: 01.10.2023

DOI: 10.21673/anadoluklin.1322030

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INTRODUCTION

Inflammatory bowel disease is "a disease that develops as a result of uncontrolled inflammation of the intestinal mucosa with chronic, relapse (exacerbation) and remission (recovery) period"(1, 2). Inflammatory bowel disease caused by environmental and genetic factors is divided into two types: "ulcerative colitis and Crohn's disease" (1). Inflammatory response and involvement differ according to disease type (3). While the inflammatory response in ulcerative colitis is restricted to the submucosa and mucosa, inflammation in Crohn's disease spreads along the entire wall from mucosa to serosa (4). While Crohn's disease typically impacts the colon and the lower part of the small intestine, it can manifest in a segmental pattern anywhere within the gastrointestinal tract, extending from the oral cavity to the rectum (2). Although the inflammation in ulcerative colitis is generally restricted to the colon, it shows diffuse superficial involvement without leaving intact segments (2). Although inflammatory bowel diseases can be seen in all age groups, studies have reported that the frequency of diagnosis is more common between the ages of 20 and 30 (5). Moreover, among gastrointestinal diseases, inflammatory bowel diseases are increasing in frequency and have the potential to become a major public health problem in the future (4).

Ulcerative colitis and Crohn's disease can manifest with diverse symptoms. The intensity of these symptoms experienced by patients varies according to the severity of the inflammatory bowel disease (6). In addition to gastrointestinal symptoms such as blood in the stool, extreme fatigue, diarrhea, loss of appetite, abdominal pain and cramping, weight loss, and fever, symptoms that can affect all other systems can occur with different severity in each patient (7, 8). In addition to the physical symptoms, people with inflammatory bowel disease may also face psychological problems such as anxiety and depression (9). The quality of life of individuals is reduced due to all these problems and therefore symptom assessment becomes an important requirement for patients (10).

These physical and psychological problems experienced by patients can negatively affect their comfort (11). Comfort means "to strengthen" in Latin and is generally defined as ensuring the ease of the individual (12, 13). Comfort, which is an important component of the holistic nursing approach, was first defined in detail by Kolcaba in 2003 and the comfort theory was revealed (14). Kolcaba defines comfort as "an expected outcome with a complex structure in physical, psychospiritual, social and environmental integrity related to helping the individual's needs, providing peace of mind and overcoming problems" and defines it as "the current experience of meeting basic human needs for relief, peace of mind and overcoming problems"(12). Increased symptom severity leads to repeated hospitalizations and patients withdraw from social and professional life (11). All these problems affect patients in physical, socio-cultural, psychospiritual, and environmental aspects and negatively affect their comfort (12, 13). Considering this multifaceted nature of comfort and its effects on patients, it is essential to evaluate individuals with diagnosed inflammatory bowel disease in this respect. Nurses aim to relieve patients by controlling symptoms in chronic disease management (15). In addition, nurses take measures for comfort and provide care and assistance by encouraging the individual/family/society and supporting coping methods (16). However, there is no study in the literature addressing comfort in patients with inflammatory bowel disease. Accordingly, this study aims to reveal the effect of gastrointestinal symptoms on comfort levels in individuals diagnosed with inflammatory bowel disease. In this context, the following research questions were sought to be answered:

- What is the gastrointestinal symptom burden in individuals diagnosed with inflammatory bowel disease?
- What is the comfort level of individuals diagnosed with inflammatory bowel disease?
- What is the relationship between gastrointestinal symptom burden and comfort level in individuals diagnosed with inflammatory bowel disease?

MATERIAL AND METHODS

Study Design

A web-based descriptive study design was used. The study was reported according to the "Strengthening the Reporting of Observational Studies in Epidemiol-

ogy (STROBE) checklist" in reporting descriptive and correlational studies.

Setting

This research was conducted with the Inflammatory Bowel Diseases and Families Assistance Association (IBHAYD) through the Google Forms survey platform (Google LLC, Mountain View, California, USA) on online platforms (e-mail, social media, etc.). The research was conducted between January 15, 2023, and May 15, 2023.

Participants

Individuals with inflammatory bowel disease in Turkey comprise the study population. The sample of the study included individuals (a) over the age of 18, (b) who were diagnosed with inflammatory bowel disease, and (c) who voluntarily agreed to participate in the study. Snowball sampling method was used to form the sample group of the study. In the snowball sampling method, individuals who meet the inclusion criteria and are suitable for the purpose of the study were identified through the online platforms (phone, message, mail, social media, etc.) of the IBHAYD, and the snowball continued to grow if the people reached suggested other names (17). Throughout the data collection process of the study, the researchers reached the sample by identifying new individuals who met the inclusion criteria through online platforms (phone, message, mail, social media, etc.). For this study, the number of patients included in the sample was calculated in the G*Power version 3.1 program. Accordingly, 111 people were planned to be included in the sample, with an effect level of medium (0.3), a power level of 95%, and a significance level of 0.05. In this context, 186 patients were evaluated and 47 were excluded because they did not have inflammatory bowel disease and 24 were excluded because they were under 18 years of age. Therefore, the study was completed with 115 individuals with inflammatory bowel disease.

Measurement Tools

In the study, the "Personal Information Form" to obtain the socio-demographic data of the patients, the " Gastrointestinal Symptoms Rating Scale (GSRS)" to evaluate gastrointestinal symptom status, and the "General Comfort Scale Short Form (GCS-SF)" to determine the comfort level were used.

Personal Information Form: This form was developed by the researchers by scanning the literature, and includes questions such as marital status, educational status, age, gender, smoking status, presence of additional chronic diseases, and type of bowel disease (18-20).

Gastrointestinal Symptoms Rating Scale (GSRS): It consists of 15 items related to the frequency of gastrointestinal symptoms that can be bothersome in the last three months by Revicki et al. (21). The symptoms in the questionnaire consisted of five categories: esophageal symptoms, upper dysmotility symptoms, intestinal symptoms, diarrhea, and constipation symptoms. The scale adopts a five-point Likert scale format, ranging from "Never (0)" to "Very often (4)," representing the frequency of symptoms. The total score achievable on the scale spans from 0 to 60 (21). Higher scores on the scale correspond to greater symptom burden and frequency. The Turkish validity and reliability study was conducted by Turan et al., who reported a Cronbach's alpha value of 0.82 (22). The Cronbach's alpha value was calculated as 0.887 in the present study sample, indicating strong internal consistency.

General Comfort Scale Short Form (GCS-SF): The form, developed by Kolcaba in 2006, consists of three sub-dimensions: refreshment (9 items), relaxation (9 items), and overcoming problems (10 items) (12). The scale comprises both negative and positive items, with the negative items being reverse-coded and then summed. Each item is rated on a six-point Likert scale. To obtain the total score, the scores for all items are summed, resulting in a range of 28 to 168. Higher scores indicate a higher level of comfort. The Turkish validity and reliability study was conducted by Çıtlık Sarıtaş et al. in 2018. The study reported a Cronbach's alpha reliability coefficient of 0.82 (23). The Cronbach's alpha value was calculated as 0.781 in the present study sample, indicating acceptable internal consistency.

Data Collection

Research data were collected in an online survey format. After reading the informed consent form, the participants accessed the research questions after clicking the "I have read the information and agree to par-

ticipate in the study of my own volition" button. The informed consent form, which included information about the aim of the study, the importance of answering the questions sincerely and honestly, and that the knowledge would be kept confidential, was given to the participants online. Additionally, participants were informed that they had the autonomy to discontinue their participation in the study at any given moment. Those who approved the informed consent form filled in the personal information form and scales sent via Google Forms and completed it with the submit button. Completing the Personal Information Form and scales took approximately 10 minutes depending on the speed at which the participants answered the questions.

Statistical Analysis

The data were subjected to statistical analysis using Statistical Package for the Social Sciences (SPSS) version 25.0 (IBM Corp, Armonk, New York). To assess the normality of the data, kurtosis and skewness values were examined, and the Shapiro-Wilk test was employed. A p-value greater than 0.05 was indicative of a normal distribution, whereas a p-value less than 0.05 indicated non-normality (24). Skewness and kurtosis values ranging from -1.5 to +1.5 were considered supportive of a normal distribution (25). Descriptive statistics, such as mean and standard deviation (SD), were employed for numerical variables, given that the data met the assumptions of normal distribution, e.g., age. Categorical variables, such as gender and educational status, were presented using frequency distributions in terms of count and percentage. Pearson correlation analysis was utilized to examine relationships between numerical variables and scales in the study. To explore the association between categorical variables and scales, a one-way analysis of variance and independent sample t-tests were conducted. Regression analyses were performed to assess the influence of gastrointestinal symptom burden on comfort. In this study, a p-value below 0.05 was considered statistically significant.

Ethical Considerations

Approval was obtained from the Ethics committee of Sakarya University of Applied Sciences for the conduct of the study (date: 02,01.2023, decision no: 27-21). Following the ethics committee approval, the necessary permission was obtained from the İBHAYD association to conduct the research. All articles of the Declaration of Helsinki were complied with in the study.

RESULTS

Participants Characteristics

The mean age of the participants included in the study was 41.29 (SD= 12.81) years. When gender distribution was analyzed, it was determined that 51.3% were female. The majority of the participants were undergraduates (34.8%) and high school graduates (33.9%). 70.4% of the participants were married. While 37.4% of the participants were current smokers, 34.8% had never smoked and 27.8% had quit smoking. Ulcerative colitis was present in 61.7% and Crohn's disease in 38.3% of the participants. When the presence of additional chronic diseases was evaluated, 53% of the patients had additional chronic diseases and the most common diseases were hypertension, diabetes, thyroid dysfunction, and ankylosing spondylitis (Table 1).

Findings Related to GSRS and GCS-SF

When the normal distribution assumptions regarding the scales are examined, according to Shapiro's test, since the p-value is greater than 0.05, it is seen that it is suitable for normal distribution ($p = 0.063$ for symptom scale; $p = 0.270$ for comfort scale). In addition, in this study, skewness values ranged between 0.421 and 0.206, and kurtosis values ranged between -0.735 and -0.562. Skewness and kurtosis coefficients between -1.5 and +1.5 supported the assumptions of normal distribution. The mean gastrointestinal symptom burden score was 46.79 (SD=17.70). The mean comfort level was 98.93 (SD=19.06) (Table 2).

Relationship Between GSRS and GCS-SF and Socio-demographic Variables

When gastrointestinal symptom burden and socio-demographic variables were analyzed, it was determined that there was a difference between gastrointestinal symptom burden scores according to gender ($t = 3.048$, $p = 0.003$), marital status ($t = -2.156$, $p = 0.033$), and presence of chronic disease ($t = -4.115$, $p < 0.001$). However, there was no difference between gastrointestinal

Table 1. The characteristics of the participants

	n	%	Gastrointestinal symptom burden			Comfort level		
			Mean±SD	Test statistic	*p*	Mean±SD	Test statistic	*p*
Age (Mean±SD)	41.29±12.81		-	-0.020*	0.830	-	-0.191*	***0.041***
Gender								
Female	59	51.3	51.52± 19.03	3.048**	***0.003***	98.86±19.16	-0.043**	0.966
Male	56	48.7	41.80±14.77			99.01± 19.13		
Education level								
Primary school	13	11.3	56.07± 18.86			92.61±15.43		
High school	39	33.9	43.20±16.72			94.15±17.89		
Associate's degree	14	12.2	44.92± 14.16	1.872***	0.120	99.57± 19.18	2.014***	0.097
License	40	34.8	49.32±18.86			103.87±20.01		
postgraduate	9	7.8	40.55±16.11			105.88± 19.92		
Marital status								
Single	34	29.6	41.38±17.01	-2.156**	***0.033***	96.67 (19.83)	-0.823**	0.412
Married	81	70.4	49.06±17.59			99.88 (18.77)		
Smoking status								
Never smoked	40	34.8	45.55±17.45			97.05 (20.40)		
Ex-smoker	32	27.8	45.06± 16.09	1.065***	0.348	98.81 (19.34)	0.475***	0.623
Current Smoker	43	37.4	50.65± 20.09			101.46 (17.16)		
Type of bowel disease								
Ulcerative colitis	71	61.7	47.60±18.96	0.625**	0.533	99.53 (19.75)	0.424**	0.672
Crohn's disease	44	38.3	45.47±15.58			97.97 (18.07)		
Presence of additional chronic disease								
No	61	53.0	40.80± 15.47	-4.115**	***0.000***	101.16 (19.85)	1.335**	0.185
Yes	54	47.0	53.5±17.98			96.42 (17.98)		

SD: Standard deviation

* Pearson correlation, ** Independent sample t-test, *** One-way ANOVA

Table 2. Findings related to scales

				Skewness		Kurtosis		Shapiro-Wilk Test	
	Minimum	Maximum	Mean±SD	Test statistic	*p*	Test statistic	*p*	Test statistic	*p*
Gastrointestinal symptom burden	16	91	46.79± 17.70	0.421	0.226	-0.735	0.447	0.981	0.063
Comfort level	60.0	142.0	98.93± 19.06	0.206	0.226	-0.562	0.447	0.986	0.270

* SD: Standard deviation, **Normality tests

Table 3. Association and regression between comfort and gastrointestinal symptom burden

		Gastrointestinal symptom burden
Comfort level	**Pearson correlation**	-0.298
	p	***0.001***
	n	115
	Non-standardized beta	-0.321
	Standard error	0.097
	Standardized beta	-0.298
	T -value	-3.324
	p	***0.001***

symptoms according to educational status (F = 1.872, p = 0.120), smoking status (F = 1.065, p = 0.348), and type of bowel disease (t = 0.625, p = 0.533). In addition, there was no association between age and gastrointestinal symptoms (r = -0.020, p = 0.830) (Table 1).

When comfort level and socio-demographic variables are analyzed, there is a weak negative relationship between age and comfort level (r = -0.191, p = 0.041). However, no significant difference was found in comfort level according to other socio-demographic variables (p > 0.005) (Table 1).

Association and Regression Between Comfort and Gastrointestinal Symptom Burden

It was determined that there was a statistically significant negative, weak relationship between comfort level and gastrointestinal symptom burden. In addition, regression was performed to reveal the effect. When the beta coefficient and t-test results of the participants were analyzed, it was determined that gastrointestinal symptom burden was a significant predictor in affecting the comfort level of patients (Table 3).

DISCUSSION AND CONCLUSION

This study represents the inaugural exploration of the correlation between gastrointestinal symptoms and overall well-being in individuals diagnosed with inflammatory bowel disease. Our study results show that gastrointestinal symptom burden scores of individuals with inflammatory bowel disease are above average. In support of our study findings, a study reported that individuals diagnosed with inflammatory bowel disease face more gastrointestinal symptoms such as abdominal diarrhea, bloating, gas, pain, and bowel incontinence than the general population (26). When socio-demographic variables and gastrointestinal symptoms are considered, this study shows that women and married people have a higher gastrointestinal symptom burden. Although no study directly evaluating gastrointestinal symptom burden in individuals diagnosed with inflammatory bowel disease was found in the literature, our findings are supported by other studies. One study concluded that women with irritable bowel syndrome experienced more gastrointestinal symptoms than men (27). In another study, gastrointestinal symptoms experienced in the last two weeks in the general population were evaluated and it was determined that women experienced more symptoms than men (28). In a large-scale descriptive study conducted to determine the burden of gastrointestinal symptoms in the United States, it was determined that married individuals experienced more gastrointestinal symptoms (29). The main reason for these results may be that being married brings additional responsibilities related to the family process and psychosocial problems such as stress in case of illness are higher in women. In addition, this study shows that individuals with additional chronic diseases have a higher burden of gastrointestinal symptoms. Similarly, in a study conducted to determine the burden of gastrointestinal symptoms, it was found that individuals with chronic diseases and a higher number of chronic diseases experienced more gastrointestinal symptoms (29).

In addition to gastrointestinal symptom burden, the comfort level of individuals with inflammatory bowel disease was found to be moderate. In addition, when socio-demographic variables and comfort level were analyzed, it was observed that comfort level decreased with increasing age. The comfort level in patients diagnosed with inflammatory bowel disease has not been directly evaluated, and one study states that individuals describe their comfort level as deteriorating as age increases (11). In another study, a weak negative correlation was determined between age and comfort level, and it was determined that the comfort levels of patients decreased with increasing age (30). It is expected that the gastrointestinal functions, which decrease with the physiological changes that occur with increasing age, decrease more in comfort due to the symptom load brought by the disease. In addition, our study findings show that comfort level is not affected by variables such as educational status, marital status, gender, smoking status, and presence of additional chronic diseases. In a study conducted with individuals with chronic diseases, it was determined that educational status and marital status were not associated with comfort level. Similarly, another study reported that marital status, presence of additional chronic diseases, income status, and educational status did not affect the comfort level (31).

This study found a significant relationship between gastrointestinal symptom burden and comfort level and concluded that symptom burden is a predictor of comfort. In another study, it was reported that patients' comfort levels can be significantly increased by controlling the symptom states (32). The main reason why the symptom burden significantly affects the comfort level in patients may be due to the fact that the symptoms experienced severely limit the physical movements of the patients and bring additional psychological problems. Especially the physical limitation due to the symptom may have triggered a significant decrease in the comfort level (33).

This study concluded that gastrointestinal symptom burden is an important predictor of comfort level in patients diagnosed with inflammatory bowel disease and comfort decreases as gastrointestinal symptom burden increases. Gastrointestinal symptom burden is higher in women, married couples, and individuals with additional chronic diseases. The comfort level was found to be lower in elderly patients diagnosed with inflammatory bowel disease. To increase comfort in patients with inflammatory bowel disease, it is important requirement to include more emphasis on reducing the burden of symptoms in education and counseling programs. Considering that older individuals affect their comfort levels more, it should not be ignored that these groups need more support. Rehabilitation practices aiming to increase patients' quality of life and comfort should include symptom control.

Nurses, who constantly interact with individuals with chronic diseases throughout the disease process, have an important role in evaluating the symptom burden of patients. It should not be forgotten that any attempt made by nurses to alleviate the symptom burden by evaluating the symptoms will also have a significant effect on increasing the comfort level of the patients. An important result is that reducing the symptom burden within the scope of holistic nursing care unquestionably increases comfort.

Strengths and Limitations

This study has one limitation. The study was conducted online through an association. This may have limited the access of patients who need access to online platforms. The strongest aspect of this study is that the effect between comfort and gastrointestinal symptom burden was revealed by regression analysis in this study.

Conflict-of-interest and financial disclosure

The author declares that she has no conflict of interest to disclose. The author also declares that she did not receive any financial support for the study.

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Meme kanseri tanısı alan hastalarda hastalık kabulü ve yaşam kalitesinin incelenmesi

Examination of illness acceptance and quality of life in patients diagnosed with breast cancer

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Öz

Amaç: Araştırma meme kanseri tanısı alan hastalarda hastalık kabulü ve yaşam kalitesinin belirlenmesi amacı ile yapılmıştır.

Yöntemler: Araştırma tanımlayıcı ve kesitsel türdedir. Çalışmaya ülkemizdeki bir üniversite hastanesinin genel cerrahi kliniği meme polikliniği'ne daha önce meme kanseri tanısı ile ameliyat olan ve kontrol muayenesine gelen 154 hasta dahil edildi. Veriler kişisel bilgi formu, Hastalığı Kabul Ölçeği, Avrupa Kanser Araştırma ve Tedavi Teşkilatı Yaşam Kalitesi (EORTC QLQ-C30) ve Meme Kanserine Özgü Yaşam Kalitesi (EORTC QLQ-BR23) ölçekleri, Kısa Form-12 (SF-12) ile toplandı. Tanımlayıcı istatistikler, tek değişkenli analizler ve Spearman korelasyon analizi verilerin analizinde kullanıldı.

Bulgular: Araştırmaya katılan hastaların yaş ortalamasının 53,70±11,44 yıl olduğu belirlendi. Araştırma grubunun %57,8'inin sol memede kanser ve %44,8'inin Evre I'de ve ameliyattan sonra geçen süre ortalamasının 26,92±10,79 ay olduğu bulundu. Hastaların %39,0'ına meme koruyucu cerrahi yapıldığı, %35,7'sine ameliyat sonrası radyoterapi ve kemoterapi uygulandığı belirlendi. Hastalık Kabulü Ölçeği puan ortalaması 30,54±7,59, SF-12 fiziksel özet skor: 43,39±6,85, zihinsel özet skor: 39,44±10,05'tir. Hastaların EORTC QLQ-C30 fonksiyonel skala alt boyut puanları yüksek, semptom skalası alt boyut puanları düşük olarak saptandı. EORTC QLQ-BR23 ölçeği fonksiyonel skala (cinsel haz ve gelecek beklentisi hariç) ve semptom skalası alt boyutlarından düşük puan aldıkları belirlendi.

Sonuç: Araştırma sonucunda meme kanserli hastaların hastalığı kabul düzeylerinin yüksek, kansere bağlı fonksiyonel durumlarının iyi olduğu, semptomları daha az hissettikleri ancak genel yaşam kalitelerinin düşük olduğu saptandı.

Anahtar Sözcükler: Hasta; meme kanseri; yaşam kalitesi

Abstract

Aim: The study was conducted with the aim of determining illness acceptance and quality of life in patients diagnosed with breast cancer.

Methods: The study is descriptive and cross-sectional. The study included 154 patients who had previously undergone surgery for breast cancer and presented for follow-up examination at the General surgery clinic breast outpatient department of a university hospital in our country. Personal information forms, the Illness Acceptance Scale, the European Organization for Cancer Research and Treatment Quality of Life (EORTC QLQ-C30) and Breast Cancer-Specific Quality of Life (EORTC QLQ-BR23) scales and Short-Form (SF-12) were used as data collection tools. The data were evaluated using descriptive statistics, univariate analyses, and Spearman correlation analysis.

Results: The mean age of the patients participating in the study was determined 53.70±11.44 years. It was found that 57.8% of the study group had left breast cancer, 44.8% were in Stage I and the mean time after surgery was 26.92±10.79 months. It was determined that 39.0% of the patients underwent breast-conserving surgery, and 35.7% of them underwent postoperative radiation therapy and drug therapy. The mean score of the Illness Acceptance Scale was 30.54±7.59, SF-12 physical summary score was 43.39±6.85, mental summary score was 39.44±10.05. The patients' EORTC QLQ-C30 functional scale sub-dimension scores were found to be high, while the symptom scale sub-dimensions scores were low. It was determined that they scored low in the EORTC QLQ-BR23 scale for functional scale (except for sexual pleasure and future expectation) and symptom scale sub-dimensions.

Conclusion: As a result of the study, it was determined that patients with breast cancer have high illness acceptance, good functional status related to cancer, lower symptoms, and an overall lower quality of life.

Keywords: Breast cancer; patient; quality of life

Geliş/*Received* : 10.08.2023
Kabul/*Accepted*: 16.10.2023

DOI: 10.21673/anadoluklin.1339663

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GİRİŞ

Meme kanseri tüm dünyada kadınlarda en sık görülen kanser türleri arasındadır ve 2020 yılında 2,3 milyon kadına meme kanseri tanısı konmuştur (1). Aynı zamanda meme kanseri 685000 ölüme yol açarak kanser ölümleri açısından beşinci sırada yer almaktadır. Meme kanseri insidansı özellikle gelişmiş ülkelerde, mortalite oranları ise gelişmekte olan ülkelerde daha yüksektir (2). Ülkemizde 2020 yılında 24175 kişiye meme kanseri tanısı konmuş ve 7161 kişi meme kanseri nedeniyle hayatını kaybetmiştir (3). Aynı zamanda tarama programları ve etkili tedavi yöntemlerinin uygulanması ile malign meme kanseri tanısı konulan hastaların prognozu önemli ölçüde iyileşmiş ve beş yıllık sağ kalım oranları artmıştır (4).

Memeler kadınlarda beden imajı algısında önemli role sahiptir. Meme dokusunun kaybı kadınların beden imajını bozarak psikolojik ve sosyal sorunları ortaya çıkarmaktadır (5). Meme kanseri tanısı hastalar ve aileleri üzerinde önemli fiziksel, mental ve ekonomik etkilere neden olmaktadır. Hastaların yaşam tarzında ve hatta aile üyelerinin dinamizminde önemli değişiklikler meydana gelmektedir. Hastalığa ilişkin belirtiler, anksiyete, stres ve depresyon gibi psikolojik durumlar, algılanan yaşam beklentisinin düşmesi ve oluşan yan etkilere bağlı yaşam kalitesi olumsuz yönde etkilenmektedir (6). Meme kanserli kadınların yaşam kalitesi değerlendirme sonuçları fiziksel ve duygusal işlevsellik, ağrı, bulantı ve yorgunluk gibi tedaviye bağlı yan etkileri içermesi nedeniyle giderek daha önemli hale gelmektedir (7).

Kanseri kabul etmek ve hastalıkla barış içinde olmak hastaların sıkıntılarını azaltmada rol oynayabilecek önemli bir faktördür. Hastalığı kabullenme farklı şekillerde kavramsallaştırılarak hastanın kendine değer verme duygusunu korurken hastalıkla ilişkili kayıpları kabul etme süreci olarak tanımlanmıştır. Bu süreç mevcut değerler ve güçlere dayanarak yaşamda yeni anlamlar ya da olanaklar keşfetmeyi içerebilir (8). Hastalığa uyum hastalıkla ve sonuçlarıyla başa çıkma, ağrı ve genel halsizlik sorunlarını da kapsamaktadır. Kabul düzeyi işlevsellik ve uyumun duygusal bir ölçütüdür. Meme kanseri ameliyatından sonra kadının değişen tüm yönlerini kabul etmesi gereklidir. Bu durumda içinde bulunduğu çevrede yaşayabilmesi ve etkin bir şekilde işlev gösterebilmesi için davranışlarını da değiştirmelidir. Hasta olduğunun ve hastalığın sonuçlarının kabul edilmesi, kendini ve hastalığı kabul etmeyi sağlar. Optimal biyopsikososyal işlevsellik, meme kanseri ameliyatından sonra hastalığı kabulün göstergelerinden biridir. Hastanın yaşam tarzını, değerlerini ya da tutumunu değiştirme kararı zaman ve duygusal olgunluk gerektirir. Bu her zaman bireysel bir süreçtir. Çevre, sosyoekonomik durum ve hastalığa yönelik bireysel tutum hastalığı kabullenmeyi etkiler. Hastalığın kabul edilmesi, hastalık ve komplikasyonlar ile ilişkilendirilen negatif duyguları azaltarak hastanın yaşam kalitesini iyileştirmeye yardımcı olabilir (9).

Literatürde meme kanseri tanısı alan hastalarda hastalık kabulü ve yaşam kalitesine ilişkin yeterince çalışma yoktur. Bu nedenle çalışma meme kanseri tanısı alan hastalarında hastalık kabulü ile yaşam kalitesi arasındaki ilişkiyi belirlemek amacıyla yapıldı. Aynı zamanda hastaların demografik, klinik veya tedaviye ilişkin diğer faktörleri belirleyerek hastalık kabulü ve yaşam kalitelerini etkileyebilecek faktörleri tanımlamak amaçlandı.

Bu araştırmada; meme kanserli hastalarda hastalık kabulü ve yaşam kalitesi düzeyi nedir? sorusuna yanıt arandı.

GEREÇ VE YÖNTEMLER

Araştırma tanımlayıcı ve kesitsel türdedir. Çalışma, Ekim-Aralık 2018 tarihleri arasında Türkiye'de bir üniversite hastanesinin genel cerrahi kliniği meme polikliniğine kontrol muayenesi için gelen meme kanseri tanılı hastalar ile yapıldı. Araştırmanın evreni ve örneklemini bu polikliniğe kontrol muayenesi için gelen meme kanseri tanılı hastalar oluşturdu. Çalışmanın örneklem büyüklüğü PASS programında Jankowska-Polańska ve arkadaşlarının çalışmasındaki hastalık kabulü ile yaşam kalitesi arasındaki korelasyon katsayısı (r=0,243) dikkate alınarak %80 güç ve a=0,05 yanılma düzeyi ile en küçük örneklemi 130 kişi olarak belirlendi (10). Çalışmaya 159 kişi alındı. Ancak üç hasta veri toplama formlarını eksik ve iki hasta da hatalı doldurduğu için araştırmaya dahil edilmedi. Araştırma 154 hasta ile tamamlandı.

Araştırmaya primer meme kanseri tanısı alan, ameliyatından sonra en az altı ay, en fazla beş yıl geçen,

ciddi kronik hastalığı ve psikiyatrik bozukluğu olmayan, işbirliği ve iletişime açık olan ve çalışmaya katılmaya gönüllü olan hastalar dahil edildi. Meme kanseri tanılı erkekler, yabancı uyruklular ve genel durumu kötü olan hastalar araştırmaya dahil edilmedi.

Araştırmanın bağımlı değişkenleri Hastalığı Kabul Ölçeği, Avrupa Kanser Araştırma ve Tedavi Teşkilatı Yaşam Kalitesi (EORTC QLQ-C30-sürüm 3.0) ve Meme Kanserine Özgü Yaşam Kalitesi (EORTC QLQ-BR23) ölçekleri, Kısa Form -12 (SF-12) puanlarıdır. . Bağımsız değişkenleri; yaş, eğitim düzeyi, çocuk sahibi olma durumu, emzirme durumu, meme kanseri bölgesi ve evresi vb değişkenlerdir.

Araştırma verileri; araştırmacılar tarafından hazırlanan kişisel bilgi formu, Hastalığı Kabul Ölçeği, EORTC QLQ-C30 (sürüm 3.0), EORTC QLQ-BR23 ve SF-12 ölçekleri ile toplandı.

- **Kişisel Bilgi Formu:** Bireylerin yaş, medeni durum, çalışma durumu, eğitim durumu gibi sosyodemografik özellikler, doğum yapma, emzirme gibi meme kanseri risk faktörleri ve ameliyat ile ilişkili 23 soru içermektedir (11,12).
- **Hastalığı Kabul Ölçeği:** Ölçeği 1984 yılında Felton ve Revenson geliştirmiştir. Yetişkinlerde hastalık kabul derecesini ölçen bir araçtır. Ölçek, kötü sağlığın olumsuz sonuçlarını tanımlayan sekiz ifade içermektedir. Ölçekteki tüm ifadeler bir hastalığın neden olduğu zorlukları ve sınırlamaları ifade eder. Likert tipindeki bu ölçekte bir ifadeye güçlü şekilde katılım (1) hastalığın kabul edilmediğini, katılmama (5) ise hastalığın kabul edildiğini gösterir. Puanlar 8 ile 40 arasında değişmektedir. Yüksek puanlar hastalığın kabul edildiğini, hastalığa ilişkin olumsuz duyguların olmadığını, fiziksel rahatsızlığın daha az hissedildiğini ve uyumu göstermektedir. Ölçeğin Türkçe geçerlilik ve güvenilirliği Büyükkaya Besen ve Esen tarafından yapılmıştır (13,14). Çalışmada ölçeğin cronbach alfa değeri 0,81 olarak saptandı.
- **EORTC QLQ-C30 (version 3.0):** Yaşam kalitesini değerlendirmek için Aranson ve arkadaşları (1993) tarafından geliştirilmiştir. Ölçekte genel iyilik hali, fonksiyonel skala (fiziksel, rol, bilişsel, duygusal ve sosyal işlevsellik) ve semptom skalası (bulantı- kusma, yorgunluk, ağrı, iştahsızlık, uykusuzluk, ishal, nefes darlığı, kabızlık, maddi zorluk) olarak üzere üç alt boyut ve 30 soru yer almaktadır. Ölçeğin ilk 28 sorusu dörtlü Likert olarak puanlanırken 29. ve 30. sorular 1 (çok kötü) ve 7 (mükemmel) arasında değerlendirilmektedir. Ölçekten 0-100 arasında puan alınmaktadır. Genel iyilik hali ve fonksiyonel skaladan alınan yüksek puanlar yaşam kalitesinin yüksek olduğunu, semptomlar bölümünden alınan yüksek puanlar ise düşük yaşam kalitesini belirtmektedir. Güzelant ve arkadaşları ölçeğin Türkçe geçerlilik ve güvenirliğini yapmıştır (15,16). Çalışmada ölçeğin cronbach alfa değeri 0,88 olarak bulundu.
- **EORTC-QLQ-BR23:** Meme kanserli hastalarda hastalık belirtileri ve tedavinin yan etkilerini değerlendiren 23 soru içermektedir. Beden imajı, cinsel haz, cinsel işlev, gelecek beklentisi soruları ölçeğin fonksiyonel skala boyutunu, sistemik tedavi yan etkileri, saç kaybından duyulan rahatsızlık, memeye bağlı sorunlar ve kola bağlı sorunlar ise semptom skala alt boyutunu oluşturmaktadır. Ölçekten 0-100 arasında puan elde edilmektedir. Fonksiyonel skala puanlarının yüksekliği yaşam kalitesinin yüksek olduğunu, semptom skala puanlarının yüksekliği ise düşük yaşam kalitesini göstermektedir. Türkçe geçerlilik ve güvenirliği Demirci ve arkadaşları tarafından yapılmıştır (17,18). Çalışmada ölçeğin cronbach alfa değeri 0,75 olarak saptandı.
- **SF-12:** On iki maddelik Kısa Form Anketi (SF-12) ilk olarak 1995 yılında Medical Outcomes Study (MOS) kapsamında yayınlanan genel sağlık anketidir. SF-12, SF-36'nın sekiz boyutundan alınan sorulardan oluşturulmuştur. SF-36'ya benzer performans gösterirken daha kısa sürede tamamlanması amaçlanmıştır. Fiziksel ve mental olmak üzere iki özet skor olarak puanlanır. Her iki özet skordan da 0-100 arasında puan alınmaktadır. Yüksek puanlar yüksek yaşam kalitesini göstermektedir. Soysal Gündüz ve arkadaşları Türkçe geçerlilik ve güvenirliğini yapmıştır (19). Çalışmada ölçeğin cronbach alfa değeri 0,80 olarak belirlendi.

Veriler meme polikliniğine kontrol muayenesi için gelen hastalar ile yüz yüze görüşme yöntemiyle ayrı bir odada toplandı. Manisa Celal Bayar Üniversitesi Tıp Fakültesi Sağlık Bilimleri Etik Kurulu'ndan izin alındı (tarih: 01.08.2018, karar no: 20.478-456). Veri toplamadan önce araştırmanın amacı ve önemi anla-

tıldı. Hastalardan yazılı ve sözlü onam alınarak kişisel verilerinin gizli kalacağı ve araştırmadan istediği zaman çekilebileceği açıklandı. Onam formunu dolduran hastalara anket formları verildi. Hastaların endişelerini azaltmak için anket formları araştırmacılar ile doldurduldu. Anket formlarını okumakta zorlanan hastalara belirttikleri sorular yüksek sesle okunarak araştırmacılar tarafından işaretlendi. Veri toplama süresi yaklaşık 20-25 dakikadır.

İstatistiksel Analiz

Veriler Statistical Package for the Social Sciences version 15.00 (SPSS Inc., Chicago, IL, USA) programında değerlendirildi. Verilerin normal dağılıma uygunluğu için Shapiro Wilk testi kullanıldı. Ölçek puanları normal dağılmadığı için veriler parametrik olmayan testler ile değerlendirildi. Tanımlayıcı bulgular ortalama ve standart sapma (minimum- maksimum), ya da ortanca (çeyrekler arası aralık), sayı ve yüzde olarak verildi. İstatistiksel anlamlılık $p<0,05$ olarak kabul edildi.

BULGULAR

Hastaların yaş ortalaması 53,70±11,44 yıl ve beden kitle indeksi ortalaması 28,55±4,46 kg/m^2'dir. Araştırma grubunun %46,1'inin ilkokul mezunu, %74,7'sinin evli, %85,7'sinin ev hanımı, %75,3'ünün ortalama gelir düzeyinde olduğu belirlendi. Ayrıca grubun %14,3'ünün çalıştığı ve %52,6'sının ilde yaşadığı saptandı (Tablo 1).

Çalışmaya katılan hastaların %11,7'sinin halen sigara içtiği, %87,0'ının doğum yaptığı ve çocuk sayısı ortalamasının 2,19±0,86 olduğu, %86,6'sının emzirdiği ve %40,3'ünün ailesinde meme kanseri öyküsü olduğu saptandı. Kadınların %57,8'inde sol memede kanser ve %44,8'inin kanser evresinin evre I ve ameliyattan sonra geçen süre ortalamasının 26,92±10,79 ay olduğu bulundu. Grubun %57,1'inde lenf nodu tutulumu görüldüğü ve tutulan lenf nodu ortalamasının 3,22±2,98 olduğu belirlendi. Hastaların %39,0'ına meme koruyucu cerrahi yapıldığı, %35,7'sine ameliyat sonrası radyoterapi ve kemoterapi uygulandığı saptandı. Araştırma grubunun %70,8'inin meme kanseri ile baş etme konusunda yardım aldığı ve %89,0'ının bu yardımı ailesinden aldığı görüldü (Tablo 2).

Hastalığı Kabul Ölçeği puan ortalaması: 30,54±7,59, SF-12 fiziksel özet skor: 43,39±6,85, mental özet skor: 39,44±10,05'tir. EORTC QLQ-C30 fonksiyonel skala alt boyutları sırası ile; global yaşam kalitesi: 67,58±17,11, fiziksel fonksiyon: 74,11±16,81, rol fonksiyon: 84,52±21,56, duygusal fonksiyon: 69,26±24,26, bilişsel fonksiyon: 78,46±21,21, sosyal fonksiyon: 78,78±23,20'dir. EORTC QLQ-C30 semptom skalası alt boyut puanları ise sırasıyla yorgunluk: 33,33±21,74, bulantı ve kusma: 8,65±16,96, ağrı: 25,54±26,41, dispne: 12,98±21,66, uyku bozukluğu: 29,65±29,16, iştahsızlık: 11,03±21,23, konstipasyon: 15,36±26,44, diyare: 6,71±14,94, mali etki: 25,75±30,84 olarak belirlendi. Hastaların EORTC QLQ-C30 fonksiyonel skala alt boyut puanları yüksek ve semptom skalası alt boyut puanları düşük olarak saptandı (Tablo 3).

EORTC QLQ-BR23 fonksiyonel skala alt boyutları sırasıyla beden imajı: 25,59±28,80, gelecek beklentisi: 43,29±30,28, cinsel işlev: 25,64±30,85, cinsel haz: 49,77±29,69, semptom skalası bileşenleri ise sistemik tedavi yan etkileri: 25,97±17,65, memeye bağlı sorunlar: 22,56±21,28, kola bağlı sorunlar: 25,03±21,95, saç dökülme kaygısı: 13,85±27,66'dır. EORTC QLQ-BR23 ölçeği fonksiyonel skala (cinsel haz ve gelecek beklentisi hariç) ve semptom skalası alt boyutlarından düşük puan aldıkları görüldü (Tablo 3).

Hastalığı Kabul Ölçeği puanları ile SF-12 fiziksel özet skor puanları arasında pozitif yönlü orta, mental özet skor puanları arasında pozitif yönlü düşük ilişki saptandı ($p<0,05$). Kadınların hastalığı kabul düzeyleri arttıkça SF-12 yaşam kalitesi ölçeğinin fiziksel ve mental özet skor puanları da artmaktadır. Hastalığı Kabul Ölçeği puanları ile EORTC QLQ-C30 fonksiyonel skala alt boyutlarından global yaşam kalitesi, fiziksel, rol ve duygusal fonksiyon puanları arasında pozitif yönlü orta, bilişsel ve sosyal fonksiyon puanları arasında negatif yönlü orta, semptom skalası bileşenlerinden yorgunluk, ağrı, uyku bozukluğu ve mali etki puanları arasında negatif yönlü orta, bulantı ve kusma, dispne, iştahsızlık puanları arasında negatif yönlü düşük ilişki görüldü ($p<0,05$) (Tablo 4).

Hastalığı Kabul Ölçeği puanları ile EORTC QLQ-BR23 fonksiyonel skala alt boyutlarından negatif yönde olmak üzere beden imajı, gelecek beklentisi puanları arasında orta ve semptomlar alt boyutlarından sistemik tedavi yan etkileri puanları arasında orta, meme ve kola bağlı sorunlar puanları arasında zayıf ilişki saptandı. Ayrıca cinsel haz, memeye bağlı sorunlar, saç dökülme

Tablo 1 . Hastaların sosyo-demografik özellikleri (n=154)

Sosyodemografik Özellikler		
	Ort±SS	**Min-Maks.**
Yaş (yıl)	53,70±11,44	32,00-76,00
Beden kitle indeksi (kg/m²)	28,55± 4,46	19,61-39,76
Yaş grubu	**n(%)**	
53 yaş ve altı	81 (52,6)	
54 yaş ve üzeri	73(47,4)	
Beden kitle indeksi		
Normal kilolu	35(22,7)	
Hafif kilolu	62(40,3)	
Obez	57(37,0)	
Eğitim düzeyi		
Ilkokul	71(46,1)	
Ortaokul	27(17,5)	
Lise	29(18,8)	
Üniversite	27(17,5)	
Medeni durum		
Evli	115(74,7)	
Bekar /dul/boşanmış	39(25,3)	
Meslek		
Ev hanımı	132(85,7)	
Memur/işçi/serbest	22(14,3)	
Gelir düzeyi		
Ortalama düzeyde	116(75,3)	
Ortalamanın altında	38(24,7)	
Çalışma durumu		
Evet	22(14,3)	
Hayır	132(85,7)	
Yaşanan yer		
İl	81(52,6)	
İlçe	47(30,5)	
Köy-kasaba	26(16,9)	

Ort: Aritmetik ortalama, SS: Standart sapma, Min: En küçük değer, Maks: En büyük değer

kaygısı puanları arasında negatif yönlü zayıf ilişki belirlendi (p<0,05). Hastalığı Kabul Ölçeği puanları arttıkça EORTC QLQ-BR23 puanları azalmaktadır.

Tabloda gösterilmemekle beraber sosyodemografik değişkenler ve ölçek puanları arasında yapılan karşılaştırmalarda istatistiksel olarak anlamlı fark saptanmadı (p>0,05).

TARTIŞMA VE SONUÇ

Dünya çapında en sık teşhis edilen kanser türü olarak akciğer kanserinin yerini alan meme kanseri, bugün sekiz kanser teşhisinden birini ve her iki cinsiyette toplam 2,3 milyon yeni vakayı oluşturmaktadır. Kadınlardaki tüm kanser vakalarının dörtte birini temsil etmekte ve 2020 yılında kadınlarda en sık teşhis edilen kanser olmuştur (4). Meme kanseri tanısı alan hastalarda hastalık kabulü ile yaşam kalitesi arasındaki ilişkiyi belirlemek amacıyla yapılan bu çalışmada hastaların hastalığı kabul durumlarının yüksek, kansere bağlı fonksiyonel durumlarının iyi olduğu ve kansere bağlı semptomların daha az hissedildiği saptandı. Meme kanseri ile ilişkili yaşam kalitesi fonksiyonel boyutunun beden imajı ve cinsel işlev puanlarının düşük, gelecek beklentisi ve cinsel haz puanlarının ortalama düzeyde olduğu ve semptomlar alt boyutu bileşenlerinin tümünden düşük puan alındığı ancak genel yaşam kalitesi puanlarının düşük olduğu belirlendi.

