Chronicles of Precision Medical Researchers

ISSN: 2757-6124

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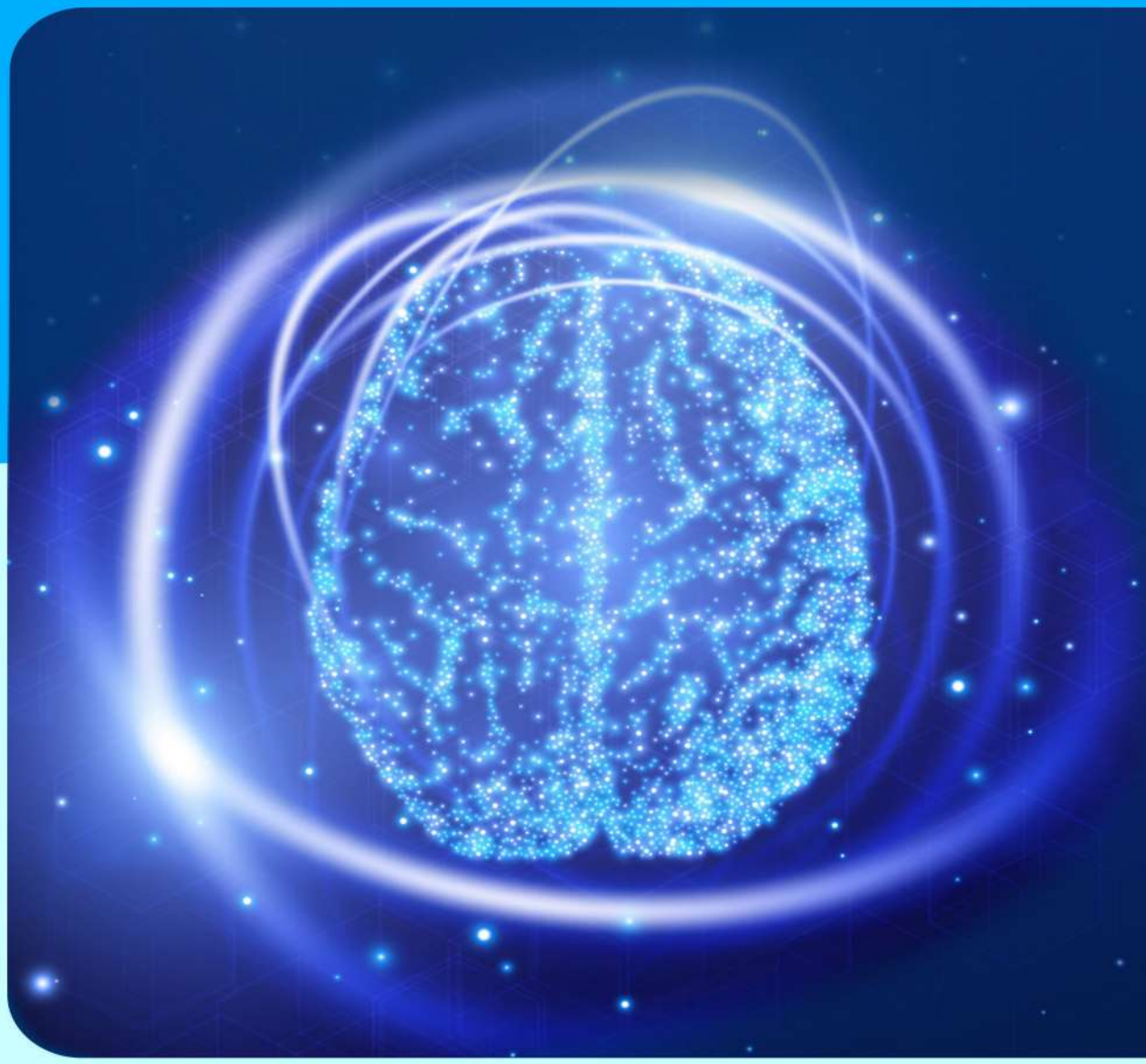

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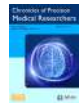

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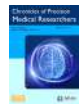

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INSTRUCTIONS FOR AUTHORS

AIM AND SCOPE

The Journal will not consider manuscripts any that have been published elsewhere, or manuscripts that are being considered for another publication, or are in press. Studies previously announced in the congresses are accepted if this condition is stated. If any part of a manuscript by the same author(s) contains any information that was previously published, a reprint or a copy of the previous article should be submitted to the Editorial Office with an explanation by the authors

A technical review is performed to confirm that all of the required documentation has been submitted and to conduct a preliminary evaluation of the manuscript and supplementary files to assess suitability for the Journal. The manuscript will be returned to the Author in the event of any deficiency.

Chronicles of Precision Medical Researchers operates a blind review process. Contributions deemed suitable are then typically sent to a minimum of two independent expert reviewers in the field of study to assess the scientific quality of the paper.

The Editor/Editors are responsible for the final decision regarding acceptance or rejection of articles. The Editor's decision is final. If necessary, author(s) may be invited to submit a revised version of the manuscript. This invitation does not imply that the manuscript will be accepted for publication. Revised manuscripts must be sent to the Editorial Office within 4 (four) weeks, otherwise they will be considered as a new application. The corresponding author will be notified of the decision to accept or reject the manuscript for publication.

Statements and suggestions published in manuscripts are the authors' responsibility and do not reflect the opinions of the Editor, Associate Editors and the Editorial Board members.

The manuscript will not be returned to the authors whether the article is accepted or not. Copyright fee is not paid for the articles published in the journal. A copy of the journal will be sent to the corresponding author.

Language of the Journal

The official languages of the Journal are Turkish and English. The manuscripts that are written in Turkish have abstracts in English, which makes the abstracts available to a broader audience.

Authorship Criteria

After accepted for publication, all the authors will be asked to sign "Coyright Transfer Form" which states the following: " This work is not under active consideration for publication, has not been accepted for publication, nor has it been published, in full or in part (except in abstract form). I confirm that the study has been approved by the ethics committee. " All authors should agree to the conditions outlined in the form.

Chronicles of Precision Medical Researchers has agreed to use the standards of the International Committee of Medical Journal Editors. The author(s) should meet the criteria for authorship according to the "Uniform Requirements for Manuscripts Submitted to Biomedical Journals: Writing and Editing for Biomedical Publication. It is available at www.icmje.org.

Ethical Responsibility

The protocol of clinical research articles must be approved by the Ethics Committee.

In all studies conducted on humans, the "Material and Method" section was approved by the relevant committee or the Helsinki Declaration of Principles (https://www.wma.net/what-we-do/medical-ethics/declaration-of-helsinki/).

It should be stated in the text that all persons included in the study signed the am Informed Consent Form ".

The articles submitted to the Chronicles of Precision Medical Researchers will be deemed to have been conducted in accordance with the Helsinki Declaration of Principles, and have received ethical and legal permissions and will not be held responsible.

If the "Animal" item was used in the study, the authors stated that in the Material and Method section of the article, they protect the animal rights in their studies in accordance with the principles of Guide for the Care and Use of Laboratory Animals (www.nap.edu/catalog/5140.html) and that they have received approval from the ethics committees of their institutions. must specify.

In case reports, Informed Consent a should be obtained from patients regardless of the identity of the patient.

If the article includes the institution (directly or indirectly) providing financial support for the commercial connection or work, the authors; the commercial product used, the drug, the company has no commercial relationship with, or if there is any relationship (consultant, other agreements, etc.), the editor must inform the presentation page.

If Ethics Committee Approval is required in the article; the received document should be sent with the article.

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The manuscript should be submitted to the Academic Plagiarism Prevention Program by the authors.

It is the authors' responsibility to ensure that the article complies with the ethical rules.

Policy of Screening for Plagiarism

The manuscripts are scanned by the Journal using the iThenticate program for determination of plagiarism and non-ethical situations. Chronicles of Precision Medical Researchers will immediately reject manuscripts leading to plagiarism.

TYPES OF MANUSCRIPT

Manuscripts should be submitted online via www.chronpmr.com

Original Articles should not exceed 3000 words and should be arranged under the headings of Abstract (not more than 300 words), Introduction, Materials and Methods, Results, Discussion, Conclusion and References.

Case Reports should not exceed 1000 words and 10 references, and should be arranged as follows: Abstract, Introduction, Case Report, Discussion and References. It may be accompanied by only one figure or table.

Letter to the Editor should not exceed 500 words. Short relevant comments on medical and scientific issues, particularly controversies, having no more than five references and one table or figure are encouraged. Where letters refer to an earlier published paper, authors will be offered right of reply.

Reviews are not accepted unless written on the invitation of the Editorial Board.

PREPARATION OF MANUSCRIPTS

All articles submitted to the Journal must comply with the following instructions:

a) Submissions should be doubled-spaced and typed in Arial 10 points.

b) All pages should be numbered consecutively in the top right-hand corner, beginning with the title page.

c) The title page should not include the names and institutions of the authors.

d) The manuscript should be presented in the following order: Title page, Abstract (English, Turkish), Keywords (English, Turkish), Introduction, Materials and Methods, Results, Discussion, Conclusion, Acknowledgements (if present), References, Figure Legends, Tables (each table, complete with title and foot-notes, on a separate page) and Appendices (if present) presented each on a separate page.

Title

The title should be short, easy to understand and must define the contents of the article.

Abstract

Abstract should be in both English and Turkish and should consist "Aim, Materials and Methods, Results and Conclusion". The purpose of the study, the setting for the study, the subjects, the treatment or intervention, principal outcomes measured, the type of statistical analysis and the outcome of the study should be stated in this section (up to 300 words). Abstract should not include reference. No abstract is required for the letters to the Editor.

Keywords

Not more than five keywords in order of importance for indexing purposes should be supplied below the abstract and should be selected from Index Medicus Medical Subject Headings (MeSH), available at www.nlm.nih.gov/meshhome.html.

Text

Authors should use subheadings to divide sections regarding the type of the manuscript as described above. Statistical methods used should be specified in the Materials and Methods section.

References

In the text, references should be cited using Arabic numerals in parenthesis in the order in which they appear. If cited only in tables or figure legends, they should be numbered according to the first identification of the table or figure in the text. Names of the journals should be abbreviated in the style used in Index Medicus. The names of all authors should be cited when there are six or fewer; when seven or more, the first three should be followed by et al. The issue and volume numbers of the referenced journal should be added.