Tablo 2. Hastaların meme kanseri risk faktörleri ve ameliyat özelliklerine göre dağılımı (n=154)

Değişkenler	**Ort±SS**	**Min-maks.**
Çocuk sayısı (n=134)	2,19± 0,86	1-6
Lenf nodu tutulumu (n=88)	3,22± 2,98	1-15
Ameliyattan sonra geçen süre (ay)	26,92± 10,79	12.0-50.0
Sigara içme durumu	**n(%)**	
Halen içiyor	18(11,7	
İçmiş bırakmış	42(27,3	
Hiç içmeyen	94(61,0)	
Çocuk sahibi olma durumu		
Evet	134(87,0)	
Hayır	20(13,0)	
Emzirme durumu (n=134)		
Evet	116(86,6)	
Hayır	18(13,4)	
Memede kanser öyküsü		
Evet*	62(40,3)	
Hayır	92(59,7)	
Meme kanseri bölgesi		
Sağ meme	61(39,6)	
Sol meme	89(57,8)	
Her ikisi	4(2,6)	
Lenf nodu tutulumu		
Evet	88(57,1)	
Hayır	66(42,9)	
Meme kanseri evresi		
Evre I	69(44,8)	
Evre II	67(43,5)	
Evre III	18(11,7)	
Yapılan ameliyat türü		
Meme koruyucu cerrahi	60(39,0)	
Lumpektomi ve aksiler diseksiyon	37(24,0)	
Modifiye radikal mastektomi	27(17,5)	
Modifiye radikal mastektomi ve aksiler diseksiyon	30(19,5)	
Ameliyat sonrası tedavi		
Radyoterapi	43(27,9)	
Kemoterapi	10(6,5)	
Hormon tedavisi	8(5,2)	
Radyoterapi+ kemoterapi	55(35,7)	
Radyoterapi+ kemoterapi +hormon tedavisi	34(22,1)	
Hiç	4(2,6)	
Hastalıkla baş etmede yardım alma		
Evet	109(70,8)	
Hayır	45(29,2)	
Yardım alınan kişi (n=109)		
Aile	97(89,0)	
Arkadaş	4(3,7)	
Sağlık personeli	6(5,5)	
Diğer	2(1,8)	

Ort: Aritmetik ortalama, SS: Standart sapma, Min: En küçük değer, Maks: En büyük değer

* anne, teyze, hala

Tablo 3. Hastaların ölçek puanlarının dağılımı

Ölçekler	Ort ±SS	Min -Maks	Ortanca	ÇAA 1-3
Hastalığı kabul ölçeği	30,54±7,59	14,00-40,00	32,00	24,00-37,0 0
SF-12 yaşam kalitesi ölçeği				
Fiziksel özet skor	43,39±6,85	23,43-57,73	43,50	38,38-47,57
Mental özet skor	39,44±10,05	14,97-65,38	38,12	32,79-46,25
EORTC QLQ-C30				
Global yasam kalitesi	67,58±17,11	16,67-100,00	66,66	58,33-83,33
Fonksiyonel skala				
Fiziksel fonksiyon	74,11±16,81	20,00-100,00	80,00	60,00-86,66
Rol fonksiyon	84,52±21,56	0,00-100,00	100,00	66,66-100,00
Emosyonel fonksiyon	69,26±24,26	0,00-100,00	75,00	58,33-83,33
Bilişsel fonksiyon	78,46±21,21	0,00-100,00	83,33	66,66-100,00
Sosyal fonksiyon	78,78±23,20	0,00-100,00	83,33	66,66-100,00
Semptom skalası				
Yorgunluk	33,33±21,74	0,00-100,00	33,33	22,22-44,44
Bulantı ve kusma	8,65±16,96	0,00-83,33	0,00	0,00-16,66
Ağrı	25,54±26,41	0,00-100,00	16,66	0,00-33,33
Dispne	12,98±21,66	0,00-100,00	0,00	0,00-33,33
Uyku bozukluğu	29,65±29,16	0,00-100,00	33,33	0,00-33,33
İştahsızlık	11,03±21,23	0,00-100,00	0,00	0,00-33,33
Konstipasyon	15,36±26,44	0,00-100,00	0,00	0,00-33,33
Diyare	6,71±14,94	0,00-100,00	0,00	0,00-0,00
Mali etki	25,75±30,84	0,00-100,00	33,33	0,00-33,33
EORTC QLQ-BR23				
Fonksiyonel skala				
Beden imajı	25,59±28,80	0,00-100,00	16,66	0,00-50,00
Gelecek beklentisi	43,29±30,28	0,00-100,00	33,33	33,33-66,66
Cinsel işlev	25,64±30,85	0,00-100,00	33,33	0,00-33,33
Cinsel haz	49,77±29,69	0,00-100,00	33,33	33,33-66,66
Semptom Skalası				
ST yan etkileri	25,97±17,65	0,00-66,67	23,80	14,28-38,09
Memeye bağlı sorunlar	22,56±21,28	0,00-91,67	16,66	8,33-33,33
Kola bağlı sorunlar	25,03±21,95	0,00-100,00	22,22	11,11-33,33
Saç dökülme kaygısı	13,85±27,66	0,00-100,00	0,00	0,00-8,33

Ort: Aritmetik ortalama, SS: Standart sapma, Min: En küçük değer, Maks: En büyük değer

ÇAA: Çeyrekler arası aralık, SF-12: Kısa Form-12, EORTC QLQ-C30: Avrupa Kanser Araştırma ve Tedavi Teşkilatı Yaşam Kalitesi Ölçeği, EORTC QLQ-BR23: Meme Kanserine Özgü Yaşam Kalitesi Ölçeği, ST: Sistemik tedavi

Çalışmada Hastalığı Kabul Ölçeği puanı (30,54±7,59) ortalamanın üzerinde bulundu. Çeşitli kanser türlerindeki hastalık kabulünün değerlendirildiği çalışmada meme kanserli kadınlarda Hastalığı Kabul Ölçeği puanı 28,46±7,98 olarak saptanmıştır (20). Meme kanserli kadınlarda hastalık kabulünün değerlendirildiği başka bir çalışmada Hastalığı Kabul Ölçeği puanı 26,53±7,71 olarak belirlenmiştir (21). Yapılan başka çalışmalarda da bu çalışmadan daha düşük puanlar bildirilmiştir (22,23). Hastalığı kabul etme meme kanserli hastaların yaşam kalitelerini etkileyen faktörlerden biridir. Meme kanseri tanılı kadınların kendi sağlık durumlarının objektif olarak değerlendirmesini ve hastalıkla başa çıkma konusunda kendilerini

Tablo 4. Hastalığa Kabul Ölçeği puanları ile Yaşam kalitesi ölçekleri puanları arasındaki ilişki

Ölçekler	n	Hastalığı kabul ölçeği		Ölçekler	n	Hastalığı kabul ölçeği	
SF-12		**r_s**	**p**	**EORTC QLQ-C30**		**r_s**	**p**
SF-12 fiziksel özet skor	154	0,393	0,001	Global yasam kalitesi	154	0,382	0,001
SF-12 mental özet skor	154	0,197	0,014	**EORTC QLQ-C30 Fonksiyonel skala**			
EORTC QLQ-BR-23 Fonksiyonel skala				Fiziksel Fonksiyon	154	0.431	0,001
Beden imajı	154	-0,409	0,001	Rol fonksiyon	154	0,501	0,001
Cinsel işlev	154	0,091	0,263	Emosyonel fonksiyon	154	0,343	0,001
Cinsel haz	154	0,200	0,085	Bilissel fonksiyon	154	-0,371	0,001
Gelecek beklentisi	154	-0,500	0,001	Sosyal fonksiyon	154	-0,314	0,001
EORTC QLQ-BR23 Semptom skalası				**EORTC QLQ-C30 Semptom skalası**			
ST yan etkileri	154	-0,480	0,001	Yorgunluk	154	-0,557	0,001
Memeye bağlı sorunlar	154	-0,282	0,001	Bulantı ve kusma	154	-0,252	0,002
Kola bağlı sorunlar	154	-0,364	0,001	Ağrı	154	-0,487	0,001
Saç dökülme kaygısı	154	-0,247	0,002	Dispne	154	-0,261	0,001
				Uyku bozukluğu	154	-0,450	0,001
				İştahsızlık	154	-0,200	0,013
				Konstipasyon	154	-0,115	0,156
				Diyare	154	-0,155	0,055
				Mali etki	154	-0,560	0,001

SF-12: Kısa Form-12, EORTC QLQ-C30: Avrupa Kanser Araştırma ve Tedavi Teşkilatı Yaşam Kalitesi Ölçeği, EORTC QLQ-BR23: Meme Kanserine Özgü Yaşam Kalitesi Ölçeği, ST: Sistemik tedavi

motive ettiğinden Hastalığı Kabul Ölçeği puanlarının yüksek olması sevindiricidir. Bu çalışmada ölçek puanlarının daha yüksek olması hastaların daha az ağrısının olması, duygusal durumlarının daha iyi olması, anksiyete ve depresyon yaşamamalarına bağlı olabilir.

Araştırmada hastaların EORTC QLQ-BR23 fonksiyonel skala alt boyutlarından en düşük beden imajı, en yüksek cinsel haz alt boyutlarından, semptom skalası alt boyutlarından en düşük saç dökülme kaygısı, en yüksek ise sistemik tedavi yan etkileri alt boyutlarından puan aldığı saptandı. Nepal'de meme kanserli hastaların yaşam kalitesinin değerlendirildiği çalışmada hastaların en düşük saç dökülme kaygısı, en yüksek ise cinsel işlev alt boyutlarından puan aldığı bildirilmiştir (24). Chen ve arkadaşlarının çalışmasında ise hastalar en yüksek cinsel işlev, en düşük memeye bağlı sorunlar boyutlarından puan almıştır (25). Suudi Arabistan'da meme kanserli hastalar ile yapılan diğer bir çalışmada ise hastaların en düşük cinsel haz, en yüksek gelecek beklentisi alt boyutlarından puan aldıkları belirtilmiştir (26). Ameliyat sonrası dönemde uygulanan radyoterapi ve kemoterapi tedavileri hastaların yaşam kalitesini olumsuz olarak etkilediğinden sistemik tedaviye bağlı sorunlar alt boyutunun daha fazla etkilendiği düşünülmektedir.

Araştırmaya katılan hastaların EORTC QLQ-C30 fonksiyonel skala alt boyutlarından yüksek, semptom skalası alt boyutlarından ise düşük puan aldıkları belirlendi. Araştırma grubunun kansere bağlı yaşam kalitesinin yüksek olduğu görüldü. Hastaların fonksiyonel skala alt boyutlarından en yüksek rol fonksiyon, semptom skalasından ise en düşük diyare alt boyutundan puan aldıkları saptandı. Yapılan benzer çalışmalarda da hastaların en yüksek rol fonksiyon, en düşük ise diyare alt boyutlarından puan aldıkları ve kansere bağlı yaşam kalitelerinin yüksek olduğu belirlenmiştir (25,27). Asyalı meme kanserli kadınların değerlendirildiği bir sistematik inceleme ve meta-analizde fiziksel skala bo-

yutlarından en düşük duygusal fonksiyon, en yüksek bilişsel fonksiyon alt boyutlarından, semptom skalasında ise en düşük diyare, en yüksek ise yorgunluk alt boyutundan puan aldıkları saptanmıştır (28). Araştırma bulguları literatürü destekler niteliktedir.

Araştırmada hastaların SF-12 fiziksel özet skor (43,39±6,85) ve mental özet skor (39,44±10,05) puanlarının düşük olduğu saptandı. Rendas-Baum ve arkadaşlarının çalışmasında meme kanserli hastaların SF-12 fiziksel özet skor puanının 36,4±12,7 ve mental özet skor puanının 46,7±11,5 olduğu belirlenmiştir (29). Yapılan başka bir çalışmada fiziksel özet skor puanının 46,5±10,1, mental özet skor puanı ise 51,8±7,7 bulunmuştur (30). Cheng ve arkadaşlarının meme kanseri tanılı 250 kadının yaşam kalitesini değerlendirdikleri çalışmada kadınların ortalama fiziksel ve mental özet skor puanlarının 50 olduğu bildirilmiştir. Hastaların vücut ağrısı, mental sağlık ve sosyal işlevsellik açısından iyi bir yaşam kalitesine sahip olduğu ancak genel sağlık ve fiziksel rol alt boyutlarından daha düşük puan aldıkları belirlenmiştir (31). Bununla birlikte Brunault ve arkadaşları metastatik olmayan meme kanseri tanılı hastaların mental özet skorlarının fiziksel özet skorlarından daha yüksek olduğunu belirtmiştir (32). Araştırma bulguları diğer sonuçlardan farklıdır. Yaşam kalitesi bireyin fiziksel ve psikolojik durumu, ekonomik ve sosyal boyutu, spiritüel algılar gibi pek çok bileşeni barındırdığı için farkın toplumsal ve kültürel yansımalara bağlı olabileceği düşünülmektedir.

Çalışmada Hastalığı Kabul Ölçeği puanları arttıkça SF-12 fiziksel ve mental özet skorlarının da arttığı saptandı. Kanser, hastanın sürekli değişen durumla başa çıkma becerisi gerektiren dinamik bir süreçtir. Kanser sürecinde hastalığı kabul etmek önemlidir. Hastalığı kabul kanserin varlığını ve hastalıkla birlikte yaşama geçmeyi kabul etmek anlamına gelmektedir. Kişi hastalığı kabul ettiğinde hastalıkla ilişkili daha az olumsuz tepkiler ve duygularla başa çıkma süreci yaşamaktadır. Ayrıca, hastalığı kabul etmek kendi iyilik halini geri kazanmak için harekete geçmekle ve hastalıkla bir hasta olarak kendini kabul etmeye istekli olmakla ilişkilidir. Bu durumda kişinin yaşam kalitesi de olumlu yönde etkilenmektedir.

Araştırmada Hastalığı Kabul Ölçeği puanları ile EORTC QLQ-C30 ve EORTC QLQ-BR23 ölçeklerinin fonksiyonel skala alt boyut puanları arasında pozitif, semptom skalası alt boyut puanları arasında negatif yönlü ilişki saptandı. Hastalığı daha yüksek düzeyde kabul eden hastaların algılanan yaşam kalitesi daha iyi aynı zamanda hastalık ve tedavi ile ilişkili semptomların şiddeti daha düşük bulundu. Çalışma bulguları Jankowska-Polańskave arkadaşlarının araştırma sonuçlarını desteklemektedir (10). Hastalığı kabul etmek, bir kişinin durumunu rasyonel bir şekilde değerlendirmesine ve sağlığını koruma çabalarında bulunmasına olanak tanıdığından yaşam kalitesini ve tedavi sonuçlarını iyileştirebilir. Aynı zamanda hastalıkla ilişkili negatif duyguları hafifletir ve hastaların kendilerini güvende hissetmelerini artırır. Kabul düzeyi ne kadar yüksek olursa hastalar hastalığa daha iyi uyum sağlayabilir ve daha az rahatsızlık yaşayabilirler.

Çalışmada ölçek puanları ile sosyodemografik ve hastalığa ilişkin değişkenler arasında anlamlı fark saptanmadı. Yapılan bazı çalışmalarda hastaların yaşı, uygulanan cerrahi tedavi ve evresi ile yaşam kalitesini değerlendiren ölçekler arasında anlamlı fark saptanmıştır (33,34). Araştırma bulguları literatürden farklıdır. Farkın örneklem grubu ile ilişkili olabileceği düşünülmektedir. Aynı zamanda araştırma grubunun ameliyattan sonra geçen süre ortalamasının iki yıldan fazla olması, tedavi süreçlerinin düzene girmesi ve hastaların normal yaşama dönmüş olmaları bu durumu etkilemiş olabilir.

Sınırlılıklar

Çalışma örnekleminin farklı evrelerdeki meme kanseri hastalarını içermesi ve örneklemin orta büyüklükte olması sınırlılık olarak kabul edilebilir. Araştırma örneklemine alınan hastaların meme kanseri tedavisinde uygulanan tüm cerrahi türlerini kapsaması ve tek bir cerrahi teknik ile sınırlanmaması da sonuçları etkilemiş olabilir. Araştırma tek merkezde yapıldığı için tüm hastalara genellemez sadece bu grubu temsil etmektedir. Ayrıca araştırmada dört farklı özbildirim ölçeği kullanılmasına bağlı olarak hastaların anket sorularına yanıt vermesi için kısıtlı zaman olması da sınırlılık olarak kabul edilebilir. Veriler yüz yüze görüşme yöntemi toplandığından verilerin güvenirliği hastaların verdiği cevaplar ile sınırlıdır. Hastaların ameliyat öncesi yaşam kalitelerinin değerlendirilmemesi ve ameliyat sonrası ile karşılaştırılamaması da çalışmanın diğer bir sınırlılığıdır.

Çalışma sonucunda hastaların hastalığı kabul düzeylerinin yüksek, kansere bağlı fonksiyonel durumlarının iyi olduğu, kansere bağlı semptomları daha az hissettiği ancak genel yaşam kalitelerinin düşük olduğu saptandı. Hastaların yaşam kalitesinin artırılması için fiziksel ve psikososyal alanları iyileştirmeye yönelik eğitimlerin verilmesi önerilmektedir.

Teşekkür

Araştırmaya katılan tüm hastalara teşekkür ederiz.

Çıkar çatışması ve finansman bildirimi

Yazarlar bildirecek bir çıkar çatışmaları olmadığını beyan eder. Yazarlar bu çalışma için hiçbir finansal destek almadıklarını da beyan eder.

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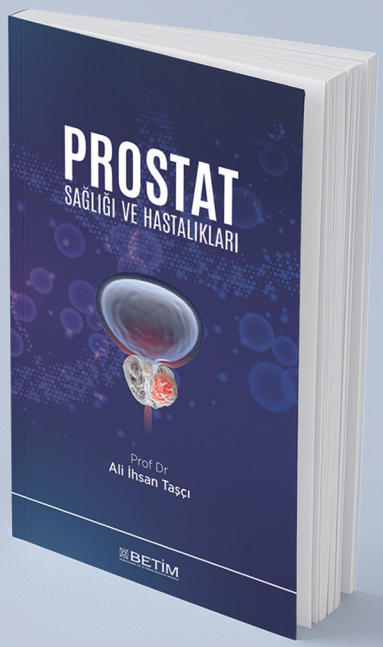

PROSTAT
SAĞLIĞI VE HASTALIKLARI

Prof Dr
Ali İhsan Taşçı

Bazen gençlerde, daha sıklıkla da yaşlanma ile birlikte, erkeklerin birçoğunda prostat ve idrar yolları ile ilgili hastalıklar görülebilmektedir. Prostat konusunda doğru bilgiye ulaşmak isteyenler için hazırlanmış bu kitapta; prostatın yapısı, fonksiyonları, hastalıkları, hastalıklardan korunma, alternatif ve tamamlayıcı tıp uygulamaları sade bir dille anlatılmaya çalışılmıştır.

BETİM KİTAPLIĞI

Investigation of awareness of parents of children with cerebral palsy about illness, physiotherapy and rehabilitation

Serebral palsili çocukların ebeveynlerinin hastalık, fizyoterapi ve rehabilitasyon hakkındaki farkındalık durumlarının incelenmesi

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Abstract

Aim: This study aimed to examine the awareness levels of parents who provide primary care to children with Cerebral Palsy (CP) about the disease, physiotherapy, and rehabilitation.

Methods: Parents (n=78) of children with aged 4-18 years diagnosed CP, were included in the study. Cerebral Palsy Disease, Physiotherapy, and Rehabilitation Awareness Evaluation Questionnaire was used to determine the level of awareness.

Results: The majority of the survey participants were mothers (85.9%). It was determined that the general awareness levels of the parents were low (5.17%), medium (56.41%), and high (38.46%). Awareness levels were found to be similar according to the education level and economic status of the parents (p>0.05). In addition, although parental awareness levels of children with CP increased according to their surgery history, age distribution, and gross motor function levels (GMFCS), there was no significant difference between them (p>0.05).

Conclusion: It was determined that the awareness levels of parents with children with CP about the disease, physiotherapy, and rehabilitation were generally medium and high. It was observed that the awareness levels were not affected by the education levels of the parents, the GMFCS levels of their children, the age of the children, and the economic status of the family.

Keywords: Awareness; cerebral palsy; parents; rehabilitation

Öz

Amaç: Bu çalışmanın amacı Serebral Palsi'li (SP) çocuklara primer bakım veren ebeveynlerin hastalık, fizyoterapi ve rehabilitasyon hakkındaki farkındalık düzeylerini incelemektir.

Yöntemler: Çalışmaya 4-18 yaş arası SP'li çocuğu olan 78 ebeveyn dâhil edildi. Farkındalık düzeyleri yarı yapılandırılmış görüşmelerle araştırmacıların hazırladığı Serebral Palsi Hastalık, Fizyoterapi ve Rehabilitasyon Farkındalık Değerlendirme Anketi ile belirlendi.

Bulgular: Anket katılımcılarının büyük oranda annelerden oluşuyordu (%85,9). Ebeveynlerin genel farkındalık düzeylerinin düşük (%5,17), orta (%56,41) ve yüksek (%38,46) düzeyde olduğu belirlendi. Ebeveynlerin eğitim düzeyi ve ekonomik durumuna göre farkındalık düzeyleri benzer bulundu (p>0,05). Ayrıca SP'li çocukların ameliyat öyküsü, yaş dağılımı ve kaba motor fonksiyon düzeylerine (GMFCS) göre ebeveyn farkındalık düzeyleri artmış olsa da, farkındalık seviyeleri arasında anlamlı fark bulunmadı (p>0,05).

Sonuç: SP'li çocukları olan ebeveynlerin hastalık, sosyal ve günlük yaşam aktiviteleri ile fizyoterapi ve rehabilitasyon hakkındaki farkındalık düzeylerinin genel olarak orta ve yüksek olduğu saptandı. Farkındalık düzeylerinin, ebeveyn eğitim düzeylerinden, çocuklarının kaba motor fonksiyon seviyelerinden, çocukların yaşlarından ve ailenin ekonomik durumlarından etkilenmediği gözlendi.

Anahtar Sözcükler: Ebeveyn; farkındalık; rehabilitasyon; serebral palsi

Received/*Geliş* : 25.08.2023
Accepted/*Kabul*: 04.12.2023

DOI: 10.21673/anadoluklin.1349686

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INTRODUCTION

Cerebral palsy (CP) is a non-progressive but age-related loss of motor function, posture, and movement disorder that develops due to damage in the perinatal period in the immature brain (1). Abnormal muscle tone, insufficiency of postural control, weakness of muscle strength, abnormal behaviors, and sensory disorders are common symptoms of motor impairments (1). Although CP presents symptoms in early infancy, the diagnosis age may be delayed. CP is a condition characterized by multiple problems that require long-term and complex care. The process of parents getting acquainted with the disease and increasing awareness about it takes time. The diagnosis of CP can be traumatic for parents (2).

Treatment is carried out through a specialized multidisciplinary team working in accordance with the child's needs and with the active involvement of parents in CP. The family is one of the most crucial members in the treatment and rehabilitation process, which is based on a multidisciplinary approach (3,4). Under the umbrella of physiotherapy and rehabilitation, the goals include improving motor skills and functions, lowering postural abnormalities, regulating muscle tone, and correcting musculoskeletal deformities. However, these goals can only be met through positive parent-physiotherapist interactions and by making sure that kids participate in society and everyday activities.

The view that families play a significant role in the lives of disabled children has gained increasing validity over time. The socio-economic status of the family, the psychological state of the parents, and their level of education are important factors in the development of children with CP (4). Providing care for their children and accessing government services can be challenging for families. In rehabilitation, a family-centered approach should be adopted, taking into account the needs and priorities of the families (5). There is not enough data about the variables that affect the needs of families with children with CP in the literature (6-8). However, these parents are indispensable in the decision-making process of the healthcare team. According to research, collaborating with parents is crucial to enhancing parental satisfaction with their children's rehabilitation (6-8).

Motor activity loss and movement disorders in children with CP result in increased dependency and the need for more external support in their daily lives (9). Parents are the ones who know their child's functional abilities and needs best. They have various responsibilities, such as managing treatments, educational services, general medical check-ups, medications, devices, and educational materials. Therefore, involving parents in the rehabilitation process provides stronger rehabilitation services for children (10,11). In recent years, with the increasing importance of family-centered practices, all family members have started to actively participate in rehabilitation by continuing rehabilitation goals at home and in the community (10,12).

The family is the most crucial element in the transformation of treatment into a lifestyle due to the lifelong nature of the illness. Therefore, it is essential to assess the awareness of CP in parents of children with CP before planning the education or interventions they need. Because parents can handle this trip more professionally in terms of social, economic, and personal obligations and anxiety levels when they are informed about their children's illnesses and processes. It can improve their involvement in life by enabling parents to see their children's potential and by encouraging them to be more engaged. The research question in this study was whether awareness levels change depending on the parents' socioeconomic level, education level, and the child's functional level. This study aims to determine the awareness level of parents providing primary care to children with CP regarding the disease, physiotherapy, and rehabilitation.

MATERIAL AND METHODS

Study Design

This study is a descriptive cross-sectional study.

Participants

The research was conducted with parents (n=78) providing primary care to children with CP having therapy at private education and rehabilitation centers in Gaziantep between June 2020 and June 2021. Consent was obtained from all parents who met the inclusion criteria for participation in the study. According to the

power analysis, the sample size was calculated to be a minimum of 49 individuals, considering the effect size as 0.2, α (significance level) as 0.05, and γ-β (power) as 0.80. However, it was decided to reach a minimum of 70 parents to increase the power of the study.

Parents who volunteered to take part in the study and provided main care for a child with CP between the ages of 4 and 18 and who could communicate to respond to the questions on the personal information form and evaluation form were included in the study. Parents with any type of psychiatric condition were disqualified.

Ethical approval was obtained from the SANKO University Non-Interventional Clinical Studies Ethics Committee (date: 05.05.2020, decision no: 2020/07-7). The clinical trial number is NCT05213663.

Measurements

All parents' and children's sociodemographic information was recorded. The data were collected using questionnaires prepared by the researchers by reviewing the literature, which examined personal information about the children and parents, and a 40-item survey prepared to assess parents' awareness of CP disease, physiotherapy, and rehabilitation. Detailed information about the purpose of the research was provided to the parents of children with CP. Each questionnaire form was completed in a quiet environment in the rehabilitation center through a face-to-face meeting between the primary caregiver of the child with CP and the physiotherapist, taking approximately 20-30 minutes.

Cerebral Palsy Disease, Physiotherapy, and Rehabilitation Awareness Assessment Questionnaire: The questionnaire prepared by the researchers consisted of 40 multiple-choice questions with one correct answer, aiming to assess the knowledge level of parents of children with CP regarding the disease, physiotherapy, and rehabilitation. Before the study, the form was administered to ten parents of children with CP who met the inclusion criteria to identify any unclear points and make revisions, resulting in the final version of the questionnaire. Each assessment was completed through face-to-face meetings with the parents of the child with CP in a quiet environment. Based on the applied form, if the number of correct answers is between 0 and 15, the parent's awareness of the disease, physiotherapy, and rehabilitation was considered low; if the number of correct answers is between 16 and 30, it was considered moderate; and if the number of correct answers is between 31 and 40, it was considered high.

Statistical Analysis

The data were analyzed using the Statistical Package for the Social Sciences package program version 24.0 (SPSS Inc., Chicago, IL, USA) After entering the data obtained from the questionnaires into SPSS, the responses to the 40 questions were scored. In scoring, correct answers were considered as 1, and incorrect answers as 0, resulting in the creation of 40 variables. The total awareness score was obtained by summing all these variables. The total awareness score was then transformed into awareness groups based on predefined low, moderate, and high values. As a result, a three-stage dataset was created, including demographic data of parents, demographic data of children, and the scored awareness levels of parents. Descriptive and inferential statistical analyses were performed on these data. Continuous variables mean ± standard deviation, median (minimum-maximum values), and categorical variables are given as number (n) and percentage (%). Additionally, cross-tabulation and graphical representations were used to examine the relationships between awareness levels and certain demographic groups (such as education level, income status, number of surgical operations the child underwent, etc.). Chi-square analysis was conducted to determine the levels of association and statistical significance. All data were considered statistically significant at the $p<0.05$ level.

RESULTS

Based on the demographic information of the families in the study, the population consisted of 67 mothers (85.9%) and 11 fathers (14.1%). Out of the total parents, 13 (16.7%) were employed, while 65 (83.3%) were not employed. Among the parents, 3.8% had received no formal education, 30.8% had completed primary

Table 1. Sociodemographic characteristics of the participants

Sociodemographic characteristics		n/%
Caregivers (n=78)	Mother	67 (85.9)
	Father	11 (14.10)
Age	20-30	11 (14.1)
	30-40	31 (39.7)
	40-50	29 (37.2)
	50-70	7 (8)
Working status	Working	13 (16.7)
	Not working	65 (83.3)
Education level	None	3 (3.8)
	primary school	24 (30.8)
	Secondary school	13 (16.7)
	High school	23 (29.5)
	University/Higher education	14 (18.2)
Marital status	Married	74 (94.9)
	Widowed, divorced	4 (5.1)
Number of children	1	11 (14.1)
	2	12 (15.4)
	3	27 (34.6)
	4	15 (19.2)
	5	7 (9)
	6	6 (7.7)
Socioeconomic status	Income less than expenses	20 (25.6)
	Income and expense equal	41 (52.6)
	Income more than expenses	17 (21.8)
Age of CP children	4-8	36 (46.2)
	9-13	26 (33.3)
	14-18	16 (20.5)
Sex of children	Male	57 (73.1)
	Female	21 (29.9)
Number of children with CP	1	74 (94.9)
	2	4 (5.1)

*CP: Cerebral Palsy, n: number, %: percent

school, 16.7% had completed middle school, 29.5% had completed high school, and 18.2% had completed undergraduate or graduate studies. All sociodemographic information of the parents is presented in **Table 1.**

When the level of awareness of parents about CP disease, physiotherapy, and rehabilitation was evaluated according to the surgical history of children with CP, it was found that 3.8% of those who underwent surgery were low, 65.4% were moderate, and 30.8% were at high awareness levels. The awareness levels of the parents according to their surgical history are shown in **Table 2.** According to the surgical history of their children with CP, there was no difference between the awareness levels of the parents ($p>0.05$).

When the awareness levels of the parents whose financial income is less than the expense are examined according to the economic status; It was found that 70% of the group with less income and expenses were at the medium level of awareness. 53.7% of parents whose financial income equaled their expenses were found to be at a medium level of awareness. It was found that 47.1% of the parents whose financial income was more than their expenses were moderate and 52.9% were at

Table 2. Awareness levels according to children's surgical history, parents' socioeconomic status, children's age distribution, and children's GMFCS level

Surgical history	**Low awareness**	**Medium awareness**	**Higher awareness**	***p***
	n/%	**n/%**	**n/%**	
Yes	1 (3.8)	17 (65.4)	8 (30.8)	0.527
No	3 (5.8)	27 (51.9)	22 (42.3)	
Socioeconomic status				
Income less than expense	1 (5)	14 (70)	5 (25)	
Income and expense equal	3 (7.3)	22 (53.7)	16 (39)	0.392
Income more than expenses	0 (0)	8 (47.1)	9 (52.9)	
Children's age (year)	**n/%**	**n/%**	**n/%**	
4-8	3 (8.3)	14 (38.9)	19 (52.8)	
9-13	1 (3.8)	18 (69.2)	7 (26.9)	0.064
14-18	0 (0)	12 (75)	4 (25)	
Education				
None	0 (0)	2 (66.7)	1 (33.3)	
Primary	1 (4.2)	5 (62.5)	8 (33.3)	
Secondary	2 (15.4)	9 (69.2)	2 (15.4)	0.148
High bachelor	0 (0)	14 (60.8)	9 (39.2)	
GMFCS level	**n/%**	**n/%**	**n/%**	
I	0 (0)	7 (46.7)	8 (53.3)	
II	1 (4.5)	15 (68.2)	6 (27.3)	
III	1 (6.3)	9 (56.3)	6 (37.5)	0.562
IV	0 (0)	7 (58.3)	5 (41.7)	
V	2 (15.4)	6 (46.2)	5 (38.5)	

*Fisher's exact test, p<0.05, GMFCS: Gross Motor Function Classification System, n: number, %: percent

high awareness levels. The awareness of the parents according to their socioeconomic status was shown in table and figure (**Table 2** and **Figure 1)**. There was no difference between the awareness states according to the economic level of the parents (p>0.05).

52.8% of parents of children with CP in the 4-8 age group were high, and 69.2% of parents in the 9-13 age group were intermediate; parents in the 14-18 age group were found to have a moderate level of awareness. The awareness levels of parents according to the age distribution of the children were shown in the table and figure (**Table 2** and **Figure 2)**. There was no difference between the awareness levels of the parents according to the age distribution of the children (p>0.05).

It was found that 66.7% of parents with no education were at an intermediate level, 62.5% of parents with primary school graduation were at an intermediate level, 69.2% of secondary school graduates were at an intermediate level, 60.8% of parents with high school graduation were at an intermediate level, and 71.4% of parents with undergraduate and graduate degrees were at a high level of awareness. The awareness of parents according to their level of education is shown in in table and figure (**Table 2** and **Figure 3)**. There was no difference between the awareness levels of the parents according to their education level (p>0.05).

Parents of children with CP at GMFCS I levels reported 46.7% had moderate and 53.3% had high levels; 68.2% of parents of children with CP at GMFCS

Table 3. Parents' awareness levels of disease knowledge

	Low awareness	Medium awareness	Higher awareness
Questions	**n/%**	**n/%**	**n/%**
q1) What is cerebral palsy?	2 (50)	31 (70.4)	30 (100)
q2) Which of the following is not accompanied by cerebral palsy?	0 (0)	41 (93.1)	30 (100)
q3) Could siblings of children with cerebral palsy have the same disease?	0 (0)	16 (36.3)	12 (40)
q4) Which of the following are not causes of cerebral palsy?	1 (25)	36 (81.8)	28 (93.3)
q5) Which of the following is not an abnormal condition that can be seen in the first 6 months?	1 (25)	18 (40.9)	18 (60)
q10) Which of the following are the types of cerebral palsy?	1 (25)	34 (77.2)	29 (96.6)
q13) Which of the following true for cerebral palsy?	1 (25)	34 (77.2)	29 (96.6)
q14) Which of the following are not types of cerebral palsy?	2 (50)	28 (63.6)	28 (93.3)
q18) Which of the following is not accompanied by cerebral palsy?	2 (50)	32 (72.7)	29 (96.6)
q24) Which of the following is right for the treatment of cerebral palsy?	1 (25)	25 (56.8)	23 (76.6)
q28) When is surgery performed on a child with cerebral palsy?	3 (75)	35 (79.5)	29 (96.6)
q32) Which of the following is not the cause of surgery in cerebral palsy?	1 (25)	15 (34)	7 (23.3)
q35) Which of the following is true for cerebral palsy?	1 (25)	8 (18.1)	20 (66.6)
q36) Which of the following does not pose a risk for cerebral palsy?	1 (25)	25 (56.8)	27 (90)
q37) Which of the following is not accompanied by cerebral palsy?	2 (50)	42 (95.4)	29 (96.6)
q38) Which of the following is wrong for the treatment of the child with cerebral palsy?	1 (25)	29 (65.9)	29 (96.6)
Parents' awareness levels of social and daily living activities			
	Low awareness	**Medium awareness**	**Higher awareness**
Questions	**n/%**	**n/%**	**n/%**
q7) Which one can a child with Cerebral Palsy do?	1 (25)	35 (79.5)	29 (96.6)
q9) Can cerebral palsy children participate in sports activities?	0 (0)	23 (52.2)	24 (80)
q17) Are there any sports activities in your region or province for children with cerebral palsy?	2 (50)	15 (34)	10 (33.3)
q20) What sport can children with cerebral palsy participate in?	0 (0)	19 (43.1)	22 (73.3)
q29) Which of the following is not one of the benefits of sports for a child with cerebral palsy?	2 (50)	9 (50.4)	11 (36.6)
q39) What is wrong with what sport has brought to children with cerebral palsy?	2 (50)	33 (75)	29 (96.6)

n: number, %: percent

II level had moderate to moderate; 56.3% of parents of children with CP at GMFCS III level were found to be moderate; 58.3% of parents of children with CP at GMFCS IV level had moderate levels and 41.7% had high levels; Parents of children with CP at GMFCS V levels were found to have a moderate level of awareness. The awareness status of the parents according to the GMFCS level was shown in in table and figure **(Table 2** and **Figure 4)**. There was no difference between their children's GMFCS levels and their parents' awareness levels ($p>0.05$).

The survey's questions, which assessed the parents of children with CP's degree of knowledge regarding the condition, physiotherapy, and rehabilitation, were divided into three categories: disease knowledge, physiotherapy and rehabilitation, and social and daily living activities. The degrees of awareness based on the questions are shown in tables **(Tables 3 and 4).**

When the general awareness levels of the parents of children with CP were examined, it was determined that 5.13% of the parents were at a low level, 56.41% were at a medium level and 38.46% were at a high awareness level **(Figure 5).**

DISCUSSION AND CONCLUSION

In our study, the awareness levels of parents who gave primary care to children with CP about the disease,

Table 4. Parents' awareness levels of physiotherapy and rehabilitation

	Low awareness	Medium awareness	Higher awareness
Questions	**n/%**	**n/%**	**n/%**
q6) Which of the following is included in the cerebral palsy physiotherapy program?	3 (75)	40 (90.9)	30 (100)
q8) When should physical therapy and rehabilitation begin in individuals with cerebral palsy?	4 (100)	38 (86.3)	26 (86.6)
q11) Which of the following is true for the role of the family in physiotherapy in children with cerebral palsy?	0 (0)	26 (59)	29 (96.6)
q12) Which of the following is wrong for physiotherapy program?	0 (0)	16 (36.3)	25 (83.3)
q15) How to determine the physiotherapy program of the child with cerebral palsy?	2 (50)	26 (59)	23 (76.6)
q16) Who should be in the physiotherapy and rehabilitation program of the child with cerebral palsy?	1 (25)	18 (40.9)	26 (86.6)
q19) Which one is wrong for the standing frame used in physiotherapy?	2 (50)	27 (61.3)	27 (90)
q21) Which of the following is wrong for orthotics (an assistive device worn on any part of the body, such as hands, feet, legs)?	0 (0)	26 (59)	29 (96.6)
q22) Which of the following is wrong for botox (intervention with a needle by doctors into the muscle)?	3 (75)	26 (59)	29 (96.6)
q23) Which of the following is not one of the goals of physiotherapy?	2 (50)	36 (81.8)	30 (100)
q25) Which of the following is true for physiotherapy in children with cerebral palsy?	1 (25)	29 (65.9)	28 (93.3)
q26) Which of the following cannot be asserted regarding the family of the cerebral palsy patient being included in the rehabilitation program?	0 (0)	33 (75)	29 (96.6)
q27) Which of the following are the assistive devices used in physiotherapy?	2 (50)	36 (81.8)	29 (96.6)
q30) Which of the following is not included in the physiotherapy program?	2 (50)	38 (86.3)	29 (96.6)
q31) Which of the following should be considered when positioning a child with cerebral palsy?	0 (0)	35 (79.5)	25 (83.3)

n: number, %: percent

physiotherapy, and rehabilitation were examined. According to the parameters classified in the questionnaire, parents' awareness levels of disease knowledge, social and daily living activities, physiotherapy, and rehabilitation were generally found at medium and high awareness levels. In addition, it was observed that the awareness levels of the parents were not affected by the level of parental education, the GMFCS levels of their children, the ages of the children, and the economic status of the family.

In the study in which Chen et al. investigated the factors affecting the quality of life of caregivers of children with CP, the vast majority of caregivers were mothers (13). In another study that examined the well-being and health of caregivers of children with CP, it was found that the vast majority of caregivers were mothers (14). In our society, it has been observed that the care of children with CP who need care is largely composed of mothers (15,16). In our study, in parallel with these studies in the literature, it was observed that mothers were the primary caregivers. Therefore, it is still thought that the burden of mothers is too much as the primary caregiver.

When the marriage process in families with CP children was assessed in the study by Sipal et al., it was discovered that the vast majority of them continued their marriages (17). The majority of the parents were found to be married in the study by Dambi et al., which looked at how the training workshop they held for parents of children with CP affected the parents' level of knowledge (18). Similar to this, a large percentage of parents in our study were married. These findings suggested that the illness might boost parental connection and attachment.

In the study in which Basaran et al. examined the effect of the quality of life of parents with children with CP, it is stated that the parent who cares for the child with CP does not work at a high rate (19). In our study,

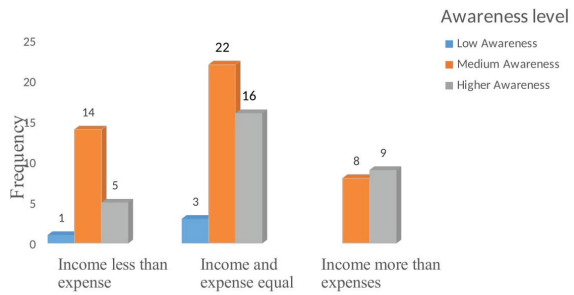

Figure 1. Awareness levels of parents according to socioeconomic status

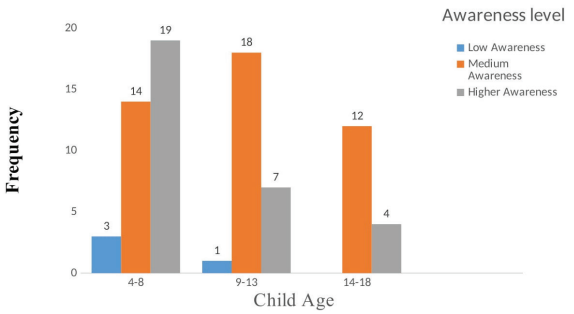

Figure 2. Awareness levels of parents according to children's age distribution

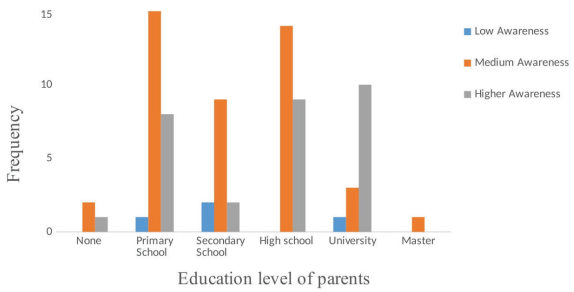

Figure 3. Awareness levels of parents according to parents's education level

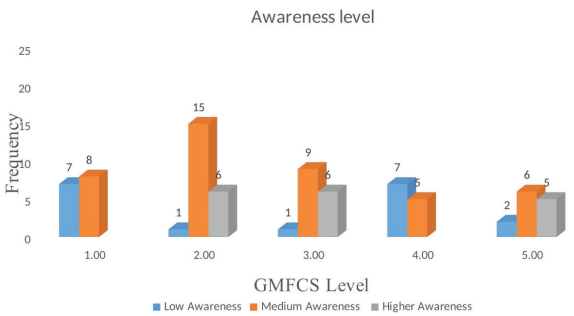

Figure 4. Awareness levels of parents according to children's Gross Motor Function Classification System level

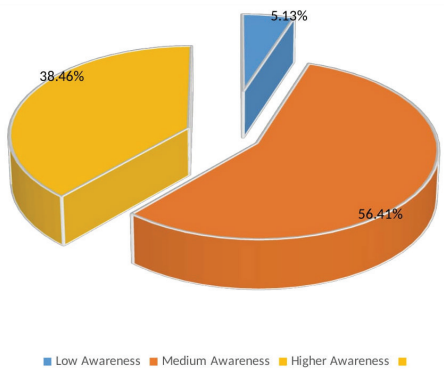

Figure 5. General awareness levels of parents

the vast majority of primary caregivers did not work, too. This situation shows that caregivers in our country do not prefer to work.

Marron et al. investigate the factors affecting the burden on caregivers of children with CP, examining the educational status of parents, stating that the majority of them have completed post-primary education (20). Wijesinghe et al. reported that the majority of caregivers were at primary school level (21). In our study, the majority of parents were at the primary and high school levels. This has shown that even in studies conducted in different countries, the level of education of parents is similar.

The awareness levels of the parents did not change according to the surgical history of the children and their economic status in the current study. In the study conducted by Difazio et al. with caregivers, the expectations and satisfaction of caregivers from the surgery in hip and spine surgery applied to children at GMFCS IV and V levels were evaluated. However, it has been reported that their expectations are unrealistic and awareness should be increased (22). Another study evaluated the functional recovery of children with CP after spinal arthrodesis for scoliosis. It has been reported that parents do not realize the effects of scoliosis deformity on head control, hand use, and feeding skills (23). These results show that surgical operations do not always increase awareness in parents. A study of families with low socioeconomic status in India found a lack of knowledge and awareness about the options needed for the treatment of their children (24). Bella et al. found that economic status in mothers of children with CP did not affect the burden of caregiving and stress (25). This situation shows that in

studies conducted in different populations, the awareness of caregivers and the level of caregiving affected by the economic level may vary.

In another study that examined the burdens and hopelessness levels of the mothers of children with CP, it was determined that the majority of families whose income was equal to their expenses when the income level was evaluated. In this study, it was found that most of the participants had equal income and expenditure levels and that the economic level of the family did not affect the level of awareness about their children's disease (26). Therefore, it was suggested that although the parents of children with CP were not at a good economic level, their level of awareness about the disease and its processes may be good. These results showed that being aware of the disease would not be directly affected by the economic situation.

There was no study that directly examined the age of the child and the level of parental awareness. In Yoruk's study in which mothers of children with CP examined the burden and impact of care, consistent with our study, it was found that parents of children between the ages of 4 and 8 had the highest rate of participation in the study, while those between the ages of 13 and 18 had the lowest rate. It has been observed that the burden of caregiving affects the awareness of the caregiver in relation to the relationship between the patient and the psychological state of the caregiver. In this study, there was no relationship between the age of the child and the mother's burden of caregiving (27). In Mohammed et al.'s study examining the quality of life of CP patients and their caregivers, similar to our study, the parents of children with CP between the ages of 4 and 8 years were found to have the highest rate of participation in the study. In this study, there was no relationship between the burden of caregiving and the age of the child (28). In our study, when the effect of child age on parents' awareness levels was examined, it was observed that awareness levels did not change significantly according to age groups, but as the age increased, parents' awareness levels of disease knowledge, social and daily living activities, physiotherapy and rehabilitation reached medium levels. It was found that the awareness levels of the parents, especially in the 14-18 age range, reached the highest level. Therefore, these results, in parallel with the studies in the literature, in addition to showing that the burden of caregivers does not change in children with CP as the age increases; showed that parents' level of knowledge and awareness of the processes of the disease and their children's performance and activities in daily life increased.

When the age distribution of children with CP was examined, the 4-8 age group had the highest rate and the 14-18 age group had the lowest rate in this study. When the level of awareness of parents of children with CP between the ages of 4 and 8 was examined, half of the parents had a high level of awareness; The vast majority of parents between the ages of 9-13 and 14-18 were found to have a moderate level of awareness. These results show us that as children age, there are no parents with low levels of awareness.

In Asilturk's study examining the care burden of parents of children with CP, the proportion of children at GMFCS I-II-III level is higher than the rate of children at GMFCS IV-V level similar to our study (29). The number of children at the GMFCS I-II-III level was larger than that of children at the IV-V level, according to another study comparing the effects of children with walking and non-walking CP on their carers' mood, health, and daily living experience (26, 30). These findings led us to believe that the children's ambulation levels in studies involving parents of CP children were comparable. No study evaluating the connection between GMFCS level and parental awareness level was found when the literature was reviewed. In our study, there were no parents with poor awareness of the GMFCS I and IV levels of children; the proportion of parents with low awareness of the GMFCS V level of children was found to be at the greatest level. Parents with children with GMFCS II level were found to be aware of the disease, with a high rate of moderate awareness. However, there was no difference in the awareness levels of the parents according to the GMFCS levels of their children.

Alruwaished et al. examined the level of knowledge about the disease in parents with children with CP and found that education level did not affect the parent's level of knowledge (31). Arora et al. also emphasized that the educational status of parents of children with CP does not affect general knowledge about CP (32). Our study similarly found that education level did not

affect parents' awareness levels of knowledge about CP, activities of social and daily living, and physiotherapy and rehabilitation. As a result of our study; Parents with no education and a primary school, middle school, and high school degree were found to have a high rate of moderate awareness. The majority of parents at the undergraduate and graduate levels were found to have a high level of awareness. It was observed that the majority of parents with low levels of awareness were parents at the secondary school level. These results made us think that mindfulness is not affected by the educational level of families.

According to the responses to the questionnaire's questions about disease knowledge, social and daily life activities, sports, physiotherapy and rehabilitation, it was found that parents in this study generally had medium to high levels of awareness. Parents' general knowledge and awareness levels of CP were shown to be severely insufficient in research with parents of children with CP conducted in Saudi Arabia (33). The majority of participants had minimal to moderate knowledge of how to professionally care for a child with CP, according to Afzal et al.'s study with carers of children with CP in Iran (34). It was discovered in another study that children with CP participated in physical activities at a low rate, and it was recommended that awareness of sports and recreation be raised and that children with CP be directed (35).

The limitations of this study are the small number of children and parents in the higher age groups, the fact that the study was conducted only in one metropolitan city, the lack of participation of parents in different countries and rural areas, and the failure to achieve equality of women and men in parents. In larger sample studies, different age groups, different countries or regions, research according to the gender of parents will provide more comprehensive information on the subject. Further research in this area will facilitate an understanding of the level of awareness of parents with children with CP in different populations and countries. The determination of this situation is the responsibility of the families; treatment processes, and preventive and preventive rehabilitation methods can increase the effort by providing awareness to increase participation in daily life. It can also provide parents with a vision for enabling their children to participate in a variety of social, and physical activity, sports skills that they can achieve, as well as play activities or environmental adjustments at school. Children's success rates in physiotherapy and rehabilitation programs may thus rise as parents' knowledge of the condition and its procedures rises. As a result, the primary objectives of treatment programs may be to evaluate parents' knowledge of CP disease, to provide physiotherapy and rehabilitation, and to educate parents about the disease process. In this regard, it is anticipated that our study will serve as a model for future research on the awareness of parents of children with CP.

In this study, it was shown that parents of children with CP generally had medium to high levels of awareness regarding their children's condition, social and daily living activities, physiotherapy, and rehabilitation. It was observed that when the children's ages climbed and they underwent surgery, the parents' degrees of awareness also rose. Additionally, it was shown that the parents' awareness levels were unaffected by their level of education, their children's gross motor function, their ages, or their family's financial situation. According to responses to survey questions about disease information, social and daily life activities, and physiotherapy and rehabilitation, parents generally had a moderate to high degree of awareness.

Acknowledgment

The authors would like to thank all of the parents who participated in to study.

Conflict-of-interest and financial disclosure

The authors declare that they have no conflict of interest to disclose. The authors also declare that they did not receive any financial support for the study.

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Comparison of clinical results of flattapered and rectangular stems in partial hip replacement based on proximal femur fracture

Proksimal femur kırığında düz-konik ve kare kesit stemler ile yapılan parsiyel kalça protezlerinin klinik sonuçlarının karşılaştırılması

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Abstract

Aim: Hemiarthroplasty is commonly used in proximal femur fractures to provide early mobilization and weight bearing to the patient. Cemented and cementless femoral stems are commonly used in this procedure. Cementless prostheses have many advantages and disadvantages, and their relevance to stem design is controversial. This study aimed to compare flat-tapered and rectangular femoral stems in hemiarthroplasty.

Methods: The study population consisted of a third-level hospital's archive orthopedics and traumatology clinic. Our study was retrospective. A total of 176 patients who underwent cementless hemiarthroplasty in proximal femoral fractures between January 2017 and January 2022 were included in the study. Within these protocols, 64 patients underwent hemiarthroplasty using a flat-tapered stem (Group 1), and 58 patients underwent hemiarthroplasty using a rectangular stem (Group 2). At the last follow-up of the patients, the Harris hip score, Visual Analogue Scale, and early and long-term complications were evaluated.

Results: No significant differences among the patients were observed regarding Harris hip scores and Visual Analogue Scale values. The study groups were analyzed in terms of developing complications. Similar results were found in both groups regarding periprosthetic femur fractures.

Conclusion: Our study found no significant difference between flat-tapered and rectangular stems in terms of clinical outcomes and periprosthetic femur fracture in cases of cementless hemiarthroplasty. As a result, rectangular stems can be safely preferred in hemiarthroplasty.

Keywords: Femoral neck fractures; hemiarthroplasty; hip prosthesis; periprosthetic fractures

Öz

Amaç: Hemiartroplasti, proksimal femur kırıklarında da hastaya erken mobilizasyon ve yük verme olanağı sağlamak amacıyla sık kullanılan bir yöntemdir. Bu prosedürde yaygın olarak çimentolu ve çimentosuz femoral gövdeler kullanılır. Çimentosuz protezlerin birçok avantajı ve dezavantajı vardır ve gövde tasarımıyla ilişkisi tartışmalıdır. Bu çalışmanın amacı hemiartroplastide konik ve kare kesit femur gövdelerini karşılaştırmaktır.

Yöntemler: Araştırma, üçüncü basamak bir hastanenin ortopedi ve travmatoloji kliniğinin arşivinden oluşturulan, retrospektif bir çalışmadır. Proksimal femur kırığı tanısıyla 2017- 2022 yıllarında çimentosuz hemiartroplasti uygulanan 64 konik (Grup 1) ve 58 kare kesit stem (Grup 2) olmak üzere toplam 176 hastaya hemiartroplasti uygulanan hasta çalışmaya dahil edildi. Hastaların son kontrollerinde Harris kalça skoru, Visual Analogue Scale ve erken ve geç dönem komplikasyonları değerlendirildi.

Bulgular: Gruplar arasında Harris kalça skoru ve Visual Analogue Scale değerleri açısından anlamlı fark gözlenmedi. Periprostetik kırıklar açısından karşılaştırıldığında her iki grupta da benzer sonuçlar elde edildi.

Sonuç: Çalışmamızda çimentosuz hemiartroplasti olgularında konik gövde ve kare kesit gövde arasında klinik sonuçlar ve periprostetik femur kırığı açısından anlamlı bir fark bulunmamıştır. Bu nedenle proksimal femur kırığı zemininde kare kesit femoral stem ile yapılan hemiartroplasti prosedürü güvenli bir yöntem olarak kabul edilmektedir.

Anahtar Sözcükler: Hemiartroplasti; femoral boyun kırıkları; kalça protezleri; protez çevresi kırıklar

Received/*Geliş* : 09.09.2023
Accepted/*Kabul*: 23.11.2023

DOI: 10.21673/anadoluklin.1357702

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INTRODUCTION

Partial hip arthroplasty (hemiarthroplasty) is a surgical procedure in which the femoral side of the hip joint is restored with an implant. This procedure is usually performed in patients who experience chronic hip pain and limited hip joint mobility due to primary and secondary (often rheumatological diseases) osteoarthritis or neglected dysplasia of the hip (1). Hip arthroplasty is also a preferred treatment method for proximal femur fractures to provide early mobilization and weight bearing for the patient who has additional morbidities. This procedure can be applied as hemiarthroplasty or total hip arthroplasty (2). Although cemented stem is commonly used in hemiarthroplasty surgeries, perioperative hemodynamic problems caused by cement application can limit the indication. On the other hand, uncemented hemiarthroplasty surgeries create some concerns, such as osteointegration problems in osteoporotic patients and perioperative fracture risk. (3-6).

Standard flat-tapered porous-coated prostheses are used safely in this surgery. Still, there are cases where these prostheses with proximal involvement cannot provide sufficient stability in patients with poor bone quality. Another alternative femoral prosthesis is rectangular stems with a square section, and the entire prosthesis is covered with a sandblasting technique. The advantage of this method is that it is more stable as it provides both proximal and distal retention. However, some publications argue that the difficulty in adapting the geometry to the normal femoral anatomy may cause fractures around the prosthesis more frequently in these patients, who are often osteoporotic, in the perioperative and early postoperative period (3,4,7,8).

The aim of our study is to compare and reveal the difference between rectangular femoral stems and flat tapered stems in terms of complication rates and clinical outcomes in hemiarthroplasty surgeries for femoral neck fractures.

MATERIAL AND METHODS

Study Population

The study population comprised an archive of hip arthroplasties performed in the orthopedics and traumatology clinic of a third-level hospital where the study was conducted.

Study Design and Participants

Our study was retrospective. A total of 176 patients who underwent cementless hemiarthroplasty in proximal femoral fractures in the orthopedics and traumatology clinic between January 2017 and January 2022 were included in the study. Participants were selected using the posterolateral approach and were followed up for at least one year.

Inclusion Criteria

- >65 years old
- Patients who underwent cementless partial hip arthroplasty with proximal femur fracture Exclusion Criteria
- Follow-up of less than one year
- Those who had previous surgery on the same side
- Unmanaged neurological/psychiatric disorders
- Chronic renal insufficiency
- Those with drug addiction or substance use for any reason

In our clinic, the patient files of all patients planned to undergo surgery after standard proximal femur fracture protocols are filled out in detail due to clinical follow-up and legal obligations. Following the pre-operative anesthesia examination before the operation, the patient's demographic information, the approach to be used for the patient, and the implant selection are made on the same day and recorded in the preoperative list.

Within these protocols, 64 patients underwent hemiarthroplasty using a flat-tapered stem (Group 1), and 58 patients underwent hemiarthroplasty using a rectangular stem (Group 2).

Standard follow-up of patients who underwent hip replacement surgery because of proximal femur fracture:

Postoperatively, on days 1, 2, and 3, standard inpatient assessments were conducted. Subsequently, evaluations were performed on the 10th and 20th days, the 6th week, and the 3rd, 6th, and 12th months following the surgery. Comprehensive outpatient follow-up and assessments were performed. Routine follow-up procedures were continued annually.

During the postoperative period, the joint range of motion is provided and recorded with the standard rehabilitation program on the 1st, 2nd, and 3rd days of the postoperative period.

Superficial and deep soft tissue complications and treatments performed during the patients' 1st, 2nd, and 3rd day hospitalization period in the postoperative period are recorded in the same system.

The patient's Visual Analog Score (VAS), pain scores, and Harris Hip Score (HHS) were recorded at their 1st-year follow-up in the postoperative period.

Two groups were identified in this retrospective study:

Group 1: Partial hip replacement with flat-tapered femoral stem (Figure 1).

Group 2 Partial hip replacement with a rectangular femoral stem (Figure 2).

Surgical Technique

All participants included in the study were prepared for the operation by undergoing lateral decubitus position application under spinal anesthesia. Following the standard sterilization procedure, a posterior-lateralhip incision was made, and the skin and subcutaneous tissue were dissected. Subsequently, access to the hip joint was achieved through a posterior approach. The hip is dislocated, and the broken femoral head is removed with the help of a corkscrew. Femoral neck cutting is performed when necessary. Then, rasping is performed with a rectangular or flat system. The femoral component is hammered. After the femoral component was applied, a stabilization was examined after reduction. In doubtful cases, fracture control is performed using fluoroscopy. After bleeding control and drain application, the capsule and soft tissue are closed, and the operation is terminated.

Data

- The research data are as follows:
- Age, body mass index (BMI), and the side on which the surgery was performed.
- Intraoperative and early postoperative periprosthetic femoral fracture (PFF).
- Soft tissue complications were recorded, including superficial infections, deep joint infections, hematomas, tissue degradation, and their timing and treatment processes.
- During the postoperative period, the patient's last follow-up VAS values and HHS were recorded.

The primary outcome is to evaluate periprosthetic femur fracture incidence in the intraoperative and early postoperative periods in both groups.

The second outcome is giving the clinical and functional scores of each patient group by using VAS and HHS scores at the last follow-up.

Ethics

This study was approved by the Clinical Research Ethics Committee of Kırsehir Ahi Evran University Faculty of Medicine (date: 05.09.2023, decision no: 2023-15/101)

Statistics

The analyses of research data were conducted using the SPSS Statistics for Windows (Statistical Package for the Social Sciences package program version 26.0, IBM Corp., Armonk, N.Y., USA). Descriptive findings are presented in frequency, percentage, minimum/ maximum values, mean, standard deviation, and median values. The normal distribution compatibility of the data of variables was examined using the Shapiro-Wilk test. The t-test or the Mann–Whitney U test was administered to compare two independent groups. In analyzing two repeated measurements, recourse was made to the paired t-test or the Wilcoxon signedrank test. Relationships among categorical variables were explored using the chi-square test. A significance threshold of $p<0.05$ was adopted to denote statistical significance in the analyses.

RESULTS

The findings regarding the analyzed variables and demographic data of the entire patient population in our study are given in tables (Table 1, 2).

It was determined that age, BMI, and follow-up period values had a similar distribution between our study groups, and there was no significant difference between them. HHS and VAS values were compared between the groups at the final controls. It was determined that there was no statistical difference between the variables in the measurements of the patients (Table 3).

Complications

There was no statistically significant relationship regarding complications between the groups (p=0.891) (Table 4). In the flat-tapered stem group, four patients had frac-

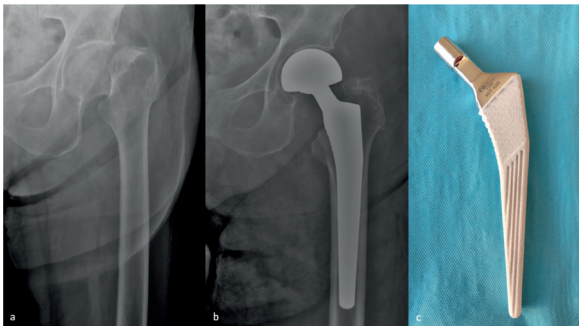

Figure 1. Radiographs of an 81-year-old woman with a proximal femur fracture
a) preoperative anteroposterior view b) early anteroposterior postoperative radiographs, hemiarthroplasty was performed with a flat-tapered stem c) photo of flat-tapered stem

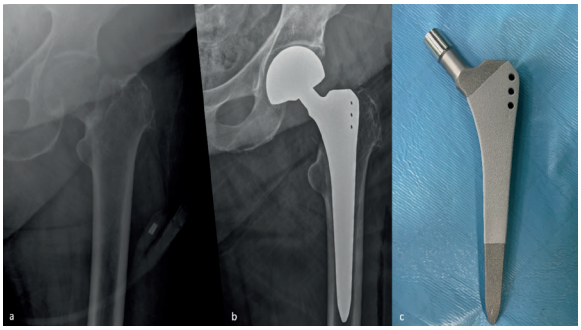

Figure 2. Radiographs of an 84-year-old woman with proximal femur fracture a) preoperative anteroposterior view b) early anteroposterior postoperative radiographs, hemiarthroplasty was performed with a rectangular stem c) photo of rectangular stem

tures intraoperatively, and two patients had fractures in the early postoperative period. Intraoperative fractures were treated using perioperative interventions. One of the early postoperative fractures was around the greater trochanter, which was reoperated, and osteosynthesis was performed with trochanteric plates and cables (Figure 3). The other patient was treated conservatively by walking without weight bearing.

In the rectangular stem group, three patients had fractures during surgery, and two had fractures in the early postoperative period. Intraoperative fractures and two femoral cracks were treated with perioperative interventions (Figure 4). The patient with an early postoperative fracture had a fracture extending to the medial calcar. Therefore, the procedure was revised with a long modular stem because the stability of the prosthesis was impaired.

During the short follow-up of the patients, no aseptic loosening was observed in either group. No patient underwent revision surgery due to implant loosening. Implant survival was similar in both groups.

In the flat-tapered stem group, dislocation was detected in two patients, hematoma requiring drainage in one patient, and prolonged serous discharge in three patients. Hip dislocations were treated by closed reduction and revision surgery for each patient. A stable hip was achieved in this surgically treated patient by using the dual mobile acetabular component. Three patients in the rectangular stem group had dislocations, and two had prolonged serous discharge. In three of the dislocations, treatment was completed with closed reduction. Periprosthetic joint infection

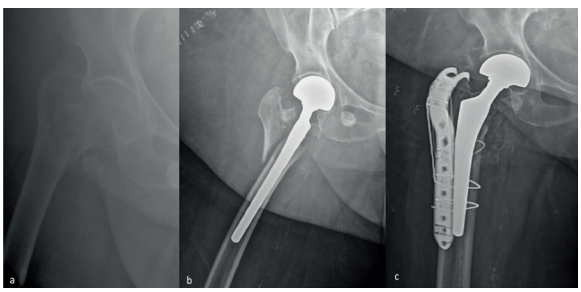

Figure 3. Radiographs of a 92-year-old woman with proximal femur fracture a) preoperative anteroposterior view b) early anteroposterior postoperative radiographs, postoperative fracture was around the greater trochanter c) periprosthetic femur fracture was reoperated and osteosynthesis was performed with trochanteric plates and cables

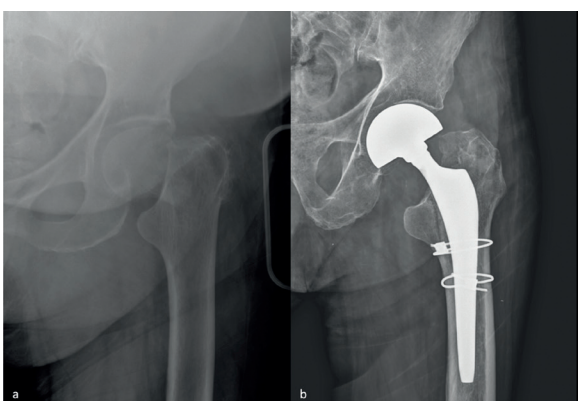

Figure 4. Radiographs of an 88-year-old woman with proximal femur fracture a) preoperative anteroposterior view b) early anteroposterior postoperative radiographs, intraoperative fractures were treated with two cables

(PJI) was observed in 2 patients in the flat tapered stem group and one in the rectangular group. Early DAIR (debridement, antibiotics, and implant retention) was performed in 3 patients and suppressed by appropriate antibiotic therapy.

Table 1. Demographic data

		n	%
Gender	Female	68	55,7
	Male	54	44,3
Group	Flat	64	46,2
	Rectangular	58	53,8
Side	Left	55	45,1
	Right	67	54,9

n: Number, %: Percent

Table 2. Demographic data and clinical parameters

	Min	**Max**	**Mean±SD**
Age	66	92	81,50±6,20
BMI (kg/m²)	21,2	38,9	29,26±4,78
Follow up (months)	14	74	29,52±18,22
Last follow up HHS	42	90	78,2±8,7
Last follow up VAS	0	7	3,31±1,32

*Min: Minimum, Max: Maximum, SD: Standard deviation, BMI: Body mass index, HHS: Harris hip score, VAS: Visual analog scale

Table 3. Comparison of data in the groups

	Flat-tapered (n=64)	Rectangular (n=58)	p
HHS	77,5±8,3	79,4±8,4	0,633
VAS	3,4±1,1	3,2±1,2	0,228
BMI	28,42±4,52	29,86±4,81	0,882
Age	82,60±5,90	80,20±6,40	0,771
Follow Up	28,74±17,84	29,96±18,41	0,556

*n: Number, HHS: Harris hip score, VAS: Visual analog scale, BMI : Body mass index, p<0.05

Table 4. Incidence of periprosthetic femoral fractures by femoral stem types

Type of The Femoral Stem	Number of PFF* (%)	Mean Months to PFF (Range)	Any Reoperation for PFF (%)	Revision of PFF (%)
Flat-Tapered Stems (n:64)	6 (9.3)	37 (14-64)	1(1.5)	-
Rectangular Taper Stems (n.58)	5(8.6)	35 (13-62)	1(1.7)	1(1.7)

*PFF, periprosthetic femoral fracture. n: Number

DISCUSSION AND CONCLUSION

PFF is a preventable but important complication that can occur during and after cementless hip replacement. There are various risk factors for intraoperative PFFs, including advanced age, poor bone quality, and surgeon's operative volume (9). Implant design is another important factor affecting fracture risk (10-13). In the literature, PFF has often been studied in THA cases. However, few studies are available on intraoperative complications during hemiarthroplasty for femoral neck fractures. Because most studies reporting PFF rates in THA femoral side fractures are studied, it can be a reference in cementless hemiarthroplasty cases. However, patients with femoral neck fractures constitute a very different group when compared with those undergoing elective total hip arthroplasty, considering age, bone quality, and additional morbidities.

Several studies have reported a higher PFF rate in hip arthroplasty using rectangular stems. It was

stated that the main reason for this may be geometric features. Although the rectangular section provides initial support, this angular structure can also be an additional stressor. When a rotational force is applied to the stem, this force can transform into a sudden increase in rotational stress in the femoral canal, causing PFF (7,14-16). Our study found no significant difference between flat-tapered and rectangular stems in terms of clinical outcomes and PFF in cases of cementless hemiarthroplasty.

Jeong et al. compared the PFF rates of flat-tapered, rectangular, and quadrangular stems in more than three thousand cementless total hip prostheses. It was concluded that rectangular stems have a higher risk of PFF than the other stems. However, two of these stems were compared in our study, and no such difference was found. This can be explained by the fact that the patient population is different (7).

Han et al. analyzed PFF types in cases with rectangular stems and found that the long spiral break was significantly greater in this design. However, their design makes typical rectangular stems more likely to be placed in the varus position (17). A systematic study detected 10.6% varus malposition in cases made with rectangular stems. Varus malposition may be an independent risk factor for implant loosening and PFF because it creates abnormal stress distribution and poor implant placement (18,19).

Ohly et al. reported the incidence of PFF to be 5.4% in a large uncemented hip arthroplasty case series (20). Similarly, Ricioli et al. reported that the incidence of intraoperative PFF was 5.39% in the cementless study group (21). Compared with these studies, although the incidence rate of intraoperative PFF was slightly higher in our study, this result seems normal because the patient group in our study was elderly and had poor bone quality.

Chandran et al. conducted a retrospective study of hemiarthroplasty with a cementless femoral stem in 65 patients diagnosed with collum femoris fracture. The results of the series reporting 12 (7.2%) patients with PFF at the end of a 1-year follow-up period are closely similar to the rate in our total patient population. It has been reported that 7 cases were in the preparation phase of the femur, and 5 cases were in the implantation phase. All cases were stable, with fixations made with cerclage in the perioperative period, and there was no need for femoral revision. As in our study, it has been reported that patients with this type of intraoperative intervention were rehabilitated by walking with partial load for six weeks. Unlike in our study, PFF was detected in four patients in the early postoperative period, but it was not found in this series. This is because early postoperative PFFs in both groups are cases of femoral cracks that were overlooked and untreated with cerclage (22).

The proximal femur should be prepared to fit the implant well. It has been argued that femur geometry and material properties affect stress distribution (23). Similar fractures occur during the preparation and implantation of the femoral canal (22). Liu et al. found 3.2% PPF in their case series. They found that most of these fractures were in preparation before prosthesis implantation. Iatrogenic fractures may occur as a result of force applied during rasp insertion while preparing the medullary canal. Therefore, when there is difficulty in the preparation phase of the prosthesis, they recommend that the rasp is repositioned in the correct position instead of increasing the strength, and re-rasping should be carefully continued (3). Our study suggests that the medial part of the trochanter major should be carefully removed with a chisel while proceeding to the preparation stage with a rasp in a patient who will use a rectangular stem. We argue that removing this part, on which the lateral part of the rasp rests, prevents pertrochanteric fractures.

Fitzgerald et al. focused on preoperative planning and templating. As a result, they reported 6.3% of intraoperative fractures, all involving the proximal femur, and concluded that 3.5% of femur fractures could be prevented by creating a preoperative x-ray template (24). Most fractures occur during the implantation of the prosthesis into the femoral canal. Preoperative planning according to the geometry of the femur and canal structure and selecting the appropriate implant are the most important preventive factors.

Many articles compare cemented and cementless hemiarthroplasty series. The general opinion is that similar results are observed regarding early functional outcomes. However, it has been reported that intraoperative complications are significantly higher in cemented hemiarthroplasty cases and early complications related to the implant in cementless stem applications (25,26). However, the literature has reported that

cemented hemiarthroplasty cases are more successful in terms of early functional outcomes and pain. In addition, Azegami et al.'s meta-analysis strongly emphasized that there is no difference between cementless hemiarthroplasty and cementless hemiarthroplasty in terms of mortality and complications (27).

It has been reported that the risk of PFF in the first three months after arthroplasty with uncemented stems is four times higher than that with cemented stems (4-6). Brodén et al. examined 1403 hips with cemented femoral stems in a large single-center case series and found a PFF rate of 3.3%. This produced PFF in half of our series of patients with cementless stems and is consistent with the literature (28). There was no significant difference between the two groups in terms of the HHS and VAS values used for clinical evaluation. In the literature, the success of cementless hemiarthroplasty in proximal femur fractures has been accepted in large patient series and long-term follow-ups. When both groups were examined in terms of complications other than PFF, the results were similar and consistent with the literature (29-30). In the study performed by Kim et al. in 123 cementless bipolar hemiarthroplasty cases where they performed hemiarthroplasty with entire porous coated rectangular stems in proximal femur fractures, they found an average of HHS 77 (31). It has similar results to our study in terms of complication rates.

Our study has some limitations. First, this study has a retrospective design. This can disrupt randomization in patient selection and the homogeneity of results. Second, although our cohort was a relatively large patient series, different results may have been obtained in the more extensive patient series of this study. Another limitation of our study is the short follow-up period; these surgeries should be evaluated with long-term follow-up studies.

Although publications show that the rectangular stem has higher complication rates, such as PFF, we found that the complication rates and functional results of rectangular stems were not different from those of flat-tapered stems in our study. Therefore, we believe that cementless hemiarthroplasty procedures with rectangular stems are safe in elderly patients with proximal femur fractures. Preoperative planning and patient selection play a key role in success.

Conflict-of-interest and financial disclosure

The authors declare that they have no conflict of interest to disclose. The authors also declare that they did not receive any financial support for the study.

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Automatic prediction of isocitrate dehydrogenase mutation status of low-grade gliomas using radiomics and domain knowledge inspired features in magnetic resonance imaging

Düşük evreli gliomların radiomic ve alan bilgisi temelli öznitelikler aracılığı ile manyetik rezonans görüntülerinden izositrat dehidrogenaz mutasyon durumunun otomatik tahmini

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Abstract

Aim: Most common and most deadly primary central nervous tumors, glial tumors harbor many heterogeneous clones of cells. Noninvasive determination of the genomic profiles of these tumors would have important implications regarding the classification, management, and prognostication of these tumors. Isocitrate dehydrogenase mutation is a key genomic signature that can downgrade the expected dismal course of these tumors. In this study we aimed to build a performant prediction model which can determine the Isocitrate Dehydrogenase (IDH) mutation status of glial tumors, using radiomics and leveraging automatic computation of domain knowledge-inspired features.

Methods: Radiomics methods based on high throughput feature extraction and application of data science principles to these extracted features are promising tools for the noninvasive classification of lesions. Domain knowledge-inspired features besides radiomics features can contribute positively to the performance of the models. Some efforts particularly a joint approach to standardize the magnetic resonance imaging (MRI), reporting of glial tumors are mainstay for domain knowledge-inspired features. However, this requires active involvement and reporting of the radiologist which hampers automatization efforts. Additionally, this feature set evaluates a small subset of all possible signal and spatial-based computations. In this study, we combined domain knowledge-inspired features with radiomics features along with a multiparametric multihabitat comprehensive lesion description strategy.

Results: Our best model which consisted of a combination of radiomics, and radiologist knowledge-inspired features reached a 0.93 f1 score (standard deviation (SD): 0.03), 0.93 accuracy (SD:0.03), and 0.98 area under curve (AUC), (SD:0.02).

Conclusion: The multiparametric and multiregional approach employed in this study coupled with the integration of both radiomics and domain knowledge-inspired features resulted in a high-performance model emphasizing the contribution of each strategy to the outcome.

Keywords: Glial cell tumors; mutation; radiomics

Öz

Amaç: En yaygın ve en ölümcül birincil merkezi sinir tümörleri olan glial tümörler, heterojen hücre klonları barındırırlar. Glial tümörlerin genomik profillerinin invazif olmayan bir şekilde belirlenmesi, bu tümörlerin sınıflandırılması, yönetimi ve prognostikasyonu ile ilgili önemli etkilere sahip olacaktır. İzositrat dehidrogenaz mutasyonu varlığı bu tümörler için önemli bir genetik belirteç olup daha iyi prognoz göstergesidir. Radyomik yöntemler, lezyonların non invazif sınıflandırılması için umut verici bir araçtır. Bu çalışmada radyomik özelliklerin yanı sıra alan bilgisinden ilham alan özelliklerle, yapay zekâ ile manyetik rezonans görüntüleme (MRI), görüntülerinden İzositrat Dehidrogenaz (IDH) mutasyon tahmini yapacak bir model geliştirilmesi amaçlanmıştır.

Yöntemler: Radyomik öznitelik kümesi çıkarılmış buna ek olarak radyologların lezyon tariflemede kullandığı belirteçler kodlanarak otomatik olarak elde edilmeye çalışılmıştır. Her iki yöntem ile elde edilen öznitelikler ile sınıflayıcı modeler geliştirilmiştir.

Bulgular: Radyomik ve radyolog bilgisinden ilham alan özelliklerin kombinasyonundan oluşan en iyi modelimiz 0,93 f1 puanı (Standart Sapma (SD): 0,03), 0,93 doğruluk (SD:0,03) ve 0,98 eğri altındaki alan (EAA)'ya (SD:0,02) ulaştı.

Sonuç: Bu çalışmada kullanılan çok parametreli ve çok bölgeli yaklaşım hem radyomik hem de alan bilgisinden ilham alan özelliklerin entegrasyonu ile birleştiğinde, nihai sonuç için her bir stratejinin katkısını vurgulayan yüksek performanslı bir modelle sonuçlandı.

Anahtar Sözcükler: Glial hücreli tümörler; mutasyon; yapay zeka

Received/*Geliş* : 24.10.2023
Accepted/*Kabul*: 31.12.2023

DOI: 10.21673/anadoluklin.1378673

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INTRODUCTION

Glial tumors are the most common primary malign neoplasms of the central nervous system (1). The presence of isocitrate dehydrogenase (IDH1) mutation which involves arginine in position 132 may be seen in 50-80 % of low-grade glioma (LGG) and 12% of high-grade glioma (HGG) (2,3). IDH mutation may render the glial tumors into a less aggressive type which exhibits significantly higher survival times regardless of histological grade (2,4). Its critical role in prognostication leads to its inclusion in World Health Organisation (WHO) 2016 and 2021 glial tumor classification criteria (5,6). The glial tumors are subdivided into four grades according to WHO classification. Significant survival differences appear on the same grade based on IDH mutation presence or absence (7). IDH enzyme takes place in oxygenated respiration of cell metabolism. In the wild form, the cell normally converts isocitrate into alpha-ketoglutarate in the Krebs cycle while in the mutated form conversion is driven to 2-hydroxyglutarate which inhibits downstream histone demethylases (8). Current state-of-the-art IDH mutation detection is based on immunohistochemical staining or genetic profiling which requires surgical or interventional tissue sampling. However spatial and spectral heterogeneity of tumors may sometimes result in over or underestimation of genomic status of the tumor (9,10).

Identification of the IDH status of glial tumors can help clinicians in several aspects. LGG with IDH mutation can be subject to and see approach. Additionally, IDH mutant cells have increased sensitivity to chemotherapy and radiotherapy which can determine the choice of treatment (11). Therefore, non-invasive determination of IDH status is an important and unsolved problem in the literature. Some studies use conventional imaging features, Visually Accessible Rembrandt Images (VASARI) features, radiomics, and deep learning to propose solutions to this problem (12-15). Conventional imaging features and VASARI features are based on the knowledge of human radiologists. The former approach depends on the vectorization of the imaging clues for further utilization of statistical methods and the latter is based on scoring standardized properties of a tumor including location, various proportions of different habitats of the tumor, and certain imaging features (16). These approaches are limited to large-scale analysis of images which can roughly reflect underlying molecular and cellular characteristics. However human eye is not sensitive to the above second-order relationship of individual image components (17). Deep learning studies based on imaging features require many images to automatically find relevant features in the images. However, in medical imaging, image resources are limited due to strict regulations of sensitive data. Radiomics which can be interpreted as digital biopsy is based on its central dogma which states that images are reflections of underlying molecular, cellular, and metabolic processes and they can be represented by various computational tools (18). Recently radiomics methods have been used to analyze various Computer Tomography (CT) and Magnetic Resonance Imaging (MRI) classification tasks successfully (19-22). We hypothesized that different MRI sequences and different habitats in these sequences may harbor complementary information regarding the explanation of underlying biology.

In this study, our aim was to explore the multiparametric multihabitat radiomics methods to build a robust classifier model that can successfully determine the IDH status of glial tumors in MR images.

MATERIAL AND METHODS

Patients

We obtained genetic and MR imaging low-grade glioma (LGG) data from the Cancer Imaging Archive (23). The ethical board approval of the data was handled by the providers of this publicly available repository. Therefore, we did not obtain additional ethical board approval and informed patient consent since this kind of data is exempt from additional ethical board approval and consent requirements. The MR image data sets were downloaded from the Cancer Imaging Archive in July 2022 (www.cancerimagingarchive.net) and originated from five centers (Thomas Jefferson University, Philadelphia, MD, Henry Ford Hospital, Detroit, MI, Saint Joseph Hospital and Medical Center, Phoenix, AZ, Case Western Reserve University, Cleveland, OH and University of North Carolina, Chapel Hill, NC).

The inclusion criteria for this study were presurgical axial T1, contrast-enhanced T1 (T1CE), T2 and Fluid Attenuated Inversion Recovery (FLAIR) images, and treatment-naive gene expression data (Figure 1). We included 108 patients who had readily available annotation masks for tumor necrotic zone, enhancing tumor and peritumoral edema regions. 7 patients were additionally excluded since they did not have data indicating their IDH status. All the analyses were held on the remaining 101 patients (Figure 2).

Preprocessing:

These scans were initially skull-stripped and co-registered to SR124 atlas, before their tumor segmentation labels were produced by an automated hybrid generative-discriminative method, ranked first during the International Multimodal Brain Tumor Segmentation Challenge (BRATS 2015) (23). These segmentation labels were revised, and any label misclassifications were manually corrected by an expert board-certified neuroradiologist (23). Images were resampled into 1mm resolution and signal intensity was normalized to the 0-1 range. Sample MRI images from both classes were provided in Figure 1.

Feature Extraction:

Two different feature extraction strategies were employed. One was radiomics with a radionics package and the other one was the automatization of a radiologist decision-making process inspired by VASARI features (16).

Pyradiomics (18) an open-source Python package (v3.0 https://pyradiomics.readthedocs.io/en/latest/) was used for feature extraction. Voxels were resampled into 1x1x1 mm resolution by a cubic b-spline algorithm to correct acquisition-related variations and discretized into a bin width of 25 followed by normalization with the normalized scale of 300. Laplacian of Gaussian (LoG) filter transformation with 5 distinct sigma values and one level 3D wavelet transformation was used along with original images yielding 1218 features. The same strategy was applied for 3 sequences (T1CE, T2, and FLAIR) and 2 habitats (tumor core and whole tumor). There were 4 possible sequences including T1 and 7 possible tissue types (necrosis, enhancing tumor, tumor core which consists of the former two, edema, whole tumor, edema plus enhancing tumor, and normal appearing peritumoral brain region). This would yield 7x4x1218 = 34104 features. After initial exploration we decided to proceed with 2 tissue types (tumor core and whole tumor) and 3 different MRI sequences) which produced a better feature set. This approach effectively reduced the number of features to 3X2X1218= 7308. Then we applied unsupervised feature selection to decrease the number of features. First, we eliminated the features with less than 5% variance. Because the additional contribution of these to the model would be limited. Then we eliminated the features with a correlation coefficient higher than 0.8. Since the information they would provide would be similar, their contribution would be low, on the contrary, they would complicate the model's performance due to multicollinearity.

For the second feature extraction approach we calculated the signal and spatial properties of the images. For spatial features, the volumes of each tissue type (necrosis, enhancing tumor, tumor core, edema, and whole tumor) were calculated and compared with each other. Thus, 20 different ratios (5x4) were obtained by the permutations of volumes of 5 tissue types. In MR, the signal properties are affected by the imaging parameters and the equipment used, as well as the tissue type displayed. For this reason, using the absolute value of the signal may give misleading results due to the images obtained on different machines. However, proportioning the signals in different sequences or different tissue regions in the same sequence to each other can eliminate this problem by creating an internal normalization. For this reason, we calculated the mean, minimum, maximum, and standard deviation values of the signals of each of the 5 tissue types in every 4 sequences and obtained the comparative signal summarizing features by calculating them. Additionally, we used the region properties function of the scikit_learn package of Python programming language to find the center of gravity and the major orientation axis of the mass. In this way, we obtained 666 attributes. After eliminating low variance and redundant features, high variance, and non-redundant domain knowledge-inspired features were

retained. After preparing the dimensionality-reduced and cleaned data set described in the previous paragraph, we applied supervised feature selection for each of the datasets using recursive feature elimination (RFE) to obtain the most relevant features (24). Recursive feature elimination is a model-based supervised feature selection method that tests all possible permutations of features and finds the best subset for a given task. The selection is based on the performance scores of many sub-models which test different combinations of features and sort the feature importance scores for the target task. The desired number of highest-ranking features are kept and the remaining are discarded in this feature selection method.

Model Building and Selection:

Support vector machines (SVM) and Random Forest (RF) are two successful classifiers that were commonly used in medical image analysis literature (25,26). The class imbalance problem was high in our dataset which can hamper the predictive ability of our models. Therefore, we implemented 2 strategies to combat with data imbalance problem. The first one was the class_balance method implemented in Random Forest and SVM itself, and the second one was the synthetic minority oversampling technique (SMOTE) which can create synthetic data points for the minority class (27).

Since the number of data points was low, we employed a cross-validation algorithm for training the models and applied the feature standardization, feature selection, and model training together in a nested cross-validation scheme so that there was no data leakage (28). 10 times 5-fold cross-validation training scheme was used to better estimate the skill of built models.

Statistical Analyses

Python scripting language with a scikit-learn package was used for statistical analysis. We reported the f1 scores of all models as mean and standard deviation and the Receiver operating curve area under curve (ROC_AUC) and accuracy values of the most successful model. The overall workflow is summarized in Figure 3.

RESULTS

Of the 101 included patients 80 were IDH mutant (80%) and 21 were IDH wild type (20%).

In the domain knowledge-guided dataset, selected final features were presented in Table 1. Starting from 666 features, 639 remained after variance thresholding and 140 remained after redundancy elimination. Finally, 6 features were selected after supervised feature selection by Recursive Feature Elimination (RFE). One of these features was FLAIR and 4 of them were T1CE based. FLAIR sequence-based selected feature was the ratio of the minimum value of the signal in the necrosis region to that of the minimum signal in the peritumoral normal-appearing brain. 3 of the 4 T1CE-derived selected features were ratios of the maximum, minimum, and standard deviation of the signals of the necrotic region to enhance tumor region. The last T1CE-derived selected feature was the ratio of the standard deviation of the whole tumor region to that of the normal-appearing brain. The last selected feature for the domain knowledge-guided dataset was a spatial feature which was the ratio of volumes of necrotic region to edema region.

In the radiomics dataset, RFE selected final features were presented in Table 1. Starting from 7308 features, we obtained 6 high variance nonredundant relevant features after the application of the same unsupervised and supervised feature selection steps. Two of these features were FLAIR derived one with tumor core and wavelet transformed image and one with whole tumor region and LoG transformed images. Both were second-order features. The third selected feature was 90. Percentile of the histogram of the original image in T1CE sequence with tumor core mask. Remaining three features were T2 sequence-based second-order features.

The combined dataset was constructed by combining radiomics and domain knowledge-based features dataset and subsequent application of the same unsupervised and supervised feature selection. 2 signals, 1 spatial, and 2 radiomics-based features were selected. Selected signal and radiomics features were T2 and FLAIR based with varying contributions of tumor core and whole tumor regions. The selected features are presented in Table 1.