References should be listed in the following form:

Journal article

Teke Z, Kabay B, Aytekin FO et al. Pyrrolidine dithiocarbamate prevents 60 minutes of warm mesenteric ischemia/reperfusion injury in rats. Am J Surg 2007;194(6):255-62.

Supplement

Solca M. Acute pain management: Unmet needs and new advances in pain management. Eur J Anaesthesiol 2002; 19(Suppl 25): 3-10.

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Online article not yet published in an issue

Butterly SJ, Pillans P, Horn B, Miles R, Sturtevant J. Off-label use of rituximab in a tertiary Queensland hospital. Intern Med J doi: 10.1111/j.1445-5994.2009.01988.x

Book

Sample1: Murray PR, Rosenthal KS, Kobayashi GS, Pfaller MA. Medical microbiology. 4th ed. St. Louis: Mosby; 2002.

Sample 2: Sümbüloğlu K, Akdağ B. Regresyon Yöntemleri ve Korelasyon Analizi. Hatiboğlu Yayınevi: Ankara; 2007.

Chapter in a book

Meltzer PS, Kallioniemi A, Trent JM. Chromosome alterations in human solid tumors. I n: Vogelstein B, Kinzler KW, editors. The genetic basis of human cancer. New York: McGraw-Hill; 2002. p. 93113.

Journal article on the Internet

Abood S. Quality improvement initiative in nursing homes: The ANA acts in an advisory role. Am J Nurs [serial on the Internet] 2002 [cited 12 Aug 2002]; 102. Available from: www.nursingworld.org/AJN/2002/june/wawatch.htm

Website

Cancer-pain.org [homepage on the Internet]. New York: Association of Cancer Online Resources [updated 16 May 2002; cited 9 Jul 2002]. Available from: www.cancer-pain.org

An organization as an author

The Intensive Care Society of Australia and New Zealand. Mechanical ventilation strategy in ARDS: Guidelines. Int Care J Aust 1996;164:282-4.

Acknowledgements

The source of financial grants and the contribution of colleagues or institutions should be acknowledged.

Tables

Tables should be complementary, but not duplicate information contained in the text. Tables should be numbered consecutively in Arabic numbers, with a descriptive, self-explanatory title above the table. All abbreviations should be explained in a footnote. Footnotes should be designated by symbols in the following order: *,†, ‡, §, ¶.

Figures

All illustrations (including line drawings and photographs) are classified as figures. Figures must be added to the system as separate .jpg or .gif files (approximately 500x400 pixels, 8 cm in width and at least 300 dpi resolution). Figures should be numbered consecutively in Arabic numbers and should be cited in parenthesis in consecutive order in the text.

Figure Legends

Legends should be self-explanatory and positioned on a separate page. The legend should incorporate definitions of any symbols used and all abbreviations and units of measurements should be explained. A letter should be provided stating copyright authorization if figures have been reproduced from another source.

Measurements and Abbreviations

All measurements must be given in metric system (Système International d'Unités, SI). Example: mg/kg, µg/kg, mL, mL/kg, mL/kg/h, mL/kg/min, L/min, mmHg, etc. Statistics and measurements should always be given in numerals, except where the number begins a sentence. When a number does not refer to a unit of measurement, it is spelt out, except where the number is greater than nine.

Abbreviations that are used should be defined in parenthesis where the full word is first mentioned. Some common abbreviations can be used, such as iv, im, po, and sc.

Drugs should be referred to by their generic names, rather than brand names.

Editorial Correspondence

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Checklist for Manuscripts

Review guide for authors and instructions for submitting manuscripts through the electronic submission, website at

http://www.chronpmr.com

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YAZARLARA BİLGİ

AMAÇ ve KAPSAM

Chronicles of Precision Medical Researchers Dergisi, dört ayda bir yayımlanır ve üç sayı ile bir cilt tamamlanır. Dergi; pediatri ile ilgili tüm nitelikli klinik ve deneysel araştırmaları, olgu sunumlarını ve editöre mektupları yayımlar.

Chronicles of Precision Medical Researchers Dergisi, bilimsel yayınlara açık erişim sağlar. Dergi basımından hemen sonra, makalelerin tam metinlerine ücretsiz ulaşılabilir.

Dergide yayımlanmak üzere gönderilen yazıların daha önce başka bir yerde yayımlanmamış veya yayımlanmak üzere gönderilmemiş olması gerekir. Daha önce kongrelerde sunulmuş çalışmalar, bu durum belirtilmek koşuluyla kabul edilir. Makale, yazar(lar) ın daha önce yayımlanmış bir yazısındaki konuların bir kısmını içeriyorsa bu durum belirtilmeli ve yeni yazı ile birlikte önceki makalenin bir kopyası da Yayın Bürosu'na gönderilmelidir.

Gerekli tüm belgelerin sunulduğunu teyit etmek ve dergiye uygunluğunu değerlendirmek için makale ve ek dosyaların ön değerlendirmesini yapmak üzere teknik bir inceleme yapılır. Herhangi bir eksiklik olması halinde makale yazara iade edilecektir. Chronicles of Precision Medical Researchers Dergisi kör bir inceleme süreci yürütmektedir. Uygun görülen yazılar daha sonra makalenin bilimsel kalitesini değerlendirmek için çalışma alanında en az iki bağımsız uzmana gönderilir. Editör / Editörler makalelerin kabulü veya reddi ile ilgili nihai karardan sorumludur.

Editörün kararı kesindir. Gerekli olduğu durumlarda, yazar(lar) dan düzeltme istenebilir. Yazardan düzeltme istenmesi, yazının yayımlanacağı anlamına gelmez. Bu düzeltmelerin en geç 21 gün içinde tamamlanıp dergiye gönderilmesi gereklidir. Aksi halde yeni başvuru olarak değerlendirilir. Sorumlu yazara yazının kabul veya reddedildiğine dair bilgi verilir.

Dergide yayımlanan yazıların etik, bilimsel ve hukuki sorumluluğu yazar(lar)a ait olup Editör, Editör Yardımcısı ve Yayın Kurulu'nun görüşlerini yansıtmaz.

Dergide yayımlanması kabul edilse de edilmese de, yazı materyali yazarlara geri verilmez. Dergide yayımlanan yazılar için telif hakkı ödenmez. Bir adet dergi, sorumlu yazara gönderilir.

Derginin Yazı Dili

Derginin yazı dili Türkçe ve İngilizcedir. Dili Türkçe olan yazılar, İngilizce özetleri ile yer alır. Yazının hazırlanması sırasında, Türkçe kelimeler için Türk Dil Kurumundan (www.tdk.gov.tr), teknik terimler için Türk Tıp Terminolojisinden (www.tipterimleri.com) yararlanılabilir.

Yazarlık Kriterleri

Dergide yayınlanması uygun bulunan tüm yazıların araştırma ve yayın etiğine uygun hazırlandığı, varsa sağlanan fonun kaynağının tanımlandığı, başka yerde yayımlanmadığı veya yayımlanmak üzere gönderilmediği, çalışmaya katılan tüm yazarlar tarafından yazının son halinin onaylandığı, yayımlanacak yazı ile ilgili telif haklarının dergiye devredildiği, tüm yazarların imzaları ile "Yayın Hakkı Devir Formu"nda belirtilmesi gerekir.

Chronicles of Precision Medical Researchers Dergisi, Uluslararası Tıp Dergileri Editörleri Kurulu'nun (International Committee of Medical Journal Editors) "Biyomedikal Dergilere Gönderilen Makalelerin Uyması Gereken Standartlar: Biyomedikal Yayınların Yazımı ve Baskıya Hazırlanması (Uniform Requirements for Manuscripts Submitted to Biomedical Journals: Writing and Editing for Biomedical Publication)" standartlarını kullanmayı kabul etmektedir. Bu konudaki bilgiye www.icmje.org adresinden ulaşılabilir.

Etik Sorumluluk

Etik Sorumluluk / Kurallar: Klinik araştırma makalelerinin protokolü Etik Komitesi tarafından onaylanmış olmalıdır.

İnsanlar üzerinde yapılan tüm çalışmalarda "Gereç ve Yöntem" bölümünde çalışmanın ilgili komite tarafından onaylandığı veya çalışmanın Helsinki İlkeler Deklarasyonu'na (https://www.wma.net/what-we-do/medical-ethics/declaration-of-helsinki/) uyularak gerçekleştirildiğine dair bir cümle yer almalıdır.

Çalışmaya dahil edilen tüm kişilerin Bilgilendirilmiş Onam Formu'nu imzaladığı metin içinde belirtilmelidir.

Chronicles of Precision Medical Researchers Dergisi'ne gönderilen makalelerdeki çalışmaların Helsinki İlkeler Deklarasyonu'na uygun olarak yapıldığı, kurumsal etik ve yasal izinlerin alındığı varsayılacak ve bu konuda sorumluluk kabul edilmeyecektir.

Çalışmada "Hayvan" öğesi kullanılmış ise yazarlar, makalenin Gereç ve Yöntem bölümünde hayvan haklarını Guide for the Care and Use of Laboratory Animals (www.nap.edu/catalog/5140.html) prensipleri doğrultusunda koruduklarını, çalışmalarında ve kurumlarının etik kurullarından onay aldıklarını belirtmek zorundadır.

Olgu sunumlarında hastanın kimliğinin ortaya çıkmasına bakılmaksızın hastalardan "Bilgilendirilmiş rıza" alınmalıdır.

Makalede ticari bağlantı veya çalışma için maddi destek veren kurum (doğrudan veya dolaylı) mevcut ise yazarlar; kullanılan ticari ürün, ilaç, firma ile ticari hiçbir ilişkisinin olmadığını veya varsa nasıl bir ilişkisinin olduğunu (konsültan, diğer anlaşmalar vs.), editöre sunum sayfasında bildirmek zorundadır.

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Makalede Etik Kurul Onayı alınması gerekli ise; alınan belge makale ile birlikte gönderilmelidir.

Makale yazarlar tarafından akademik intihal önleme programından geçirilmelidir.

Makalenin etik kurallara uygunluğu yazarların sorumluluğundadır.

İntihal Taraması Politikası

Makaleler, intihal ve etik olmayan durumların belirlenmesi için iThenticate programı kullanılarak Journal tarafından taranır. Chronicles of Precision Medical Researchers Dergisi intihallere yol açan makaleleri derhal reddedecektir.