Table 1: Distribution of selected features

	MRI sequence	Tissue mask	Feature type	Feature name
Radiologist inspired and Radiomics Combined	T2	Whole tumor	Signal	Mean ratio
	FLAIR	Whole tumor	Signal	Std ratio
	T2/FLAIR	Enhancing/Core	Signal	Std ratio
	General	Necrosis	Spatial	Volume
	FLAIR LoG sigma=5	Whole tumor	GLSZM 2nd order	Large Area Low Gray Emphasis
	FLAIR Wavelet HLL	Tumor core	First order	Minimum
Radiomics	FLAIR Wavelet LLH	Tumor core	GLRLM 2nd order	Run Entropy
	T1CE Original	Tumor core	First order	90. percentile
	T2 Wavelet LHH	Tumor core	GLCM 2nd order	Cluster Shade
	T2 Original	Whole tumor	GLSZM 2nd order	Zone entropy
	FLAIR Wavelet HLL	Tumor core	First order	Minimum
	FLAIR LoG sigma=5	Whole tumor	GLSZM 2nd order	Large Area Low Gray Emphasis

FLAIR: Fluid Attenuated Inversion Recovery, LoG: Laplace of Gaussian, Wavelet HLL: Wavelet High Low Low, T1CE: T1 contrast enhanced, LHH: Low High High, LLL: Low low low, GLSZM: Gray Level Size Zone Matrix, GLRLM: Gray Level Run Length Matrix, GLCM: Gray Level Co-occurance matrix

Table 2: Performance metrics

		SVM	SVM_SMOTE	SVM_classwg	RF	RF_SMOTE
Radiologist knowledge Inspired	**F1**	0.77, 0.14	0.89, 0.05	0.76, 0.10	0.68, 0.18	0.92, 0.04
	Acc	0.91, 0.05	0.89, 0.04	0.87, 0.06	0.86, 0.04	0.92, 0.04
	AUC	0.89, 0.04	0.97, 0.04	0.95, 0.08	0.85, 0.06	0.96, 0.06
Radiomics	**F1**	0.64, 0.14	0.88, 0.04	0.64, 0.11	0.61, 0.16	0.90, 0.04
	Acc	0.86, 0.05	0.88, 0.04	0.81, 0.06	0.82, 0.04	0.89, 0.05
	AUC	0.92, 0.08	0.94, 0.04	0.91, 0.07	0.83, 0.08	0.96, 0.06
Combined	**F1**	0.84, 0.10	0.93, 0.03	0.81, 0.09	0.70, 0.21	0.93, 0.03
	Acc	0.93, 0.04	0.93, 0.03	0.91, 0.04	0.91, 0.05	0.94, 0.04
	AUC	0.96, 0.06	0.98, 0.02	0.96, 0.06	0.93, 0.07	0.98, 0.02

Acc: Accuracy, AUC: Area Under Curve, SVM: Support Vector Machine, SVM_SMOTE: Support Vector Machine with Syntheric Minority Oversampling Technique, SVM_classwg: Support Vector Machine with class weighting, RF: Random Forest RF_SMOTE: Random Forest with Synthetic Minority Oversampling Technique

Best best-performing model with domain knowledge-based features was Random Forest with SMOTE which achieved a 0.92 f1 score. SVM without SMOTE reached 0.77 and with SMOTE reached 0.89 f1 scores indicating the importance of data balancing strategies in imbalanced dataset conditions.

For the radiomics-based features RF with SMOTE had the best performance with a 0.90 f1 score followed by SVM with SMOTE with a 0.88 f1 score.

On the other hand, combined feature set yielded the best scores. With this strategy, both RF and SVM models achieved similar performance with a 0.93 f1 score whereas SVM without SMOTE yielded still a good score of 0.84 f1 score. The performance metrics of the built models were provided in Table 2 (Table 2) and bar plots in Figure 4.

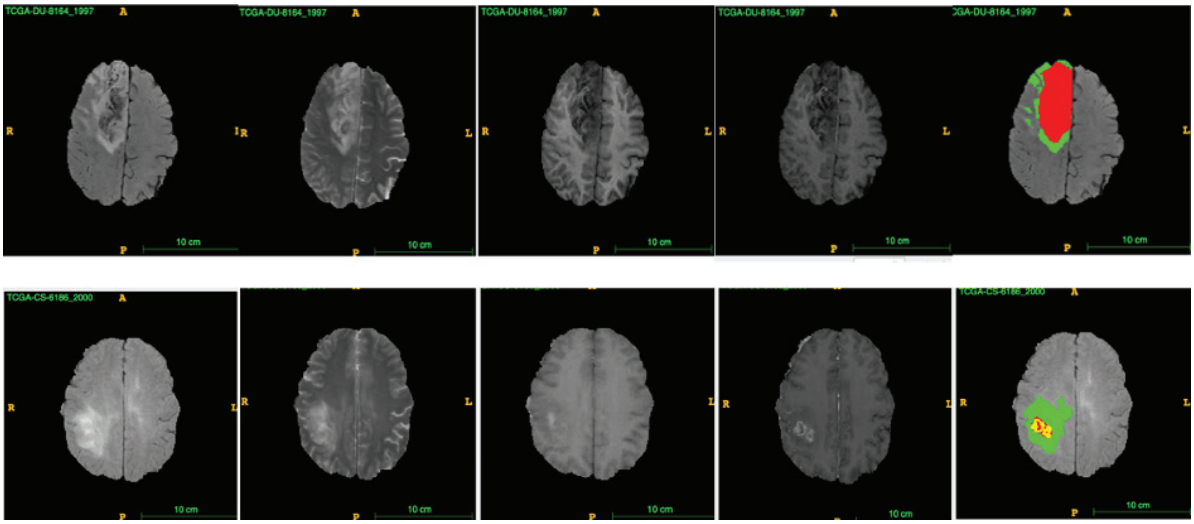

Figure 1: Sample images from IDH dataset. Upper row IDH mutated; lower row IDH wild.
a) FLAIR b) T2 c) T1 d) T1 post contrast e) Segmentation mask overlay
(Red: Necrosis, Yellow: Tumor, Green: Peritumoral edema).
IDH: Isocitrate dehydrogenase

DISCUSSION AND CONCLUSION

The major finding of this study was radiomics-based multiparametric multihabitat features enriched with domain knowledge guided features and reduced to a minimal subset by extensive usage of feature selection methods allowed for better predictive performance than the literature for prediction of IDH status of glial tumors in MRI. The multiregional multisequence model outperformed all other models when radiologist knowledge-based features were integrated. Some recent studies showed local distinct heterogeneous subregions in gliomas (9,10). However, few studies acknowledged this regional heterogeneity in their research plan (29,30). Additionally, multiparametric assessments that leverage the information gained from different sequences are also few (31). Additionally, we explored the value of integration of automatized information gained from human reader assessment approach. To the best of our knowledge, there is no study exploring a multihabitat, multiparametric radiomics model leveraged with automized vectorized human knowledge integrated into the predictive model. Some studies did not consider the curse of dimensionality, a basic data science principle that dictates the total number of predictive features should be a fraction of a total number of samples which may otherwise hamper

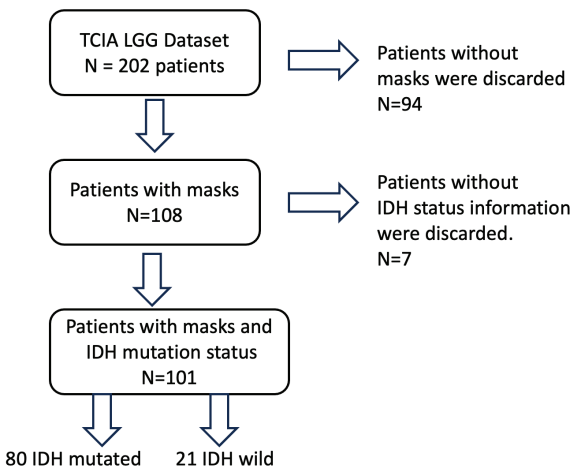

Figure 2: Patient selection process.
TCIA: The cancer imaging Archive. LGG: Low grade Glioma N: Number

their generalizing capacity (31,32). Recalling taking care of this limitation which can lead to overfitting, the above studies exhibited the mean area under a curve of 0.79 to 0.92. Our 6-feature combined model achieved a higher AUC (0.94). The accuracy of this model was 0.93. Our initial feature set for the combined features dataset comprised 7974 features, including 1218 features from each of T1CE, T2, and FLAIR-based tumor core and whole tumor-based region of interests and 666 domain knowledge-based features. This rich comprehensive feature set effectively characterized the tu-

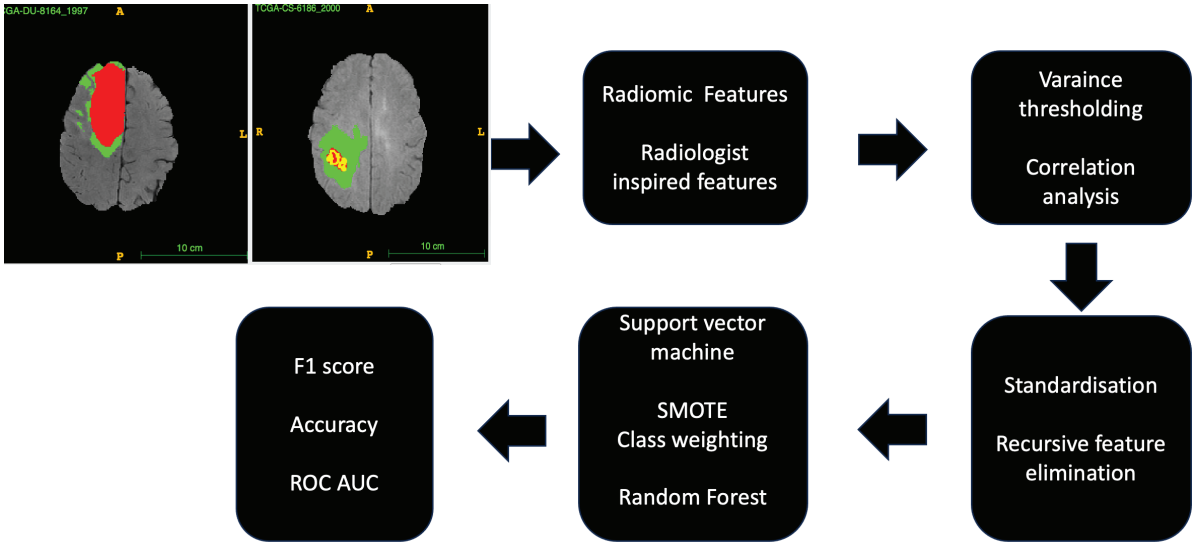

Figure 3: Overall workflow. Three MRI sequences and two tissue masks were given to the system. After radiomic and domain knowledge-based feature extraction, robust, non-redundant, relevant features were selected, followed by model training coupled with imbalance data combatting strategies.
SMOTE: Synthetic Minority Oversampling Technique, ROC_AUC: Receiver Operating Characteristic Area Under Curve

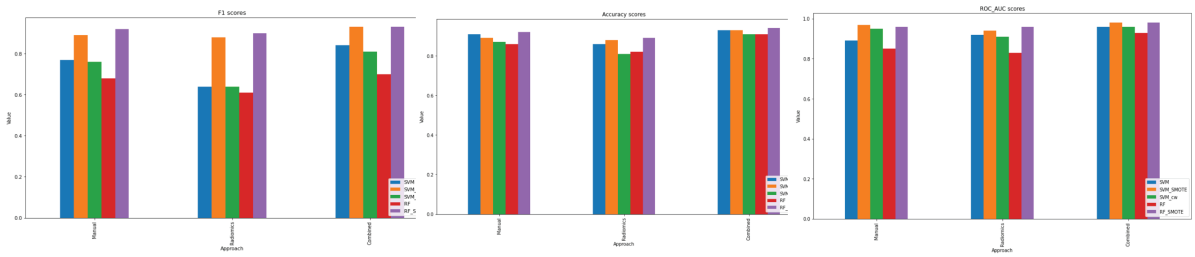

Figure 4: Bar plots of performance metrics.
SVM: Support Vector Machine SVM_SMOTE: Support Vector Machine with Synthetic Minority Oversampling SVM_cw: Support Vector Machine with class weighting RF: Random Forest RF_SMOTE: Random Forest with Synthetic Minority Oversampling Technique

mors. Unsupervised and supervised feature selection methods each having different strengths applied to this feature set reduced the radiomics feature set effectively. Features from different MRI sequence tissue habitat combinations along with domain knowledge-guided features provided a more comprehensive feature set. TCIA data was collected from 5 centers and exhibited considerable variability. We resampled the images into 1 mm resolution, and 0-1 intensity range to obtain spatial and signal normalization. To combat with imbalance dataset problem, we applied class weighting and SMOTE. These steps along with optimized feature extraction and selection strategy improved the predictive ability of our model.

Our results show that among all regions tumor core and whole tumor equally contributed to radiomics relevant features, emphasizing the importance of the multihabitat approach while for the multiparametric options T2 sequence contributed more. Nevertheless, the contribution from T1CE and FLAIR sequences could not be neglected as well as a contribution from signal and spatial-based features. This observation indicated that the imaging phenotypes within distinct tumor subregions and from different MRI sequences may contribute differently to the outcome. In ref. (33) The authors demonstrated that tumor heterogeneity is not limited to the tumor core but also involves the edema area. In ref. (34) The authors have shown

that radiomics features from the peritumoral edema area could predict survival better than from enhancing tumor and necrosis areas. The authors in ref. (35) showed that a higher ratio of non-enhancing areas is associated with IDH1 mutation in HGG. Similarly in our study, necrosis volume, and signal of the peritumoral region in T2 and FLAIR had high coefficients.

Glial tumors harboring IDH mutation accumulate 2-hydroxyglutarate within the tumor that can be identified by MR spectroscopy which is a promising technique to detect IDH mutation noninvasively in glial tumors (33). Another promising modality is T2 perfusion imaging which showed that IDH mutant gliomas tend to present lower regional cerebral blood volume than wild counterparts (36). Nevertheless, these techniques are advanced and cannot be used outside specialized centers (37,38). On the other hand, our algorithm has broader applicability due to the advantage that it is based on routinely acquired standard protocols. The readily availability of the system operating on standard sequences could help better clinical adoption of our model. This may help the clinician in decision-making process for further evaluation or taking actions for intervention. Providing that our results are validated on large cohorts, our model might reduce the interventions for determination of IDH subtype, the morbidity to the patient based on additional operations, the business of neurosurgery departments, and the overall cost to the healthcare system. This might have additional positive effects on the society.

The most important limitation of our dataset was that it was a public dataset so we could not explore clinical variables besides imaging features. Another limitation was the small sample size. Finally, as most of the radiomics studies feature stability over external validation sets was an important issue that should be tested in large cohorts.

In conclusion, the IDH mutation phenotype of glial tumors can be predicted by a combination of human radiologist-imitated features and multiparametric multihabitat radiomics features.

Conflict-of-interest and financial disclosure

The authors declare that they have no conflict of interest to disclose. The authors also declare that they did not receive any financial support for the study.

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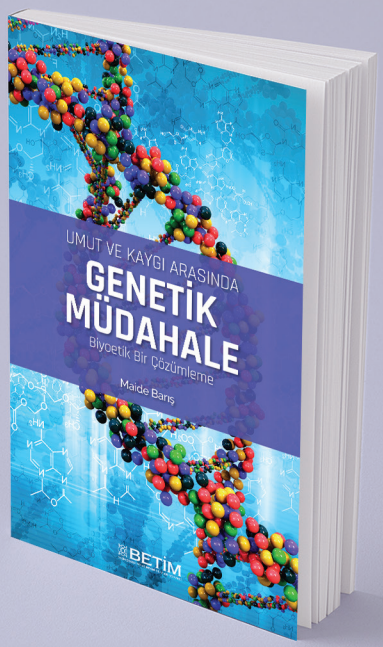

UMUT VE KAYGI ARASINDA

GENETİK MÜDAHALE

Biyoetik Bir Çözümleme

Maide Barış

Dünyadaki biyoetik literatürü genetik müdahale konusundaki tartışmalar bağlamında her geçen gün daha da zenginleşirken, Türkçe olarak yapılmış çalışmaların sayısı oldukça kısıtlıdır. Bu çalışma soy hattına yönelik genetik müdahalenin kategorik bir şekilde ahlaken yanlış olarak değerlendirilip değerlendirilemeyeceğine ilişkin kapsamlı bir tartışma yürütmektedir. CRISPR/Cas9 teknolojisinin geliştirilmesi ile birlikte pratik olarak mümkün hale gelen soy hattına yönelik genetik müdahaleler, laboratuvar dışına çıkmak (ve kliniğe doğru ilerlemek) için son hazırlıklarını tamamlamaktadır. Elinizdeki bu kitapta, tüm insanlığı ve gelecek nesilleri etkileme potansiyeli bulunan ve hem umut hem de kaygı kaynağı addedilen soy hattına yönelik genetik müdahale teknolojisi, dünya ile eş zamanlı olarak detaylı bir şekilde ele alınarak biyoetik bir analiz gerçekleştirilmiştir.

BETİM KİTAPLIĞI

Readability of online educational materials for brainstem implants: An assessment

Beyin sapı implantları için çevrimiçi eğitim materyallerinin okunabilirliği: Bir değerlendirme

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Abstract

Aim: This study aimed to assess the readability of online patient education materials related to brainstem implants and to determine how comprehensible these materials are for patients and their families.

Methods: Using Google Search with the term "auditory brainstem implant", the first 50 websites were identified and categorized into two: Hospital and General Information Websites. Non-educational texts were removed from each site, and readability was assessed using six established readability tests. The readability scores for the texts were automatically calculated using a dedicated online tool.

Results: Overall, all websites were found to have a high level of readability, surpassing the recommended 6th-grade reading level suggested by the American Medical Association. No significant difference was found between the readability scores of hospitals and general information websites.

Conclusions: The online patient education materials concerning brainstem implants typically exceed the recommended reading levels, which may hinder patients and their families from fully understanding these materials. There's a need for health professionals and institutions to strike a balance between scientific accuracy and readability to cater to a broader audience and make their materials more accessible.

Keywords: Auditory brain stem implants; patient education; readability; teaching materials

Öz

Amaç: Bu çalışma, beyin sapı implantlarıyla ilgili çevrimiçi hasta eğitim materyallerinin okunabilirliğini değerlendirmeyi ve bu materyallerin hastalar ve aileleri için ne kadar anlaşılabilir olduğunu belirlemeyi amaçlamaktadır.

Yöntemler: "Odyolojik beyin sapı implantı" terimi ile Google Arama kullanılarak ilk 50 web sitesi belirlendi ve iki kategoriye ayrıldı: Hastane ve Genel Bilgi Web Siteleri. Her siteden eğitimle ilgili olmayan metinler kaldırıldı ve okunabilirlik, altı kurulu okunabilirlik testi kullanılarak değerlendirildi. Metinlerin okunabilirlik puanları, özel bir çevrimiçi araç kullanılarak otomatik olarak hesaplandı.

Bulgular: Genel olarak, tüm web sitelerinin okunabilirlik seviyesi yüksek bulundu ve Amerikan Tıp Birliği'nin önerdiği 6. sınıf okuma seviyesini aştı. Hastane ve genel bilgi web sitelerinin okunabilirlik puanları arasında anlamlı bir fark bulunmadı.

Sonuçlar: Beyin sapı implantlarıyla ilgili çevrimiçi hasta eğitim materyalleri, genellikle önerilen okuma seviyelerini aşmaktadır, bu da hastaların ve ailelerinin bu materyalleri tam olarak anlamalarını engelleyebilir. Sağlık profesyonellerinin ve kurumların, daha geniş bir kitleye hitap etmek ve materyallerini daha erişilebilir kılmak için bilimsel doğruluk ve okunabilirlik arasında bir denge kurmaları gerekmektedir.

Anahtar Sözcükler: Hasta eğitimi; işitsel beyin sapı implantları; okunabilirlik; öğretim gereçleri

Geliş/*Received* : 01.11.2023
Kabul/*Accepted*: 28.03.2024

DOI: 10.21673/anadoluklin.1384818

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INTRODUCTION

Education and information play a critical role in the success of medical treatments and interventions (1). In this context, it is crucial for patients and their families to have a comprehensive understanding of medical processes. Particularly in recent years, with the increased accessibility of medical information via the Internet, the significance of online patient education materials has become even more pronounced (2).

In the field of Otorhinolaryngology (ENT), complex procedures such as brainstem implants not only represent a physiological intervention for patients but also carry an associated psychological burden. Therefore, it is crucial that patient education materials not only convey scientifically accurate information but are also presented at a level that patients can readily understand.

The brainstem implant is a procedure performed to restore hearing ability in patients with hearing loss (3). However, the intricacies of this procedure, accompanied by its inherent risks and benefits, necessitate that patients have access to accurate information. Especially for such complex interventions, patients need clear and comprehensible information to actively participate in the decision-making process and make informed choices regarding their treatment.

In this study, we aimed to evaluate the readability levels of online patient education materials related to brainstem implants, determining the extent to which these materials are comprehensible for patients and their families.

MATERIAL AND METHODS

Utilizing the most commonly used search engine, Google Search, patient education materials related to brainstem implants were identified on June 14, 2023. The search term "auditory brainstem implant" was employed. Advanced search filters were set to include only the exact phrases and the English language. The first 50 websites were evaluated. Duplicative websites, academic journals, videos, and websites containing only graphics or tables were excluded from the study. Since this study did not involve human or animal subjects, ethical committee approval was not required.

The articles were divided into two categories: Hospital and General Information Websites. The 'Hospital' category included hospitals that provide treatment or surgical interventions for brainstem implants. The 'General Information Websites' were from non-clinical entities offering general public health information.

Each text was saved into separate Microsoft Word (version 2010; Microsoft, Redmond, WA) documents. Webpage navigations, copyright notices, disclaimers, author details, feedback surveys, links, website URLs, references, figures, tables, captions, addresses, and phone numbers or any other non-educational related texts were removed to prevent influencing the readability scores.

For each article, readability scores were assessed using the following tests: Flesch reading ease (FRE), Flesch–Kincaid grade level (FKGL), Gunning–Fog index (GFI), Simple Measure of Gobbledygook (SMOG), Coleman–Liau index (CLI), and Automated Readability Index (ARI). The readability scores for the texts were automatically calculated by transferring them to https://www.webfx.com/tools/read-able/.

Statistical Analyses

Mean, standard deviation, median, minimum, maximum value frequency, and percentage were used for descriptive statistics. The distribution of variables was checked with Kolmogorov-Simirnov Test. Independent Samples T Test was used for the comparison of quantitative data. Statistical Package for the Social Sciences software for Windows, version 28.0 (SPSS Inc., Chicago, IL, USA) was used for the statistical analysis.

RESULTS

The readability levels of all the websites were as follows: The average score for FRE (Flesch Reading Ease) was 42.0 ± 8.0. For FKGL (Flesch–Kincaid Grade Level), the average score was determined to be 12.6 ± 2.0. The Gunning FOG had an average value of 14.9 ± 2.2, SMOG recorded an average of 11.0 ± 1.6, CLI (Coleman–Liau Index) reported an average of 14.0 ± 1.2, and the ARI (Automated Readability Index) was established at 12.8 ± 2.4 (Table 1).

For the FRE (Flesch Reading Ease), the Hospital Group exhibited an average of 43.9 ± 10.0, in comparison to the General Information Websites Group's aver-

Table 1. Descriptive analysis of readability metrics for the assessed websites

	Min-Max	Median	Mean±SD
FRE	33.8 - 57.9	40.4	42.0 ± 8.0
FKGL	9.4 - 15.3	13.0	12.6 ± 2.0
Gunning FOG	11.4 - 18.1	15.2	14.9 ± 2.2
SMOG	8.5 - 13.5	11.4	11.0 ± 1.6
CLI	11.1 - 16.0	14.0	14.0 ± 1.2
ARI	9.3 - 16.0	13.2	12.8 ± 2.4

FRE: Flesch Reading Ease, FKGL: Flesch-Kincaid Grade Level, Gunning FOG: Gunning–Fog index, SMOG: Simple Measure of Gobbledygook, LI: Coleman–Liau index, ARI: Automated Readability Index, SD: Standard deviation, Min: Minimum, Max: Maximum

Table 2. Comparative analysis of readability metrics between hospital and general information websites

	Hospitals group		General information websites group		p
	Mean±SD	Median	Mean±SD	Median	
FRE	43.9 ± 10.0	41.1	40.2 ± 5.6	39.9	0.418 [t]
FKGL	11.9 ± 2.2	12.7	13.2 ± 1.7	13.5	0.229 [t]
Gunning FOG	14.4 ± 2.5	14.6	15.4 ± 2.0	16.2	0.292 [t]
SMOG	10.7 ± 1.8	11.1	11.4 ± 1.3	11.8	0.275 [t]
CLI	13.8 ± 1.7	14.0	14.1 ± 0.6	14.0	0.753 [t]
ARI	11.9 ± 2.5	12.2	13.7 ± 2.1	14.6	0.174 [t]

[t]Independent Sample t test
FRE: Flesch Reading Ease, FKGL: Flesch-Kincaid Grade Level, Gunning FOG: Gunning–Fog index, SMOG: Simple Measure of Gobbledygook, LI: Coleman–Liau index, ARI: Automated Readability Index, SD: Standard deviation, Min: Minimum, Max: Maximum

age of 40.2 ± 5.6. The difference between the two groups was not statistically significant (p=0.418). Regarding the FKGL (Flesch–Kincaid Grade Level), the Hospital Group's average stood at 11.9 ± 2.2, while the General Information Websites Group demonstrated an average of 13.2 ± 1.7. The distinction between these groups was not found to be statistically significant (p=0.229). For the Gunning FOG, the Hospital Group's average was 14.4 ± 2.5, contrasting with the General Information Websites Group's average of 15.4 ± 2.0. This difference wasn't statistically significant (p=0.292). In the case of SMOG, the Hospital Group averaged 10.7 ± 1.8, whereas the General Information Websites Group averaged 11.4 ± 1.3, with no statistically significant difference (p=0.275). For the CLI (Coleman–Liau Index), the Hospital Group recorded an average of 13.8 ± 1.7, compared to the General Information Websites Group's average of 14.1 ± 0.6. The distinction was not statistically significant (p=0.753). Lastly, for the ARI (Automated Readability Index), while the Hospital Group presented an average of 11.9 ± 2.5, the General Information Websites Group's average was 13.7 ± 2.1. The variation between these entities was not deemed statistically significant (p=0.174) (Table 2).

DISCUSSION AND CONCLUSION

The readability of patient education materials related to brainstem implants is crucial for the efficacy of patient education and information. Our study evaluated the readability levels of patient education materials found in the top 14 websites accessed via Google Search. Our analysis determined that there was no significant difference in terms of FRE, FKGL, Gunning FOG, CLI, and ARI values between hospital and general information websites. However, all websites were observed to be of a high level in terms of readability.

The American Medical Association has suggested that the 6th-grade reading level is the ideal standard for patients and their families to access medical information (4,5). Nonetheless, our research indicated that the materials presented on brainstem implants do not

align with this recommended level. This is particularly concerning for hospital websites, which directly serve the purpose of treatment and surgical intervention and hence should be comprehensible for patients.

Previous literature reported that materials related to otolaryngology also exceeded the 6th-grade reading level. Sax et al. evaluated online patient education materials targeted at patients' parents left with hearing screening tests. They concluded that the readability of online materials was much more challenging than recommended levels. Provider-oriented websites were found to have more challenging readability than patient-oriented sites. They consequently suggested a revision of all online materials (6). Another study examining online information related to tinnitus reported that all 134 websites were far from the suggested readability level (7). Kong and colleagues focused on the readability of online tracheostomy care patient education materials. They discerned that the online materials substantially exceeded the recommended reading level, with professional websites being less readable than patient-oriented ones (8). A study examining online patient education materials related to idiopathic subglottic stenosis categorized websites into Professional-targeted and Patient-targeted. Overall, the websites' readability levels were found to be above the recommended levels, with patient-targeted websites being more readable (9). Research into online materials related to parathyroidectomy concluded that none of the materials met the recommended reading level (10). This study similarly reveals a consistent trend in the domain of brainstem implants. This might indicate that medical informational materials are generally written at higher reading levels.

Many websites utilize intricate terminology and expressions requiring specialization, aiming to provide scientific accuracy and detailed information. This underscores the necessity to strike a balance between readability and scientific precision. Providing information that parents and patients find challenging to comprehend does not yield effective patient education and information.

Readability scores do not evaluate a website's scientific accuracy. Future studies should incorporate criteria that assess the scientific accuracy and the currency of such materials. Nevertheless, this study distinctly illustrates that educational materials concerning brainstem implants typically do not meet recommended readability levels. This implies that patients and their families might struggle to understand these materials. Thus, there is an imperative need for health professionals to advocate for these materials to be written in more comprehensible language.

This study has several limitations. Firstly, it is based solely on searches via the Google Search engine. Therefore, the findings cannot be generalized for the entire internet as results from other popular search engines weren't considered. Secondly, the search was limited to the English language, implying that educational materials in other languages weren't evaluated in this study. Thirdly, only the first 50 websites were taken into account, which means other potentially valuable and relevant sites might have been overlooked. Fourthly, readability scores do not evaluate a website's scientific precision. Lastly, websites are dynamic entities, continuously updated. Thus, the outcomes of this study represent the information as of its date, and websites might have been updated or changed subsequently.

The readability of patient education materials concerning brainstem implants is crucial for patients to better comprehend their treatment processes and make informed decisions. This study demonstrates that the majority of popular online materials exceed the recommended reading levels, suggesting a prevalent trend across general medical informational materials. The complexity of these medical informational materials might stem from efforts to maintain scientific accuracy and provide detailed information. However, the necessity for these materials to be comprehensible to patients and their families underscores the imperative to strike a balance between scientific precision and readability. The primary goal of patient education and information is not merely to provide knowledge but to effectively convey it. Therefore, health professionals and institutions should curate their materials to cater to a broad audience and revise them as needed.

Conflict-of-interest and financial disclosure

The authors declare that they have no conflict of interest to disclose. The authors also declare that they did not receive any financial support for the study.

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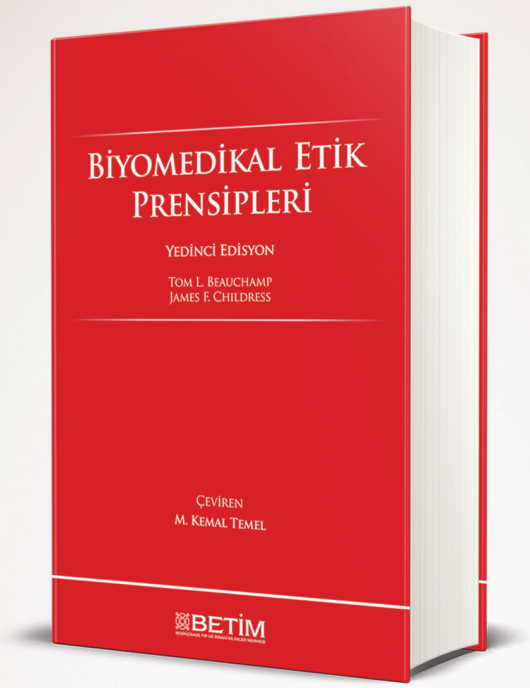

BİYOMEDİKAL ETİK PRENSİPLERİ

YEDİNCİ EDİSYON

TOM L. BEAUCHAMP - JAMES F. CHILDRESS

ÇEVİREN
M. KEMAL TEMEL

Amerikan filozoflar Tom L. Beauchamp ve James F. Childress tarafından yazılmış olan ve birçok ülkede benimsenen ana akım tıp etiği paradigmasının temelini oluşturan Biyomedikal Etik Prensipleri, Türkiye'de de klinik uygulama ve araştırmalarda, tıp eğitimi, etiği ve hukukunda esas alınan başlıca ilkelerin kaynağıdır. Bu kitap, İngilizce temel eserin yedinci edisyonu ve ilk Türkçe baskısıdır. İstanbul Tıp Fakültesi Tıp Tarihi ve Etik Anabilim Dalı mensubu Uzm. M. Kemal Temel tarafından tercüme edilmiş ve üç yıllık kusursuz bir çalışma sonucunda basılmıştır. Başta tıp ve insani bilimler olmak üzere, Türkiye'de bilimsel gelişim ve üretime adanmış bir kurum olan, Hayat Sağlık ve Sosyal Hizmetler Vakfı bünyesindeki Beşikçizade Tıp ve İnsani Bilimler Merkezi—BETİM, bu tercümeyi Türk akademisyen ve okurların istifadelerine iftiharla sunar.

BETİM KİTAPLIĞI

Sağlık profesyonellerinin fiziksel aktivite seviyesi, depresyon durumu ve yaşam kalitesinin araştırılması

Investigation of physical activity level, depression status, and quality of life of healthcare professionals

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Öz

Amaç: Sağlık profesyonellerinin fiziksel aktivite seviyesi, depresyon düzeyi ve yaşam kalitesini incelemektir.

Yöntemler: Kesitsel olarak planlanan bu çalışmaya Çankırı Devlet Hastanesi'nde çalışan 128 (78 Kadın/50 Erkek, 34,35±8,37 yıl) sağlık profesyoneli dahil edildi. Fiziksel aktivite seviyesi Uluslararası Fiziksel Aktivite Anketi Kısa Form, depresyon düzeyi Beck Depresyon Envanteri ve yaşam kalitesi Dünya Sağlık Örgütü Yaşam Kalitesi Ölçeği kullanılarak değerlendirildi.

Bulgular: Çalışmaya katılan sağlık profesyonellerinin %36,7'si inaktif, %43'ü minimal aktif ve %20,3'ü çok aktifti ve %55,5'i hafif düzeyde depresyona sahipti. Katılımcıların fiziksel aktivite seviyesi ile depresyon düzeyi ve yaşam kalitesi arasında anlamlı bir ilişki yoktu. Depresyon düzeyi ile yaşam kalitesinin bedensel alanı (r= -0,335), ruhsal alanı (r=-0,578), sosyal alanı (r=-0,436) ve çevresel alanı (r=-0,418) arasında negatif orta düzeyde bir ilişki vardı (p<0,05). Normalin üstünde kiloya sahip katılımcıların depresyon düzeyleri normal kilolu olanlara göre daha yüksekti (p<0,05). Lisansüstü eğitimi olanların yaşam kalitesinin çevresel alan puanı lise mezunu (ortalama farkı=1,54) ve üniversite mezunu olanlara (ortalama farkı=1,32,) göre anlamlı olarak daha yüksekti (p<0,05). Mesaiye gelirken yürümeyi tercih edenlerin fiziksel aktivite düzeyi araçla gelenlere göre daha yüksekti (p<0,05). Mesaisini sadece nöbet tutarak tamamlayanların yaşam kalitesinin bedensel alan puanı diğerlerine göre daha iyiydi (p<0,05).

Sonuç: Çalışmamıza katılan sağlık profesyonellerinin sadece %20,3'ü yeterli düzeyde fiziksel aktivite yapmaktadır ve yaşam kaliteleri ile depresyon düzeyleri negatif ilişkilidir. Sağlık profesyonellerinin vücut kitle indeksi, depresyon düzeyini, ulaşım tercihi fiziksel aktivite seviyesini ve eğitim düzeyi ve mesai türü yaşam kalitesini etkilemektedir. Çalışmamız Koronavirüs Hastalığı 2019 pandemisi sırasında gerçekleştirildiğinden sağlık profesyonellerinin fiziksel aktivite seviyesinin ve depresyon durumlarının olumsuz etkilenmiş olabileceği de düşünülmektedir.

Anahtar Sözcükler: Depresyon; hastaneler; sağlık personeli; sedanter yaşam; yaşam kalitesi

Abstract

Aim: To examine the physical activity and depression level, and quality of life (QoL) of healthcare professionals.

Methods: In this cross-sectional study, 128 healthcare professionals (78F/50M, 34.35±8.37 years) working at Çankırı State Hospital were included. Physical activity level was assessed using the International Physical Activity Questionnaire Short Form, depression level using the Beck Depression Inventory, and QoL using the World Health Organisation Quality of Life Scale.

Results: Among the healthcare professionals who participated in the study, 36.7% were inactive, 43% were minimally active, 20.3% were very active, and 55.5% had mild depression. There was no significant relationship between the participant's physical activity level, depression level, and QoL. There was a moderate negative correlation between depression level and physical domain (r=-0.335), mental domain (r=-0.578), social domain (r=-0.436), and environmental domain (r=-0.418) of QoL (p<0.05). Depression levels of participants above normal weight were higher than those with normal weight (p<0.05). The environmental domain score of QoL of those with postgraduate education was significantly higher than those with high school graduates (mean difference=1.54) and university graduates (mean difference=1.32, p<0.05). The physical activity level of those who preferred to walk to work was higher than those who travelled by car (p<0.05). The physical domain score of the QoL of those who completed their shift only by keeping watch was better than the others (p<0.05).

Conclusion: Only 20.3% of healthcare professionals in our study perform adequate physical activity, and their QoL and depression levels are negatively related. The BMI of healthcare professionals affects the level of depression, transport preference affects the level of physical activity, and the level of education and type of working hours affect the QoL. Since our study was conducted during the COVID-19 pandemic, it is thought that physical activity level and depression status of healthcare professionals may have been negatively affected.

Keywords: Depression; health personnel; hospitals; quality of life; sedentary behavior

Geliş/*Received* : 10.05.2023
Kabul/*Accepted*: 30.10.2023

DOI: 10.21673/anadoluklin.1295068

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GİRİŞ

Fiziksel aktivite, enerji harcanmasıyla sonuçlanan, iskelet kasları tarafından üretilen bedensel hareketler olarak tanımlanmaktadır ve mesleki, spor, ev içi veya diğer faaliyetler olarak kategorize edilmektedir. Fiziksel aktivitenin ruhsal, fiziksel ve zihinsel sağlık üzerine birçok olumlu etkisi olduğu bilinmektedir. Yetişkinler için fiziksel aktivite günlük yaşam aktiviteleri ve rekreasyonel aktivitelerden oluşmaktadır. Önemli sağlık yararlarının elde edilebilmesi için hafta boyunca en az 150–300 dakika orta yoğunluklu veya en az 75-150 dakika yüksek yoğunluklu veya orta ve yüksek yoğunluklu aktivitenin eşdeğer bir kombinasyonu olan aerobik fiziksel aktivite yapılması gerekmektedir (1).

Düzenli fiziksel aktivite, kronik hastalıklardan korunmada en kolay ve ucuz yöntemdir (2) ve kardiyovasküler ve metabolik yararlarının yanında, depresyonu azaltmakta ve yaşam kalitesini de iyileştirmektedir (3). Fiziksel aktiviteye katılımın, yaşam kalitesinin ruhsal ve fiziksel alanlarındaki iyileşmeyi artırdığı ve kişilerin yaşam sürelerinin artışında etkili olduğu görülmektedir. Fiziksel aktivitenin çok boyutlu yararları düşünüldüğünde fiziksel ve ruhsal olarak sağlıklı toplumlar için bireylerin kendilerine en uygun olan fiziksel aktiviteye yönlendirilmeleri gerekmektedir (4).

Yoğun ve stresli çalışma koşulları bireylerin hem fiziksel hem de ruhsal sağlıklarını etkileyerek yaşam kalitelerini bozmaktadır. Sağlık profesyonelleri uzun mesailer, zorlu nöbetler, stresli mesai saatleri, düzensiz ve yetersiz beslenme, uyku-uyanıklık düzeninin bozulması gibi olumsuz faktörlere sürekli maruz kalan meslek gruplarından biridir (5). Bu faktörler, özellikle topluma hizmet ederek toplumsal ve bireysel sağlığın korunmasında görevli olan ve aynı zamanda toplumda rol model olarak farkındalık sağlayan sağlık profesyonellerinin ruhsal ve fiziksel sağlıkları ve yaşam kalitelerini olumsuz etkilemektedir (6). Sağlık profesyonellerinin fiziksel aktiviteleri, gerek Koronavirüs Hastalığı 2019 (COVİD-19) pandemisinin getirdiği gerek kamusal kısıtlamalar gerekse bu süreçteki iş yükünün artması sonucu daha fazla kısıtlanmıştır. Sağlık profesyonellerinin inaktif oldukları literatürde önceki çalışmalarda gösterilmiş, pandemiye bağlı kısıtlamaların getirdiği inaktiviteye bağlı olarak kişilerde orta, şiddetli depresyon bulguları ortaya çıktığı bildirilmiştir (7). Sağlık profesyonellerinin fiziksel aktivite seviyesi, depresyon düzeyi ve yaşam kalitesini araştıran çalışmalar kısıtlıdır, *COVID-19* pandemisinde de bu çalışmalar kısıtlı kalmaya devam etmiştir. Literatüre katkı sağlayacağını düşündüğümüz bu çalışmanın amacı sağlık profesyonellerinin fiziksel aktivite seviyesi, depresyon düzeyi ve yaşam kalitesinin incelenmesidir.

GEREÇ VE YÖNTEMLER

Kesitsel olarak planlanan bu çalışma Ağustos-Ekim 2020 tarihleri arasında Çankırı Devlet Hastanesi'nde Helsinki Bildirgesi'nde tanımlanan ilkelere uygun şekilde yürütüldü. Çalışmaya katılan sağlık profesyonellerinden aydınlatılmış onam formu alındı. Çalışma Muğla Sıtkı Koçman Üniversitesi Bilimsel Araştırmalar Etik Kurulu tarafından (tarih: 02.06.2020, karar no: 93) onaylanmıştır. Çalışmaya 18-65 yaşlarında, herhangi bir iletişim problemi olmayan ve çalışmaya katılmaya gönüllü olan sağlık profesyonelleri dahil edildi. Kısmi zamanlı veya hastanede stajyer olarak çalışan, çalışmanın yapıldığı sürelerde izinli olan, hastanede idare ve büro personeli olarak çalışan, tanısı konulmuş veya ilaç kullanımı gerektiren hastalığı olan, vücut kitle indeksi (VKİ) 40 kg/m^2 ve üzeri olan, fiziksel aktivite yapmaya engel olacak torakal, abdominal ya da kardiyak cerrahi geçirmiş ve sosyal sebeplerden fiziksel aktivitesi kısıtlanmış olan kişiler çalışmadan dışlandı.

Çalışmaya katılan kişilere her birine olgu numarası verildi ve demografik bilgi formu ile anket formları üzerine bu numara kodlandı. Kişilerin yaş, cinsiyet, boy, vücut ağırlığı gibi demografik özellikleri; ek olarak öğrenim durumu, medeni hali, mesleki bilgileri, çalışma birimi, mesai türü, öğle tatili yapma/yapmama, işe ulaşım yöntemi ve sigara kullanım durumları değerlendirme formuna kaydedildi. Katılımcıların fiziksel aktivite düzeylerini değerlendirmek için Uluslararası Fiziksel Aktivite Anketi Kısa Formu "International Physical Activity Questionnaire-IPAQ-SF" (8, 9), depresyon durumunu belirlemek için Beck Depresyon Envanteri "Beck Depression Inventory-BDI" (10, 11) ve yaşam kalitesini değerlendirmek için Dünya Sağlık Örgütü Yaşam Kalitesi Ölçeği Türkçe Ulusal Kısa

Sürümü "World Health Organization Quality of Life Questionnaire- WHOQOL-BREF" (12, 13) kullanıldı.

Fiziksel Aktivite Seviyesinin Değerlendirilmesi

Yedi sorudan oluşan Uluslararası Fiziksel Aktivite Anketi (UFAA-KF) kısa formu katılımcıların son bir hafta içindeki fiziksel aktivite seviyesini değerlendirmektedir ve oturma, yürüme, orta şiddetli aktiviteler ve şiddetli aktivitelerde harcanan zaman hakkında bilgi vermektedir. Anketten alınan toplam puan yürüme, orta şiddetli aktivite ve şiddetli aktivitenin yapıldığı dakika ve yapıldığı gün sayısıyla çarpılıp çıkan sonuçların hepsinin toplanmasıyla hesaplanmaktadır. Dakika, gün ve metabolik eşdeğeri (MET: Metabolic Equivalent of Task, istirahat oksijen tüketiminin katları) çarpılarak "MET-dakika/hafta" olarak bir skor elde edilmektedir. Oturma puanı 1,5 MET ile oturma süresi çarpılarak değerlendirilmektedir. Fiziksel aktiviteleri değerlendirmeye almak için herhangi bir aktivitenin tek seferde en az 10 dakika yapılmış olması gerekmektedir. Yürüme aktivitesinin puanı yürüme süresi (dakika) 3,3 MET ile çarpılarak hesaplanmaktadır. Orta şiddetli fiziksel aktivite için 4 MET, şiddetli fiziksel aktivite için 8 MET alınarak hesaplanmaktadır. Fiziksel aktivite düzeyleri, fiziksel olarak aktif olmayan/inaktif (<600 MET-dk/hafta), fiziksel aktivite düzeyi yetersiz olan/minimal aktif (600-3000 MET-dk/hafta) ve fiziksel aktivite düzeyi yeterli olan/çok aktif (sağlık açısından faydalı olan) (>3000 MET dk/hafta) şeklinde kategorize edilmektedir (9).

Depresyon Durumunun Değerlendirilmesi

Beck Depresyon Envanteri'nde (BDE) bulunan 21 soru çeşitli ruhsal durumları ifade etmektedir. Her soruda o ruhsal durumunun derecesini belirleyen 4 ifade vardır. Anketi yanıtlayan kişilerden son 1 hafta içindeki ruhsal hallerine en uygun olan ifadeyi işaretlemeleri istenmektedir. Her sorunun puanı 0-3 puan arasındadır. Anketten alınabilecek puan 0-63 puan aralığındadır. Puan aralıklarına göre depresyon düzeyi değerlendirmesi yapılabilmektedir. 0-9 puan depresyonsuz, 10-15 puan hafif depresyon, 16-23 puan orta derece depresyon ve 24-63 puan ciddi derece depresyon düzeyini ifade etmektedir (11).

Yaşam Kalitesinin Değerlendirilmesi

Yirmi yedi soruluk Dünya Sağlık Örgütü Yaşam Kalitesi Ölçeği'nin (DSÖYKÖ- Türkçe Ulusal Kısa Sürümü) giriş kısmında bireylerin cinsiyeti, doğum tarihi, eğitim düzeyi, medeni hali ve hastalık durumu sorgulanmaktadır. Bireylerin ankete verdikleri yanıtları son 2 haftalarını düşünerek işaretlemeleri istenmektedir. Ölçek bedensel alan, ruhsal alan, sosyal alan ve çevresel alan kategorilerini değerlendirmektedir. Ölçekte her alan birbirinden bağımsız olarak bir yaşam kalitesi kategorisini ifade etmektedir ve her kategoride alınabilecek puan 4-20 puan arasındadır. Alınan puan arttıkça yaşam kalitesi artmaktadır (13). Verilerin analizi WHOQOL-TR merkezi tarafından yapılmaktadır.

İstatistiksel Analiz

Çalışma için gerekli olan örneklem büyüklüğünün tahmininde G-Power İstatistiksel ve Niteliksel Veri Analizi Yazılımı 3.1 sürümü kullanıldı. Çalışmanın tek zaman noktasında anket değerlendirmesine tabii tutulacak bir gruptan oluştuğu düşünüldüğünde; etki büyüklüğü f=0,40, α yanılma düzeyi 0,05, gücü (1-β: yanılma düzeyi) 0,80 alındığında toplam örneklem düzeyi 84 olarak hesaplandı. Takip sırasındaki birey kayıp oranı %20 olarak alındığında çalışmaya en az 105 sağlık personeli alınması planlandı. Verilerin istatistiksel analizinde IBM SPSS Statistics (Statistical Package for The Social Sciences Versiyon 22.0. Armonk, NY: IBM Corp.) paket programı kullanıldı. Nitel veriler sayı (n) ve yüzde (%), nicel veriler ortalama (Ort) ve standart sapma (SS) olarak gösterildi. Değişkenlerin normal dağılıma uygunluğu görsel (histogram ve olasılık grafikleri) ve analitik yöntemlerle (Kolmogorov-Smirnov testi) ile incelendi. Parametrik varsayımlar sağlanamadığı için parametreler arasındaki ilişki Spearman Korelasyon Testi ile analiz edildi. Korelasyon katsayısı (r) 0,80'den büyük ise parametreler arası ilişki "mükemmel", 0,70-0,79 ise "yüksek", 0,59-0,69 ise "orta" ve 0,49'dan küçük ise "kabul edilemez" olarak değerlendirildi (14). Verilerin karşılaştırılmasında 3 ve daha fazla grup için Kruskall Wallis testi kullanıldı ve ikili karşılaştırmalar için Bonferonni düzeltmesi yapıldı. 2 grup karşılaştırması için ise Mann Whitney U testi kullanıldı. İstatistiksel analizde yanılma olasılığı p<0,05 olarak belirlendi.

Tablo 1. Sağlık profesyonellerinin demografik özellikleri ve fiziksel aktivite, depresyon ve yaşam kalitesi anket puanları (n=128)

Değişken	Min-Max	Ort ±Ss
Yaş (yıl)	20-55	34,35 (8,37)
Kilo (kg)	45-103	70,28 (14,08)
Boy (cm)	150-193	168,53 (9,31)
VKİ (kg/m²)	15,94-38,87	24,62 (3,85)
UFAA-KF puanı (MET-dk/hafta)	0-8361	1657,67 (1840,46)
UFAA- Oturma süresi (dk/gün)	30-900	323,01 (185,66)
BDE puanı (0-63)	0-34	9,98 (7,55)
DSÖYKÖ-BA (4-20)	9,71-20	15,09 (2,39)
DSÖYKÖ RA (4-20)	6,67-20	14,63 (2,74)
DSÖYKÖ SA (4-20)	4-20	14,18 (3,16)
DSÖYKÖ ÇA (4-20)	6,67-19,11	14,29 (2,53)

Max: Maximum, Min: Minimum, n: birey sayısı, Ort: Ortalama, Ss:Standart sapma, VKİ: Vücut Kitle İndeksi. UFAA-KF: Uluslararası Fiziksel Aktivite Formu Kısa Formu, BDE: Beck Depresyon Envanteri, DSÖYKÖ-Kısa form: Dünya Sağlık Örgütü Yaşam Kalitesi Ölçeği Türkçe Ulusal Kısa Sürümü, BA: Bedensel Alan, RA: Ruhsal Alan, SA: Sosyal Alan, ÇA: Çevresel Alan.

Tablo 2. Sağlık profesyonellerinin fiziksel aktivite seviyesi, depresyon düzeyi ve yaşam kalitesi arasındaki ilişki (n=128)

		UFAA-KF	BDE	DSÖYKÖ-BA	DSÖYKÖ-RA	DSÖYKÖ-SA	DSÖYKÖ-ÇA
UFAA-KF	**r**	1	0,157	-0,062	0,018	-0,125	0,009
	p		0,077	0,485	0,843	0,158	0,924
BDE	**r**	0,157	1	-0,335	-0,578	-0,436	-0,418
	p	0,077		p<0,001	p<0,001	p<0,001	p<0,001
DSÖYKÖ-BA	**r**	-0,062	-0.335	1	0,653	0,505	0,595
	p	0,485	p<0,001		p<0,001	p<0,001	p<0,001
DSÖYKÖ-RA	**r**	0,018	-0,578	0,653	1	0,635	0,680
	p	0,843	p<0,001	p<0,001		p<0,001	p<0,001
DSÖYKÖ-SA	**r**	-0,125	-0,436	0,505	0,635	1	0,606
	p	0,158	p<0,001	p<0,001	p<0,001		p<0,001
DSÖYKÖ-ÇA	**r**	0,009	-0,418	0,595	0,680	0,606	1
	p	0,924	p<0,001	p<0,001	p<0,001	p<0,001	

UFAA-KF: Uluslararası Fiziksel Aktivite Formu Kısa Formu, BDE: Beck Depresyon Envanteri, DSÖYKÖ-Kısa form: Dünya Sağlık Örgütü Yaşam Kalitesi Ölçeği Türkçe Ulusal Kısa Sürümü, BA: Bedensel Alan, RA: Ruhsal Alan, SA: Sosyal Alan, ÇA: Çevresel Alan. n: birey sayısı, p: anlamlılık düzeyi, r: korelasyon katsayısı, p<0,05.

Tablo 3. Kadın ve erkek sağlık profesyonellerinin fiziksel aktivite seviyesi, depresyon düzeyi ve yaşam kalitelerinin karşılaştırılması (n=128)

Değişkenler	Kadın (n=78) (Ort±Ss)	Erkek (n=50) (Ort±Ss)	*p*
UFAA-KF puanı (MET-dk/hafta)	1504,32 (1859,99)	1896,91 (1801,94)	0,205
BDE puanı (0-63)	10,2 (7,76)	9,64 (7,26)	0,52
DSÖYKÖ-BA (4-20)	15,09 (2,32)	15,09 (2,5)	0,955
DSÖYKÖ-RA (4-20)	14,76 (2,59)	14,42 (2,98)	0,794
DSÖYKÖ-SA (4-20)	14,27 (3,08)	14,05 (3,31)	0,4
DSÖYKÖ-ÇA (4-20)	14,27 (2,48)	14,32 (2,64)	0,882

UFAA-KF: Uluslararası Fiziksel Aktivite Formu Kısa Formu, BDE: Beck Depresyon Envanteri. DSÖYKÖ-Kısa form: Dünya Sağlık Örgütü Yaşam Kalitesi Ölçeği Türkçe Ulusal Kısa Sürümü, BA: Bedensel Alan, RA: Ruhsal Alan, SA: Sosyal Alan, ÇA: Çevresel Alan, MET: Metabolik eşdeğer, n: birey sayısı, Ort: Ortalama, p: anlamlılık duzeyi, Ss: Standart sapma, p<0,05.

Tablo 4. Sağlık profesyonellerinin vücut kompozisyonlarına göre fiziksel aktivite seviyesi, depresyon düzeyi ve yaşam kalitelerinin karşılaştırılması (n=128)

Değişkenler	Normal (18.5-24.99 kg/m²) (n=69) (Ort±Ss)	Normal üstü (>25.00 kg/m²) (n=54) (Ort±Ss)	p
UFAA-KF puanı (MET-dk/hafta)	1818,36 (2033,25)	1445 (1581,2)	0,758
BDE puanı (0-63)	8,52 (7,16)	11,29 (7,28)	0,031
DSÖYKÖ-BA (4-20)	15,28 (2,42)	14,93 (2,38)	0,379
DSÖYKÖ-RA (4-20)	15,07 (2,63)	14,17 (2,65)	0,072
DSÖYKÖ-SA (4-20)	14,39 (2,79)	13,95 (3,6)	0,644
DSÖYKÖ-ÇA (4-20)	14,51 (2,48)	14,09 (2,51)	0,546

UFAA-KF: Uluslararası Fiziksel Aktivite Formu Kısa Formu, BDE: Beck Depresyon Envanteri. DSÖYKÖ-Kısa form: Dünya Sağlık Örgütü Yaşam Kalitesi Ölçeği Türkçe Ulusal Kısa Sürümü, BA: Bedensel Alan, RA: Ruhsal Alan, SA: Sosyal Alan, ÇA: Çevresel Alan, MET: Metabolik eşdeğer, n: birey sayısı, Ort: Ortalama, p: anlamlılık duzeyi, Ss: Standart sapma, p<0,05.

Tablo 5. Sağlık profesyonellerinin fiziksel aktivite seviyesine göre depresyon düzeyleri ve yaşam kalitesinin karşılaştırılması (n=128)

Değişkenler	İnaktif bireyler (n=47) (Ort±Ss)	Minimal aktif bireyler (n=55) (Ort±Ss)	Çok aktif bireyler (n=26) (Ort±Ss)	p
BDE puanı (0-63)	9,26 (6,51)	9 (6,38)	13,38 (10,41)	0,188
DSÖYKÖ-BA (4-20)	15,27 (2,38)	14,9 (2,2)	15,21 (2,83)	0,803
DSÖYKÖ-RA (4-20)	14,65 (2,49)	14,53 (2,6)	14,79 (3,5)	0,772
DSÖYKÖ-SA (4-20)	14,5 (2,83)	14,23 (2,76)	13,54 (4,36)	0,584
DSÖYKÖ-ÇA (4-20)	14,27 (2,27)	14,3 (2,57)	14,32 (2,97)	0,77

UFAA-KF: Uluslararası Fiziksel Aktivite Formu Kısa Formu, BDE: Beck Depresyon Envanteri. DSÖYKÖ-Kısa form: Dünya Sağlık Örgütü Yaşam Kalitesi Ölçeği Türkçe Ulusal Kısa Sürümü, BA: Bedensel Alan, RA: Ruhsal Alan, SA: Sosyal Alan, ÇA: Çevresel Alan, n: birey sayısı, Ort: Ortalama, p: anlamlılık düzeyi, Ss: Standart sapma, p<0,05.

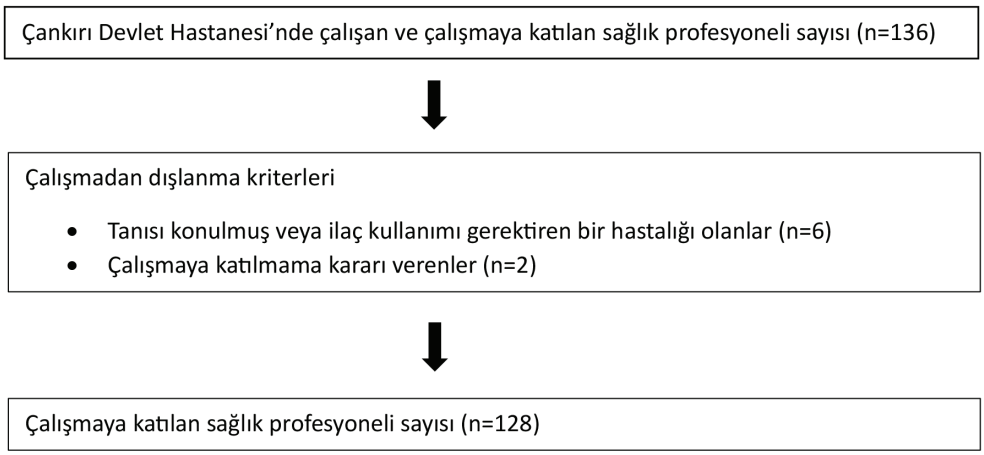
Tablo 6. Depresyon düzeylerine göre sağlık profesyonellerinin fiziksel aktivite seviyesi ve yaşam kalitelerinin karşılaştırılması (n=128)

Değişkenler	Depresyon yok (n=57) (Ort±Ss)	Depresyon var (n=71) (Ort±Ss)	p
UFAA-KF puanı (MET-dk/hafta)	1400 (1609,99)	1978,06 (2062,39)	0,179
DSÖYKÖ-BA (4-20)	15,65 (2,11)	14,4 (2,54)	0,002
DSÖYKÖ-RA (4-20)	15,76 (2,13)	13,21 (2,78)	p<0,001
DSÖYKÖ-SA (4-20)	15,19 (2,81)	12,9 (3,14)	p<0,001
DSÖYKÖ-ÇA (4-20)	14,91 (2,51)	13,52 (2,36)	p<0,001

UFAA-KF: Uluslararası Fiziksel Aktivite Formu Kısa Formu, BDE: Beck Depresyon Envanteri. DSÖYKÖ-Kısa form: Dünya Sağlık Örgütü Yaşam Kalitesi Ölçeği Türkçe Ulusal Kısa Sürümü, BA: Bedensel Alan, RA: Ruhsal Alan, SA: Sosyal Alan, ÇA: Çevresel Alan, MET: Metabolik eşdeğer, n: birey sayısı, Ort: Ortalama, p: anlamlılık duzeyi, Ss: Standart sapma, p<0,05.

BULGULAR

Sağlık profesyonellerinin demografik özellikleri, UFAA-KF, BDE ve DSÖYKÖ puanları Tablo 1'de gösterilmiştir. Sağlık profesyonellerinin %60,9'u kadın ve %30,1'i erkek; %66,4'ü evli ve %33,6'sı bekârdı. Sağlık profesyonellerinin %76,6'sı öğle tatili yapıyor; %67,2'si araba, %18,8'i toplu taşıma kullanarak ve %14,1'i yürüyerek işe geliyordu. Sigara kullananlar %28,1 ve kullanmayanlar (sigarayı bırakmış olanlar ve hiç kullanmamış olanlar) %71,9 oranındaydı. Çalışmaya en fazla sayıda katılım gösteren (%30,5) sağlık profesyonelleri hemşirelerdi ve en çok katılan 2. grubu diğer birimlerde çalışan sağlık profesyonelleri (fizyoterapist, diye-



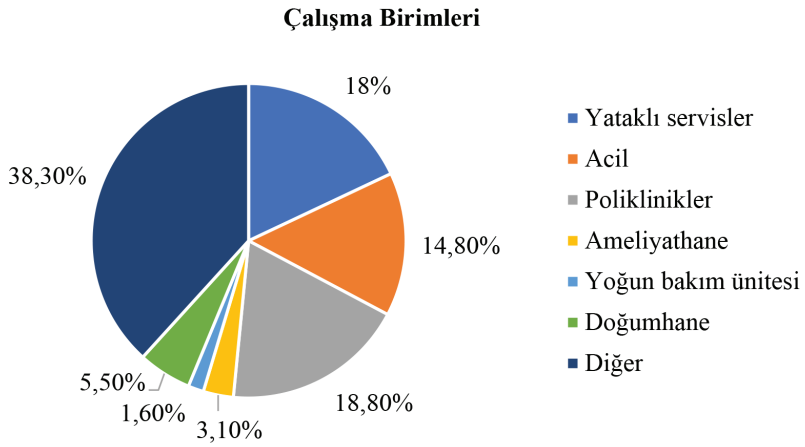
Şekil 1. Olgu akış şeması

tisyen, psikolog, sosyal hizmet uzmanı ve diğer meslekler) oluşturdu. Çalışmaya katılan sağlık profesyonellerinin %20,3'ü doktordu. Çalışmaya en az katılım (%1,6) yoğun bakım ünitesinden oldu. Katılımcıların çoğunluğu %47,7'si sadece gündüz mesaisinde çalışanlardan oluşmaktaydı. Lisansüstü mezunu olanların DSÖYKÖ-çevresel alan puanı (15,40±2,19) lise mezunu (13,85±3,0, p=0,009) ve üniversite mezunu olanlara (14,08±2,41, p=0.015) göre istatistiksel anlamlı olarak daha yüksekti. Karma mesaide çalışanların DSÖYKÖ-bedensel alan puanı (14,45±1,94) nöbetli çalışanlara (16,04±2,18, p=0,015) göre anlamlı olarak daha düşüktü. İşe ulaşımda yürümeyi tercih edenlerin UFAA puanı (2072,38±1526,77 MET-dk/hafta) toplu taşıma kullananlara göre (1334,33±1789,14 MET-dk/hafta, p=0,016) istatistiksel olarak daha yüksekti.

Sağlık profesyonellerinin fiziksel aktivite, depresyon ve yaşam kalitesi arasındaki ilişki Tablo 2'de gösterildi. Kadın ve erkek sağlık profesyonellerinin fiziksel aktivite seviyesi, depresyon düzeyi ve yaşam kalitesi puanları benzerdi (Tablo 3, p>0,05). Normalin üstü kiloda olan sağlık profesyonellerinin BDE puanları normal kilolulara göre daha yüksekti (Tablo 4, p=0,031). Farklı fiziksel aktivite seviyesi olan sağlık profesyonellerinin BDE puanları ve DSÖYKÖ puanları benzerdi (Tablo 5, p>0,05). Depresyonu olmayan sağlık profesyonellerinin DSÖYKÖ- bedensel alan (ortalama fark=1,24 puan), DSÖYKÖ-ruhsal alan (ortalama fark=2,54 puan), DSÖYKÖ-sosyal alan (ortalama fark=2,25 puan) ve DSÖYKÖ- çevresel alan puanı (ortalama fark=1,39 puan) depresyonu olanlara göre istatiksel anlamlı olarak daha yüksekti (Tablo 6, p<0,001).

TARTIŞMA VE SONUÇ

Sağlık profesyonellerinin fiziksel aktivite seviyesi, depresyon düzeyi ve yaşam kalitesinin araştırıldığı çalışmanın akışı "Olgu Akış Şeması" ile gösterilmiştir (Şekil 1). Çalışmaya 136 kişi davet edildi, 8 kişi dahil edilme kriterlerini karşılamadığı için çalışmadan çıkarıldı, çalışmaya 128 kişi katıldı. Çalışmaya katılan sağlık profesyonellerinin çalışma birimleri dağılımı grafiksel olarak gösterilmiştir (Şekil 2). Katılımcıların çoğunluğu diğer birimlerde çalışmaktadır, en az katılım ise yoğun bakım ünitesinden olmuştur. Katılımcıların fiziksel aktivite seviyesi ile yaşam kalitesi ve depresyon düzeyi arasında anlamlı bir ilişki bulunmazken; yaşam kalitesi ile depresyon durumu arasında orta düzeyde negatif ilişki olduğu gösterildi. Çalışmamıza katılan sağlık profesyonellerinin %36,7'si inaktif ve %43'ü minimal aktifti; %55,5'i hafif depresyon düzeyine sahipti. Normalin üstünde kiloya sahip katılımcıların depresyon düzeyleri normal kilolu olanlara göre daha yüksek; mesaiye yürüyerek gelen sağlık profesyonellerinin fiziksel aktivite düzeyi toplu taşıma kullananlara göre daha yüksekti. Lisansüstü mezunu olan sağlık profesyonellerinin çevre ile ilgili yaşam kalitesi lise ve üniversite mezunu olanlara göre ve mesaisini sadece nöbet tutarak tamamlayan sağlık profesyonellerinin bedensel alanla ilgili yaşam kalitesi karma ve gündüz mesaisinde çalışanlara göre daha iyiydi.



Şekil 2. Sağlık profesyonellerinin çalışma birimleri dağılım grafiği

Dünyada ve Türkiye'de yapılan çalışmalarda sağlık profesyonellerinin fiziksel aktivite seviyesinin düşük olduğu gösterilmiştir (15). Yıldırım ve ark. yaptığı çalışmada fiziksel aktivite seviyesi UFAA-KF ile değerlendirilmiş ve bireylerin sadece %25,4'ünün orta düzeyde fiziksel aktivite (2882,48±7589,19 MET-dk/hafta) yaptığı gösterilmiştir (16). Korkmaz ve ark. yaptığı çalışmada da 152 sağlık profesyoneli incelenmiş, katılımcıların fiziksel aktivite seviyesinin düşük olduğu bildirilmiştir (17). 278 hemşirenin katıldığı bir çalışmada birden çok alt boyutlu sağlıklı yaşam biçimi davranışları ölçeği uygulanmıştır ve fiziksel aktivite alt boyutu en düşük puana sahip alt boyut olarak bildirilmiş ve sağlık profesyonelleri fiziksel olarak inaktif bulunmuştur (18). Sağlık profesyonellerinin fiziksel aktivite motivasyonunun sadece boş zaman fiziksel aktivitesi ile ilişkili olduğu bildirilmektedir (19). Literatür kişilerin boş vakitleri olmadığı ya da çalışma saatlerinden dolayı fiziksel aktiviteye katılımlarının daha az olduğunu göstermektedir (20), boş vakitlerinin olmaması fiziksel aktivite için bir bariyer olabilir ve gelecekteki çalışmalarda sağlık profesyonellerinin fiziksel aktivite bariyerleri araştırılmalıdır.

Bu çalışmada fiziksel aktivite ile depresyon ve yaşam kalitesi arasında bir ilişki bulunmamıştır. Bu çalışmadan farklı olarak Lök ve ark. çalışmasında sağlık profesyoneli olmayan bireylerin ve Lindwall ve ark. çalışmasında ise sağlık profesyonellerin fiziksel aktivite seviyesi ile depresyon düzeyleri arasında negatif ilişki olduğu gösterilmiştir (21, 22). Tessier ve ark. çalışmasında da fiziksel aktivite ve yaşam kalitesi arasında pozitif ilişki gösterilmiştir (23). *COVID-19* pandemisi sırasında sağlık profesyonellerinin incelendiği bir çalışmada pandemi öncesine göre fiziksel aktivite düzeylerinde azalma ve buna bağlı olarak egzersiz süresindeki azalmanın hafif stres ve orta-şiddetli depresyon için önemli bir risk faktörü olduğu, egzersiz sıklığının artmasının ise depresif duygu durumuna karşı koruyucu bir faktör olduğu bulunmuştur (7). Bu çalışmada sağlık profesyonellerinin depresyon durumu ve yaşam kalitesi üzerine fiziksel aktivite etkisinin gösterilememesinin nedenlerinden biri *COVID*-19 pandemisinin hem fiziksel aktivite hem de zihinsel sağlık üzerine farklı etkilerinin olduğu bir dönemde çalışmanın yapılmış olması olabilir. Bir diğer neden de özellikle ülkemizdeki sağlık profesyonellerinin diğer ülkelere göre farklı sosyo-kültürel koşullarda çalışıyor olması olabilir.

Depresyon durumunu etkileyen bedensel, duygusal, bilişsel ve motivasyonel unsurlar aynı zamanda yaşam kalitesinin de belirleyici özellikleri arasında yer almaktadır (24). Bu durumu da doğrulayacak şekilde bu çalışmada depresyon düzeyi ile yaşam kalitesi arasında negatif orta düzeyde ilişki olduğu ve depresyon arttıkça kişilerin yaşam kalitesinin azaldığı gösterilmiştir. Depresyon düzeyi arttıkça bedensel, ruhsal, sosyal ve çevresel alanlarda yaşam kalitesinin düştüğü saptanmıştır. Bu çalışmadaki yaşam kalitesinin çeşitli alt boyutları ile depresyon arasındaki negatif ilişki, Kızılırmak ve ark. hemşireler üzerinde yaptığı çalışmada

(25) ve Rios ve ark. (26) tarafından yapılan çalışmada da görülmektedir.

Toplumsal rollerin, iş hayatının ve evdeki aile yaşantısının kadın cinsiyet üzerinde fiziksel aktiviteye katılım için zaman problemi yarattığı tahmin edilmektedir (27) , bu çalışmada fizik-sel aktiviteye katılım açısından cinsiyetin etkisi saptanmamıştır. Çalışmadaki kadın ve erkeklerin UFAA-KF puanları (1504,3 2±1859,99/1896,91±1801,94; sırasıyla), BDE puanı ve DSÖYKÖ puanları benzerdi. Başka bir çalışmada da erkeklerin fiziksel aktivite düzeyinin daha fazla olduğunu bildirmiştir (28). Literatürde yapılan çalışmalar kadınların iş yükü, kişisel ihtiyaçları ve toplumsal rolleri depresyonu etkileyen faktörler olarak bildirilmiştir ve yaşam kaliteleri ile depresyon arasında negatif ilişki olduğu bildirilmiştir (25). Kadın cinsiyette rekabetin daha fazla olması, bireysel olarak daha duygusal olmak, anne ve eş olmak, evde ve işte ayrı sorumlulukların olması kişilerin üzerindeki stres ve baskıyı arttırıyor olabilir bu da beraberinde kişilerin yaşam kalitesini olumsuz etkiliyor olabilir. Bir çalışmada kadın çalışanların BDE puanı= 10,04±7,26, erkek çalışanların BDE puanı=8,26±8,59 olarak bildirilmiş ve kadınların yaşam kalitesi erkeklerden düşük bulunmuştur (26). Kadın cinsiyette depresyon daha fazla bulunmuş olup bunda toplumsal cinsiyet rolleri, fazla sorumluluk, vardiyalı çalışma koşulları, erkek çalışanlara görece daha fazla mobbinge uğramak, iş ve aile yaşantısının stresi etkili olmuş olabilir.

Bir çalışmada VKİ'si yüksek olan kişilerin depresyon seviyelerinin yüksek olduğu ve obezitenin depresyon riskini arttırıcı etkisinin yanı sıra düşük beden saygısı ve olumsuz vücut algısı ile ilişkili olduğu bildirilmiştir (29). Benzer şekilde bu çalışmada da kilolu olan sağlık profesyonellerinin depresyon düzeyleri (BDE= 11,29±7,28 puan), normal kilolu sağlık profesyonellerine (BDE=8,52±7,16 puan) göre yüksekti. Kişilerin bedensel vücut imaj değişimleri ruh sağlıklarını etkilemektedir, bu iki parametre arasındaki ilişkinin daha kapsamlı çalışmalarla gösterilmesine ihtiyaç vardır.

Bu çalışmada eğitim düzeyi yüksek kişilerin çevresel alan puanlarının daha yüksek olduğu gösterildi. Saridi ve ark. yaptığı çalışmada eğitim düzeyi arttıkça yaşam kalitesinden beklentinin arttığı ve ekonomik seviye olarak daha iyi düzeye gelindiği bildirilmiştir (24). Eğitim düzeyinin artması kişilerin çevreden beklentisinin artmasını, beklentilere olan ulaşılabilirliği ve kişilerin ekonomik olarak bir şeylere ulaşmasını kolaylaştırdığı için dış dünya ile başa çıkmanın daha kolay olduğunu gösteriyor olabilir.

Bu çalışmadaki sağlık profesyonellerinden karma mesai şeklinde çalışanların DSÖYKÖ-bedensel alan puanlarının daha düşük olduğu gösterildi. Literatürde de kişilerin karma sistemde çalışmalarının bedensel sağlık alanını olumsuz etkilediği gösterilmiştir (30), diğer çalışma şekillerine göre karma mesainin bedensel toleransının daha zor olduğu düşünülmektedir. Nöbetli çalışan kişilerin UFAA-KF puanları (2032,35±1969,49 MET-dk/hafta) diğer mesai türlerinde çalışanlara göre daha yüksekti, literatürde ise farklı olarak gündüz çalışanların fiziksel aktivite-egzersiz düzeylerinin daha yüksek olduğu bildirildi (31), bu çalışmada farklı çıkması kişilerin nöbetten sonraki vakitlerini daha aktif geçirdiklerini düşündürmektedir, ancak daha ayrıntılı araştırılmaya ihtiyaç vardır. Bu çalışmada nöbetli çalışan kişilerin DSÖYKÖ-bedensel alan puanı diğer sistemlerde çalışan kişilerden daha yüksek bulunmuştur, bu durum hastanenin gece sirkülasyonunun daha az olmasından kaynaklanmış olabilir. Ancak nöbetli çalışan bu kişilerin BDE puanı diğerlerinden daha yüksekti. Bu da kişilerin düzensiz beslenme, sigara tüketimi, uyanık kalmak için fazla kafein alımı ile alakalı olabilir. Sağlığı olumsuz etkileyen sigara-alkol tüketimi, hazır yemek alışkanlığı ve kafein alımının sağlık profesyonellerinde diğer çalışanlara göre daha fazla olduğu gösterilmiştir (32). Vardiyalı çalışmak obeziteye yatkınlığı arttıran bir faktördür, vardiya düzenlenmesi veya egzersiz uyumunun geliştirilmesi sağlığı olumlu etkileme ve geliştirme için önerilmiştir (33). Kişilerin fiziksel aktivite düzeyleri istatiksel olarak benzer olsa da işe gelirken yürümeyi tercih eden kişilerin fiziksel aktivite puanları daha yüksek olma eğilimindeydi, işe gelirken yürümenin fiziksel aktiviteye olumlu yansıdığı görülmektedir. Kişiler evlerinden kendi araçlarını kullanarak geldiklerinde fiziksel olarak daha az aktif bulunmuştur. Bu durum da meslek dışı fiziksel aktivitenin sağlıkla ilgili yararları açısından daha önemli olduğunu ortaya koyabilir, ancak araştırılmaya ihtiyaç vardır.

Sağlık profesyonelliği stresli bir iştir ve birçok olumsuz duyguya maruziyete sebep olmaktadır. Yapılan bir çalışmada fiziksel olarak inaktif sağlık profesyonelleri-

nin olumsuz duyguları dışa vurumunun daha sert olduğu bildirilmiştir ve sağlık profesyonellerinin olumsuz duygularını dengelemek için fiziksel aktivite yapabilecekleri alanların oluşturulması önerilmiştir (34). Fiziksel inaktivite, vardiyalı çalışmak, uyku süresinin azlığı depresyona yol açabilir, depresyonu önlemek için vardiya sisteminde değişim ve kişilerin egzersiz uyumluluğunun iyileştirilmesi önerilmiştir (35). Uzun saatler çalışmak duygusal ve ruhsal bozukluklara karşı kişileri savunmasız hale getirmektedir, hastanede çalışmanın ruh sağlığını olumsuz etkilediği bildirilmiştir (36). Sağlık profesyonellerinin çalışma saatlerinin ve döngülerinin depresyon durumlarıyla birlikte yaşam kalitelerini de etkilediği bu çalışmada da gösterilmiştir. Literatür incelendiğinde sağlık profesyonelleri üzerine yapılan çalışmaların kısıtlı olduğu daha fazla araştırma yapılması gerektiği, fiziksel aktivite yapmadaki bariyerlerin belirlenmesine yönelik çalışmaların yapılması gerektiği, fiziksel aktiviteye katılımı destekleyici eğitimler verilmesi, alanlar oluşturulması dikkat çekmektedir. Sağlık profesyonellerinin koşullarının yarattığı olumsuz durumların azaltılması, ruhsal olarak çalışanların desteklenmesi, yaşam kalitelerinin iyileştirilmesi kişilerin toplumsal rol model olmalarını kolaylaştırabilir.

Çalışmanın Limitleri

Katılımcılar değerlendirilirken COVID-19 pandemisi dönemi bulaş tedbirleri nedeniyle fiziksel temasın minimumda tutulabilmesi adına sadece sübjektif yöntemler kullanılabildi. Bu durum çalışmamızın en önemli limitasyonudur. Gelecekte planlanacak çalışmalarda objektif ve sübjektif yöntemlerin bir arada kullanılması önerilmektedir.

Çalışmada örneklem sayısı güç analizi ile belirlenmiş ve çalışmaya belirlenen sayının üzerinde birey dahil edilmiştir, ancak literatürdeki benzer çalışmalara daha fazla katılımcı dahil edildiği görülmektedir. Bu durumun özellikle farklı meslek gruplarından, farklı servis ya da birimlerde çalışan katılımcıların karşılaştırılması ya da alt grupların incelenmesi açısından sınırlılık yarattığı düşünülmektedir.

Teşekkür

Çalışmaya katılmayı kabul eden Çankırı Devlet Hastanesi sağlık profesyonellerine ve çalışmaya izin veren hastane yönetimine teşekkür ederiz.

Çıkar çatışması ve finansman bildirimi

Yazarlar bildirecek bir çıkar çatışmaları olmadığını beyan eder. Yazarlar bu çalışma için hiçbir finansal destek almadıklarını da beyan eder.

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The impact of 0.24% hyaluronic acid gel on pain level and periodontal status following labial frenectomy

%0,24'lük hyalüronik asidin labial frenektomi sonrası ağrı düzeyi ve periodontal duruma etkisi

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Abstract

Aim: The labial frenum is a mucosal fold that connects the upper lip to the alveolar ridge. Frenectomy involves the surgical removal of a mucosal fold. The traditional surgical technique utilizing a scalpel remains popular for performing a frenectomy. The study aims to examine the effectiveness of applying Hyaluronic Acid (HA) Gel after conventional frenectomy.

Methods: This research comprised 48 young patients (25 girls and 23 boys) aged 8 to 14. Participants were randomly divided into two groups. Group 1: Conventional Scalpel Surgery and Sterile Saline (SS) (n=24) and Group 2: Conventional Scalpel Surgery+HA (Aftamed, Child Gel 24% HA) (n=24). After measuring the participants' periodontal parameters, the frenectomy was performed. Postoperative pain levels were evaluated daily for one week utilizing a 10-point Visual Analog Scale. Before frenectomy, Plaque Index (PI), Gingival Index (GI), Pocket Depth (PD), Bleeding On Probing (BOP), Keratinized Gingival Width (KGW), Attached Gingival Thickness (AGT) values were measured and recorded. The periodontal parameters were assessed and analyzed after a 3-month follow-up period.

Results: VAS (Visual Analogue Scale) was assessed. The application of Although 0.24% HA gel caused less pain from days 1-3.6, there was no significant difference in pain levels between the HA gel and control groups (p>0.05). Pain levels were equal between groups on day 7. No significant changes in PI, GI, PD, BOP, KGW, or AGT values after three months of follow-up (p>0.05).

Conclusions: During the first week after a frenectomy performed with classic scalpel surgery, the application of 0.24% HA gel did not significantly reduce pain levels. It did not result in significant changes in other measured periodontal parameters after three months of follow-up.

Keywords: Conventional therapy; diastema; hyaluronic acid; labial frenum.

Öz

Amaç: Labial frenulum üst dudağı alveoler krete bağlayan bir kas dokusudur. Frenektomi işlemi bu kas dokusunun kaldırılmasını içerir. Frenektomi işlemi sırasında bisturi kullanılarak gerçekleştirilen geleneksel cerrahi teknik halen en popüler yöntemdir.Çalışmanın hedefi Hyalüronik Asidin (HA) konvansiyonel frenektomi sonrası etkisini incelemektir.

Yöntemler: Çalışmada yaşları 8-14 arasında değişen 48 genç hasta yer aldı (25 kız-23 erkek). Katılımcılar rastgele olarak 2 gruba ayrıldı. Grup 1: Konvansiyonel Cerrahi ve Steril Salin (SS) (n=24) ve Grup 2: Konvansiyonel Cerrahi+HA (Aftamed, Child Gel 24% HA) (n=24). Katılımcılara ait periodontal parametreler ölçüldükten sonra frenektomi yapıldı. Operasyon sonrası ağrı değerleri bir hafta boyunca günlük olarak 10 puanlık Görsel Analog Skala (VAS) ile değerlendirildi. Frenektomi öncesi Plak İndeksi (Pİ), Gingival İndeks (Gİ), Cep Derinliği (CD), Sondalamada Kanama (SK), Keratinize Diş Eti Genişliği (KDG), Yapışık Diş Eti Kalınlığı (YDK) ölçülüp kaydedildi. Periodontal parametreler 3 ay sonra tekrar ölçülüp değerlendirildi.

Bulgular: GAS (Görsel Analog Skala) skorları değerlendirildi. 1 ve 3. gün arası ve 6. günde HA grubunda ağrı düzeyi daha az olsa da, %0,24 HA jel uygulaması ağrı düzeyinde önemli bir farka yol açmadı (p>0.05). 7. günde ağrı düzeyleri eşitti. Pİ, Gİ, CD, SK, KDG, YDK değerlerinde 3 ay sonunda önemli bir fark yoktu (p>0.05).

Sonuçlar: Bir hafta sonunda topikal HA uygulamasının ağrı düzeyinde önemli bir farka yol açmadığı görüldü. Diğer periodontal parametrelerde üç aylık takip süresince yine HA uygulamasının önemli bir değişime yol açmadığı saptandı.

Anahtar Sözcükler: Diyastem; hyalüronik asit; konvansiyonel tedavi; labial frenulum

Received/*Geliş* : 04.12.2023
Accepted/*Kabul*: 28.03.2024

DOI: 10.21673/anadoluklin.1399941

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INTRODUCTION

Labial frenum mucosal fold consists of muscle fibers and connective tissue (1). As children develop, their frenum becomes shorter, and their maxilla continues remodeling. Many children have midline diastema until their permanent canines erupt due to the thick frenum structure despite any changes (2). Diastemas have multiple causes, but a hypertrophic frenum usually compounds the problem (3). While diastemas up to 1.6-2 mm between the teeth are considered normal until the permanent canines erupt, it has been stated that diastemas greater than 1.6-2 mm do not close spontaneously (2–4). To reduce the relapse rate in orthodontic treatments, the thick frenum causing diastema must be surgically removed (5).

Labial frenectomy is a surgical technique that separates the frenum attachment from the bone underneath it (1). There are four types of frenum classified based on their structure: mucosal attachment (42%) (6), gingival attachment (34%) (6), papillary attachment (20%) (6), and papilla penetrating attachment (4%) (7). Frenum with papillary or papilla-penetrating attachments can lead to pull syndrome. The pull syndrome occurs when lip movements detach the gingival papilla between teeth and marginal gingiva (1).

Following the surgical frenectomy procedure, the wound area is closed by suturing (8). Numerous wound care products have been introduced to minimize inflammation, reduce pain intensity, and take advantage of their potent antibacterial properties upon sealing the primary wound area. Hyaluronic Acid (HA) is a natural polymer synthesized exclusively by living organisms. HA degradation products exhibit pro-angiogenic effects. HA is known for its ability to bind water and create a beneficial matrix for wound healing (9). In recent years, HA has become a popular product in dentistry for wound healing. However, there are limited studies on its application after frenectomy, despite positive results from topical use (10).

This study examines how applying 0.24% HA affects pain levels in children during a week after undergoing a classical scalpel frenectomy procedure. It also evaluates bleeding on probing, gingival thickness, and gingival width parameters in the 3rd month after the frenectomy procedure. The study hypothesizes that the frenectomy group with 0.24% HA will have lower pain levels and higher gingival parameter values.

MATERIALS AND METHODS

This study was performed after obtaining the approval of Afyonkarahisar University Clinical Research Ethics Committee (date: 14.06.2019, decision no: 2019-220). Children and adolescents between the ages of 8 and 14 were included in the study if they had parental written informed consent forms and were willing to participate. This research was conducted at the Department of Periodontology between August 2019 and May 2021. The number of study participants was determined using G-Power version 3.1. (Informer Tech Inc., Germany). The values for α and β were set at 0.05 and 0.2, respectively, and an effect size of 0.5 was considered (11). Based on the calculations, it was determined that each group should consist of 16 individuals for 95% power at a 5% significance level. Considering the exclusion criteria, it was decided to include additional patients in the study. The study included children who were systemically healthy and had not received medical treatment in the last three months.

48 patients were randomly divided into two groups. Group 1: Conventional Scalpel Surgery+Sterile Saline (SS) (n = 24), Group 2: Conventional Scalpel Surgery+HA (n = 24). The study included frenectomy treatments performed by researchers SSAD and CA. The researchers performed frenectomy treatments on the children without knowing which group they belonged to (control or HA). Each patient's controls and post-operative measurements were performed by a different physician, not the surgeon.

Before the frenectomy procedure, the patients' plaque index (PI), gingival index (GI), pocket depth (PD), bleeding on probing (BOP), keratinized gingival width (KGW), and attached gingival thickness (AGT) measurements were taken and recorded using a periodontal sond (HUF No:15, Hu-Friedy, Chicago, Illinois, USA). Measurements were taken independently for teeth number 11 and 21. PI, GI, and PD values were measured from 6 different points of each tooth: mesiobuccal, midbuccal, distobuccal, distopalatinal, midpalatal, and mesiopalatinal. Statistical analysis was conducted by averaging six values.