YAZI TÜRLERİ

Yazılar, elektronik ortamda www.chronpmr.com adresine gönderilir.

Orijinal makaleler, 3000 sözcük sayısını aşmamalı, "Öz (en fazla 300 kelime), Giriş, Gereç ve Yöntem, Bulgular, Tartışma, Sonuç, Kaynaklar" bölümlerinden oluşmalıdır.

Olgu Sunumu, "Öz, Giriş, Olgu Sunumu, Tartışma, Kaynaklar" şeklinde düzenlenmelidir. En fazla 1000 sözcük ile sınırlıdır. Sadece bir tablo veya şekil ile desteklenebilir.

Editöre Mektup, yayımlanan metinlerle veya mesleki konularla ilgili olarak 500 sözcüğü aşmayan ve beş kaynak ile bir tablo veya şekil içerecek şekilde yazılabilir. Ayrıca daha önce dergide yayınlanmış metinlerle ilişkili mektuplara cevap hakkı verilir.

Yayın Kurulu'nun daveti üzerine yazılanlar dışında derleme kabul edilmez.

MAKALENİN HAZIRLANMASI

Dergide yayınlanması istenilen yazı için aşağıdaki kurallara uyulmalıdır.

a) Yazı; iki satır aralıklı olarak, Arial 10 punto ile yazılmalıdır.

b) Sayfalar başlık sayfasından başlamak üzere, sağ üst köşesinde numaralandırılmalıdır.

c) Online makale sistemine yüklenen word dosyasının başlık sayfasında (makalenin adını içeren başlık sayfası), yazarlara ait isim ve kurum bilgileri yer almamalıdır.

d) Makale, şu bölümleri içermelidir: Her biri ayrı sayfada yazılmak üzere; Türkçe ve İngilizce Başlık Sayfası, Öz, Abstract, Anahtar Sözcükler, Keywords, Giriş, Gereç ve Yöntem, Bulgular, Tartışma, Sonuç, Açıklamalar (varsa), Kaynaklar, Şekil Alt Yazıları, Tablolar (başlıkları ve açıklamalarıyla beraber), Ekler (varsa).

Yazının Başlığı

Kısa, kolay anlaşılır ve yazının içeriğini tanımlar özellikte olmalıdır.

Özetler

Türkçe (Öz) ve İngilizce (Abstract) olarak yazılmalı, Amaç, Gereç ve Yöntem, Bulgular ve Sonuç (Aim, Materials and Methods, Results, Conclusion) olmak üzere dört bölümden oluşmalı, en fazla 300 sözcük içermelidir. Araştırmanın amacı, yapılan işlemler, gözlemsel ve analitik yöntemler, temel bulgular ve ana sonuçlar belirtilmelidir. Özette kaynak kullanılmamalıdır. Editöre mektup için özet gerekmemektedir.

Anahtar Sözcükler

Türkçe Öz ve İngilizce Abstract bölümünün sonunda, Anahtar Sözcükler ve Keywords başlığı altında, bilimsel yazının ana başlıklarını yakalayan, Index Medicus Medical Subject Headings (MeSH)'e uygun olarak yazılmış en fazla beş anahtar sözcük olmalıdır. Anahtar sözcüklerin, Türkiye Bilim Terimleri'nden (www.bilimterimleri.com) seçilmesine özen gösterilmelidir.

Metin

Yazı metni, yazının türüne göre yukarıda tanımlanan bölümlerden oluşmalıdır. Uygulanan istatistiksel yöntem, Gereç ve Yöntem bölümünde belirtilmelidir.

Kaynaklar

Chronicles of Precision Medical Researchers Dergisi, Türkçe kaynaklardan yararlanmaya özel önem verdiğini belirtir ve yazarların bu konuda duyarlı olmasını bekler.

Kaynaklar metinde yer aldıkları sırayla, cümle içinde atıfta bulunulan ad veya özelliği belirten kelimenin hemen bittiği yerde ya da cümle bitiminde noktadan önce parantez içinde Arabik rakamlarla numaralandırılmalıdır. Metinde, tablolarda ve şekil alt yazılarında kaynaklar, parantez içinde Arabik numaralarla nitelendirilir. Sadece tablo veya şekil alt yazılarında kullanılan kaynaklar, tablo ya da şeklin metindeki ilk yer aldığı sıraya uygun olarak numaralandırılmalıdır. Dergi başlıkları, Index Medicus'ta kullanılan tarza uygun olarak kısaltılmalıdır. Kısaltılmış yazar ve dergi adlarından sonra nokta olmamalıdır. Yazar sayısı altı veya daha az olan kaynaklarda tüm yazarların adı yazılmalı, yedi veya daha fazla olan kaynaklarda ise üç yazar adından sonra et al. veya ve ark. yazılmalıdır. Kaynak gösterilen derginin sayı ve cilt numarası mutlaka yazılmalıdır.

Kaynaklar, yazının alındığı dilde ve aşağıdaki örneklerde görüldüğü şekilde düzenlenmelidir.

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Dergilerdeki yazılar

Teke Z, Kabay B, Aytekin FO et al. Pyrrolidine dithiocarbamate prevents 60 minutes of warm mesenteric ischemia/reperfusion injury in rats. Am J Surg 2007;194(6):255-62.

Ek sayı (Supplement)

Solca M. Acute pain management: Unmet needs and new advances in pain management. Eur J Anaesthesiol 2002;19(Suppl 25):3-10.

Henüz yayınlanmamış online makale

Butterly SJ, Pillans P, Horn B, Miles R, Sturtevant J. Off-label use of rituximab in a tertiary Queensland hospital. Intern Med J doi: 10.1111/j.1445-5994.2009.01988.x

Kitap

Örnek 1: Murray PR, Rosenthal KS, Kobayashi GS, Pfaller MA. Medical microbiology. 4th ed. St. Louis: Mosby; 2002.
Örnek 2: Sümbüloğlu K, Akdağ B. Regresyon Yöntemleri ve Korelasyon Analizi. Hatiboğlu Yayınevi: Ankara; 2007.

Kitap bölümü

Meltzer PS, Kallioniemi A, Trent JM. Chromosome alterations in human solid tumors. I n: Vogelstein B, Kinzler KW, editors. The genetic basis of human cancer. New York: McGraw-Hill; 2002. p. 93113.

İnternet makalesi

Abood S. Quality improvement initiative in nursing homes: The ANA acts in an advisory role. Am J Nurs [serial on the Internet] 2002 [cited 12 Aug 2002]; 102. Available from: www.nursingworld.org/AJN/2002/june/wawatch.htm

Web Sitesi

Cancer-pain.org [homepage on the Internet]. New York: Association of Cancer Online Resources [updated 16 May 2002; cited 9 July 2002]. Available from: www.cancer-pain.org

Yazar olarak bir kuruluş

The Intensive Care Society of Australia and New Zealand. Mechanical ventilation strategy in ARDS: Guidelines. Int Care J Aust 1996;164:282-4.

Açıklamalar

Varsa finansal kaynaklar, katkı sağlayan kurum, kuruluş ve kişiler bu bölümde belirtilmelidir.

Tablolar

Tablolar metni tamamlayıcı olmalı, metin içerisinde tekrarlanan bilgiler içermemelidir. Metinde yer alma sıralarına göre Arabik sayılarla numaralandırılıp tablonun üstüne kısa ve açıklayıcı bir başlık yazılmalıdır. Tabloda yer alan kısaltmalar, tablonun hemen altında açıklanmalıdır. Dipnotlarda sırasıyla şu semboller kullanılabilir: *, †, ‡, §, ¶.

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İlaçların yazımında jenerik isimleri kullanılmalıdır.

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ORIGINAL ARTICLE
ORİJİNAL ARAŞTIRMA

Characteristics of Patients Admitted to the Thoracic Surgery Outpatient Clinic of a Secondary Public Hospital

İkincil Devlet Hastanesi Göğüs Cerrahisi Polikliniğine Başvuran Hastaların Özellikleri

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ABSTRACT

Aim: Thoracic surgery is the department that handles the diagnosis, treatment, and follow-up of thoracic pathologies and thoracic traumas. This study aimed to reveal the characteristics of the patients admitted to a thoracic surgery outpatient clinic in a public hospital.

Material And Method: The patients admitted to the thoracic surgery outpatient clinic of the public hospital between June-July 2018 were retrospectively analyzed. The patients who were admitted to emergency service and referred from another clinics as a consultation, and patients who made an appointment by mistaking it as a breast polyclinic and chest diseases polyclinic were excluded from the study.

Results: There were 106 (31 female, 75 male) patients admitted to the outpatient clinic. 68 of 106 patients (64.1%) admitted directly. The most common complaint was chest pain in 71 patients (67%). Seventy of the patients (66%) admitted with trauma. Eighty-seven patients (82%) were treated with medical treatment, and seven patients (6.6%) underwent surgery.

Conclusion: Thoracic surgery outpatient clinic is a specific, non-intensive branch of patients who admit primary to the outpatient clinic in public hospitals. Although awareness of trauma has occurred in the community, it has revealed that the area in which chest surgery is concerned should be explained to society more clearly.

Keywords: Outpatient clinic, thoracic surgery, secondary public hospital

ÖZ

Amaç: Göğüs cerrahisi toraks patolojileri ile ilgilenen, toraks travmaları ve cerrahi hastalıklarının tanı, tedavi ve takiplerini yapan bölümdür. Bu çalışmada ikinci basamak bir devlet hastanesinde göğüs cerrahisi polikliniğine başvuran hasta profilinin ortaya konulması amaçlanmıştır.

Gereç ve Yöntem: Haziran-Temmuz 2018 tarihleri arasında göğüs cerrahisi polikliniğine başvuran hastalar retrospektif olarak incelendi. Acil servis başvurusu olan ve diğer kliniklerden konsültasyon şeklinde refere edilen hastalar, meme polikliniği ve göğüs hastalıkları polikliniği zannederek başvuran hastalar çalışma dışında tutuldu.

Bulgular: Çalışmada polikliniğe ayaktan başvuran 106 (31 kadın, 75 erkek) hasta vardı. 106 hastanın 68'i (%64,1) göğüs cerrahisi polikliniğine doğrudan kendisi başvurdu. En çok karşılaşılan yakınma olarak 71 hastada (%67) göğüs ağrısı olarak saptandı. Hastaların 70'i (%66) travma ile başvurdu. 87 hasta (%82) medikal tedavi ile, 7 hasta (%6,6) cerrahi olarak ile tedavi edildi.