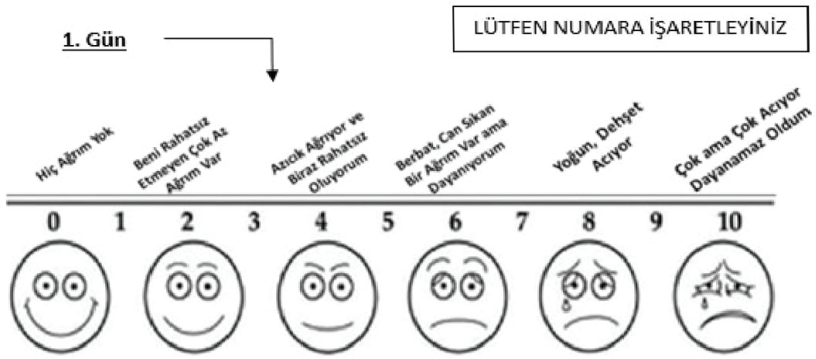
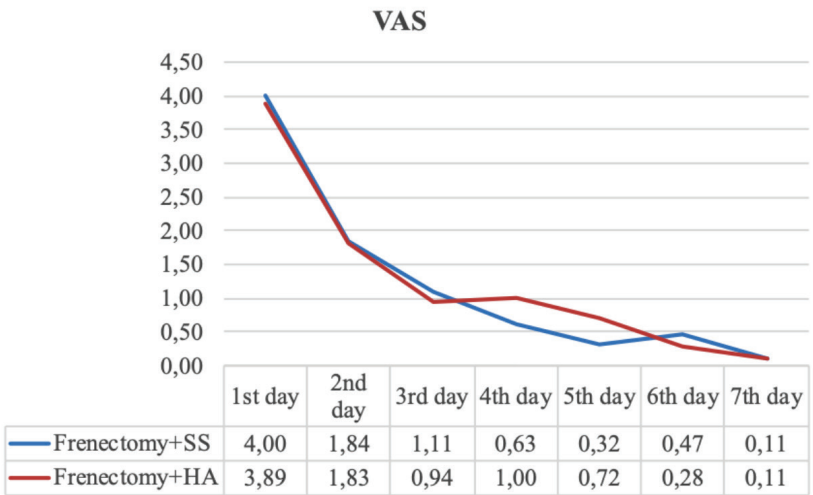


Figure 1. Visual Analog Scale



	1st day	2nd day	3rd day	4th day	5th day	6th day	7th day
Frenectomy+SS	4,00	1,84	1,11	0,63	0,32	0,47	0,11
Frenectomy+HA	3,89	1,83	0,94	1,00	0,72	0,28	0,11

Figure 2. Changes in VAS over time for the Conventional Surgery+SS and Conventional Surgery+HA groups (VAS; Visual Analog Scale, SS: Sterile Saline, HA: Hyaluronic Acid)

Before undergoing the frenectomy procedure, all patients received oral hygiene training and professional dental cleanings. Local anesthesia was used for all frenectomy procedures. To ensure proper behavioral guidance, all patients were given topical anesthesia using Locanest spray, containing 10% lidocaine (Avixa İlaç San. Başakşehir, Istanbul). Each patient received local anesthesia using 2% articaine and 1:100.000 adrenaline. Injected one cc of local anesthetic solution on each side of the frenum. After achieving anesthesia, the frenum was clamped with a straight hemostat and removed by cutting from the upper and lower sides with a number 15 scalpel. After making a horizontal incision in the periosteum, the muscle attachments on the submucosal lateral walls were distally relieved and dissected away from the periosteum using a hemostat. The wound was closed using a 4-0 silk suture (DOGSAN, Turkey). Patients in the control group received seven days of SS injections using a 10cc syringe after the needle had broken. Patients in the HA experimental group were given seven blister disposable packages containing 0.24% HA. (Aftamed Child Gel, Aktident, Üsküdar, İstanbul, TURKEY).

Following the surgery, patients were advised to maintain proper hygiene and clean the incision site. Therefore, the control group (Conventional Scalpel Surgery+SS) was advised to irrigate the wound area with SS 3 times a day after meals. The participants in the experimental group were instructed to apply HA Gel to the wound area thrice a day after opening a new blister pack and refrain from eating or drinking for 10-15 minutes. Sutures were removed one week later.

A visual analog scale (VAS) was given to patients to rate their pain level each evening, including the night

Table 1. Comparing for three months changes between two groups using start-3 variables.

Variables		Conventional scalpel surgery+SS	Conventional scalpel surgery+HA	*p-value*
	No change	17 (89,4)	17 (94,4)	
PI 11	Decrease	1 (5,3)	0 (0,0)	*1,000[a]*
	Increase	1 (5,3)	1 (5,6)	
	No change	17 (89,4)	17 (94,4)	
PI 21	Decrease	1 (5,3)	1 (5,6)	*1,000[a]*
	Increase	1 (5,3)	0 (0,0)	
	No change	15 (83,3)	16 (88,9)	
GI 11	Decrease	2 (11,1)	2 (11,1)	*1,000[a]*
	Increase	1 (5,6)	0 (0,0)	
	No change	14 (77,8)	17 (94,4)	
GI 21	Decrease	2 (11,1)	1 (5,6)	*0,404[a]*
	Increase	2 (11,1)	0 (0,0)	
	No change	18 (94,7)	16 (88,9)	
PD 11	Decrease	1 (5,3)	0 (0,0)	*0,354[a]*
	Increase	0 (0,0)	2 (11,1)	
	No change	18 (94,7)	16 (88,8)	
PD 21	Decrease	1 (5,3)	1 (5,6)	*0,736[a]*
	Increase	0 (0,0)	1 (5,6)	
	No change	15 (93,8)	11 (84,6)	
BOP 11	Decrease	0 (0,0)	2 (15,4)	*0,192[a]*
	Increase	1 (6,2)	0 (0,0)	
	No change	14 (87,5)	10 (76,9)	
BOP 21	Decrease	2 (12,5)	3 (23,1)	*0,632[a]*
	Increase	-	-	
	No change	13 (68,4)	14 (77,7)	
KGW 11	Decrease	5 (26,3)	1 (5,6)	*0,229[a]*
	Increase	1 (5,3)	3 (16,7)	
	No change	12 (63,2)	15 (83,3)	
KGW 21	Decrease	5 (26,3)	1 (5,6)	*0,264[a]*
	Increase	2 (10,5)	2 (11,1)	
	No change	15 (78,9)	17 (94,4)	
AGT 11	Decrease	0 (0,0)	1 (5,6)	*0,105[a]*
	Increase	4 (21,1)	0 (0,0)	
	No change	14 (73,7)	15 (83,3)	
AGT 21	Decrease	0 (0,0)	2 (11,1)	*0,098[a]*
	Increase	5 (26,3)	1 (5,6)	

SS: Sterile Saline, HA: Hyaluronic Acid, PI: Plaque Indeks, GI: Gingival Indeks, PD: Probing Depth, BOP: Bleeding On Probing, KGW: Keratinized Gingival Width, AGT: Attached Gingival Thickness, SD: Standard Deviation, Min: Minimum, Max: Maximum, a: Fisher-exact test.

of the frenectomy. According to this scale, 0 means I have no pain, and 10 means I have unbearably great pain (Figure 1). The researchers provided instructions to the patient and their parents on how to use the scale. Following a week, the patients accomplished the VAS scales and handed. All patients in the study were contacted for follow-up at the end of the third month.

Statistical Analysis

The data was analyzed using the Statistical Package for the Social Science (SPSS) v21 program (SPSS, Chicago, USA). Quantitative variables were described using standard deviation and median (minimum-maximum). The Fisher exact test examines the relationship between two qualitative variables. The Repeated Mea-

sures Analysis of Variance test was used to compare the differences in measurements within each group. The statistical significance level was considered as 0.05.

RESULTS

After conducting repeated VAS measurements for seven days in both the control group created with SS and the test group created with HA Gel, the study determined the days on which statistical significance was observed between the two groups. (p<0.001). The average Visual Analog Scale (VAS) score was at its peak on the first day and reached its lowest point on the seventh day. Upon examining the differences between pairs of days, it was observed that the following pairs had significant differences: first day-third day (p=0.039), first day-fourth day (p=0.002), first day-fifth day (p=0.001), first day-sixth day (p=0.001), first day-seventh day (p<0.001), second day-fifth day (p=0.013), and second day-seventh day (p=0.017). (Figure 2).

In the Conventional Scalpel Surgery+HA group, there was a significant difference in VAS measurements taken at seven different times (p<0.001). The mean VAS score was highest on the first day and lowest on the seventh day. After examining the variations between pairs of days, we have discovered that the following differences are significant: first day-second day (p<0.001), first day-third day (p<0.001), first day-fourth day (p<0.001), first day-fifth day (p<0.001), first day-sixth day (p<0.001), first day-seventh day (p<0.001), and second day-seventh day (p=0.004). (Figure 2).

Table 1 shows variable changes for both groups, but no significant differences were found (p>0.05). When looking at monthly changes, the Conventional Surgery+SS group had a 5.3% decrease and a 5.3% increase in PI values for tooth 11. An increase in PI value was only observed in 5.6% of patients in the Conventional Surgery+HA group for tooth 11 (p = 1.000). When analyzing three monthly changes, 5.3% of the patients in the Conventional Surgery+SS group had a decrease in PI value, while 5.3% had an increase in PI value for tooth 21. An insignificant reduction in PI value was found among only 5.6% of patients in the Conventional Surgery+HA group for tooth 21 (p = 1.000).

In the GI start-three months, it was found that among the patients in the Conventional Surgery+SS group, 11.1% experienced a decrease in GI value, and 5.6% had an increase in GI value on three monthly basis. However, in the Conventional Surgery+HA group, only 11.1% of patients experienced decreased GI value. The difference in results between the two groups was not statistically significant (p = 1,000) for tooth 11. In the GI start-3 month, it was found that among patients in the Conventional Surgery+SS group, 11.1% experienced a decrease in GI value, and 11.1% experienced an increase in GI value on three monthly basis. However, only 5.6% of patients in the Conventional Surgery+HA group experienced a decrease in GI value (p=0.404) for tooth 21, as shown in Table 1.

Pocket depth (PI) starting 3. months Considering three monthly changes, only 5.3% of the patients in the Conventional Surgery+SS group had a decrease in pocket depth value. In comparison, only 11.1% of the patients in the Conventional Surgery+HA group had an increase in pocket depth value (p = 0.354) for tooth 11 the pocket depth starts in three months. Considering the monthly change, only 5.3% of the patients in the Conventional Surgery+SS group had a decrease in pocket depth value. In comparison, 5.6% of the patients in the Conventional Surgery+HA group had a reduction in pocket depth value, and 5.6% had an increase in pocket depth value observed (p=0.736) for tooth 21 (Table 1).

For three months, 6.2% of patients in the Conventional Surgery+SS group experienced an increase in BOP value, compared to only 15.4% of patients in the Conventional Surgery+HA group who showed a decrease in BOP value (p = 0.192) for tooth 11. Over the initial three-month observation period, it was observed that patients in the Conventional Surgery+HA group experienced a decrease in BOP value at a rate of 23.1%. In contrast, only 12.5% of patients in the Conventional Surgery+SS group experienced a similar outcome. These findings are presented in Table 1 (p= 0.632) for tooth 21.

Within the Conventional Surgery+SS group, 26.3% of patients noted a monthly KGW value reduction, whereas 10.5% observed an increase. Conversely, the Conventional Surgery+HA group showed only 5.6% of patients experiencing a decrease, with 16% noting an increase in their KGW value. It's worth noting that seven patients experienced an increase in their

KGW value, though the statistical significance was not particularly strong (p=0.229) for tooth 11. Based on initial-3 data from KGW, there appears to have been a monthly shift in patients' KGW values. In the Conventional Surgery+SS group, 26.3% of individuals experienced a decline, while 5.3% observed an increase. In the Conventional Surgery+HA group, 5.6% noted a decrease, and 11% saw an increase. Furthermore, one patient experienced an increase in their KGW value (p=0,264) for tooth 21 (Table 1).

According to the findings of AGT start-3, it was observed that 21.1% of patients who underwent Conventional Surgery+SS treatment showed an increase in AGT value. In contrast, only 5.6% of patients who underwent Conventional Surgery+HA treatment experienced a decrease in AGT value on three monthly bases (p=0,105) for tooth 11. As per the findings of AGT start-3, a monthly variation in patients' AGT value was detected. Among the patients in the Conventional Surgery+SS group, 26.3% witnessed an increase in AGT value; in the Conventional Surgery+HA group, 11.1% experienced a decrease in AGT value, and 5.6% observed an increase (p = 0.098) for tooth 21.

DISCUSSION AND CONCLUSION

This research introduces an approach to frenectomy in pediatric patients, utilizing 0.24% HA in conjunction with the conventional scalpel technique. The study examines the effects on periodontal parameters and pain levels during the first week and a three-month follow-up. The null hypothesis was rejected, revealing that a 0.24% HA dose did not significantly change pain values. It was determined that HA gel did not affect PI, GI, PD, BOP, KGW, or AGT parameters.

The frenum is a fold of mucosa that connects the upper lip to the mucosa, overlying the maxillary alveolar process (12). Abnormalities in the size and location of the frenum attachment cause midline diastema, restriction of lip movements during speaking and chewing, and aesthetic problems (2). In cases where the frenum needs to be removed, a surgical procedure called frenectomy is performed to excise it (6). Frenectomy should be performed early, particularly in cases where adequate oral hygiene is not achievable and there is a risk of early childhood caries (2). Relapse (13) and scar tissue formation18 after frenectomy operations performed at early ages are mentioned in the literature. Scalpel surgery was preferred to prevent both relapse and the formation of scar tissue (13), as well as to assist with orthodontic treatment, to assist in orthodontic treatment (4). It is recommended to use dental lasers to overcome these difficulties (10). It is preferred to trade with the scalpel method for fast operating time.

A visual analog scale was used to measure pain levels for patients who underwent frenectomy. Patients marked their pain level each evening. According to this scale, a score of 0 indicates no pain, while 10 signifies excruciating pain. As mentioned in the literature, the VAS scale is commonly used to assess pain levels in children (12–14). Since this study was conducted on pediatric patients, the VAS scale was used in conjunction with Wong-Baker pain scale images, unlike previous studies (15,16).

In children with oral injuries, concerns include retaining topically administered drugs in the wound, uncertain application dosage, and safety if ingested (17,18). High-viscosity HA gel has become increasingly popular among dentists, including treating gingivitis (9), periodontitis (9), oral aphthous ulcers (19), teething pain (20), and promoting wound healing after tooth extraction (9). Upon a search of the literature, only one study evaluated the healing effect of HA after frenectomy (10). However, that research used a diode laser and included adults. From this point of view, the findings of this study hold greater significance.

Before the frenectomy procedure, the participants' periodontal indexes, gum indexes, probing depths, bleeding on probing, keratinized gingiva width, and attached gingiva thickness values were measured before and three months after the treatment. No significant differences were found between the groups at either the first or second postoperative measurement time for any parameter. Upon examination of the literature, no other study resembling ours was found. However, in their studies evaluating similar parameters after classical scalpel technique and laser-assisted frenectomy procedures, Öztürk et al. (8) and Uraz et al. (21) found no significant difference in these parameter values.

There are certain limitations to this research. A larger sample size of patients with frenectomy indica-

tion would have improved the accuracy and clarity of the study results. Performing surgical operations on pediatric patients in a dental chair is difficult. Many patients had to be excluded from the study due to their treatment disrupting research standardization. One of our limitations is that we may not accurately apply topical medical treatments to pediatric patients. All patients who underwent frenectomy had HA administered by their parents. When evaluating research results, it's essential to consider the challenge of controlling children's eating and drinking habits after medical treatments. This study discontinued the monitoring of KGW and AGT parameters after three months. We suggest increasing the number of participants and extending the follow-up period in future studies to validate the obtained results.

After conducting the research, it was concluded that using 0.24% HA with high molecular weight did not effectively reduce postoperative pain in pediatric patients aged 8-14 who underwent frenectomy using classical scalpel surgery. There was no significant change in any measured periodontal parameters among the patients Our research will help to make for similar studies using HA gel with a higher percentage.

Acknowledgment

The authors also thank Dr. Batuhan Bakırarar for statistical analysis support.

Conflict-of-interest and financial disclosure

The authors declare that they have no conflict of interest to disclose. The authors also declare that they did not receive any financial support for the study.

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The clinical value of complete blood count-based immun parameter in predicting testicular cancer pathology and prognosis

Testis kanseri patolojisini ve prognozunu öngörmede tam kan sayımına dayalı immün parametrenin klinik değeri

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Abstract

Aim: The management of testicular cancer (TC) requires more specific and applicable biomarkers. We aimed to determine the ability of complete blood count (CBC) based inflammatory markers to predict tumor pathology and prognosis in TC.

Methods: Patients who underwent inguinal orchiectomy for testicular germ cell tumors (TGCTs) at our hospital between January 2011 and December 2022 were included in the study. The medical records of patients with pathologically confirmed TC, including demographics, preoperative tumor markers, preoperative CBC, tumor characteristics, pathological outcomes, postoperative follow-up, and survival outcomes, were retrospectively collected. CBC-based inflammatory markers were compared between seminomatous and non-seminomatous TGCTs. To determine the independent prognostic significance of survival, the data were analyzed and fitted to the multivariate Cox proportional risk regression model.

Results: The median follow-up was 48 (1-140) months. In our chord, 69 patients had seminomatous TGCTs (Group 1), and 66 had non-seminomatous TGCTs (Group 2). The median ages of Groups 1 and 2 were 35 (22-74) years and 31 (21-72) years(p<0,05). The median platelet count (PC) was 238 (136-377) $10^3/mm^3$ in Group 1, and 260,5 (158-414) $10^3/mm^3$ in Group 2 (p<0.05). The median neutrophil count (p=0.75), monocyte count (MC) (p=0.762), lymphocyte count (LC) (p=0.726), neutrophil-to-lymphocyte ratio (p=0.128), platelet-to-lymphocyte ratio (p=0.201), and lymphocyte-to-monocyte ratio (p=0.782) there was no statistically significant difference between seminomatous and non-seminomatous TGCTs. A higher median systemic immune-inflammation index (SII) was statistically significantly associated with non-seminomatous TGCTs. Multivariate Cox regression analysis revealed that high PC and MC values and a low LC value were independently correlated with worse overall survival.

Conclusions: High PC and SII levels are associated with non-seminomatous TGCTs. However, SII is not associated with survival outcomes. Unlike the remaining parameters, high PC and MC and low LC were found to have independent prognostic effects on worse overall survival.

Keywords: Inflammation mediators; pathology; testicular cancer

Öz

Amaç: Testis kanserinin (TK) yönetimi daha spesifik ve uygulanabilir biyobelirteçler gerektirir. Tam kan sayımı (TKS) bazlı inflamatuar belirteçlerin TK'da tümör patolojisini ve prognozunu tahmin etme yeteneğini belirlemeyi amaçladık.

Yöntemler: Çalışmaya Ocak 2011 ile Aralık 2022 tarihleri arasında hastanemizde testis germ hücreli tümör (TGHT) nedeniyle inguinal orşiektomisi uygulanan hastalar dahil edildi. Patolojik olarak doğrulanmış TK'lı hastaların demografik özellikleri, ameliyat öncesi tümör belirteçleri, ameliyat öncesi TKS, tümör özellikleri, patolojik sonuçlar, ameliyat sonrası takip ve hayatta kalma sonuçları dahil olmak üzere tıbbi kayıtları geriye dönük olarak toplandı. TKS bazlı inflamatuar belirteçler seminomatöz ve seminomatöz olmayan TGHT'ler arasında karşılaştırıldı. Genel sağkalım ve hastalıksız sağkalımın ön gören bağımsız prognostoik faktörleri belirlemek için Cox regresyon analizleri kullanılmıştır.

Bulgular: Ortalama takip süresi 48 (1-140) aydı. Bizim çalışmamızda 69 hastada seminomatöz TGHT (Grup 1), 66 hastada ise seminomatöz olmayan TGHT (Grup 2) vardı. Grup 1 ve 2'nin ortanca yaşları sırasıyla 35 (22-74) ve 31 (21-72) yıldı(p<0,05). Ortanca trombosit sayısı (TS) Grup 1'de 238 (136-377) $10^3/mm^3$, Grup 2'de 260,5 (158-414) $10^3/mm^3$ idi (p<0,05). Ortanca nötrofil sayısı (p=0,75), monosit sayısı (MS) (p=0,762), lenfosit sayısı (LS) (p=0,726), nötrofil-lenfosit oranı (p=0,128), trombosit-lenfosit oranı (p=0,201) ve lenfosit/monosit oranı (p=0,782) seminomatöz ve seminomatöz olmayan TGHT'ler İstatistiksel olarak anlamlı fark yoktu Seminom olmayan TGHT grubunda Sistemik İnflamatuvar indeks(SII) istatiksel olarak anlamlı derecede daha yüksekti(p<0,05). Çok değişkenli Cox regresyon analizi, yüksek TS ve MS değerleri ile düşük LS değerinin bağımsız olarak daha kötü genel sağkalım ile ilişkili olduğunu ortaya çıkardı.

Sonuç: Yüksek TS ve SII seviyeleri seminom dışı TGHT'lerle ilişkilidir. Ancak SII hayatta kalma sonuçlarıyla ilişkili değildir. Geri kalan parametrelerin aksine, yüksek TS ve MS ile düşük LS'nin, daha kötü genel sağkalım üzerinde bağımsız prognostik etkilere sahip olduğu bulundu.

Anahtar Sözcükler: İnflamasyon mediyatörleri; patoloji; testis kanseri

Received/*Geliş* : 06.12.2023
Accepted/*Kabul*: 19.03.2024

DOI: 10.21673/anadoluklin.1400323

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INTRODUCTION

Testicular cancer (TC) is a rare condition, representing 1% of adult neoplasms and 5% of urological neoplasms (1). However, among young adult men (aged 15-34 years), TC is the most common solid malignancy (2,3). More importantly, the incidence of TC has exhibited a notable increase over the past 40 years (4).

TC manifests itself in a very different manner, both clinically and pathologically. Testicular germ cell tumors (TGCTs), which comprise approximately 95% of all testicular tumors, are the most common type of TC (5). Histologically, they are classified into seminomatous and non-seminomatous TC. In TGCTs, non-seminoma is predominant in the third decade and seminoma in the fourth decade (6).

The treatment of TC is based on histopathological findings and tumor stage. Inguinal orchiectomy is an effective treatment for localized testicular tumors. However, regarding patient prognosis and oncological therapies, there are some differences between seminomatous and non-seminomatous TCs. Therefore, it is crucial to be aware of potential variations that may arise during the postoperative follow-up of the disease.

Several biomarkers, such as alpha-fetoprotein, human chorionic gonadotropin, and lactate dehydrogenase, are currently employed in clinical practice to predict and differentiate seminomatous and non-seminomatous TC. According to the International Germ Cell Consensus Classification, the clinical use of these biomarkers is mandatory for predicting both the diagnosis and prognosis (7). However, the specificity of these biomarkers is very low (8). Therefore, more specific and cost-effective biomarkers are required in the clinical management of TC.

While the immune system creates an immune response against pathogens, it also generates an immune response against tumor cells. The immune response against tumor cells causes a systemic inflammatory response, resulting in increased levels of inflammatory biomarkers in the peripheral circulation (9). There are some hypotheses that can affect the immune response against tumor cells. One of these hypotheses is immunological desensitization, through which some tumor cells may be able to evade the response of the immune system. The histological types of tumor cells are also effective parameters in determining the level of inflammatory response since they differ in terms of antigenic features. In addition, the level of immune response is valuable in the prediction of tumor biology (8,10).

The relationship between various complete blood count (CBC)-based inflammatory markers and cancer prognosis has recently been described (10,11,12). However, there is a need for the clear identification of CBC-based inflammatory markers in TC to assist clinicians in the treatment of the disease and improve disease management. In addition, the feasibility of implementing precision medicine can be facilitated by the widespread and reliable use of these biomarkers. To evaluate the immune response, the neutrophil-to-lymphocyte (NLR), plate-to-lymphocyte ratio (PLR), and lymphocyte-to-monocyte ratio (LMR), derived from CBC parameters, are utilized. In addition, the systemic immune-inflammation index (SII), which is calculated by multiplying the platelet count (PC) and NLR, was introduced in 2014 (13). These parameters are advantageous due to their cost-effective and easy-to-calculate nature.

There is limited data in the literature on the role of SII and other CBC-based parameters in predicting the histopathology and prognosis of TC. Therefore, this study aimed to investigate the ability of CBC-based inflammatory markers to predict tumor pathology and prognosis in individuals with TC.

MATERIAL AND METHODS

Patients aged 18 years and older who underwent inguinal orchiectomy for TGCTs at our hospital between January 2011 and December 2022 were included in the study. This study was approved by Clinical Research Ethics Committee of İstanbul University-Cerrahpaşa (date: 13.06.2023, decision no: 712209). The diagnosis of TGCTs was confirmed pathologically, and both seminomatous and non-seminomatous TGCTs were included. The medical records of the patients, including demographics, preoperative tumor markers, preoperative CBC parameters, tumor characteristics, pathological outcomes, postoperative follow-up, and survival outcomes, were collected retrospectively. Patients with metastases at the time of diagnosis were excluded. Other exclusion criteria were missing data,

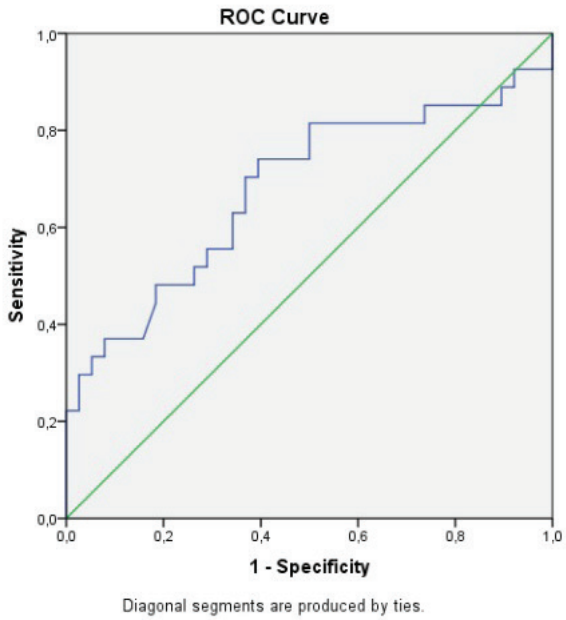

Figure 1. Receiver operating characteristic (ROC) curve analysis of systemic immune-inflammation index (SII) and platelet count for the differentiation of seminomatous and non-seminomatous testicular germ cell tumors.

the presence of any other malignancy, acute infections, and immune deficiency disease.

To minimize the effect of surgical inflammation, the peripheral blood samples of the patients were collected before inguinal orchiectomy. CBC-based inflammatory markers, including NLR, PLR, LMR, and SII, were calculated. SII was calculated using the following formula: PC x NLR (14,15).

A single pathologist (IG) analyzed all pathological specimens according to the guidelines of the American Joint Committee on Cancer (16). Systemic staging was performed using thorax and abdomen contrast-enhanced computed tomography (CT) images. Before surgery, informed consent was obtained from all patients. Following the recommendations of the European Association of Urology guidelines, tumor marker measurements, and chest/abdominal CT scans were performed on all patients. Follow-up data were collected, and survival and oncological outcomes were analyzed during patient visits.

Statistical Analyses

Statistical Package for the Social Sciences package program version 23.0 (SPSS Inc., Chicago, IL, USA). Fisher's exact test and the Mann-Whitney U-test were used to evaluate the data for categorical and continuous variables, respectively. The statistically significant parameters in univariate analysis were further evaluated using multivariable analysis. To determine the independent prognostic significance of survival, the data were analyzed and fitted to the multivariate Cox proportional risk regression model. Statistical significance was accepted as a p-value of <0.05

RESULTS

Inguinal orchiectomy was performed on 148 patients from January 2011 to December 2022. After excluding 13 patients who did not meet the inclusion criteria, 135 patients were enrolled in the study. In our cohort, 69 patients had seminomatous TGCTs (Group 1), and 66 had non-seminomatous TGCTs (Group 2). The median ages of Groups 1 and 2 were 35 (22-74) years and 31 (21-72) years, respectively(p<0,05). A total of 13 patients (9.6%) died during the median 48 (1-140) months of follow-up. The remaining demographic and clinicopathological data of the patients are presented in Table 1.

CBC-based inflammatory markers were evaluated in Group 1 and Group 2. The median PC was 238 (136-377) $10^3/mm^3$ in Group 1 and 260,5 (158-414)$10^3/mm^3$ in Group 2 ($p < 0.05$). The median neutrophil count (NC) ($p = 0.75$), monocyte count (MC) ($p = 0.762$), lymphocyte count (LC) ($p = 0.726$), NLR ($p = 0.128$), PLR ($p = 0.201$), and LMR ($p = 0.782$) 'There was no statistically significantly differ between the seminomatous and non-seminomatous TGCT groups. A higher median SII was statistically significantly associated with non-seminomatous (Table 2**).**

Receiver operating characteristic curve analysis was performed to determine the ability of SII and PC to differentiate between seminomatous and non-seminomatous TGCTs. Accordingly, the sensitivity and specificity were determined to be 77% and 45%, respectively, for SII and 77% and 40%, respectively, for PC (shown in Figure 1).

The multivariate Cox regression analysis conducted by adjusting the remaining clinical and pathological variables revealed that PC ($p = 0.009$), LC ($p = 0.014$), and MC ($p = 0.007$) were independently correlated with poor overall survival but not correlated with me-

Table 1. Demographic and clinicopathologic features of patients

	Seminoma (*n* = 69)	Non-seminoma (*n* = 66)	p value
Age, years, median (min–max)	35 (22–74)	31 (21–72)	<0,05
Side, overall (%)			0,945
Right	37 (53,6)	35 (53)	
Left	32 (46,4)	31 (47)	
Stage*, overall (%)			0,167
I (A,B,S)	45 (65,2)	52 (78,8)	
II (A,B,C)	18 (26,0)	12 (18,2)	
III (A,B,C)	6 (8,8)	2 (3)	
Preop LDH (U/L), median (min–max)	260 (0-11148)	226 (0-3335)	0,295
Preop AFP (U/mL), median (min–max)	3,95 (0-39781)	3,8 (0-12692)	0,918
Preop HCG (mIU/mL), median (min–max)	2,49 (0-19504)	2,3 (0-12726)	0,92
Tumor size, cm, median (min–max)	4,2 (0,6-15,09	3,85 (0,4-9,60)	0,127
Follow up, month, median (min–max)	51 (1-111)	46,5 (1-140)	0,418

Data were expressed as median (range) or number (percentage) whenever appropriate. The statistical significance limit of all evaluations was accepted as p <0.05. LDH: Lactate dehydrogenase, AFP: Alpha-fetoprotein, HCG: Human chorionic, Min: Minimum, Max: Maximum, n: Number, %: percentage.

*Prognostic groups for testicular cancer (UICC, 2016, 8th edn.).

tastasis-free survival. Table 3 shows the results of the multivariate analysis of the parameters determined to be statistically significant in the univariate analysis.

DISCUSSION AND CONCLUSION

This study revealed that PC and SII could be used to distinguish between seminomatous and non-seminomatous TGCTs. Unlike the remaining parameters, PC, LC, and MC were found to have an independent prognostic effect on overall survival. The presence and effects of a cancer-related systemic immune inflammatory response have been investigated in many types of urological cancers; however, research on TC is limited.

The immune system plays a dual role in the tumor microenvironment, involving both oncogenesis and anti-oncogenesis. The association between cancer and inflammation has also been well documented (9,17,18). The immune system influences the development and progression of cancer cells. Recent research has revealed how tumor microenvironmental inflammation influences the growth and survival of tumor cells. The cells of the immune system are actively involved in each of these processes. Thus, it is possible to acquire more knowledge about tumor biology through immune system-related cell measurements.

Recently, researchers have investigated the utility of SII, which is easily calculated using peripheral LC, NC, and PC, as a prognostic predictor in urological cancers (9). SII reflects the relationship between the immune response and host inflammation (19). In a retrospective study, Imamoglu et al. reported the role of SII and other CBC-based inflammatory markers in predicting TC stage (20). They detected a significant association between high-stage TC and high SII. In a meta-analysis including a total of 833 patients with TC from six cohorts, high SII levels were reported to be associated with lower overall survival and progression-free survival (21). Another meta-analysis covering 22 articles showed the predictive role of SII for poorer overall survival in many urological and non-urological cancers (22). Additionally, not only overall survival but also progression-free survival and cancer-specific survival have been found to be related to high pretreatment SII levels (23). SII can be affected by various clinical conditions. Therefore, the findings of our study were unable to prove the predictive value of SII in the context of TC. However, we determined that a high SII value might be a marker for non-seminomatous TC.

Platelets have a protective effect on tumor cells against the anti-tumor immune response (24), leading to the protection of the adhesion and invasion func-

Table 2. Markers of inflammation ratios by stages

	Seminoma (n = 69)				Non-seminoma (n = 66)				
	Whole group	Stage I	Stage II-III	p value*	Whole group	Stage I	Stage II-III	p value*	p value**
Neutrophil count, (10^3/mm^3), median (min–max)	5,3 (1,4-16)	5,2 (1,4-16)	4,3 (1,8-8,4)	0,677	5,7 (0,6-16,3)	5,75 (0,6-16,3)	5,5 (3,6-10,4)	0,925	0,075
Platelet count, (10^3/mm^3), median (min–max)	238 (136-377)	251 (136-377)	224,5 (159-340,5)	0,301	260,5 (158-414)	265,5 (158-414)	245,5 (187-374)	0,409	<0,05
Monocyte count, (10^3/mm^3), median (min–max)	0,6 (0,1-1,6)	0,6 (0,3-1,6)	0,55(0,1-1,1)	0,468	0,6 (0,1-2,4)	0,6 (0,1-2,4)	0,5 (0,2-0,8)	0,14	0,762
Lymphocyte count, (10^3/mm^3), median (min–max)	1,8 (0,5-6,4)	2 (0,5-6,4)	1,65 (1-3,4)	0,48	1,8 (0,5-3,6)	1,8 (0,6-3,6)	1,45 (0,5-3,25)	0,076	0,726
NLR, median (IQR 25–75%)	2,6 (1,7-3,5)	2,6 (0,4-13,3)	2,6 (1,13-5,43)	1	2,9 (2,3-4,5)	2,8 (0,26-16,3)	3,5 (1,45-18,0)	0,239	0,128
PLR, median (IQR 25–75%)	137,1 (101,6-166,7)	137,1 (45,4-374)	136,8 (60-213)	0,97	140,9 (105-198,6)	131,8 (68,7-481,5)	181 (63-374)	0,239	0,201
LMR, median (IQR 25–75%)	3,07 (1,3-4,3)	3,1 (1-23)	3 (1,6-10)	0,668	3,3 (2,2-4,2)	3,4 (0,85-17)	3,2 (1,5-5,24)	0,857	0,782
SII, median (IQR 25–75%)	651,9 (373,8-1024,2)	695,3 (118,4-2654)	567 (202,5-1183,4)	0,641	796,1 (524,5-1250,7)	769 (41,2-5150,8)	984,7 (339,3-3366)	0,415	<0,05

Data were expressed as median (range) or number (percentage) whenever appropriate. The statistical significance limit of all evaluations was accepted as p <0.05.

NLR: Neutrophil lymphocyte ratio, PLR: Platelet lymphocyte ratio, LMR: Lymphocyte monocyte ratio, SII: Systemic inflamation index, IQR: Interquartile range. Min: Minimum, Max: Maximum, n: Number, %: percentage.

*Analysis according to stages within the groups.

**Analysis according to groups.

Table 3. Multivariable cox regression analysis for overall survival

	Overall Survival		
	HR	CI (95%)	p value
Platelet Count	1,031	1,008 - 1,056	0.009
Lymphocyte Count	0,005	0,00 - 0,350	0.014
Monocyte Count	27,682	2,527 - 303,287	0.007
PLR	0,976	0,948 - 1,004	0.089
LMR	1,242	0,881 - 1,752	0.216
SII	1	0,999 - 1,001	0.559

The statistical significance limit of all evaluations was accepted as p <0.05. Abbrevations: HR, Hazard ratio; CI, Confidence interval; PLR, platelet to lymphocyte ratio; LMR, Lymphocyte to monocyte ratio; SII, sytstemic inflamation index

tion of circulating tumor cells. Studies based on in vitro models have also reported growth factor secretion from platelets (25). In clinical practice, Imamoglu et al. showed the valuable role of PLR in the differentiation of stage 1 and advanced non-seminomatous TC cases [20]. In another study, PLR was found to be significantly higher in patients with pT3 TC than in pT1 and pT2 cases (26). However, there was no statistically significant difference between the patients with pT1 and pT2 TC. In our study, PC was associated with poor overall survival in TGCTs. This may be related to the oncogenic effect of platelets in the cancer microenvironment. Additionally, a high PC value may be a marker for the prediction of prognosis in non-seminomatous TC.

Neutrophils and lymphocytes are key elements of the inflammatory response in many types of cancer. Lymphocytes are directly related to the host's immune response to cancer (27). In cancer pathways, they also activate cell death and inhibit tumor cell proliferation

and migration. Thus, the suppression of lymphocyte function by activated neutrophils causes lower antitumor activity (27). Based on these findings, it has been considered that LMR can contribute to the clinical approach. Neutrophils can stimulate endothelium and parenchymal cells, which helps circulating tumor cells disseminate (28). In the cancer microenvironment, neutrophils secrete inflammatory mediators and angiogenic proteins, leading to cancer growth and the dissemination of cancer cells. In particular, tumor-associated neutrophils are crucial to the biology of cancer. It has been demonstrated that neutrophils support the development of tumors and inhibit the antitumor immune response. Additionally, neutrophils and macrophages secrete growth factors, such as epidermal growth factor, vascular endothelial growth factor, and interleukin-6, which affect the tumor microenvironment (29). From a clinical perspective, there are valuable studies in the literature investigating neutrophils and lymphocytes in patients with TC. Herraiz-Raya et al. reported that a neutrophil count of >8,000 mL was related to high progression and mortality rates (30). Another study also demonstrated the significance of NLR changes during anticancer therapy as a predictor of treatment efficacy (14). Additionally, it was emphasized that NLR could differentiate stage 1 TC from advanced TC stages only in individuals with seminomatous testicular tumors (16). However, there are some studies demonstrating the limited capacity of these labile parameters for clinical use (5). These studies suggest that NC is a parameter affected by many factors; therefore, it cannot have a predictive role in cancer prognosis. In our study, unlike LMR, NC, and NLR, LC was found to be associated with poor overall survival in TGCTs.

There is very limited research investigating the predictive value of MC in TC. One study demonstrated the association between a high MC value and unfavorable prognosis in testicular diffuse large B-cell lymphoma (31). However, there is a lack of data concerning MC in TGCTs. Our study provided evidence of a worse prognosis in patients presenting with high MC values.

Our study had certain limitations. First, it had a retrospective, non-randomized, and single-center design. Second, our cohort did not include individuals with non-germ cell tumors of the testis. Third, although our sample included TGCTs, there are different clinicopathologic features of these cases that may have affected the values of CBC-based inflammatory parameters. Lastly, the timing of blood sampling and any other clinicodemographic factors may have influenced the findings of the study.

This study revealed that high PC and SII levels were independently associated with non-seminomatous TGCTs. However, SII was not associated with survival outcomes. Unlike the remaining parameters, high PC and LC values and a low MC value were found to have independent prognostic effects on worse overall survival

Conflict-of-interest and financial disclosure

The authors declare that they have no conflict of interest to disclose. The authors also declare that they did not receive any financial support for the study.

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TIBBİ VE SOSYAL YÖNLERİYLE

SÜNNET CERRAHİSİ

EDİTÖRLER
M. FATİH ŞİMŞEKOĞLU
BÜLENT ÖZALTAY

İnsanlık tarihi boyunca en çok uygulanan cerrahi işlemlerden olan sünnet (hitan) ile ilgili tıbbi ve sosyal alanda bugüne kadar çokça tartışmalar yürütülmüştür. Bu tartışmaların genellikle bilimsel veriler zemininde ele alınmaması ve farklı önyargıların tesiri altında kalması nedeniyle sünnet cerrahisi ile ilgili net kanaatlere ulaşmak mümkün olmamıştır.

Elinizdeki kitap sünnetin tıbbi, cerrahi ve sosyal yönlerine dair en güncel tartışmaları disiplinler arası işbirliği çerçevesinde sunmayı amaçlamaktadır. Bu çalışmanın sağlık çalışanları, akademisyenler ve sünnete dair rehberlik arayışında olan aileler için kaynak kitap olmasını umuyoruz.

BETİM KİTAPLIĞI

Clinical insights into juvenile myoclonic epilepsy: Our experience

Juvenil miyoklonik epilepsi üzerine klinik deneyimimiz

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Abstract

Aim: Juvenile Myoclonic Epilepsy (JME) is predominantly observed during adolescence, characterized by myoclonic jerks exacerbated by sleep deprivation. Generalized tonic-clonic (GTC) and absence seizures are also common in JME. Patients are often photosensitive and usually require long-term treatment. This study aims to retrospectively evaluate the clinical, demographic, and electroencephalography (EEG) findings of patients diagnosed with JME at our Pediatric Neurology Clinic.

Methods: Patients who were followed up at the Department of Pediatric Neurology between 2017-2022, diagnosed with JME based on clinical and EEG findings, and had at least one year of follow-up were included in this study. The clinical characteristics of the patients, as well as their diagnostic and follow-up EEG results, were retrospectively reviewed.

Results: Of the patients, 12 (55%) were female and 10 (45%) were male. The mean age of the patients was 17±1 (range 14-18) years, and the average age at first seizure was 13±2 (range 12-16) years. When examining the types of seizures in our cases; 12 (55%) had myoclonic and GTC seizures, 4 (18%) had a combination of myoclonic-GTC-absence, and 6 (27%) had isolated myoclonic seizures. EEG results showed that 6 (27%) of the patients had spike and multiple spike waves at 3-5.5 Hz during sleep, while the remaining 16 (73%) had these during wakefulness. Fourteen (64%) of the patients responded to photic stimulation. Six (27%) of the patients had a first-degree relative with a history of epilepsy. A significant association was found between the presence of photosensitivity and family history of epilepsy (p=0.03).

Conclusion: Juvenile myoclonic epilepsy is a type of epilepsy observed in the adolescent period, characterized by myoclonic jerks and photosensitivity. In patients with JME who have a family history of epilepsy, photosensitivity is more commonly observed

Keywords: Adolescent; myoclonic epilepsy; photosensitivity,

Öz

Amaç: Juvenil Miyoklonik Epilepsi (JME) daha çok ergenlik döneminde ortaya çıkan, uykusuzlukla tetiklenen miyoklonik jerklerin hakim olduğu kliniktir. JME'de jeneralize tonik-klonik (JTK) ve absans nöbetler görülebilmektedir. Hastalar çoğunlukla fotosensitiftir ve genelde uzun süreli tedavi gereklidir. Bu çalışmada Çocuk Nöroloji kliniğimizde JME tanısıyla takipli hastalarımızın klinik, demografik ve elektroensefalografi (EEG) bulgularının retrospektif olarak değerlendirilmesi amaçlanmıştır.

Yöntemler: Çocuk Nöroloji Kliniği'nde 2017-2022 yılları arasında takip edilen, klinik ve EEG bulgularıyla JME tanısı alan ve en az 1 yıl takibi olan olgular çalışmaya dahil edilmiştir. Hastaların klinik özellikleri, tanı ve takipteki EEG sonuçları geriye dönük olarak incelenmiştir.

Bulgular: Hastaların 12'si (% 55) kız, 10'u (% 45) erkek idi. Hastaların ortalama yaşı 17±1 (14-18) yıl, ilk nöbet geçirme yaşı 13±2(12-16) yıl idi. Olgularımızın nöbet tipleri incelendiğinde; 12 (%55) hastada miyoklonik ve JTK nöbet, 4 (%18) hastada miyoklonik-JTK-absans birlikteliği ve 6 (%27) hastada ise izole miyoklonik nöbetler olduğu tespit edildi. Hastaların EEG sonuçları incelendiğinde; 6 (%27) hastanın uyku, diğer 16 (%73) hastanın uyanıklık EEG sonucunda 3-5,5 Hz diken ve çoklu diken dalgalar mevcuttu. Hastaların 14 (%64) tanesinde fotik stimülasyona cevap vardı. Hastalarımızın 6 (% 27) tanesinin birinci derece akrabalarında epilepsi öyküsü mevcuttu. Fotosensitivite ile ailede epilepsi varlığı arasında anlamlı bir ilişki olduğu saptandı (p=0.03).

Sonuç: Juvenil miyoklonik epilepsi adölesan dönemde görülen, miyoklonilerin ve fotosensitivitenin ön planda olduğu bir epilepsi türüdür. Fotosensitive, ailede epilepsi öyküsü olan JME hastalarında daha sık görülmektedir.