Sonuç: Göğüs cerrahisi polikliniği ikinci basamak sağlık hizmeti veren hastanelerde polikliniğe birincil başvuran hasta sayısı yoğun olmayan, spesifik bir branştır. Toplumda travma ile ilgili bir farkındalık oluşmuş olsa da göğüs cerrahisinin ilgilendiği alanın topluma daha net anlatılması gerektiği bu çalışmada ortaya konmuştur.

Anahtar Kelimeler: Göğüs cerrahisi, poliklinik, ikinci basamak devlet hastanesi

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INTRODUCTION

Thoracic surgery is the department that cares about the diagnosis, treatment, and follow-up of thoracic pathologies and thoracic traumas. As per the decision of the medical specialty board, thoracic surgery specialists should have clinical and interventional competence in the fields of lung diseases, chest wall diseases, mediastinum, pleura, trachea, esophagus, diaphragma and thoracic trauma (1). Thoracic surgery, separated from cardiovascular surgery and became an independent major in 2002, is a relatively new branch to other branches. This study aimed to present the characteristics of the patients admitted to a thoracic surgery outpatient clinic in a secondary public hospital.

MATERIAL AND METHOD

Patients admitted to the thoracic surgery outpatient clinic of the secondary public hospital between June and July 2018 were reviewed. Emergency department admissions, consultations from other clinics, patients who made an appointment by mistaking it as a breast polyclinic and chest diseases polyclinic were not included in the study. The age, gender, smoking status, admission methods to the outpatient clinic, reasons for admission, complaints, diagnoses, and treatments of the patients were recorded. The study was carried out with the permission of Selçuk University Ethics Committee (Date: 23.06.2021, Decision No: 2021/351). This study was designed in accordance with the principles of the Declaration of Helsinki. Because the study was retrospective, no written informed consent form was obtained from patients.

RESULTS

One hundred and six patients included in the study, as 31 (29.2%) female and 75 (70.8%) male, with a mean age of 43.64 years (5-92). Twenty-six (24.5%) of the patients included in the study were active smokers, and there was an average smoking rate of 17.5 packs/year (5-35 packs/year). Sixty-eight (64.1%) of 106 patients were admitted directly to the thoracic surgery outpatient clinic. Fifteen patients (14.1%) were referred to our outpatient clinic from another clinic. Seven patients (6.6%) were admitted to the outpatient clinic for post-trauma control, six patients (5.6%) for postoperative control, five patients (4.7%) for the forensic report, four patients (3.7%) to show the result, and one patient (0.9%) for the report of medical board.

Chest pain was the most common complaint in 71 patients (67%) (**Table 1**). 70 (66%) of the patients were admitted due to trauma. Of the trauma patients, 21 (30%) were admitted due to falling, and 15 (21.4%) due to in-vehicle traffic accidents (**Table 2**). Fifteen(21.4%) of these patients had rib fractures, two (2.8%) had sternum and rib fractures, and two (2.8%) had only sternum fracture. Soft tissue trauma was detected in 44 patients (62.8%).

Table 1. Outpatient clinic admission complaints of patients

Complaint	n (%)
Chest pain	71 (66.98%)
Dyspnea	9 (8.49%)
Protrusion on the chest wall	5 (4.71%)
Excessive sweating in the hands and feet	2 (1.88%)
Depression on the chest wall	1 (0.94%)
Exudate at the surgical incision	1 (0.94%)
No complaint	17 (16.03%)
Total	106 (100%)

Table 2. Trauma occurrence type of patients admitted

Type of trauma	n (%)
Falls	21 (30%)
Traffic accident(Inside of a vehicle)	15 (21.42%)
Overtaxing/Heavy lifting	6 (8.57%)
Impact/Compression	4 (5.71%)
Accidental prank injury	4 (5.71%)
Penetrating thoracic trauma	3 (4.28%)
Traffic accident (Pedesterian)	3 (4.28%)
Assault	3 (4.28%)
Back massage with foot	2 (2.85%)
Motorcycle accident	2 (2.85%)
Valsalva	1 (1.42%)
Suspected trauma	6 (8.57%)
Total	70 (100%)

Eighty-seven patients (82%) evaluated in the outpatient clinic were treated with medical treatment, and seven patients (6.6%) underwent surgery. Complaints of 12 (11.3%) patients admitted were not directly related to thoracic surgery; therefore, those four patients were referred to chest diseases, two patients to cardiology, one patient to physical therapy and rehabilitation, two patients to neurosurgery, one patient to general surgery, one patient to dermatology and one patient to oncology outpatient clinics.

DISCUSSION

Although thoracic surgery is old as a branch, it is newer compared to other branches. For this reason, patients admitted to the outpatient clinic may not have enough awareness regarding thoracic surgery fields such as hyperhidrosis and esophageal diseases. In a survey in the literature applied to assistant healthcare staff other than nurses, the rate of knowledge about lung surgeries performed by a thoracic surgeon was 50-68.6% (2). Moreover, in the study conducted by Aktin et al., specialist physicians were asked questions about thoracic surgery, and it was shown that specialist physicians had inaccurate and incomplete information about the area of interest of thoracic surgery and its interventions (3). Akçay also stated that less than 60% of physicians marked diseases such as hyperhidrosis and bronchiectasis as the area of interest of thoracic surgery and showed that more than

40% of physicians had never heard of mediastinoscopy and videothoracoscopy before (4).In another study conducted with medical students in the literature, it was reported that awareness of thoracic surgery is higher in upper grades, but it is still not sufficient (5).

In light of these, the outpatient characteristics of thoracic surgery also vary. For example, in hospitals where there are no branches, such as pediatrics and medical oncology, thoracic surgery practice mainly consists of trauma. In this study, it was found that 66% of the patients admitted with trauma. Traumas caused by falls and traffic accidents accounted for more than half of the traumas. Afacan et al. evaluated patients with blunt thoracic trauma admitted to the emergency department and found traffic accidents and falls as primary causes(6). Emergency cases constitute the intensity of thoracic surgery clinics. Therefore, it can be expected that there will be more patients admitting to the outpatient clinic for control after being evaluated and treated under emergency conditions. Nevertheless, it was determined that 6.6% of the patients admitted in this way, and 66% of them were able to admit to the relevant polyclinic after suffering a trauma associated with thoracic surgery. This result was interpreted as the awareness of thoracic surgery's duties related to trauma is not too weak. However, thoracic surgery patients admitting with trauma often require a multidisciplinary approach. These patients may have been referred to the outpatient clinic for pathologies related to thoracic surgery after receiving emergency treatment in neurosurgery, general surgery, or orthopedics and traumatology clinics. However, in this study, the rate of patients referred by another branch was found to be 14.1%.

11.3% of the patients in this study applied with a complaint other than diseases related to thoracic surgery. This rate is not low. This revealed that thoracic surgery should be explained more clearly to the public.

CONCLUSION

Thoracic surgery is a specific clinic that does not have a large number of primary patients admitted to the outpatient clinic in hospitals providing secondary health care services Associated with trauma, although there has been some level of awareness about what thoracic surgery performs, it is clear that the admittion to thoracic surgery still continues with complaints that are not related to thoracic surgery.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was carried out with the permission of Selçuk University Ethics Committee (Date: 23.06.2021, Decision No: 2021/351).

Informed Consent: Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process: Externally peer-reviewed.

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ORIGINAL ARTICLE
ORİJİNAL ARAŞTIRMA

Kronik Subdural Hematomların Cerrahi Tedavisinde Bir Burr Hole ve İki Burr Hole Tekniğinin Karşılaştırması

Comparison of One Burr Hole and Two Burr Hole Techniques in the Surgical Treatment of Chronic Subdural Hematomas

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ÖZ

Amaç: Opere ettiğimiz Kronik Subdural Hematomlu (KSDH) hastalarda bir veya iki burr hole tekniğini karşılaştırmak.

Gereç ve Yötem: Ocak 2013-Aralık 2021 tarih aralığında 84 hastaya 62'si bir, 42'si iki burr hole olmak üzere 104 operasyon yapıldı. Veriler, retrospektif olarak hasta kayıtlarından elde edildi. İstatistiksel analiz SPSS 25.0 programı ile yapıldı.

Bulgular: 84 hastanın 20'si kadın (%23,8), 64'ü erkekti (%76,2). 104 operasyonun 27 (%26)'si kadın, 77 (%74)'si erkek hastalara yapıldı. Ortalama yaş 72,63 (20-96). 104 operasyon içinde 52 (%50) hipertansiyon (HT), 39 (%37,5) diabetus mellitus (DM), 16 (%15,4) kalp yetmezliği (KY), 7 (%6,7) kronik böbrek yetmezliği (KBY), 2 (%1,9) koagülopati, 33 (%31,7) demans, 38 (%36,5) antiplatelet veya antikoagülan kullanımı, 20 (%19,2) sigara içimi, 11 (%10,6) alkol bağımlılığı, 65 (%62,5) kafa travması öyküsü vardı. Operasyon süresi ve postoperatif hastane kalış süresi sırasıyla Bir burr hole'de 31,6 dakika ve 7,3 gün, İki burr hole'de ise 60 dakika ve 7 gündü. İkisi KBY'li 3 hastada rekürrens gelişti. Bunlardan ikisi iki burr hole, biri bir hole operasyonuydu. Bir burr hole ile iki burr hole verilerinin karşılaştırmasında operasyon süresi dışında anlamlı bir farklılık yoktu. Risk faktörlerinin rekürrens gelişimine etkinliği ise sadece KBY için anlamlıydı.

Sonuç: Kronik subdural hematomun cerrahi tedavisinde bir burr hole operasyonu iki burr hole kadar etkin ve güvenlidir. Operasyon süresi daha kısa olduğu için bir burr hole'ü öneriyoruz

Anahtar Kelimeler: Kronik subdural hematom, bir burr hole, iki burr hole

ABSTRACT

Objective: To compare one or two burr hole techniques in our operated patients with Chronic Subdural Hematoma (CSDH).

Material and Method: Between January 2013 and December 2021, 104 operations were performed on 84 patients, 62 of which were in one burr hole and 42 were in two burr holes. Data were obtained retrospectively from patient records. Statistical analysis was done with SPSS 25.0 program.