Anahtar Sözcükler: Adölesan; fotosensitivite; miyoklonik epilepsi

Received/*Geliş* : 20.01.2024
Accepted/*Kabul*: 01.04.2024

DOI: 10.21673/anadoluklin.1422939

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INTRODUCTION

The term Juvenile Myoclonic Epilepsy (JME) was first mentioned by Herpin in 1867 (1). The disease was comprehensively defined 90 years later, in 1957 by Janz and Christian, using the term "impulsive petit mal" (2). It took time for JME to gain an international definition. It was eventually included in the International League Against Epilepsy's (ILAE) first international classification proposal for epilepsies and epileptic syndromes in 1985 (3). JME predominantly emerges during adolescence, the onset age is mostly between 12-18 years. The disease is characterized by bilateral, single or repetitive, irregular arrhythmic myoclonic jerks, usually in the arms. Seizures usually occur shortly after waking and are often triggered by sleep deprivation (3). The most significant clinical finding is myoclonic jerks that appear in the early morning hours. It has been noted that the excitability measured by transcranial magnetic stimulation increases in the early morning in patients with JME, which is associated with increased seizures at this time of day (4).

Often, the myoclonus, causing objects to drop from the patients' hands, is perceived as clumsiness by families. While myoclonus does not involve loss of consciousness, it can occasionally cause sudden falls. Myoclonic seizures are indispensable for diagnosis. Other types of seizures include absence seizures, seen in approximately 35-40% of patients, and generalized tonic-clonic (GTC) seizures seen in approximately 85-90% of patients (5). These three different seizure types in JME have distinct clinical implications. For instance, while GTC seizures are a relatively nonspecific type seen in many epilepsy types, studies have suggested that absence of seizures in JME might indicate a form of endophenotyping (6). Although absence seizures alone may not carry significant meaning, the progression from childhood absence epilepsy to JME has been indicated as an adverse prognostic marker (7). Patient groups exhibiting all three types of seizures are associated with a high risk of antiseizure medication resistance (8). For a diagnosis of JME, the presence of myoclonic seizures along with 3-5.5 Hz generalized spike or polyspike waves in ictal or interictal electroencephalography (EEG) is a prerequisite (9). The spike-wave discharges in JME are thought to originate from abnormal neuronal discharges in cortico-subcortical networks and dysfunction in thalamofrontal circuits (10).

JME is the epilepsy syndrome most characterized by reflex epileptic traits. These include photosensitivity, eye-closure sensitivity, orofacial reflex myoclonus, and praxis induction (3). Photosensitivity is the most commonly encountered type of reflex epilepsy. It is described as the elicitation of spike-wave discharges following intermittent photic stimulation, typically originating and being dominant in the occipital region. The association between this condition and JME was first described by Wolf and Gooses in 1986. The prevalence of photosensitivity in patients is reported to be between 50-90% (11). Intermittent light stimulation brings out photosensitivity either in the form of seizures or as a 'photoparoxysmal response' visible in EEG as spike and wave discharges.

Eye-closure sensitivity is defined as the appearance of spike and wave discharges within 2 seconds after closing the eyes. While it is pathognomonic for Jeavons syndrome, it also occurs in about 20% of JME cases (3). Orofacial reflex myoclonus consists of small myoclonic jerks in the tongue, throat, jaw, and perioral muscles. While primarily seen in reading epilepsy, it is also found in approximately 30% of patients with JME (8). Praxis induction is the emergence of epileptic seizures and epileptiform EEG discharges with complex cognitive behaviors involving visual-motor coordination and decision-making. In other words, it is the appearance of myoclonic jerks with cognitive effort. This clinic is observed in approximately 30-50% of JME patients (12). A survey conducted among JME patients identified that those with praxis induction clinic have a more severe course than the other reflex epileptic features (13).

Considering the reflex epileptic features of JME, it is thought to arise from disturbances in the functional anatomical networks of the brain. Disruption of thalamo-cortical network functions can lead to impairments in higher-level frontal lobe lesions such as working memory, planning, and risk-taking, resulting in poor socioeconomic outcomes and unemployment in this patient group (14). Patients with JME exhibit impaired working memory functions. Behavioral traits among patients with JME can include indiscipline, insensitivity and instability, which may affect their ad-

Table 1. Gender comparison in photosensitivity patients

	Male	Female	*Total*
Photosensitivity present	7	7	14
Photosensitivity absent	3	5	8
	10	12	**p=0.45**

Table 2. Relationship between photosensitivity and iron deficiency

	Ferritin <10 ng/ml	Ferritin > 10 ng/ml	*Total*
Photosensitivity present	4	10	14
Photosensitivity absent	2	6	8
	6	16	**p=0.6**

Table 3. Photosensitivity and epilepsy relationship in the family

	Family history of epilepsy	Alt sütun yukarıdakilerle hizalansın	*Total*
Photosensitivity present	6	8	14
Photosensitivity absent	0	8	8
	6	16	**p=0.03**

herence to treatment. Furthermore, studies have found higher pharmacoresistance in patients with psychiatric comorbidities (15).

Despite traditional teachings that do not expect morphological abnormalities in JME, micro-architectural level magnetic resonance (MR) studies in JME have revealed reductions in functional and structural connectivity within the motor cortex, anterior supplementary motor area and frontoparietal cognitive networks (16). Furthermore, a meta-analysis found increased grey matter volume in the bilateral medial frontal gyrus and anterior cingulate, along with decreased volume in the bilateral thalamic region (17). MR spectroscopy reports on patients have observed that in those with photosensitivity, frontal cortical and thalamic dysfunction extends to the occipital region (18). Some of the genes associated with JME include CACNB4, GABRA1, GABRD, CASR, and EFHC1 (19). In addition, abnormal functional MR frontal lobe working memory activation has been observed in the healthy siblings of JME patients (20). The treatment objective of this disease involves lifestyle changes and medication adherence. Generally, the response to appropriate antiseizure medication is favorable.

In this present study, we aimed to evaluate the clinical findings of JME patients along with the frequently observed photosensitivity and share with the literature.

MATERIAL AND METHODS

This study was approved by Necmettin Erbakan University Ethics Committee (date: 07.07.2023, desicion no: 2023/4405). The diagnosis of JME was made referencing the International League Against Epilepsy's (ILAE) guidelines published in 2022 (21).

Clinical, demographic, and EEG findings of 22 patients diagnosed with JME and followed at Necmettin Erbakan University, Meram Faculty of Medicine, Department of Pediatric Neurology, between 2017-2022 were retrospectively evaluated. Patients who had been followed for at least one year were included in the study. Patients with external center diagnoses, follow-ups, and additional diseases were excluded from the study.

Patients' demographic data (age, gender, family history, etc.), clinical data (presence of seizures, antiseizure medication used, age at seizure onset, duration of follow-up, etc.), electroencephalography (EEG), laboratory results (complete blood count, biochemistry, hormones), and brain magnetic resonance (MR) imaging findings were retrospectively scanned from our hospital's e-medical record system.

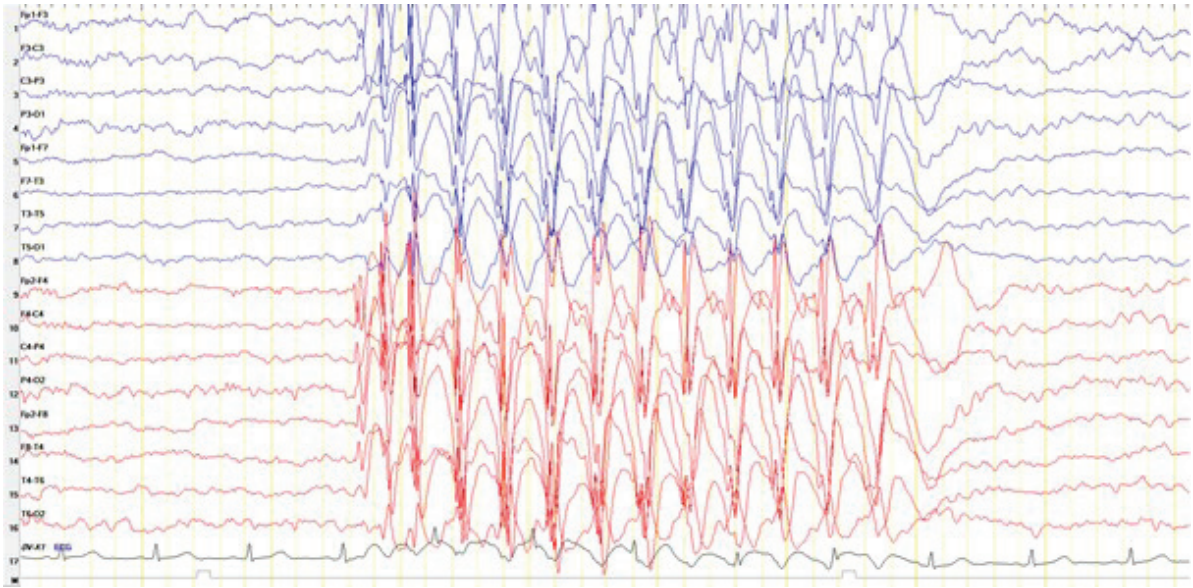

Figure 1. Generalized high-amplitude 3-5 Hz multi-spike slow wave paroxysms, maximal in the frontal region

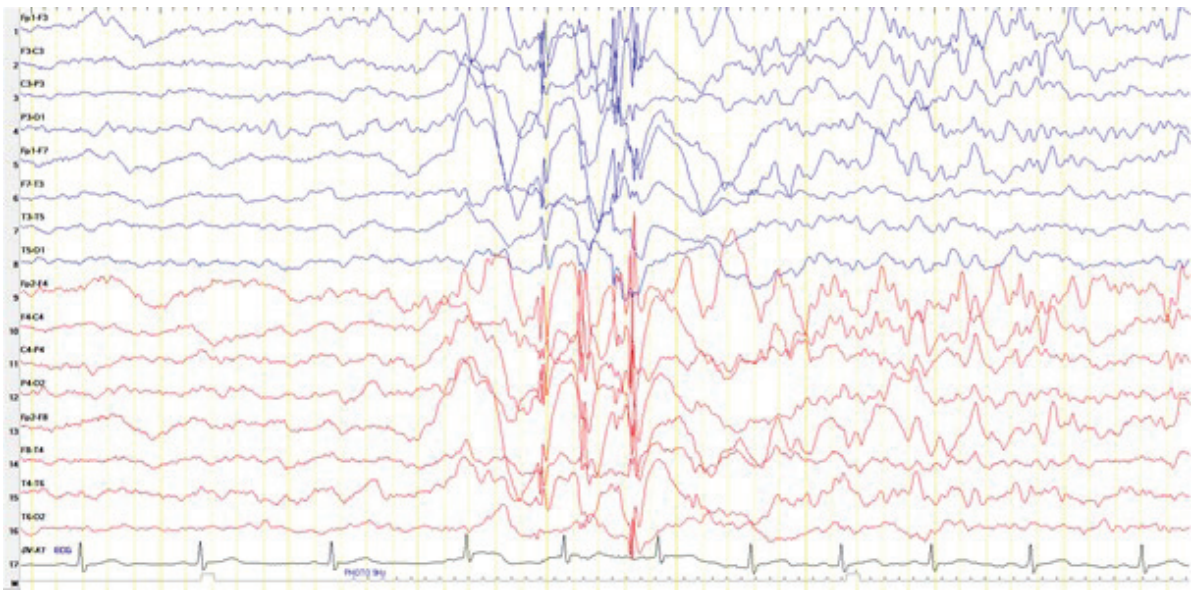

Figure 2. Generalized high-amplitude 4-5 Hz multiple spikes and sharp slow wave paroxysms lasting about 1-2 seconds, maximal in bilateral frontal regions.

Photosensitivity was considered an abnormal clinical response developed with light effect along with findings in the electroencephalography. Patients with anemia in the complete blood count and a ferritin value of <10 ng/ml were considered to have severe iron deficiency anemia. Severe iron deficiency anemia, family history of epilepsy, and gender were analyzed for their association with photosensitivity.

Statistical Analysis

The data of the present study were analyzed statistically using SPSS version 22 software (Statistical Package for the Social Sciences, Chicago, IL, USA). In the descriptive analysis of the data, continuous variables were presented as median and interquartile range (IQR), minimum and maximum values, and categorical variables as frequency (n) and percentage (%). The

association of the presence of photosensitivity with iron deficiency anemia, family history of epilepsy, and gender were analyzed via Pearson Chi-square test. A value of $p<0.05$ was considered statistically significant throughout the study.

RESULTS

Of the patients, 12 (55%) were female and 10 (45%) were male. The average current age of the patients was 17±1 (range 14-18) years, and the average age at first seizure was 13±2 (range 12-16) years.

The types of seizures in our cases were as follows: 12 (55%) had myoclonic and GTC seizures, 4 (18%) had a combination of myoclonic-gtc-absence seizures, and 6 (27%) had isolated myoclonic seizures.

Looking at the EEG results of our cases; 6 patients (27%) exhibited 3-5.5 Hz spikes and multiple spike waves during sleep, while the remaining 16 patients (73%) had these during wakefulness (Figures 1 and 2). Additionally, photic stimulation was found to be effective in 14 patients (64%). Photosensitivity was present in 7 (% 32) of the girls and 7 (% 32) of the boys. A gender comparison among photosensitive patients revealed no significant difference between the two genders in terms of photosensitivity ($p=0.45$) (Table 1).

As shown in the table, photosensitivity was observed in 4 patients with iron deficiency, while photosensitivity was present in 10 patients without iron deficiency. Upon diagnosis, it was observed that there was no significant relationship between patients with photosensitivity in EEG and those with severe iron deficiency ($p=0.6$) (Table 2).

Six (27%) of our patients had a first-degree relative with a history of epilepsy. When comparing presence of photosensitivity with the presence of epilepsy in the family, a significant relationship was found ($p=0.03$) as shown in Table 3.

Eleven of our cases were taking valproic acid, nine were on levetiracetam, and two were receiving a combination treatment of valproic acid and lamotrigine. It was observed that two of the patients on levetiracetam had initially received valproic acid treatment but were switched to levetiracetam due to the development of tremors in the hands during follow-up. All of our cases brain MR imaging did not reveal any pathology and was reported as normal.

DISCUSSION AND CONCLUSION

Juvenile myoclonic epilepsy is seen in approximately 0.5-1% of the general population and represents about 5-15% of all epilepsies (22). While it was previously considered to affect both genders equally, recent studies have indicated a higher prevalence in females (23). In line of these results, in our patient group, the number of female patients was relatively higher.

The inheritance pattern of juvenile myoclonic epilepsy is not fully defined, but a family history is present in the majority of patients (25-65%) (24). Some genes most associated with JME inheritance include CACNB4, CASR, GABRA1, GABRD, and EFHC1 (19). In our cases, 27% had a family history, but no genetic panel testing was conducted for any patient. Personality and behavioral disorders observed in some patients have been associated with frontal lobe involvement, and brain MR imaging has indicated increased gray matter volume in the frontal and cingulate gyrus and decreased volume in the thalamus (17). Nevertheless, the normal interpretation of MR reports for our patients was related to the inability to perform functional MRI and the use of thicker slices. More research is needed on this topic.

In cases with JME, ictal and interictal EEGs show fast generalized, often irregular spike and polyspike waves, while the baseline rhythm is normal. However, there is no synchronization between myoclonic jerks and spike waves in EEG. When the EEGs of the 22 patients in our study were examined, all had a normal baseline rhythm, while 6 had 3-5.5 Hz spike and polyspike waves during sleep, and the remaining 16 were during wakefulness.

Photosensitivity is an abnormal sensitivity response of the brain to complex stimuli such as light flashes, intermittent light sources, visual patterns, and video games. It occurs in 5-10% of epilepsy patients and 40-50% of JME patients (11). It is more commonly seen in adolescents and females (25). In our patient group, 64% exhibited photosensitivity. The distribution of photosensitive patients was equal among both genders. It is often stated that photosensitivity is predominantly

inherited as an autosomal dominant trait. Our study also supports this finding that it is more common in those with a family history. Therefore, patients with a family history of epilepsy and clinical photosensitivity can be candidate for comprehensive genetic studies.

In treatment management, the proper use of antiseizure medication and avoiding situations such as stress, sleep deprivation, sudden lights, and anxiety are fundamental (26). In our study, 5 patients had been seizure-free for more than a year, and this was associated with their adherence to treatment and avoidance of triggers. While lifelong treatment was recommended in previous years due to the high risk of relapse, some recent studies do not support this (27). Studies suggest that valproic acid is the first choice in JME treatment, affecting all three types of seizures and achieving a clinical response rate of 85%. If there is drug interaction or adverse effects from valproic acid, lamotrigine, clobazam, levetiracetam, and topiramate is recommended (28). When polytherapy is needed, the combination of valproic acid and lamotrigine can be effective, but attention must be given to rashes and side effects.

The homogeneity of our patient group, with none having additional diseases and the majority exhibiting photosensitivity, is a strength of our study. However, limitations include the limited number of patients and the retrospective nature of the study method.

In conclusion, JME is a type of epilepsy observed in the adolescent period, characterized by prominent myoclonus and photosensitivity, and is heterogeneous due to various seizure types and responses. In patients with juvenile myoclonic epilepsy (JME) who have a family history of epilepsy, photosensitivity is more commonly observed

Conflict-of-interest and financial disclosure

The authors declare that they have no conflict of interest to disclose. The authors also declare that they did not receive any financial support for the study.

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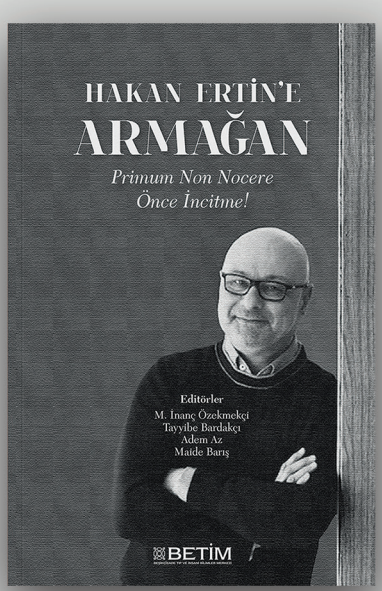

HAKAN ERTİN'E
ARMAĞAN

Primum Non Nocere
Önce İncitme!

Editörler
M. İnanç Özekmekçi, Tayyibe Bardakçı
Adem Az, Maide Barış

Hakan Ertin, akademide eşine az rastlanır incelikte ve bilgelikte, merhametli, anlayışlı, öğrencisine her zaman vakti olan, yeri geldiğinde yakın bir arkadaş, yeri geldiğinde bir baba, ama her zaman en sevilen hocalardan biri oldu. Türkiye'nin ilk ve halihazırda tek tıpta insan bilimleri merkezi olan Beşikçizade Tıp ve İnsani Bilimler Merkezi - BETİM'i kurdu. BETİM'de çok sayıda etkinlik, dersler, çalıştaylar düzenlenmesinde, "tıpta insan bilimleri" ve "biyoetik" alanlarının ülkemizde duyulmasında çok önemli bir rol üstlendi. Öğrencilerine sürekli tıbbın öznesinin olduğu kadar nesnesinin de 'insan' olduğunu vurguladı. Tıbbın ilk kuralı "*primum non nocere*", yani "önce zarar verme" Hakan Hocamızın hem öğrencilerine öğrettiği hem de kendi hayatında titizlikle uyguladığı bir ilkeydi. Ve bu ilkenin maddi boyutu kadar manevi boyutunun da önem taşıdığının bilincindeydi. Hakan Hoca, modern hayatın empoze ettiği kalp kırıp kırmadığını önemsemeyen benmerkezci ve pragmatik tutuma inat, hayatı boyunca, incinse de incitmemek için gayret etti. Biz de bu yüzden ona armağan ettiğimiz bu kitapta, hocamızın bu düsturunu bir rehber kabul ederek "önce incitme!" dedik.

BETİM KİTAPLIĞI

Can inflammatory markers such as lymphocyte to C-reactive protein ratio and hemoglobin, albumin, lymphocyte, and platelet score predict complications after loop ileostomy closure?

Lenfosit/C-reaktif protein oranı ve hemoglobin, albümin, lenfosit ve trombosit skoru gibi enflamatuar belirteçler loop ileostomi kapatılması sonrası komplikasyonları öngörebilir mi?

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Abstract

Aim: This study aims to investigate whether inflammatory biochemical markers such as hemoglobin, albumin, lymphocyte, platelet scores (HALP), and lymphocyte-C-reactive protein ratio (LCR) can predict complications after ileostomy closure.

Methods: Eighty-five patients who underwent loop ileostomy closure were included in this retrospective study. Alongside the patient's demographic data, surgical data, histopathology results, and biochemistry data were recorded. Complications that occurred within the first 30 days after surgery were evaluated using the Clavien-Dindo classification. Inflammation markers such as HALP and LCR were obtained using biochemical parameters.

Results: The rate of mild complications (Clavien-Dindo I and II) was 27%, while the rate of severe complications (Clavien-Dindo III and IV) was 12.94%. A statistically significant correlation was found between the development of early complications and levels of albumin, lymphocyte, neutrophil, and C-reactive protein (CRP) ($p<0.05$). Patients who developed complications had lower mean serum albumin levels and higher mean neutrophil and CRP values. There was a strong correlation between HALP score and LCR and complications in patients ($p<0.05$).

Conclusion: It was concluded that HALP and LCR measured preoperatively could be important predictors of early complications after loop ileostomy closure.

Keywords: Biochemical markers; inflammation; loop ileostomy; postoperative complications

Öz

Amaç: Bu çalışmanın amacı hemoglobin, albümin, lenfosit ve trombosit skorları (HALP) ve lenfosit-C-reaktif protein oranı (LCR) gibi inflamatuar biyokimyasal belirteçlerin ileostomi kapatılması sonrası komplikasyonları öngörüp öngöremediğini araştırmaktır.

Yöntemler: Bu retrospektif çalışmaya loop ileostomi kapatılan seksen beş hasta dahil edildi. Hastaların demografik verilerinin yanı sıra ameliyat verileri, histopatoloji sonuçları ve biyokimya verileri veritabanına kaydedildi. Ameliyattan sonraki ilk 30 gün içinde ortaya çıkan komplikasyonlar Clavien-Dindo sınıflandırması kullanılarak değerlendirildi. HALP ve LCR gibi inflamasyon belirteçleri biyokimyasal parametreler kullanılarak elde edildi.

Bulgular: Hafif komplikasyonların (Clavien-Dindo I ve II) oranı %27 iken, ciddi komplikasyonların (Clavien-Dindo III ve IV) oranı %12.94 idi. Erken komplikasyon gelişimi ile albümin, lenfosit, nötrofil ve C-reaktif protein (CRP) düzeyleri arasında istatistiksel olarak anlamlı bir korelasyon bulundu ($p<0.05$). Komplikasyon gelişen hastaların ortalama serum albümin düzeyleri daha düşük, ortalama nötrofil ve CRP değerleri ise daha yüksekti. HALP skoru ve LCR ile hastalardaki komplikasyonlar arasında güçlü bir korelasyon vardı ($p<0.05$).

Sonuç: Ameliyat öncesi ölçülen HALP ve LCR'nin loop ileostomi kapatılması sonrası erken komplikasyonların önemli belirleyicileri olabileceği sonucuna varıldı.

Anahtar Sözcükler: Ameliyat sonrası komplikasyonlar; biyokimyasal belirteçler; inflamasyon, loop ileostomi

Received/*Geliş* : 17.01.2024
Accepted/*Kabul*: 01.04.2024

DOI: 10.21673/anadoluklin.1421211

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INTRODUCTION

Anastomotic leak is a serious complication that can occur after anterior resection of the rectum. To minimize the harmful effects of anastomotic leakage, a diverting ileostomy is often performed (1). However, it is important to note that ileostomy is not a procedure without any risks, as closure has been associated with morbidity and mortality in 0.5-4% of cases (2-4). When closing a loop ileostomy, can be done using linear staples or sutures. There have been no significant differences reported in terms of morbidity between these two techniques (5-7). Some common complications that can arise after ileostomy closure include small bowel obstruction, surgical site infection, abdominal septic complications, and enterocutaneous fistula (7).

The degree of the systemic inflammatory response measured before surgery is associated with survival in cancer patients. Low levels of albumin and lymphocytes, as well as high levels of CRP, leukocytes, neutrophils, and platelets, are indicators of systemic inflammatory response (8). Various prognostic factors based on inflammation can be revealed by combinations of these parameters. Biochemical markers of the inflammatory response can be used to determine the prognosis of many malignant diseases (9). These biochemical markers have also been utilized in autoimmune, inflammatory, and infectious diseases where the severity of inflammation is crucial (10). Hemoglobin, albumin, leukocyte, and platelet values have demonstrated associations with prognosis in oncological patients in numerous settings (11-13).

The objective of this study is to investigate whether certain biochemical markers, such as hemoglobin, albumin, lymphocyte, and platelet scores (HALP), as well as the lymphocyte-C-reactive protein ratio (LCR), can predict complications after ileostomy closure.

MATERIAL AND METHODS

The study included sequential patients who underwent loop ileostomy closure a Tokat University Medical Faculty Hospital between 2013 and 2021. The patients' data was retrieved from the hospital's electronic database and analyzed retrospectively. Ethics committee approval was obtained from Tokat Gaziosmanpaşa University Clinical Research Ethics Committee for the study (date: 14.01.2021, decision no: 2021/01). Loop ileostomy closures were performed in the General Surgery clinic by experienced faculty members or under their supervision.

The study included adult patients (over 18 years of age) who underwent ileostomy closure. Loop ileostomies were performed for various reasons, including benign and malignant causes, in emergency or elective colorectal surgery settings.

The study excluded patients under 18 years of age, those with terminal or double barrel ileostomy, patients with systemic autoimmune disease and/or regular use of immunosuppressive drugs, and those with missing data.

Before the operation, all concomitant diseases (including diabetes mellitus and arterial hypertension) in the patients were stable. The blood pressure and fasting blood glucose values of the patients were within normal limits in the preoperative and early postoperative periods.

Prior to ileostomy closure, the integrity of colorectal anastomoses performed at the index operation was checked with colonoscopy and/or computed tomography with oral and intravenous contrast. 1 gram of cefazolin, as a prophylactic antibiotic, was administered before surgery. The operations were performed under general anesthesia with different incisions (peristomal, peristomal+laparoscopic, or median incisions) using either a linear stapler or sutures (with 3/0 PDS or 3/0 vicryl Lambert sutures). Some patients required resection of the loop ileostomy, while in others, anastomosis could be performed without resection. In all peristomal incisions, the skin was closed as a purse-string. Complications that developed within the first 30 days after surgery were evaluated according to the Clavien-Dindo classification. Complications such as anastomotic leakage, intra-abdominal collection, and ileus were defined based on clinical (abdominal distention, pain, nausea, vomiting, inability to pass gas and stool) and radiological (standing direct abdominal X-ray, ultrasonography, computed tomography) findings. The follow-up was conducted through the scheduled outpatient department of surgery weekly after discharge until the complete healing of the ileostomy wound. Patients who did not come to the hospital were assessed

Table 1. Demographic data of the patients in the study

Clinical characteristics			
	Mean±SD	**Min-Max**	
Age (year)	62,07±9,82	34-82	
BMI (kg/cm^2)	25,88±4,21	17,70-40,20	
Operative time (minutes)	58.66±15.38	35-150	
Mean time between the index surgery and ileostomy closure surgery (day)	102.47±108.24	8-567	
Length of hospital stay	5.59±2.85	2-19	
		n	**%**
Gender	Female	28	32,94
	Male	57	67,06
ASA	1	1	1,18
	2	32	36,47
	3	52	61,18
	4	1	1,18
Smoking	Yes	16	18,82
	No	69	81,18
Comorbid diseases	DM+HT	32	37,65
	Cardio-vascular system (CAD and AF)	8	9,41
	Previous cerebrovascular disease	2	2,35
	Respiratory system (COPD, Asthma)	10	11,76
	Chronic kidney disease	2	2,35
	No comorbidity	31	36,47
Diagnosis			
Rectal Cancer		75	88,23
Rectal Tumor (benign)		4	4,71
FAP		3	3,53
Descending colon injury		1	1,18
Iatrogenic colon perforation		1	1,18
Ulcerative Colitis		1	1,18
Index surgery			
LAR+conservative ileostomy		79	92,94
Total proctocolectomy+ileoanal anastomosis+protective ileostomy		4	4,71
Sigmoid colon repair + protective ileostomy		2	2,35
Incision	Peristomal	82	96.47
	Median	1	1.18
	Peristomal+ laparoscopic	2	2.35
Elective/emergency			
Elective		82	96,47
Emergency		3	3,53
First pathology			
Malignant		78	91,76
Benign		7	8,23
Initial pathology results			
Adenocarcinoma		78	91,76
Ulcerative colitis		1	1,18
Adenomatous polyp		4	4,71
Stab wound		1	1,18
Sigmoid colon perforation		1	1,18
Adjuvant CT	Received	35	41.18
	Did not received	50	58.8

nCT/CRT	Received	60	70.59
	Did not received	25	29.4
Stoma closure			
Resection+hand anastomosis		58	68,24
Hand anastomosis		17	20,00
Resection + anastomosis with linear stapler		7	8,24
Linear stapler anastomosis		3	3,53

FAP: Familial adenomatous polyposis coli, LAR: Low anterior resection, CAD: Coronary artery disease, AF: Atrial fibrillation, COPD: Chronic obstructive pulmonary disease, BMI: Body mass index, DM: Diabetes Mellitus, HT: Hypertension, ASA: American Society of Anaesthesiologists physical status classification, nCT/CRT: Neoadjuvant chemotherapy/chemoradiotherapy, SD: Standard deviation, Max: Maximum, Min: Minimum, n: Number, %: Percentage

through a phone call.

The variables considered in the study were demographic, clinical, and biochemical. They included age, gender, BMI (body mass index), ASA score, comorbidities, smoking, use of chemotherapy agents, time between the first operation and ileostomy closure surgery (days), operation time (minutes), postoperative hospital stay (days), incision type (peristomal, median), postoperative complications, leukocyte, lymphocyte, neutrophil, and platelet counts; hemoglobin, albumin, CRP levels. Laboratory blood values used in the study were measured at an average of 14.86±11.45 days before ileostomy closure surgery.

Inflammation markers such as HALP and LCR were obtained using biochemical parameters. HALP score calculation: Hemoglobin (g/dL) x Albumin (g/dL) x Lymphocyte (count/µl) / Platelet (count/µl).

LCR calculation: Lymphocyte (count/µl) / CRP (mg/L).

Statistical Analysis

In the analysis of the data collected in the study, Statistical Package for the Social Sciences software for Windows, version 24.0 (SPSS Inc., Chicago, IL, USA) was used. Optimal cut-off values of HALP and LCR scores were calculated using X-tile software version 3.6.1 (Yale University, NEW Haven CT, USA). In the study, descriptive statistics regarding the distribution of responses to independent variables were presented as numbers and percentages for categorical variables, and mean, standard deviation, and median for numerical variables. The compatibility of continuous variables with the assumption of normal distribution was evaluated with the Kolmogorov-Smirnow test. Survival was analyzed by the Kaplan-Meier method, with differences analyzed by log-rank test. While the distribution relationship between categorical variables was examined with the Chi-Square test, the Paired Sample T Test and Independent T-test were used to compare numerical data. One way Anova or Kruskal-Wallis Method was used to compare multiple groups. In addition, ROC Analysis was applied to determine the cut-off point for numerical variables. In multivariate analysis, independent predictors were examined to predict outcomes in early and late complications using logistic regression analysis. The results were evaluated at the 95% confidence interval, with $p<0.05$ as significant.

RESULTS

The mean age of the patients, of whom 57 (67.06%) were male, was 62.07±9.82 (min.34- max.82) years. The most common comorbidities were DM and HT in 32 (37.65%). The mean follow-up period was 40.99±24.17 (min.1,7-max.95) months. (Table 1).

Abscess drainage and debridement were the most common (7.06%) patients who underwent reoperation. Surgical site infection was observed in 9 (10,59%) patients as the reason for readmission, and some patients had more than one reason for hospitalization (Table 2).

The most common early complications were surgical site infection in 21 (24.70%) patients and ileus in 15 (17.64%) patients. Some patients had multiple early complications.

67.64% of complications were mild complications (Clavien-Dindo I and II). Nine patients (10.59%) who were mortal died in the late postoperative period (5.2 months at the earliest after ileostomy closure surgery) (Table 3). There was no mortality associated with ileostomy closure surgery.

Table 2. Data on the reoperation status of the patients and the reasons for readmission to the hospital

Features	n	%
Reoperation		
Yes	9	10,59
No	76	89,41
Reoperation types		
Abscess drainage, debridement	6	7,06
Bridectomy	1	1,18
Opening a double-barrel ileostomy	1	1,18
Percutaneous abscess drainage	1	1,18
No	76	89,41
Hospitalization within 30 days		
Yes	14	16,47
No	71	83,53
Reason for readmission		
No	71	83,53
Acute coronary syndrome	1	1,18
Intra-abdominal abscess/ hematoma	2	2,35
Brid ileus	3	3,53
Surgical site infection	9	10,59
Rectal bleeding	1	1,18
Lower extremity DVT	1	1,18

DVT: Deep vein thrombosis, n: Number, %: Percentage

Table 3. Data on early complications observed in patients

Features	n	%
Early complication		
Yes	34	40,00
No	51	60,00
Type of early complication		
No	51	60,00
Cardio-vascular system AF, tachycardia, ACS	3	3,53
Intra-abdominal abscess/ hematoma	2	2,35
Anastomotic leak	1	1,18
İleus	15	17,64
Surgical site infection	21	24,70
Gastrointestinal bleeding	1	1,18
Urinary tract infection	2	2,35
Treatment of early complications		
No	51	60,00
Medical treatment	12	14,11
Surgical abscess drainage	5	5,88
Drainage and debridement (AF, tachycardia, ACS)	14	16,47
Erythrocyte suspension replacement	1	1,18
Nasogastric tube insertion	8	9,41
Percutaneous abscess drainage	1	1,18
Reoperation+resection+double barrel ileostomy opening	1	1,18
Clavien-Dindo		
I	7	8,24
II	16	18,82
III	10	11,76
IV	1	1,18
Survival		
Live	76	89,41
Ex	9	10,59
Exitus reason		
Distant metastasis	7	77,77
Multiple organ failure	2	22,22

AF: Atrial fibrillation, ACS: Acute coronary syndrome, n: Number, %: Percentage

Table 4. The relationship between HALP, LCR scores, and biochemistry data of early complications in the patients in the study

		Early complications	
		Mean ±SD	**p value**
HALP	Yes	28,61±28,45	<0,001**
	No	29,40±22,51	
	Total	29,09±24,89	
LCR	Yes	0,25±0,26	0,019**
	No	0,42±0,37	
	Total	0,35±0,34	
Hemoglobin	Yes	12,17±2,04	0,861
	No	12,09±2,02	
	Total	12,12±2,01	
Albumin	Yes	3,63±0,63	0,029**
	No	3,92±0,54	
	Total	3,80±0,590	
Lymphocyte	Yes	1,45±0,92	0,582
	No	1,36±0,69	
	Total	1,40±0,79	
Platelet	Yes	320,89±165,08	0,106
	No	268,33±130,24	
	Total	289,36±146,54	
Neutrophil	Yes	5,52±3,67	0,041**
	No	4,31±1,65	
	Total	4,79±2,70	
CRP	Yes	24,22±41,40	0,003**
	No	6,08±5,34	
	Total	13,34±27,75	

HALP: Hemoglobin, albumin, lymphocyte, and platelet score, LCR: Lympocyte-C-reactive protein ratio, CRP: C-reactive protein, SD: Standard deviation

It was determined that Capecitabine and Folfox were the most commonly used KT agents in both groups.

We observed that the longer the interval between index surgery and loop ileostomy closure surgery, the higher the rate of postoperative complications. The longer the duration of ileostomy closure surgery, the higher the rate of postoperative complications. Similarly, the longer the hospitalization period, the more frequent the postoperative complications ($p<0.05$).

A significant difference was found between the development of early complications and HALP (P: 0.001) and LCR (p: 0.019) scores. It was concluded that these scores were significant predictors of the development of early complications ($p<0.05$). The cut-off values were measured as 25.12 for HALP and 0.45 for LCR.

A significant difference was found between the development of early complications and the biochemistry data of albumin ($p = 0.029$), neutrophil ($p = 0.041$), and CRP ($p = 0.003$). Patients with early complications had a lower mean albumin value. Additionally, it was observed that the mean values of neutrophil and CRP were higher in patients with complications (Table 4).

There was no statistically significant difference between early complications and the first operation, pathology results, and stoma closure method. Similarly, there was no significant difference between the neoadjuvant and adjuvant chemotherapy given to the patients and the development of early complications ($p > 0.05$). However, the type of incision applied ($p = 0.039$) was found to be an effective variable in the development of early complications. Complications were

observed in all ileostomies closed with a median incision or laparoscopically.

The development of early complications in the patients included in the study was evaluated using ROC analysis, and curves were created to assess the rates and influencing factors of early complication development.

Factors associated with the development of early complications were compared using Multiple Logistic Regression. Upon examination of the results, HALP ($p = 0.014$) and LCR ($p = 0.007$) were identified as significant variables (Figure 1).

The relationship between early complication development and biochemistry values was also assessed using Multiple Logistic Regression. The results showed that Albumin ($p = 0.035$), lymphocyte ($p = 0.013$), neutrophil ($p = 0.009$), and CRP ($p = 0.005$) were significant variables (Figure 2).

According to the results of the Pearson correlation analysis, an inverse significant difference was found between the development of early complications and the HALP variable. Higher HALP values were associated with a lower risk of developing early complications.

Similarly, an inversely significant difference was observed between the early complication development status and the LCR variable. Higher LCR values were associated with a lower risk of developing early complications.

DISCUSSION AND CONCLUSION

The predictability of complications after loop ileostomy closure is important for both patient healthcare and the cost of treatment. The systemic inflammatory response plays a significant role in both benign and malignant diseases. In many diseases, inflammatory markers such as hemogram and albumin obtained from routine biochemical tests of patients are used. In this study, we examined whether inflammatory markers such as HALP and LCR can predict complications after loop ileostomy closure. We found that both markers are strongly associated with complications that occur after ileostomy. In other words, higher preoperative LCR and HALP scores are associated with a lower postoperative complication rate after loop ileostomy surgery.

Loop ileostomy closure can be performed with staples or by manual anastomosis. Small bowel obstruction is more common after manual anastomosis. However, there is no significant difference between these two techniques in terms of anastomotic leakage (14,15). In our study, there was no difference between manual anastomosis and stapled anastomosis in terms of complications.

The rate of complications after loop ileostomy closure ranges from 17% to 23.7%. The mortality rate has been reported to be below 1% (16,17). The most common complications are surgical site infection and intestinal obstruction. Hypoalbuminemia has been identified as an independent factor associated with complications (17). In our study, the rate of early complications was higher than what has been reported in the literature. We found that the rate of mild complications (Clavien-Dindo I and II) was 27%, and the rate of severe complications (Clavien-Dindo III and IV) was 12.94%. The most common complications in our patients were surgical site infection and ileus/intestinal obstruction.

There were no mortalities after ileostomy closure in our study. However, the complication rate of our patients was higher compared to rates reported in some articles in the literature (16,17). This difference may be attributed to our provincial healthcare organization. Since our hospital is a tertiary referral center, younger patients and uncomplicated cases are usually managed in local hospitals. On the other hand, patients with multiple comorbidities, elderly patients, and complicated cases are referred to the university hospital. This may explain the relatively higher morbidity rates observed in our study. Additionally, we found a statistically significant relationship between the development of early complications and low serum albumin levels. Patients who developed complications had lower mean serum albumin levels.

Systemic inflammation and nutritional status are factors that play a crucial role in determining treatment outcomes for many diseases. The HALP score, which is calculated using hemoglobin, albumin, lymphocyte, and platelet values, serves as an inflammatory marker that reflects both the inflammatory response and nutritional status of patients. The HALP score has been used as a marker associated with poor prog-

nosis and survival in patients with various gastrointestinal cancers, such as stomach and colon (18,19). Each component of the HALP score individually reflects the prognosis of diseases. Previous studies have shown that complications after ileostomy closure are associated with low hemoglobin levels (20). Similarly, hypoalbuminemia and malnutrition increase the risk of complications in patients undergoing ileostomy closure surgery (17). Lymphocyte counts have also been found to be associated with prognosis in patients with colorectal and gastric cancer who underwent surgery (21,22). In pediatric patients who have undergone appendectomy, low lymphocyte levels have been suggested to predict the development of intra-abdominal abscesses (23). Furthermore, platelets, which play an active role in the development of the inflammatory response, have been identified as a potential indicator of postoperative complications (24). However, the relationship between complications of ileostomy closure and the HALP score has not been investigated before. In this study, we have demonstrated a strong correlation between the HALP score and complications in our patients. We observed that the complication rate increased with decreasing HALP score.

LCR, as a marker of the inflammatory response, is confidently used to predict disease-free survival and overall survival rates in patients with colorectal cancer and gastric cancer. Low preoperative LCR values are associated with worse overall survival and disease-free survival, as well as more advanced cancer stages (25,26). LCR has also been reported as an independent factor associated with bowel ischemia in strangulated abdominal wall hernias (27). In our study, we found that LCR effectively predicted complications after loop ileostomy closure. The complication rates increased as the LCR decreased, indicating a reciprocal association.

There are some limitations to our study. Firstly, it was a retrospective, single-center study with a low number of patients, which are the three most important limitations. However, it is the first study of its kind to compare postoperative complications and inflammatory markers in patients with loop ileostomy closure. This pilot study is the first to demonstrate that LCR and HALP scores can predict complications after ileostomy closure. Low LCR and/or HALP scores measured preoperatively may indicate potential complications that could arise from loop ileostomy closure and may assist in determining the optimal timing for surgery. Prospective studies with larger patient cohorts are needed to validate and standardize the data.

In conclusion, preoperative measurement of HALP and LCR is valuable in predicting early complications after loop ileostomy closure. It may be beneficial to incorporate these inflammatory markers alongside other diagnostic tools.

Conflict-of-interest and financial disclosure

The authors declare that they have no conflict of interest to disclose. The authors also declare that they did not receive any financial support for the study.

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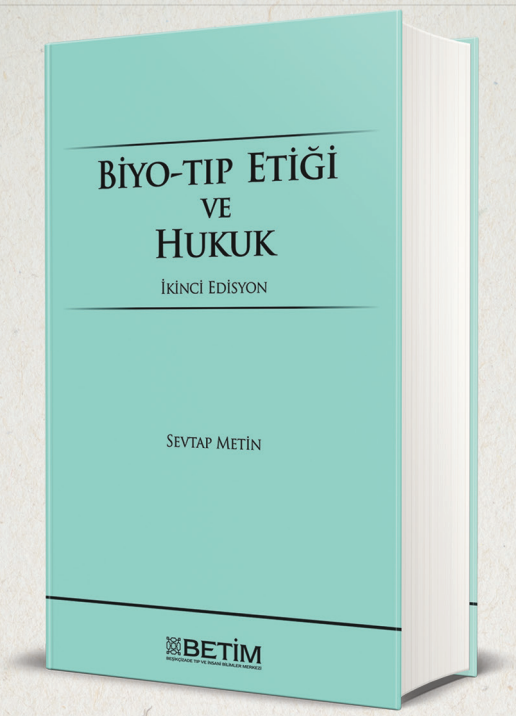


BİYO-TIP ETİĞİ VE HUKUK

SEVTAP METİN

Biyo-tıp etiği, muhtaç olanlara gerektiği şekilde yardım etme biçimindeki genel ahlaki yükümün, doktorun faaliyetinde somutlaştırılması olarak görülür. Bu durumda yardıma gereksinim duyanlar hastalardır ve onlara yapılması gereken yardım esas olarak tıbbidir. Yine de hekimlik etkinliği sadece teknik gerekleri yerine getirmekle yetinemez; öyle ki eğer ahlak boyutu eksikse hekim tıbbı uygulayan bir teknisyen olmaktan öteye geçemeyecektir. Ancak bunun da ötesinde, içinde yaşadığımız 21. yüzyıla dair nitelendirmelerden biri de biyoteknoloji yüzyılı olacağı öngörüsüdür. Bir kısmı şu an için pratiğe geçirilemese de tasavvur ötesi olmayan birçok biyoteknolojik atılım ve bunun insan hayatı ve sağlığına etkisi, görmezden gelinemeyecek aşamaya gelmiştir. İşte bu dönemde tıbbi işlemlerin sadece ahlaki tarafına vakıf olmanın da ötesine geçilerek felsefi bir tartışma ve yaklaşıma her zamankinden daha fazla ihtiyaç vardır.