Results: Of the 84 patients, 20 (23.8%) were female and 64 (76.2%) was male. Of 104 operations, 27 (26%) were performed on female patients and 77 (74%) on male patients. The mean age is 72.63 (20-96). Among 104 operations, 52 (50%) hypertension (HT), 39 (37.5%) diabetus mellitus (DM), 16 (15.4%) cardiac failure (CF), 7 (6.7%) choronic renal failure (CRF), 2 (1.9%) coagulopathy, 33 (31%) ,7) had dementia, 38 (36.5%) antiplatelet or anticoagulant use, 20 (19.2%) smoking, 11 (10.6%) alcohol addiction, 65 (62.5%) head trauma. Operation time and postoperative hospital stay were 31.6 minutes in a burr hole, respectively. and 7.3 days, 60 minutes in two burr holes. and it was 7 days. Recurrence developed in 3 patients, 2 of whom had CRF. Two of them were two burr holes and one was a hole operation. There was no significant difference in the comparison of one burr hole and two burr hole data, except for the operation time. The effectiveness of risk factors on the development of recurrence was significant only for CRF.

Conclusion: One burr hole operation is as effective and safe as two burr holes in the surgical treatment of chronic subdural hematoma. We recommend a burr hole as the operation time is shorter

Keywords: Chronic subdural hematoma, one burr hole, two burr holes

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GİRİŞ

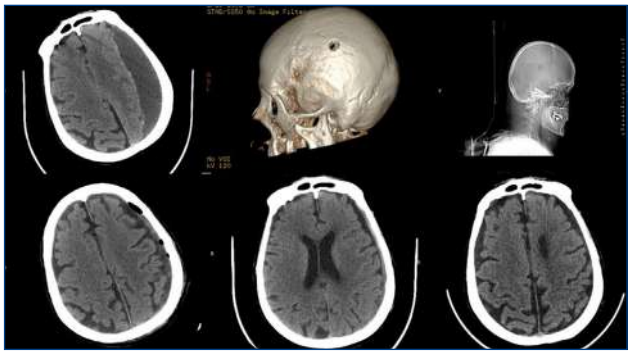
Kronik subdural hematom (KSDH); subdural boşlukta gizlice başlayıp ilerleyici kan birikimiyle ortaya çıkan ve beyin cerrahisi kliniklerinde en sık rastlanılan hastalıklardandır (1-4). Genel popülasyonda yıllık insidansı 1.72-13.1/1.000.000 arasındadır (5). Yaşlılarda görülme sıklığı daha fazladır (2,6). Asemptomatik hastalarda medikal tedavi ve yakın takip olasıdır. Ancak nörolojik bulguları olan hastalarda cerrahi tedavi başarılıdır. KSDH'da cerrahi tedavi seçenekleri; burr hole (ler) ile drenaj (BHD), twist drill ile drenaj (TDD), kraniotomi ve endoskopik burr hole drenajdır (6-8). Tüm cerrahi teknikler, en düşük morbidite ve mortalite ile serebral hemisferin dekompresyonunu ve KSDH'nın tekrarını önlemeyi amaçlar. Seçenek çeşitliliği sebebiyle günümüzde KSDH'yı tedavi etmek için optimal cerrahi tekniğin belirlenmesi tartışmalıdır (7). Buna rağmen tüm dünyada en çok tercih edilen cerrahi teknik burr hole ile direnajdır (9,10). Burr hole direnaj bir (BBHD) veya iki adet burr hole (İBHD) ile yapılabilir. Ancak nöroşirürjienler arasında Burr hole sayısı ile ilgili halen bir fikir birliği yoktur (2,10,11). Postoperatif rekürrens KSDH cerrahisinin en önemli komplikasyonlarından biridir (12).

Çalışmamızın amacı; kliniğimizde bir veya iki adet burr hole ile opere edilen KSDH'lı hastaların karşılaştırmasını yapmak ve sonuçlarımızı paylaşmaktır.

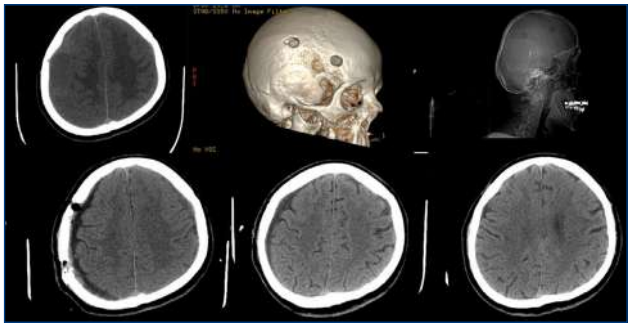
GEREÇ VE YÖTEM

Ocak 2013 ile Aralık 2021 tarihleri arasında KSDH nedeniyle kliniğimizde opere edilen 86 hasta retrospektif olarak değerlendirildi. 86 hastaya toplam 113 operasyon yapıldı. 66 operasyonun BBHD, 42 operasyonun İBHD, 5 operasyonun ise kraniyotomi olduğu tespit edildi. Çalışmamız BBHD (**Resim 1**) ile İBHD (**Resim 2**) karşılaştırması olduğu için 5 adet kraniyotomi operasyonu çalışma dışı bırakıldı. Aynı seansta bilateral veya farklı zamanda karşı taraftan KSDH boşaltılan hastalar, iki farklı operasyon olarak çalışmaya dahil edildi. 2 erkek hasta aynı seansta bilateral SDH nedeniyle BBHD sonrası hastaneden taburcu edilmeden vefat etti. Bu iki hasta ve uygulanan 4 adet BBHD operasyonu çalışma dışı bırakıldı. Sonuçta çalışmaya 84 hasta ve 104 burr hole operasyonu (62 BBHD, 42 İBHD) ile devam edildi.

Hastaların tüm verileri hastanenin fiziki ve dijital arşivinden elde edildi. Hastalar opere edilmeden önce kendilerinden veya 1.derece yakınlarından aydınlatılmış onam belgesi alındı. Hastalar yazar tarafından opere edildi. Hastaların yaş, cinsiyet, 3 haftadan daha önce olan kafa travması varlığı, eşlik eden diğer hastalıklar (hipertansiyon, diabet mellitus, kalp yetmezliği, kronik böbrek yetmezliği, kuogülopati ve demans), alışkanlıklar (sigara, alkol), kullanılan ilaçlar (antiplatelet, antikuagülan), operasyon süresi ve postoperatif hastane kalış gün sayısı tespit edildi. Tanı beyin tomografiisi (BBT) ve manyetik rözanans görüntüleme (MRG) ile konuldu. Tüm hastalara; hematomun boşaltılma oranını ve rekürrens gelişimini belirmek amacı ile postoperatif diren çekildikten sonra, 1. ve 3.ay kontrol BBT çekildi. Postoperatif 90. günden önce aynı tarafta SDH birikimi rekürrens olarak kabul edildi.



Resim 1. Tek Burr hole ile KSDH drenajı



Resim 2. Çift Burr hole ile KSDH dreanajı

Hastalar genel anestezi altında opere edildi. Hematomun en geniş bölgesine bir veya iki burr hole açıldı ve hematomun spontan boşalmasından sonra açık renkte sıvı gelene kadar subdural mesafe serum fizyolojik ile yıkandı. Tüm hastalarda subdural mesafeye kapalı sistem direnaj kateteri yerleştirildi. Postoperatif dönemde hastalar baş kısmından 30-45 derece arası supin pozisyonda yatırıldı. Subdural dren en az 48 saat en fazla 72 saat sonra çıkarıldı. Burr hole sayısı cerrahın tercihine ve tecrübesine göre belirlendi.

Hastaların preoperatif BBT'lerindeki KSDH miktarı 100 olarak kabul edilerek, postoperatif erken dönem, 1. ve 3.ay BBT'leri; preoperatif BBT ile karşılaştırılarak rezidü SDH oranları yüzde (%) olarak hesaplandı.

Verilerin istatistiksel analizi SPSS 25.0 programı ile yapıldı (IBM, Armonk, NY, USA). Kategorik değişkenler, frekans ve yüzde olarak tanımlandı; sürekli değişkenler ortalama olarak tanımlandı. İkili grupların ortalamasını karşılaştırmak için İndependet Samples Test ve Student T-Test, çalışmadaki tüm faktörlerin rekürrens gelişimine etkinlikleri için Chi-Square Test kullanıldı. İstatistiksel anlamlılık düzeyi 0,05 olarak kabul edildi. Tüm testler operasyon sayısı baz alınarak yapıldı.

BULGULAR

Toplam 84 hastanın 20'si kadın (%23,8), 64'ü erkekti (%76,2). 104 operasyonun 62'si BBHD (%59,6), 42'si İBDH idi (%40,4). 17 (%20) hasta aynı seansta bilateral, 3 hasta ise farklı zamanlarda (ikisi 1 yıl, diğeri 2 ay sonra) karşı taraftan KSDH nedeniyle opere edildi. Bilateral opere edilen hastaların 7'si kadın, 13'ü erkektir. Toplam 104 operasyon ayrı ayrı birer vaka olarak değerlendirildiğinde 20 Kadın hastaya 27 (%26) operasyon, 64 Erkek hastaya ise 77 (%74) operasyon yapıldı. Ortalama yaş 72,63 (20-96), BBHD'de 69 (20-91), İBHD'de ise 77 (53-96) idi. 104 operasyon içinde 52 (%50) hipertansiyon (HT), 39 (%37,5) diabetus mellitus (DM), 16 (%15,4) kalp yetmezliği (KY), 7 (%6,7) kronik böbrek yetmezliği (KBY), 2 (%1,9) kuagülopati, 33 (%31,7) demans, 38 (%36,5) antiplatelet veya antikuagülan kullanımı, 20 (%19,2) sigara içimi, 11 (%10,6) alkol bağımlılığı, 65 (%62,5) kafa travması öyküsü vardı. Operasyon süresi ve postoperatif hastane kalış süresi sırasıyla BBHD'de 31,6 dakika ve 7,3 gün, İBHD'de ise 60 dakika ve 7 gündü. Preoperatif BBT ile postoperatif erken dönem, 1.ay ve 3.ay kontrol BBT'lerin karşılaştırılması sonucu KSDH'nın rezidü oranı sırası ile BBHD'de %24,03, %3,70 ve %0,32, İBHD'de ise %24,04, %3,92 ve %0,23 olarak tespit edildi. 2'si kronik böbrek yetmezliği (KBY) olan toplam 3 hastada postoperatif ilk 20 gün içerisinde rekürrens görüldü. Bunlardan iki tanesi İBHD diğeri BBHD operasyonu yapılan hastalardı. Rekürrens görülen hastalara kraniyotomi yapıldı. Her iki operasyon tekniğinin istatiksel karşılaştırmalarında yaş, cinsiyet, eşlik eden hastalıklar, sigara ve alkol bağımlılığı, kan sulandırıcı ilaç kullanımı, kafa travması varlığı, hastane kalış süreleri, postoperatif rezidü hematom oranı açısından anlamlı bir farklılık yoktu (p>0,05). Operasyon süresinin daha kısa olması BBHD'de İBHD'ye göre istatiksel olarak anlamlı bulundu (p<0,001). İBHD ve BBHD operasyonunun ve KBY hariç çalışmada değerlendirilen diğer risk faktörlerinin KSDH'nın rekürrensine etkinlikleri de istatiksel olarak anlamsızdı (p>0,05). Çalışmamızda KBY'nin tekrarlayan KSDH gelişimine etkisinin istatiksel olarak anlamlı olduğu tespit edildi (p<0,01) (**Tablo 1** ve **Tablo 2**).

Tablo 1. Hastaların genel özellikleri ve BBHD ile İBHD'nin karşılaştırması

	BBHD	İBHD	Genel (toplam/ ortalama)	p değeri
Operasyon sayısı	62	42	104	
Yaş (yaş aralığı)	69 (20-91)	77 (53-96)	72,63 (20-96)	p>0,05
Operasyon süresi (dakika)	31,6	60	43	p<0,01
Hastane kalış süresi (gün)	7,3	7	7,2	p>0,05
Rezidü hematom oranı (%)				
Postop. erken BBT	24,3	24,04		p>0,05
1.ay BBT	3,7	3,9		p>0,05
3.ay BBT	0,32	0,23		p>0,05

Tablo 2. Hastalarda operasyon sayısı temel alınarak var olan risk faktörleri ve burr hole sayısının KSDH'nın rekürrensine etkinlikleri

	Operasyon sayısı	Rekürrens Kr.SDH'ya etki	p değeri
Hipertansiyon	52	yok	p>0,05
Diabetes Mellitus	39	yok	p>0,05
Kalp Yetmezliği	16	yok	p>0,05
Kronik Böbrek yetmezliği	7	var	p<0,01
Kuagulopati	2	yok	p>0,05
Demans	33	yok	p>0,05
Sigara	20	yok	p>0,05
Alkol	11	yok	p>0,05
Kafa travması	65	yok	p>0,05
Antiplatelet/antikuagulan	38	yok	p>0,05
BBHD	62	yok	p>0,05
İBHD	42	yok	p>0,05

TARTIŞMA

KSDH özellikle 65 yaş üstü yaşlılarda ve erkeklerde daha sık görülür (1,2,12-14). Hastaların ortalama %60-80'inde çok ciddi olmayan kafa travması vardır (15-17). Yaptığımız çalışmada yaş ortalaması 72,63, hastaların %76,2'si erkek ve operasyonların %62,5'inde 3 haftadan daha önce kafa travması öyküsü vardı. Yaş, cinsiyet ve kafa travması açısından BBHD ve İBHD operasyonları yapılan hastalar arasında istatiksel olarak farklılık yoktu (p>0,05).

Hastaların yaşlı olmaları nedeniyle bazı kronik hastalıkların varlığı, kan sulandırıcı ilaç kullanımı ve alkol-sigara bağımlılığı gibi durumlar KSDH gelişiminde risk faktörler olarak araştırmacıların dikkatini çekmiştir. Castro-Rodríguez ve ark.'ı (17), KSDH'lı hastalarda %35,5 kalp yetmezliği (KY), %20,5 hipertansiyon (HT), %8 DM, %20 demans, %35,5 antiplatelet veya antikoagülan kullanımı ve %1,5 alkolizm bildirmiştir. Ducruet (6), KSDH varlığında antiplatelet veya antikuagülan kullanımını %39 olarak taspit etmiştir. Jang ve ark.'ı (13), %50 HT, %31 DM, %14 KBY, %11 KY, %10 koagülopati, % 16 demans, %19 antiplatelet veya antikoagülan kullanımı, %35 sigara içiciliği ve %24 kronik alkolizm bildirmiştir. Bizim çalışmamızda ise KSDH'lı hastalarda %50 HT, %37,5 DM, %15,4 KY, %6,7 KBY, %1,9 kuagulopati, %31,7 demans, %36,5 antiplatelet veya antikuagulan kullanımı, %19,2 sigara içiciliği ve %10,6 alkol bağımlılığı vardı. BBHD ve İBDH operasyonu yapılan hastaların bu risk faktörler yönünden karşılaştırmasında istatiksel olarak farklılık tespit etmedik (p>0,05).

KSDH'lı hastalarda eş zamanlı bilateral SDH görülme oranı %10-25 arasındadır (17-22). Çalışmamızda hastaların %20'sinde (17 hasta) eş zamanlı bilateral KSDH vardı.

Nöroşirürjiyenler KSDH'nın boşaltılması için %75-100 oranında BHD'ı tercih etmektedir (2,9,21,23-29). Ancak

burr hole sayısı ile ilgili bu kadar yüksek bir fikir birliği yoktur (2,12,13,21,30). Baschera ve ark.'ı (10), tüm SDH operasyonları içerisinde orantısal olarak %65 BBDH, %20 İBHD, %5 kraniyotomi ve %10 TDD olduğunu bildirmiştir. Bu çalışmanın yapıldığı tarih aralığında kliniğimizde KSDH tanısı ile toplam 113 operasyon yapıldı. Bunların 108 tanesi (%95,6) BHD, 5 tanesi (%4,4) kraniyotomidir. BHD'lerin 66'si (%58,4) BBHD, 42'si (%37,2) İBHD dir. Yazar tarafından TDD operasyonu hiçbir hastada uygulanmamıştır.

KSDH'nın Burr hole ile boşaltıldıktan sonra tekrar operasyon gerektirecek şekilde rekürrens gelişme oranı %2,3-38,7 arasındadır (31). Burr hole sayısının rekürrense etkinliği halen tartışmalıdır. BBHD operasyonlarında daha fazla rekürrens geliştiğini bildiren yayınlar (2,13,14,21,22) varsa da tam aksi İBHD'dan sonra daha çok geliştiğini iddia eden yayınlar da vardır (11,32). Öte yandan bazı yazarlar, BBHD ile İBHD arasında rekürrens oranında farklılık olmadığını bildirdi (5,12,16,25,30). Bizim çalışmamızda da İBHD ve BBDH arasında rekürrens açısından anlamlı farklılık yoktu (p>0,05).

Rekürrens nedeniyle tekrar opere edilen 3 hastamızın 2'sinde KBY vardı ve KBY'nin KSDH'nın rekürrensine etkisi istatiksel olarak anlamlı bulundu (p<0,01). Hastalarımızda KBY hariç olmak üzere diğer eşlik eden hastalıklar, sigara ve alkol bağımlılığı, antiplatelet veya antikuagülan kullanımı ve geçirilmiş kafa travması öyküsünün KSDH'nın yeniden operasyon gerektirecek şekilde birikimine etkilerinin olmadığı istatiksel olarak tespit edildi (p>0,05).

Bir adet cilt insizyonundan yapılan BBHD ile iki ayrı cilt insizyonundan yapılan İBHD operasyonunun sürelerinin BBHD lehine daha kısa olması cerrahi girişimin doğal sonucudur (11,25). Bizim çalışmamızda da operasyon süresi ortalamaları 60 dakikaya karşılık 31,6 dakika ile İBHD operasyonlarında daha kısa ve istatiksel olarak anlamlıdır (p<0,001).

BBHD ve İBHD operasyonlarının karşılaştırıldığı çalışmalarda KSDH'lı hastaların postoperatif hastanede kalış süreleri arasında farklılık olmadığı bildirilmiştir (13,25,30). BBHD ve İBDH karşılaştırması yaptığımız bu çalışmada hastane kalış süreleri bakımından her iki grup arasında anlamlı bir farklılık saptanmamıştır.

SONUÇ

Bu klinik çalışmada; KSDH'nın cerrahi iyileşmede BBHD ile İBHD'nın sonuçları benzerdi. Bu nedenle her iki teknikte KSDH için etkin ve güvenlidir. Ancak İBHD'ye göre operasyon süresinin daha kısa ve kısmen daha az invazif bir teknik olması nedeniyle BBHD'yi öneriyoruz.

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Etik Kurul Onayı: Çalışma retrospektif olarak planlanmış ve veriler dijital olarak elde edildiğinden etik kurul onayına gerek yoktur.

Aydınlatılmış Onam: Çalışma retrospektif olarak dizayn edildiği için hastalardan aydınlatılmış onam alınmamıştır.

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ORIGINAL ARTICLE
ORİJİNAL ARAŞTIRMA

The Hepatic Antioxidant Defense Efficacy of IDA Propolis in Aflatoxin B1 Administered Male Rats and Related Histopathological Findings

Aflatoksin B1 Uygulanan Erkek Sıçanlarda İDA Propolisin Hepatik Antioksidan Savunma Etkinliği ve Histopatolojik Bulgularının Araştırılması

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ABSTRACT

Aim: Natural products such as honey, pollen, propolis and royal jelly are generally friendly to the human liver and all other body cells, with a high antioxidant capacity. The present study aims at observing the damages caused by Aflatoxin B1 on rat liver and determining the beneficial effects of propolis on liver tissue.

Material and Method: The duration of the study was determined as 60 days and 45 male rats of Wistar albino breed with an average weight of 250-350 grams suitable for the working conditions were included in the study. Experimental animals were randomly and equally divided into 3 groups (The Control Group, The Aflatoxin B1 group, The Aflatoxin B1 + IDA Propolis group). The rats liver tissue and blood samples were taken and placed in separate sterile vials. These liver tissues and blood samples were sent to the our hospital Pathology and Biochemistry Department for histopathological examination and for biochemical blood analysis to be performed.