Türkiye'nin ilk ve tek tıp ve insani bilimler merkezi Beşikçizade Tıp ve İnsani Bilimler Merkezi—BETİM tarafından yayımlanan bu önemli eser tıbbın felsefi yönü ile de ilgilenen okurlar için vazgeçilemez bir başvuru kaynağı olacaktır.

BETİM KİTAPLIĞI

ANADOLU KLİNİĞİ TIP BİLİMLERİ DERGİSİ YAZIM KURALLARI

1. GENEL BİLGİLER

- Dergilerin, uluslararası standartları göz önüne alarak, bir makalenin hazırlanması sırasında uyulması gereken ilkeleri belirlemeleri ve değerlendirmeye alacakları makalelerde bu kurallara uygunluğu kontrol etmeleri, bilimsel yayıncılık standartlarımızın yükseltilmesi açısından önem taşımaktadır.
- Bilimsel dergilere gönderilecek bir makalenin hazırlığı sırasında uyulması gereken, uluslararası tıp dergilerinin de kabul ettiği ve uyguladığı en önemli standartlar şu şekildedir:
  - Yayımlanmak için gönderilen çalışmaların daha önce başka bir yerde yayımlanmamış veya başka bir yere yayımlanmak üzere gönderilmemiş olması gerekir.
  - Makale daha önce yayımlanmışsa ve(ya) alıntı yazı, tablo, fotoğraf gibi ögeler içeriyorsa evvelki yayın hakkı sahibinden ve(ya) bu ögelerin telif hakkı sahiplerinden yazılı izin alınması ve bunun makalede belirtilmesi gerekir.
  - Bilimsel toplantılarda sunulan yazılar, bu sunumun dipnot olarak belirtilmesi koşuluyla, değerlendirmeye alınır.
  - Türkçe yazılarda Türk Dil Kurumu'nun güncel ve bilimsel sözlüklerinde geçen yazımlar esas alınmalıdır. İngilizce yazılar Amerikan İngilizcesi ile yazılmalıdır.

2. BİLİMSEL SORUMLULUK

- Gönderilen bilimsel yazıda, tüm yazarların akademik–bilimsel olarak doğrudan katkısı olmalıdır.
- Dergi ile iletişim görevini yapan yazar (yazışma yazarı), tüm yazarlar adına yazının son halinin sorumluluğunu taşır.

3. ETİK SORUMLULUK

- "İnsan" ögesi içeren tüm orijinal araştırmalarda Helsinki Bildirgesi prensiplerine uygunluk şarttır. Bu tip araştırmalarda yazarların, yazılarının GEREÇ VE YÖNTEMLER bölümünde, araştırmaları sırasında bu prensiplere uyduklarını ve ayrıca kurumlarının etik kurullarından ve çalışmaya katılmış insanlardan "bilgilendirilmiş onam" (*informed consent*) aldıklarını belirtmeleri gerekmektedir.
- "Hayvan" ögesi içeren orijinal araştırmalarda ise yazarlar, yazılarının GEREÇ VE YÖNTEMLER bölümünde, araştırmaları sırasında *Guide for the Care and Use of Laboratory Animals* prensipleri doğrultusunda hayvan haklarını koruduklarını ve hayvan etik kurullarından onay aldıklarını belirtmelidirler.
- Vaka sunumlarında sunulan kişi ya da kişilerin kimliğinin açığa çıkıp çıkmadığına bakılmaksızın "bilgilendirilmiş onam" (*informed consent*) alınmalıdır.
- Çalışmaları ile ilgili direkt–endirekt bir ticari bağlantıları veya çalışmalarına maddi destek veren bir destekçileri varsa, yazarlar bunları ve bu ilişkilerinin doğasını (konsültan, diğer anlaşmalar) Editöre Sunum sayfasında belirtmelidirler.
- Makalede "etik kurul onayı" alınması gerekli ise; yazarlar, yazılı etik kurul izni / onayı aldıklarını "Gereç ve Yöntemler" bölümünde "……..etik kurulundan …….tarih ve…… sayı ile etik kurul onayı alınmıştır" şeklinde beyan etmelidir. "Sözlü etik onay alınmıştır" ifadesi kullanılmamalıdır.

4. YAYIN/TELİF HAKKI

- Yayımlanmak üzere kabul edilen yazıların her türlü yayın/telif hakları dergimize aittir. Yazılardaki düşünce ve öneriler tümüyle yazarların sorumluluğundadır.

5. YAZI TÜRLERİNE GÖRE YAZIM KURALLARI

- Derginin yayın dili Türkçe ve İngilizcedir.
- Her tür bilimsel yazı için, *Word* dosyası halinde ayrı ayrı "Editöre Sunum Sayfası" ve "Kapak Sayfası" hazırlanmalı ve dergiye başvuru esnasında ayrı birer dosya halinde gönderilmelidir. Dergimiz İnternet sitesinden "Editore Sunum Sayfası" ve "Kapak Sayfası"na dair örnek şablonlar indirilebilir. Yazım dili Türkçe olan yazılar için sadece Türkçe şablonun, yazım dili İngilizce olan yazılar için ise sadece İngilizce şablonun doldurulup gönderilmesi yeterlidir.
- Her makale için yazarlar "TELİF HAKKI DEVİR FORMU" nu, bilimsel yazılarını dergiye başvuru esnasında doldurup imzalayarak, yazıları ile birlikte dergiye göndermelidirler. Türkçe ve İngilizce form İnternet sayfamızdan indirilebilir. Yazım dili Türkçe olan yazılar için sadece Türkçe formun, yazım dili İngilizce olan yazılar için ise sadece İngilizce formun doldurulup gönderilmesi yeterlidir.
- Bilimsel yazı kabul edildikten sonra baskı öncesi kopyanın her sayfasının ve Telif Hakkı Devir Formu'nun tüm yazarlar tarafından ıslak imza ile imzalanması ve tüm bu evrakın BETİM Hasekisultan Mah., Topçu Emin Bey Çıkmazı, no. 4, 34096 İstanbul adresine posta yoluyla gönderilmesi gerekmektedir (tel. 0212 632 0369; faks 0212 632 0328). İlk başvuruda bunların elektronik olarak yüklenmesi yeterlidir.
- Dergilere yayımlanmak üzere gönderilecek yazıların türlerine göre yazım kuralları aşağıda tanımlanmıştır.

5.1. ORİJİNAL ARAŞTIRMA MAKALESİ

- Yazılar *Microsoft Word*® belgesi olarak hazırlanmalı ve 1,5 aralıklı, 12 punto, iki yana yaslı ve *Times New Roman* karakteri kullanılarak yazılmalıdır. Sayfa kenarlarında 2,5 cm boşluk bırakılmalı ve sayfa numaraları sayfanın sağ üst köşesine yerleştirilmelidir.
- Kör hakemlik ilkesi gereğince, "Editöre Sunum Sayfası" ve "Kapak Sayfası" sisteme ayrı birer dosya halinde yüklenmelidir. Editöre sunum sayfasında olması gereken bilgiler, yazının türü, daha önce başka bir dergiye gönderilmemiş olduğu ve varsa çalışmayı maddi olarak destekleyen kişi ve kuruluşlar ve bu özel ve tüzel kişilerin yazarlarla olan ilişkileri belirtilmelidir. Kapak sayfasında ise Türkçe ve İngilizce olarak alt alta olacak şekilde yazının uzun başlığı ve 40 karakteri geçmeyen kısa başlığı, yazar bilgileri ve sorumlu yazar bilgileri ve önerilen hakem bilgileri yer alır. İnternet sitemizdeki örnek şablonlarda bu bilgilerin nerede ve nasıl verileceğine dair yönlendirmeler mevcuttur. Yazarlara, izin alınan etik kurullara ve kurumlara ait bilgiler yazının ana metninde yer almamalıdır. GEREÇ VE YÖNTEMLER bölümünde bu ibareler XXXXXXX şeklinde yazılmalıdır.
- Yazıya ait ana metnin ilk sayfasında çalışmanın uzun başlığı Türkçe ve İngilizce olarak yer almalı, başlık büyük harflerle yazılmalı ve sayfanın geri kalan kısmı boş bırakılmalıdır. Başlıkta kısaltma kullanılmamalıdır.
- Daha sonra önce "ÖZ" (çalışmanın yazım dili İngilizce ise *ABSTRACT*) bölümü yazılmalıdır. Bu bölüm en fazla 300 kelimeden oluşmalıdır. Türkçe ve İngilizce yazılmalıdır. Bu sayfa da ayrı bir sayfa olmalı ve anahtar sözcüklerden başka yazı bölümü içermemelidir.
- Yazının ana metni Türkçe ise önce ilk sayfaya Türkçe ÖZ, ikinci sayfaya İngilizce *ABSTRACT* yazılmalıdır. Yazının ana metni İngilizce ise önce ilk sayfaya İngilizce *ABSTRACT*, ikinci sayfaya Türkçe ÖZ yazılmalıdır.
- ÖZ veya *ABSTRACT* yapılandırılmış olmalıdır. Yapılandırılmış ÖZ (*ABSTRACT*) bölümünde

- "Amaç (*Aim*),"
- "Gereç ve Yöntemler (*Materials and Methods*),"
- "Bulgular (*Results*),"
- "Tartışma ve Sonuç (*Discussion and Conclusion*)"

olmak üzere dört alt başlık yer almalıdır. ÖZ'de paragraflar içeriden başlamamalıdır.

- Türkçe ve İngilizce özetin sonunda yer alacak olan anahtar sözcüklerin sayısı en az iki, en fazla altı olmalıdır. Bunlar birbirinden noktalı virgül (;) ile ayrılmalı ve alfabetik sıraya göre sıralanmalıdır. Örneğin: **Anahtar Sözcükler:** insan denekler; klinik araştırmalar; kontrollü deney; randomize kontrollü deney. İngilizce anahtar sözcükler *Medical Subject Headings* (*MeSH*) doğrultusunda verilmelidir. Anahtar sözcük seçimi için, izleyen bağlantı tıklanarak açılan sayfada, ilgili konuya dair uygun sözcük girilerek anahtar sözcüklere ulaşılabilir: www.nlm.nih.gov/mesh/MBrowser.html. Türkçe anahtar sözcükler Türkiye Bilim Terimleri (TBT) doğrultusunda verilmelidir: www.bilimterimleri.com.
- ÖZ ve *ABSTRACT* bölümlerinden sonra ana metne yeni bir sayfada GİRİŞ bölümü ile başlanmalıdır. Yazıda GİRİŞ, GEREÇ VE YÖNTEMLER, BULGULAR, TARTIŞMA VE SONUÇ, gerekli ise TEŞEKKÜR ve KAYNAKLAR ana bölümleri yer almalıdır. Ana bölümlerin başlığı büyük harflerle ve **kalın** olarak yazılmalıdır. Ana başlıklar sola yaslı olmalıdır.
- GİRİŞ bölümünün son paragrafı çalışmanın amacını açıklamalıdır.
- Kaynaklar, ilgili cümlenin sonunda parantez içinde numaralarla, metin içinde geçtiği sıraya göre verilmelidir. Örneğin; …… (1). veya …… (1,2). veya …… (3–5).
- Ana metinde paragraflar *Word* programında yer alan cetvel yardımıyla 1 cm içeriden başlamalıdır.
- Yazıda yer alan tüm alt başlıkların sadece ilk harfi büyük olmalıdır. Yalnızca alt bölümler içindeki alt bölümlerin (alt-alt bölümlerin) başlıkları *italik* yazılmalıdır.
- GEREÇ VE YÖNTEMLER bölümü ile BULGULAR bölümünde verilmesi düşünülen Tablo ve Görsel yazılarının ilk harfi büyük olmalı ve **kalın** yazılmalıdır. Örneğin **Tablo 1., Görsel 1.** Tablo yazıları ilgili tablonun üzerinde, görsel yazıları ise ilgili görselin altında yer almalıdır.
- Tablo ve şekiller metin içerisinde nerede geçiyor ise o bölümde ilgili cümlenin sonuna parantez içinde **Tablo 1.** veya **Görsel 1.** gibi yazılmalı, ancak ilgili tablo ve görseller başlıklarıyla birlikte kaynaklardan sonra ve her biri bir sayfada olacak şekilde ayrı ayrı verilmelidir. Görsel ve tablo üzerinde kısaltma ve/veya sembol kullanılmış ise tablo/görsel altında 8 punto ile yazılarak açıklanmalıdır.
- Görseller (örneğin fotoğraflar) metne eklenmemeli, ayrı bir dosya olarak (görüntü kalitesi 300 dpi olacak şekilde ve .jpeg, .bmp, .tif vb. formatta) sisteme yüklenmelidir. Görsel alt yazıları, son tablonun olduğu sayfadan hemen sonra, ayrı bir sayfada sırasıyla, ilk harfleri büyük olacak biçimde (**Görsel 1.** Açıklayıcı metin) yazılmalıdır.
- Daha önce basılmış görsel, tablo ve grafik kullanılmış ise yazılı izin alınmalı ve bu izin açıklama olarak görsel, tablo ve grafik açıklamasında parantez içinde belirtilmelidir.
- Çalışmada veri analizi yapılmış ise GEREÇ VE YÖNTEMLER bölümünün son alt başlığı olarak "İstatistiksel analiz" başlığı tanımlanmalı ve bu bölümde hangi amaç için hangi istatistiksel yöntemlerin kullanıldığı ve ilgili paket programlar yazılmalıdır.
- BULGULAR bölümünde yöntem adları verilmemelidir.
- Çalışmada TEŞEKKÜR bölümü gerekli ise bu bölümde, çıkar çatışması, finansal destek, bağış ve diğer bütün editöryal (İngilizce/Türkçe değerlendirme) ve/veya teknik yardım belirtilmelidir.
- KAYNAKLAR bölümü aşağıda belirtilen kurallara uygun olarak yazılmalıdır.

5.2. DERLEME TÜRÜ YAZILAR

Orijinal araştırma yazıları için yukarıda tanımlanan yazım kuralları derleme türü yazılar için de geçerlidir. Sadece aşağıda tanımlanan birkaç maddede değişiklikler söz konusudur:

- Derleme türü yazılarda ana başlıklarda değişiklikler yapılabilir.
- Derleme türü yazılarda ÖZ en fazla 250 kelimeden oluşmalıdır.

5.3. VAKA SUNUMU / VAKA SERİLERİ VE DİĞER TÜRDEN YAZILAR

Orijinal araştırma yazıları için yukarıda tanımlanan yazım kuralları vaka sunumu veya vaka serileri türünde hazırlanan yazılar için de geçerlidir. Sadece aşağıda tanımlanan birkaç maddede değişiklikler söz konusudur:

- Vaka sunumu türündeki yazılarda ana başlıklarda değişiklikler yapılabilir.
- Derleme türü yazılarda ÖZ en fazla 150 kelimeden oluşmalıdır.
- Bu tür yazılarda kaynak sayısı 15'i aşmamalıdır.

Bu üç ana yazı türünden başka;

- Editöryel Yorum/Tartışma türünde (yayımlanan orijinal araştırma makalelerinin, araştırmanın yazarları dışında konunun uzmanı tarafından değerlendirilmesi) veya
- Editöre Mektup türünde (son bir yıl içinde dergide yayımlanan makaleler ile ilgili okuyucuların değişik görüş, tecrübe ve sorularını içeren, en fazla 500 kelimeden oluşan yazı türü) yazılar da gönderilebilir. Bu yazıların hazırlanmasında da genel yazım kuralları geçerlidir. Bu yazı türlerinde,
  - Başlık ve özet bölümleri yoktur.
  - Kaynak sayısı beş ile sınırlıdır.
  - Sayı ve tarih verilerek hangi makaleye atıf yapıldığı belirtilmeli ve sonunda yazarın ismi, kurumu ve adresi bulunmalıdır. Mektuba cevap, editör veya makalenin yazar(lar) ı tarafından, yine dergide yayımlanarak verilir.

KAYNAK YAZIM KURALLARI

- Dergilerin atıf sayılarının sağlıklı olarak tespit edilebilmesi, kaynakların düzgün yazılmasıyla doğrudan ilişkilidir. Dergimizde Vancouver kaynak yazım stilinin bir varyantı kullanılmaktadır.
- Dergiye başvuru sırasında kaynakların ayrıştırılması, atıflar açısından büyük önem taşımaktadır. Bu ayrıştırmanın sağlıklı bir şekilde yapılabilmesi için kaynakların Vancouver kaynak yazım stiline göre yazılması büyük önem arzetmektedir. Dergimiz kaynak yazım kuralları, kaynak yazının türüne göre aşağıda tanımlanmıştır.

Dergi Makaleleri İçin Yazım Kuralları

[Her yazar için] yazarın soyadı, yazarın adının baş harf[ler]i. Makalenin başlığı [yalnızca ilk kelimenin ilk harfi büyük, geri kalanlar özel isim değilse küçük olarak]. Derginin adı [italik, kısaltılmış ve her harf öbeğinin ilk harfi büyük olarak]. Yıl;cilt(sayı):başlangıç sayfa numarası–bitiş sf. no. [mükerrer rakamlar çıkarılmış olarak].

Örnek:
Abaraogu UO, Tabansi-Ochuogu CS. As acupressure decreases pain, acupuncture may improve some aspects of quality of life for women with primary dysmenorrhea: a systematic review with meta-analist. J Acupunct Meridian Stud. 2015;8(5):220–8.

Kitaplar İçin Yazım Kuralları
[Her yazar için] yazarın soyadı, yazarın adının baş harf[ler]i. Kitabın Adı [bağlaç, soru eki vb. hariç, tüm sözcüklerin ilk harfleri büyük olarak], [varsa] ed. [her editör için] editörün soyadı, editörün adının baş harf[ler]i, [ya da varsa] çev. çevirmenin soyadı, çevirmenin adının baş harf[ler]i, X. ed. [ilk edisyon/baskı değilse X. edisyon/baskı olduğu bilgisi]. Yayınevinin kenti: Yayınevinin ismi; yayımlanma tarihi:göstermek istenirse kaynak gösterilen sayfa[lar].

Örnek:
Ankaralı H, Cangür Ş, Sungur MA. Formülsüz Biyoistatistik. İstanbul: BETİM; 2015.

Beauchamp TL, Childress JF. Biyomedikal Etik Prensipleri, çev. Temel MK, 7. ed. İstanbul: BETİM: 2017:263.

Kitaplar Bölümleri İçin Yazım Kuralları
[Her yazar için] yazarın soyadı, yazarın adının baş harf[ler]i. Kitabın bölümünün adı [yalnızca ilk kelimenin ilk harfi büyük, geri kalanlar özel isim değilse küçük olarak]. In: [varsa, her editör için] editörün soyadı, editörün adının baş harf[ler]i, (ed.), [ya da varsa] çevirmenin soyadı, çevirmenin adının baş harf[ler]i (çev.), Kitabın Adı [tüm esas sözcüklerin ilk harfleri büyük olarak], X. ed. [ilk edisyon/baskı değilse X. edisyon/baskı olduğu bilgisi]. Yayınevinin kenti: Yayınevinin ismi; yayımlanma tarihi:bölümün başladığı–bittiği sayfa.

Örnek:
Beauchamp TL, Childress JF. Özerkliğe saygı. In: Temel MK (çev.), Biyomedikal Etik Prensipleri, 7. ed. İstanbul: BETİM: 2017:153–226.

İnternet Kaynakları İçin Yazım Kuralları
İnternet girisini giren kişinin soyadı, adının baş harf[ler]i, ya da, kurumun tam ve açık adı (varsa giri tarihi). Giri başlığı [özel isim olmadığı sürece sadece ilk kelimenin ilk harfi büyük olarak]. Erişim: adresi (erişildi: son erişildiği tarih).

Örnek:
T.C. Resmî Gazete (29.6.2019). Eczacılar ve Eczaneler Hakkında Yönetmelikte Değişiklik Yapılmasına Dair Yönetmelik. Erişim: www.resmigazete.gov.tr/eskiler/2019/06/20190629-8.htm (erişildi: 12.9.2020).

Türk Dil Kurumu. Kesme işareti (’). Erişim: www.tdk.gov.tr/icerik/yazim-kurallari/kesme-isareti (erişildi: 8.8.2020).

Yayımlanmamış Yüksek Lisans/Doktora Tezleri İçin Yazım Kuralları
Yazarın soyadı, yazarın adının baş harf[ler]i. Tezin adı [kitap adı gibi yazılmış şekilde] (yayımlanmamış yüksek lisans/doktora tezi). Yükseköğretim kurumunun kenti: kurumun ismi: yıl [kitapların yayımlandığı yer, yayınevi ve tarih bilgileri gibi].

Örnek:
Barış M. Down Sendromu Bağlamında Seçici Kürtaj Hakkındaki Etik Argümanların Normatif Analizi (yayımlanmamış yüksek lisans tezi). İstanbul: T.C. İstanbul Üniversitesi, İstanbul Tıp Fakültesi, Tıp Tarihi ve Etik Anabilim Dalı; 2017.

6. GENEL AÇIKLAMALAR

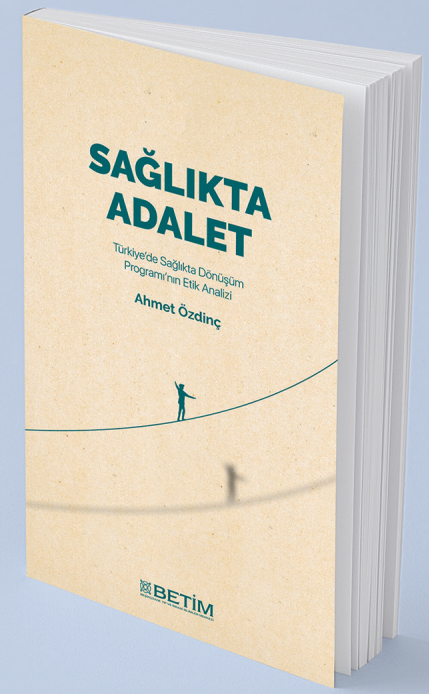
Medical Subject Headings (MeSH) nedir?
- Uluslararası başlıca makale tarama dizinleri ve veri tabanlarında, makalelerin sınıflandırılması için kullanılmakta olan, tıbbi–biyolojik terminolojiye standart getirmeyi amaçlayan ve sürekli güncellenen, İngilizce makalelerin anahtar sözcüklerinin seçilebileceği, geniş bir tıbbi–biyolojik terimler dizinidir.

Türkiye Bilim Terimleri (TBT) nedir?
Ulusal düzeyde tıbbi–biyolojik terminolojiye standart getirmeyi amaçlayan, şimdilik 186.000 tıbbi–biyolojik terim içeren ve sürekli güncellenen, Türkçe makalelerin anahtar sözcüklerinin seçilebileceği tıbbi–biyolojik terimler dizinidir.

Anahtar Sözcükler Neden *MeSH* ya da TBT Arasından Seçilmelidir?
- *MeSH* ve TBT terimleri, ana başlıklar ve alt başlıklardan oluşan, birbiri ile ilişkilendirilmiş hiyerarşik bir yapı ile kodlanmışlardır.
- Böylece tek bir terim ile yapılan aramada, ana başlıklar yanında terimin ilişkilendirildiği tüm alt başlıklar da otomatik olarak aramaya dahil edilir.
- Aynı terim, birden çok terminoloji ile tanımlanmış olduğundan, araştırmacının az veriyle, kolay ve hızlı bir şekilde mümkün olduğunca çok makaleye ulaşabilmesini sağlar.

KISALTMA VE AKRONİMLER
Kısaltılacak sözcüğün ya da sözcük öbeğinin ilk geçtiği yerde parantez içinde verilmelidirler. Aynı sözcük(ler) için tüm metin boyunca aynı kısaltma/akronim kullanılmalıdır. Uluslararası kullanılan kısaltmalar için “Bilimsel Yazım Kuralları” (*Scientific Style and Format: the CBE Manual for Authors, Editors, and Publishers)* kaynağına başvurulabilir.

7. YAZININ GÖNDERİM AŞAMASINDA DİKKAT EDİLECEK NOKTALAR
- Sorumlu yazar, “TELİF HAKKI DEVİR FORMU”nu doldurup, çalışma ile birlikte dergiye göndermelidir.
- Yazarlar, makaleyi değerlendirmek üzere potansiyel iki hakemin ismini ve güncel iletişim bilgilerini (e-posta, telefon, faks) Editöre Sunum sayfasında bildirmelidirler. Bununla birlikte editörlerin hakemleri bizzat seçme hakkı mahfuzdur.
- Gönderiler, yazılar TÜBİTAK ULAKBİM DergiPark sistemine (http://dergipark.gov.tr/anadoluklin) yüklenerek gerçekleştirilmelidir.
- Gönderi sırasında Editöre Sunum sayfası, kapak sayfası, yazının ana metni, Telif Hakkı Devir Formu ve varsa görseller ayrı dosyalar halinde yüklenmelidir.
- Yazarlar İnternet sitemizdeki hakem değerlendirme formlarını inceleyerek hakemlerin incelediği konulara özellikle dikkat ederlerse yazımdaki eksikliklerini hakem sürecinden dönmeden gidermiş olurlar. Yine de hakemler her türlü eleştiriyi yapma hakkına sahiptir.



SAĞLIKTA ADALET

Türkiye'de Sağlıkta Dönüşüm Programı'nın Etik Analizi

Dr Ahmet Özdinç

Sağlığın sadece bir tıp problemi olarak görülmediği günümüzde, tıp etiği konusu büyük bir önem kazanmıştır. Sosyal güvenlik kapsamında ve devletin kontrolünde yürütülen sağlık hizmetleri, adalet ve etiğin konusu haline gelmiştir. Devlete karşı yükümlülüklerini yerine getiren bireylerin sosyal güvencenin bir parçası olan sağlık taleplerine hukukî bir zemin oluşturulmaktadır. Bu organizasyonda devlet, sağlık hizmetlerini imkânları en iyi şekilde değerlendirip vatandaşlarına dağıtmakla sorumludur. Yine bu zeminde hastalarla hekimlerin hak ve sorumlulukları da devletin güvencesi ve denetimi altındadır. Planlamadan uygulamaya kadar yürütülen bütün faaliyetler, oldukça kapsamlı bir etik tartışmasını da beraberinde getirmiştir.

BETİM KİTAPLIĞI

Yıl : 2. Sayı : 1. Haziran 1934

Anadolu Kliniği

Üç ayda bir Konyada neşrolunur.

KLİNİK DERSLERİ

AKCİGER VEREMİNDE İKLİM VE İRTİFA İSTİTBAPLARI VE SANATORYUM İNTİHABI.

Profesör Dr. Abdülkadir Lütfi.

Üstünde yaşadığımız dünyanın her tarafında hava şartları ve denizlere göre yükseklik seviyesi bir olmadığından iklim ve irtifa farkları hasıl oluyor. Ve bu farklar sıhhat üstüne muhtelif tesirler yapıyor. Hasta olmayan insanların bu farklara karşı gösterdikleri teamül ve tahammülden bahsedecek değilim. Akciğer vereminin iklim ve irtifa farklarıyle olan münasebetini hülasa edeceğim. İklim tabiriyle kısaca her hangi bir mahallin mutat vasatî hava şartları anlaşılır. Havanın sıhhat üstüne tesir eden amilleri arasında güneşin şuaları, havanın harareti, rutubeti, tazyiki, ruzgârları, tozları, allergenleri, dumanları, bulutları ve teressüpleri (yağmur, kar, şebnem . . . vs.) mühimdir. Bu âmillerin azlığı çokluğu tedricî veyahut ânî değişikliği ve nisbetleri sıhhat üstünde rol oynar.

Fransız tıp akademisinin 1933 senesi 30 mayıs celsesinde tuberkuloz âlimlerinden Emil Segent'ın dı vazıh olarak söylediği gibi akciğer vereminin tedavisi için has ve tamamen bu hastalığa mahsus bir iklim vardır denemez, fakat akciğer vereminin tedavisinde muzaddı istitbap olabilecek iklimler mevcuttur denilebilir. Havanın rie ile münasebeti daimî ve havanın rieye girmeden evvel muzir tesirlerini tamamen tadil etmek için her yerde ve her vakit vasıtalar tedariki ve istimali imkânsız olduğundan akciğer vereminin tedavisinde hava ve iklimin ehemmiyetli bir vazifesi olduğunu kabul etmek mecburiyeti vardır. Hava ve iklimin rieye ve rie hastalıklarına tesiri yalınız hava yolları ile ve doğruca temas suretiyle değildir. Havanın ve iklimin cilt ve vücut yoluyla vaki olan umumî tesiri daha ehemmiyetlidir.

İklîm ve havanın müessir âmilleri tetkik edilirse : Günşein şuaı ve bilhassa kısa mevceli ültraviyolesi vucut için münebbihtir. Hava hararetinin çokluğu vücutta gıda istiklabını güçleştirir azlığı ziyadeleştirir, havanın rutubeti bulutları, ruzgârleri yağmurları, çabuk değişiklikleri vucuda muzirdir. Yüksek dağlarda havanın tazyiki nisbeten azdır. Bu hal kan müvellidi âzaya münebbih gibi tesir eder ve bu sayede faydalı olabilir.

Yerleşmiş ve donmuş kar ve buz tabakaları güneş ziyasının inikâsını temin ve tesirini teşdit eder. Yüksek yerlerdeki sabit ve daimi serinlik vucutta gıda istiklabını teşvik eder bu veçhile istifadeli telâkki olunabilir. Havanın dumanları, tozları, bulutları, ziyanın kudretini ve şiddetini tenkis eder, allergen mevad ile birlikte cilt ve gışayı muhatiyi tahriş eden âmillerdendir, vucuda ve sıhhata zararlı olabilirler. Rutubeti az ve serin mahallerde ter azalır, akciğer veremınde bu şartın da faidesi olabilir.

Havanın sıhhat üstüne iyi ve muzir tesiri yapan bu müessir âmilleri bazı mahallerde en iyi tarzlarda birleşmiş ve yerleşmiştir. Bazı yerlerde de sıhhate karşı en muzir şekillerde cenk ve cidal sahnesi açmışlardır. Bu muhtelif şartlar ve birleşmeler dünya yüzünde belli başlı iklimler yaratmışlardır. Bu iklimlerin en mühimleri : Deniz, sahil, ova, çöl ve dağ iklimidir.

Akciğer hastaları ve hastalığı üstüne bu iklimlerin yaptığı tesiri arzetmeden evvel belli başlı vasıflarını hulâsa edeceğim:

Dağ iklimi:

İrtifaa göre üç dereceye ayrılır, irtifaı 1400 metreden yüksek olana « yüksek dağ iklimi » denir. İrtifaı 700 - 1400 metre arasında olanlar « o r t a d a ğ i k l i m i », irtifaı 700 den az olanlara « Alçak dağ iklimi » denir.

Y ü k s e k d a ğ i k l i m i : Burada toz, allergen maddeler, bulut, rutubet çok az, hava tabakası hafiftir, bu sebeple güneş ziyası ve bilhassa ültraviyolesi tesirlidir. Deniz seviyesinde güneş ziyasının tesiri yüzde 20 - 30 zayi olmakta iken yüksek iklim sayılan Mont-Belanc dağı zirvesinde ziyanın zayi olma derecesi yüzde 6 bulunmuştur. Yüksek iklimlerde senenin güneşli geçen zamanları alçak iklimlere nazaran pek fazladır. Meselâ Zürich'te 400 metre irtifaında, güneş bir sene zarfında 1576 saat görüldüğü halde 1800 metrede bu miktar 1857 saata çıkıyor, yalnız kış mevsimi hisap edilirse yükseklerde güneşli geçen saatlar daha fazladır,

İstanbul rasathanesi müdiriyetininden İstanbulun bir sene zarfında güneşli geçen günleri sormuştum, bir çok zahmet sarfıyla çıkarılan dakik hisapları lütfen bildirdiler, bu cetveli aynen ve teşekkürle kaydediyorum. Cetvelden anlaşılıyor ki İstanbul şehrinin ve cıvarının senelik güneşli saatları 2523 dür ve sanatoryumlar memleketi olan İsviçreye nazaran pek çoktur. Cetvel :

1932 senesi İstanbul rasathanesinin kaydettiği güneşli saatlar cetveli :

Ay	Güneşli geçen saatlar:
İkinci kânun	78
Şubat	89
Mart	88
Nisan	231
Mayıs	276
Haziran	307
Temmuz	373
Ağustos	354
Eylûl	308
Birinci teşrin	240
İkinci teşrin	105
Birinci kânun	70
Y e k û n	2523

Şiddetli ziya, serinlik, rutubetsizlik, ekseriya akciğer veremine müsâit gelir. Havanın tozzuz, allergen'siz olması, havada duman ve ruzgârın nisbeten az bulunması, mevsime göre teessüs eden muvazenenin sebat etmesi de akciğer veremine faidesi olan iklim şartları arasındadır. Yüksek dağ iklimlerinde ve bilhassa dağların şimal ruzgârlarından masun bazı mailelerinde bu faideli şartlar çok iyi içtima edebilirler.

Uzun süren kış mevsimlerinde kalın kar ve buz tabakalarının aksettirdiği ziya ayni zamanda havanın sükûnetle ve sabit kalışı da bu iklimin tesirlerini daha semereli kılar. Bu irtifalardaki dağların çam ormanı ile süslenmiş yerlerinde manzara daha güzeldir. Havada ozon gazı nisbeten fazladır. Mikrup çok azdır, bu güzel vasıflar dahi o iklime akciğer veremi için istifadeli hassalar verir.

O r t a v e a l ç a k d a ğ i k l i m l e r i n d e : Ziyanın şiddeti havanın tenbih edici diğer şartları tedricen azalır. Buna mukabil tahriş edici unsurları fazlalaşabilir. Fazlalaşabilir diyorum, çünki iklim şartlarını yaratan ziya, rutubet, hararet, toz, bulut ve sair bir takım amiller de tesir yalnız irtifa ile değil, mevkiin teveccühü (o r i e n t a t i o n), meyli, vaziyeti, arâzide zemin sularının satha yakın veyahut uzak oluşu arâzinin yakininde bir göl, orman veyahut boğaz bulunuşu gibi muhtelif bir çok hallerle değişir. Orta ve alçak dağ iklimi dahi akciğer veremi için istifadeli mevkiler çoktur.

Çöl iklimi: Münhat iklimler arasındadır. Çöl ikliminde havanın rutubeti az, kar hemen hiç yok gibidir. Yaz ve kış mevsimlerinde günler ekseri güneşlidir. Ziya şiddetlidir, Yaz mevsiminde hararet yaz ve kış mevsimlerinde gice gündüz hararetleri arasındaki fark fazladır. Mevsim ruzkârları şiddetlidir, bu esnada havada kumdaneciklerinden ibaret toz fazladır. Çol ikliminin fazla harareti gece gündüz hararet farklarının ziyadeliği ve kum tozu akciğer veremine muzir, diğer hassaları faideli olabilir.

Deniz ve sahil iklimleri : Münhat iklimlerdendir, bu iklimde güneşin şuaı nisbeten az, rutubet ve yağmur fazla ruzkârlar seri, mütebeddil ve muhtelif olduğu için bu şartlar akciğer veremine muzir olabilir. Deniz ve sahil havasının mikropları, tozları, allergenleri, gece ve gündüz hararet farkları az olduğu için de bu iklim bazı rie tuberkulozuna fa-

ide verebilir. Asıl deniz iklimi deniz ortasındaki küçük adalarda yahut sabih gemilerde tahakkuk edebilir. Sahile yakın adaların iklimi sahil iklimi sayılır. Sahil iklimleri sahil gerisindeki arazînin tabiatiyle çok değişir. Sahillerde çam ormanlarıyla süslü dağ kenarları bazen çok müsait iklim şartlarını temedebilirler. Deniz rutubeti, münhat havanın kesafetiyle husule gelen ziya noksanlığı meyli muvafik olan dağ eteklerinde denizden inikâs eden güneş şualarının yardımı ile tazmin olunur. Denizin hava cereyanlarına müsait olan vaziyeti sahilin esaslı ruzkârlara mani olan dağlarıyla zararsız bir hale getirilmiş olabilir.

İstanbulda heybeli ve büyük adalar ve Modadan Pendiğe kadar uzanan Anadolu sahilinde böyle yerler vardır. Çamlıcadan itibaren İzmite doğru uzanan dağlar bir çok yerlerde şimal ruzkârlarını kapar. Yer yer çam ormanları havayı tasfiye eder, sahile yakın tatlı meyiller denizden akseden ziyaları alır. Bu suretle güzel sanatoryum iklimleri hasıl olur.

Sanatoryumlar : Bahsettiğimiz iklim, irtifa ve hava şartları yalnız başına akciğer veremine lüzumu olan şifa ve devayı temin edemez. Müsait iklimlerde veremlilerin tedavis için tekmil teferruatı ve lüzumu olan techizatı havi olmak üzere müesseseler inşa edilmesine ihtiyaç vardır. Bu müesseselere sanatoryum diyoruz. Sanatoryumlarda dahi son zamanlara kadar sıhhî şartlarla verem tedavisine çalışılırdı. Yani iyi hava, iyi gida ve intizan altına alınan hayat ve istirahatle veremlilerin tedavisine gayret olunurdu. Şimdi sanatoryumlarda aynı zamanda veremin tedavisi için lüzumu olau tekmil fen vasıtalarından da istifade edilmektedir. Bu maksatla sanatoryumlarda dahilî tedavi için has, gayri has devalar ve kollapstedavisi için pnömotoraks, frenisektomi' torakoplasti vasıtaları hazır bulundurulmaktadır.

Bu vechile fennin her gün biraz daha tekmmül edüp deva kudretleri ile tabiatın verem lehine olan şafi kudretleri birleştirilmektedir.

Muhtelif irtifa ve iklim sanatoryumlarına istitbap:

İklim ve irtifa şartlarından bir kısmı münebbih ve faideli, bir kısmı muharriş ve muzir olduğundan bu unsurları muhtelif tarzda birleştiren iklimlerin hastalara intihap ile tavsiyesi icabeder. Akciğer veremine musap insanlara sanatoyum seçerken çok çok dikkat etmek lâzım gelir. Çünki akciğer veremiuin muhtelif şekilleri, devirleri ve hastaların muhtelif tabiat ve bünyeleri vardır.

Her hastaya Mürtefi, yahut münhat iklim iyi gelmez. İstanbuldan ve Anadoludan avrupanın yüksek sanatoryumlarına giderek az zaman sonra daha vahim bir hal ile avdet eden hastaların adedi pek az değildir.

Yüksek dağ iklimi ve sanatoryumu tavsiye edilecek hastalar:

Orta derece en daha vahim, daha faal, daha vasi olmayan akciğer veremleri yüksek dağ iklimi sanatoryumlarına gönderilebilirler.

Yüksek dağ ikliminden zarar görecek hastalar:

1. -- Çok basil çıkaran, tahribatı, humması ve faaliyeti fazla, kuvveti düşkün hastalar.

2. -- Faaliyeti az fakat vüsati fazla akciğer veremi,

3. -- Sık kanayan, hemoptizisi yeni kesilmiş hastalar ,

4. -- Hançere em'a ve kilye ihtilâtı yapmış tammüm etmiş akciğer veremi,

5. -- Müterakki kalp, epher afeti ve amfizen ile müterafık akciğer veremi,

6. -- Ağır mafsal romatizması, diyabet ve nikris le müterafık mütrakki akciğer veremi,

7. -- Vilâdî nevrasteni, pisikozlar derin ve müterakki anemi ile müterafık akciğer veremi.

Yüksek dağ sanatoryumları ekseriya kış mevsimi için faideli telekkî olunur. Yaz mevsimi için de açık bulunanlar vardır.

Orta dağ iklimi ve sanatoryumu tavsiye olunacak hastalar:

Yüksek ve bacaklı humma ile müterafık çok faal ve müterakki olanlardan başka akciğer veremlilerine orta dağ iklimi iyi gelir. Buralarda hastalar hem kış ve hem de yaz mevsimini geçirebilirler,

Alçak dağ sanatoryumları tavsiye edilecek hastalar: Buralarda artık irtifaın ve bu sebeple vaki olan şiddetli tenbihin rolu kalmaz.

Hava ve iklimin sair ve muvafık şartları birleştiren mahaller hastalar için istifadeli olur. Buralar hmmalı hastaların yüksek mahallere gitmeden evvel muvafık bir kademe teşkil eder. Hat âraz buralarda hafifledikten sonra hastalar icabında daha yüksek sanatoryumlarda iklimin tenbih hastalarından istifadeye giderler.

Münhat iklim sanatoryumu tavsiye edilecek hastalar :

Çöl iklimi sanatoryumları bilhassa sıcak memleket ahalisinden vereme musap olan ve fazla humma, faaliyet ve harabiyet göstermiyen hastalara muvafık gelir.

Bundan başka umumiyetle müzmin nefrit, müzmin bronşitle müteraftk akciğer veremlilerine de iyi gelir. Buna mukabil hançere tuberkulozu ve yabis bronşiti olan akciğer veremlilerine iyi gelmez.

Çöl iklimi halen Mısır, sudan, cezair gibi sıcak memleketlerin müsait mahallerinde tesis edilen sanatoryumlarda istifadeli bir hale getirilmiştîr. Çöl sanatoryumları sıcak memleket ahalisine kış ve yaz mevsiminde , soğuk ve mutedil memleket hastalarına yalnız kış mevsimi için muvafık gelebilir. Burnand çöl ikliminin hummalı hasta tedavisine çok müsait olduğunu ve nisbeten müterakki ve faal akciğer veremine yüksek iklimlerden daha iyi gel-

diğini bildiriyor.

Deniz iklimi :

Vapur şeklinde sabih sanatoryumlar çok masraflı olacağı ve buna mukabil esaslı istifade temin edemiyeceği için tehakkuk ettirilmemiştir.

Sahil iklimi sanatoryumları ;

İstanbulda heybeliada, Büyükada ve Erenköy sanatoryumları sahil iklimleri sanatorymlarına ait birer misal teşkil edebilirler. Bu iklimin sanatoryumları hasta için yüksek dağ ve çöl iklimi gibi çok münebbih değildir. Mevkilerinin müsaadesi sayesinde toz, sis, duman ve muzir hava cereyanları gibi zararlı âmillerden azade olan sahil sanatoryumları nisbeten ağır, faal hummalı ve münteşir akciğer veremine, zaif kansız ve ihtiyar şahıslara da muvafık gelir.

İstanbul muhitinin avrupada sanatoryumlar memleketi olan İsviçreye nazaran daha güneşli olması bir hakîkattır. İstanbulun bilhassa yaz havası çok güneşli ve oldukça sabit ve sükûnetlidir. Bu sebeple İstanbul sanatoryumları yaz mevsimlerinde ağır ve hafif veremler için en müntehap tedavi müesseleri evsafını taşırlar. Sanatoryumlarımız sahil ikliminin en güzel ve müsait mevkilerini intihap etmişlerdir.

Bu itibarla İstanbul sanatoryumları kış mevsiminde de barındırdığı hafif ve ağır akciğer veremlilerine diğer iklimleri aratmayacak kadar faideler ve istifadeler temin edebilirler,

Güneşi bol ve geniş Anadolunun çam ormanlarıyla bezenmiş dağlarında yüksek iklim sanatoryumları tesisine müsait mahaller de mevcuttur. Buralarda yüksek iklim sanatoryumlarına malik olursak fazla tenbihe muhtaç akciğer veremlilerinin de kendi memleketi, içinde tedavisi temin edilecek ve hastalarımızın uzak memleketlerde, yabancı ellerde kalmasına fırsat verilmiyecektir.