Result: The Gamma glutamyl transferase (GGT), Alanine Aminotransferase (ALT) and Alkaline phosphatase (ALP) levels of groups that were administered Aflatoxin B1 and Aflatoxin B1 + Propolis were higher than those of the control group. Administering Aflatoxin B1 alone increased Aspartate Aminotransferase (AST) levels whereas administering Aflatoxin B1 + Propolis decreased AST levels. The Total Bilirubin, Direct Bilirubin and c-reaktive protein (CRP) levels of groups that were administered Aflatoxin B1 and Aflatoxin B1 + Propolis were higher than those of the control group. The Total Bilirubin, Direct Bilirubin and CRP levels of rats that were administered Aflatoxin B1 were higher than those of rats that were administered Aflatoxin B1 + Propolis. Administering Aflatoxin B1 and Aflatoxin B1 + Propolis have increased the malondialdehyde (MDA) levels but decreased the catalase (CAT) levels, and this decrease is statistically significant (p<.0001). Administering Aflatoxin B1 + Propolis has resulted in a similar level of glutathione peroxidase.(GPx) with the control group. However, administering Aflatoxin B1 alone has resulted in a GPx level that is lower than both other groups. Administering Aflatoxin B1 and Aflatoxin B1 + Propolis have caused a statistically significant difference in the total antioxidant (TAS), total oxidant (TOS) and superoxide dismutase (SOD) levels (p<.0001).

Conclusion: The results of this study indicate that bee pollen is an important source of flavonoids, which can be considered as natural antioxidants. It is also reported that bee products prevent lipid peroxidation and scavenge a number of free oxygen radicals that are known oxidants and carcinogenic agents.

Keywords: Aflatoxin B1, histopathology, hepatic antioxidant defense, IDA propolis, Wistar albino (Rat).

ÖZ

Giriş: Bal, polen, propolis ve arı sütü gibi doğal ürünler insan karaciğer ve diğer tüm vücut hücreleri ile genellikle dost olup yüksek antioksidan kapasiteye sahip maddelerdir. Mevcut çalışma, Aflatoksin B1'in sıçan karaciğerinde oluşturduğu zararlar ve propolisin karaciğer dokusu üzerindeki yararlı etkilerini gözlemlemeyi amaçlamaktadır.

Gereç ve Yöntem: Çalışma süresi 60 gün olarak belirlenmiş ve çalışma şartlarına uygun ortalama ağırlığı 250-350 gram Wistar albino cinsi 45 adet erkek rat çalışmaya alınmıştır. Deney hayvanları rastgele ve eşit sayıda 3 gruba (Kontrol Grubu, Aflatoksin B1 grubu, Aflatoksin B1 + IDA Propolis grubu).ayrılmıştır. Ratların karaciğer doku ve kan örnekleri alınarak ayrı steril flakonlara yerleştirilmiştir. Karaciğer dokuları ve kan örnekleri histopatolojik inceleme ve biyokimyasal kan analizi için hastanemiz Patoloji ve Biyokimya laboratuvarına gönderildi.

Bulgular: Aflatoksin B1ve Aflatoksin B1+Propolis uygulanan gruplarda gama glutamil transferaz (GGT), alanin aminotransaminaz (ALT) ve alkalen fosfotaz (ALP) düzeylerinin kontrol grubuna göre yüksek olduğu görülmektedir. Tek başına AflatoksinB1 uygulamasının aspartat aminotransaminaz (AST) düzeyini yükselttiği, Aflatoksin B1+Propolis uygulamasının ise AST düzeyini düşürdüğü görülmektedir. Aflatoksin B1 uygulanan ratlar Aflatoksin B1+Propolis uygulanan ratlardan daha yüksek Total Bilirubin, Direk Bilirubin ve c-reaktif protein (CRP) düzeyine sahiptir. Aflatoksin B1 ve Aflatoksin B1+Propolis uygulaması malondialdehit (MDA) seviyesini arttırmakta ve katalaz (CAT) seviyesini ise düşürmektedir ve bu düşüş istatistiksel olarak önemlidir (P<,0001). Aflatoksin B1+Propolis uygulaması glutatyon peroksidaz (GPx) bakımından kontrol grubu ile benzer bir düzeye sahiptir. Aflatoksin B1 uygulaması ise her iki gruptan daha düşük bir GPx seviyesine neden olmuştur. Aflatoksin B1 ve Aflatoksin B1+Propolis uygulaması total antioksidan (TAS), total oksidan (TOS) ve süperoksit dismutaz (SOD) değerlerinde istatistiksel anlamada önemli bir farklılığa neden olmuştur (P<,0001).

Sonuç: Bu çalışmanın sonuçları, arı poleninin doğal antioksidanlar olarak kabul edilebilecek önemli bir flavonoid kaynağı olduğunu göstermektedir. Arı ürünlerinin lipid peroksidasyonunu önlediği ve oksidan ve kanserojen ajan olarak bilinen bir dizi serbest oksijen radikali temizlediği de bildirilmektedir.

Anahtar Kelimeler: Aflatoksin B1, Histopatoloji, Hepatik antioksidan savunma, IDA Propolis Wistar albino (Rat).

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INTRODUCTION

Natural products such as honey, pollen, propolis and royal jelly are generally friendly to the human liver and all other body cells, with a high antioxidant capacity (18). Apitherapeutic bee products not only contain high levels of vitamin A (beta-carotene) and vitamin C (ascorbic acid) but they also constitute a source of phenolic acids, flavonoids and anthocyanins as well as Vitamin B (B1-B2) and elements such as Na, K, Ca, Mg, Fe, Cu, Zn, Se, F and CI with coenzyme function, which are used as a metabolic regulator and are required to be obtained externally. It is reported in the literature that the bee pollen phenolic extract has an anti-allergic effect on rats, the ethanolic extract of honeybee collected pollen in the Mexican flora inhibit lipid peroxidation and that bee products prevent lipid peroxidation and scavenge a number of free oxygen radicals that are known oxidants and carcinogenic agents (2-21-22). Apiculture products are known to be effective in the prevention of numerous diseases and treatment of the liver disease in particular. Products such as honey, pollen, propolis and royal jelly have a high antioxidant effect on the human liver and all other body cells. These products, which are collected and concentrated by honeybees in the nature, contain elevated levels of carbohydrates, vitamins, coenzymes, polyphenols, aromatic compounds and phytosterols. Honey, pollen, propolis and other bee products that are composed of nectars and pollens collected by honeybees from plants contain elevated levels of polyphenolic compounds.The liver is a vital organ of the human body (15). It is exposed to toxic substances and drugs when performing its anatomical, physiological, and biochemical functions. A major function of the liver is detoxification.

Consequently, various chemical agents and drugs escalate liver damage, impairing its histopathological structure (1). Thus, acute and chronic hepatitis and liver cirrhosis have become very common nowadays. Therefore, the treatment method using natural products has gained prominence in the prevention of liver damage. Consequently, animal tests are conducted with a view to preventing hepatitis using natural extracts. Research studies involving apiculture products have proven to be effective in the recent years, most of which is focused on using pollen, propolis, honey and royal jelly to prevent hepatitis (2-21-22). The present study aims at observing the damages caused by Aflatoxin B1 on rat liver and determining the beneficial effects of propolis on liver tissue.

MATERIAL AND METHOD

The study was carried out with the permission of Çanakkale Onsekiz Mart University Animal Research Ethics Committee (Decision No: 2018/11-08). The rats were housed in separate cages in a room with a 12 hour light-dark cycle and fresh air supply, throughout the experiment. They were provided with rat food and water ad libitum save for the 8 hour anesthesia period. The duration of the research study was 60 days, where 45 male Wistar albino rats meeting the requirements of the study and weighing between 250-350 grams on the average were examined. The test animals were randomly divided into (n=20) 3 groups of equal size.

The Groups

1. The Control Group: The rats in this group were fed a standard diet for 2 months and then sacrificed on day 60 (Rats in this group were fed a standard diet for 2 months and then liver and blood samples were taken on day 60). Liver tissue and blood samples were taken from all rats and placed in separate sterile vials. These liver tissue and blood samples were sent to the Medical Pathology and Medical Biochemistry Department of our university to be dissected for histopathological examination and for biochemical analysis to be performed.

2. The Aflatoxin B1 group: The rats in this group were fed a standard diet for 2 months and Aflatoxin B1 was added to their drinking water at the rate of 0-04 mg/kg. (Rats were fed with a standard diet for 2 months and added 0-04 mg / kg Aflatoxin B1 to 1 liter of drinking water every day. has been added) sacrificed on day 60 and liver tissue and blood samples were taken from them.

3. The Aflatoxin B1+IDA Propolis group: The rats in this group were fed a standard diet for 2 months, where Aflatoxin B1 was added to their drinking water at the rate of 0- 04 mg/kg and IDA Propolis was added to their drinking water at the rate of 2-7.3 g per3.liter. (In addition, 2-7.3 g of İDA Propolis was added to 1 liter of drinking water every day for 2 months. These rats were then). These rats were then sacrificed on day 60 and liver tissue and blood samples were taken from them.

Postoperative Procedures

An abdominal centerline incision was performed while the rats were anesthetized with Ketamine hydrochloride (35 mg/kg, Alfamine 10%, Egevet/Turkey) and Xylazine (15 mg/kg, Alfazyne 2%, Egevet/Turkey) (12) and liver tissue and blood samples were taken and placed in separate sterile vials. These liver tissue and blood samples were sent to the Medical Pathology and Medical Biochemistry Department of xxxxxxxxxxxxxx University) to be dissected for histopathological examination and for biochemical blood analysis to be performed.

Histopathological Examination

The histopathological examination was performed by a pathologist blinded to the groups. All liver tissue

samples taken from the groups were fixated in 10% formaldehyde solution. The tissues were rinsed in tap water overnight and embedded in paraffin after running a series of routine histological techniques. Subsequently, 5 µm thick sections of paraffin blocks were placed on microscope slides. The tissue samples were stained with Hematoxylin-Eosin (H&E). All sections were examined and photographed by a ZEISS Primo Star light microscope.

Blood Sample Collection and Biochemical Analyses

The rats were sacrificed at the end of the experimental procedures and blood and liver tissue samples were taken from them. Blood samples were collected in vials containing anticoagulants (EDTA) and centrifuged at 3,000 RPM and +4 °C for 10 minutes to segregate the plasma. The hemolysate was prepared by washing the erythrocytes with physiological saline solution (0.9% NaCl) three times. The hemolysate and liver tissue samples were stored at -80 °C until the biochemical analyses were performed. EDTA blood samples were centrifuged to remove their plasma, and the MDA levels of removed plasma were examined. These diluted blood samples were further diluted with 50 mm phosphate buffer (pH: 7.0) using a dilution factor of 1:100 to determine catalase activity in the hemolysate. Centrifuged blood samples were placed in silicone tubes to segregate the serum. The aspartat aminotransaminaz (AST), Alanine Aminotransferase (ALT), Alkaline phosphatase (ALP), Gamma glutamyl transferase (GGT) total bilirubin and direct bilirubin levels were determined using photometric, colorimetric, and enzymatic methods. The blood samples were transferred to biochemical tubes to be used in further studies. The blood samples were centrifuged at 3,000 RPM for 5 minutes to examine total oxidant (TOS), total antioxidant (TAS), superoxide dismutase (SOD) and glutathione peroxidase (GPx) levels. The serum c-reaktive protein (CRP) level was measured using the enzyme-linked immunosorbent assay (ELISA) test. The statistical package for the social sciences (SPSS) analysis method, where study groups are treated as fixed factors, was used for statistical analysis. The groups were compared with each other by using the Duncan test in post-hoc analyses.

RESULTS

The following results were obtained upon examination of the blood samples and histopathological sections of tissue liver. Biochemical Parameter Findings: following results were obtained upon examination of the blood samples and Administering Aflatoxin B1 and Aflatoxin B1 + Propolis have caused statistical differences in the GGT, AST, ALT and ALP levels of blood (p<.0001). The GGT, ALT and ALP levels of groups that were administered Aflatoxin B1 and Aflatoxin B1 + Propolis were higher than those of the control group. Administering Aflatoxin B1 alone increased AST levels whereas administering Aflatoxin B1 + Propolis decreased AST levels. Propolis extract has been shown to decrease the level of AST enzyme in rats (30). AST, ALT, LDH and ALP activities have also increased as diagnostic indicators of liver injury (22). The study titled "Antioxidant Effects of Herbal Extracts on Rats Contaminated with Aflatoxin" has reported an increase in serum AST, ALP, cholesterol, total bilirubin, LDH and urea levels (16). The GGT, ALT and ALP levels of groups that were administered Aflatoxin B1 and Aflatoxin B1 + Propolis were higher than those of the control group.

Table 1: The Biochemical Parameters of GGT, AST, ALT and ALP in Aflatoxin B1 and Propolis Administered Rats

Blood	GGT (U/L)	AST (U/L)	ALT (U/L)	ALP (U/L)
Control	1.36^{c}	153.30^{c}	60.16^{b}	136.5^{c}
Aflatoxin B1	1.68^{a}	181.35^{a}	85.10^{a}	153.2^{a}
Aflatoxin B1+Propolis	1.42^{b}	135.17^{b}	63.60^{b}	140.1^{b}

*The mean values marked by different superscript letters in a column differ significantly (P<.0001). **Gamma glutamyl transferase (GGT). Aspartat aminotransaminaz (AST), Alanine Aminotransferase (ALT), Alkaline phosphatase (ALP).

Administering Aflatoxin B1 and Aflatoxin B1 + Propolis have caused statistical differences in the Total Bilirubin, Direct Bilirubin and CRP levels (p<.0001). The Total Bilirubin, Direct Bilirubin and CRP levels of groups that were administered Aflatoxin B1 and Aflatoxin B1 + Propolis were higher than those of the control group. The Total Bilirubin, Direct Bilirubin and CRP levels of rats that were administered Aflatoxin B1 were higher than those of rats that were administered Aflatoxin B1 + Propolis. Bilirubin, Direct Bilirubin and CRP levels of groups that were administered Aflatoxin B1 and Aflatoxin B1 + Propolis were higher than those of the control group. The Total Bilirubin, Direct Bilirubin and CRP levels of rats that were administered Aflatoxin B1 were higher than those of rats that were administered Aflatoxin B1 + Propolis.

Table 2: The Biochemical Parameters of Total Bilirubin, Direct Bilirubin and CRP in Aflatoxin B1 and Propolis Administered Rats

Blood	Total Bilirubin (mg/dl)	Direct Bilirubin (mg/dl)	CRP (µg/ml)
Control	0.26^{c}	0.08^{c}	3.32^{c}
Aflatoxin B1	0.34^{a}	0.11^{a}	5.08^{a}
Aflatoxin B1+Propolis	0.30^{b}	0.10^{b}	4.12^{b}

*The mean values marked by different superscript letters in a column differ significantly (P<,0001). *c-reaktive protein (CRP)

Administering Aflatoxin B1 and Aflatoxin B1 + Propolis have increased the MDA levels but decreased the CAT levels, and this decrease is statistically significant (p<.0001). Administering Aflatoxin B1 causes the MDA levels to be higher and the CAT levels to be lower than

administering Aflatoxin B1 + Propolis. Administering Aflatoxin B1 + Propolis has resulted in a similar level of GPx with the control group. However, administering Aflatoxin B1 alone has resulted in a GPx level that is lower than both other groups.

Table 3: The Biochemical Parameters of MDA , CAT and GPx in Aflatoxin B1 and Propolis Administered Rats

Blood	MDA (nmol/ml)	CAT (k/gHb)	GPx (U/mg Hb)
Control	7.05[c]	59.18[a]	0.29[b]
Aflatoxin B1	10.08[a]	46.20[c]	0.24[a]
Aflatoxin B1+Propolis	8.03[b]	54.26[b]	0.27[b]

*The mean values marked by different superscript letters in a column differ significantly (P<.0001). **Malondialdehyde (MDA), catalase (CAT), glutathione peroxidase.(GPx)

Administering Aflatoxin B1 and Aflatoxin B1 + Propolis have caused a statistically significant difference in the TAS, TOS and SOD levels (p<.0001). Administering Aflatoxin B1 has caused the TAS levels to increase in comparison to the control group. On the contrary, administering Aflatoxin B1 + Propolis has caused the TAS levels to decrease in comparison to the control group. The TOS levels are higher in the Aflatoxin B1 and Aflatoxin B1 + Propolis groups compared to the control group. Administering Aflatoxin B1 + Propolis has resulted in lower TOS levels in comparison to the Aflatoxin B1 group. Administering Aflatoxin B1 + Propolis has resulted in a similar level of SOD with the control group. However, administering Aflatoxin B1 alone has resulted in a SOD level that is higher than the control group. Histopathological Findings: Normal histological liver structures were observed in the liver tissue sections of the rats in the control group (**Figure 1**). Liver tissues of the rats in the Aflatoxin B1 administered group exhibited sinusoidal dilatation (S), Kupffer cell proliferation (KC) and congestion of the central vein (CV) (**Figure 2a**), inflammatory cell infiltration in the portal area (**Figure 2b**), haloes around congested hepatocyte nuclei (perinuclear halo, PH) (**Figure 2c**) and porto-portal fibrosis (**Figure 2d**). The liver tissues of the rats in the Propolis administered group demonstrated comparable properties with the control group (**Figure 3**). As a result, liver tissues of rats that are exposed to Aflatoxin B1 demonstrated significant injuries whereas liver tissues of rats that are given propolis extracts demonstrated comparable properties with the control group.

Table 4: The Biochemical Parameters of TAS, TOS and SOD in Aflatoxin B1 and Propolis Administered Rats

Blood	TAS (Mmol Trolox eq/L)	TOS (µmol H2O2 eq/L)	SOD (U/mg protein)
Control	1.01[c]	7.05[c]	7.45[b]
Aflatoxin B1	1.15[a]	11.90[a]	8.54[c]
Aflatoxin B1+Propolis	0.81[b]	9.15[b]	7.10[b]

*The mean values marked by different superscript letters in a column differ significantly (P<,0001). *Total antioxidant (TAS),total oxidant (TOS), superoxide dismutase (SOD).

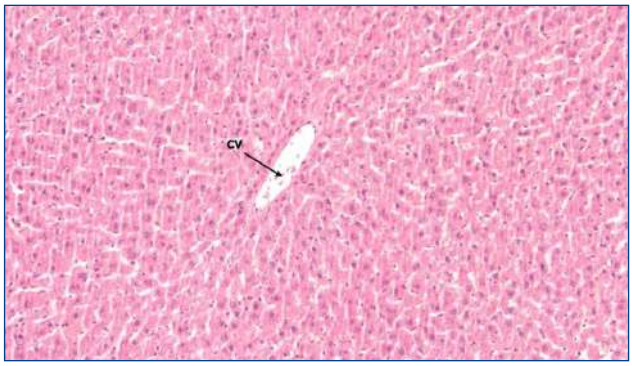

Figure 1 (Control Group): Normal liver histology and central vein (CV) structures were observed microscopically (HEX100).

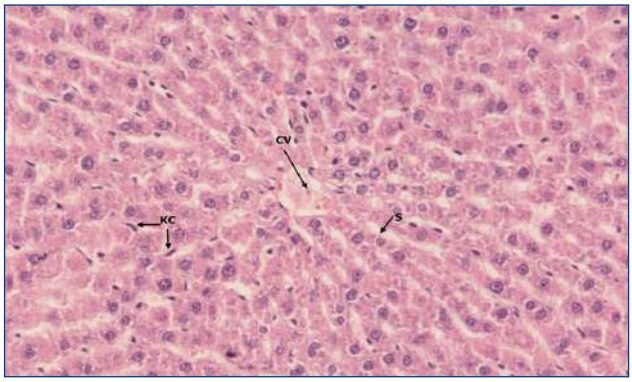

Figure 2 (Aflatoxin Group): Congestion of the central vein (CV), Kupffer cell increase (KC) and sinusoidal dilatation (S) were observed microscopically (HEX200).

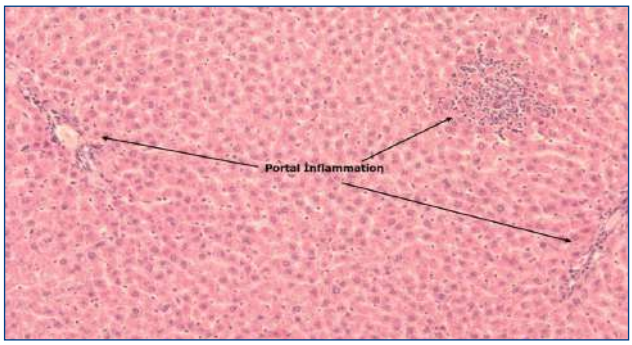

Figure 2b (Aflatoxin Group): All portal areas of the section demonstrated inflammatory cell infiltration in varying degrees of severity microscopically (HEX100).

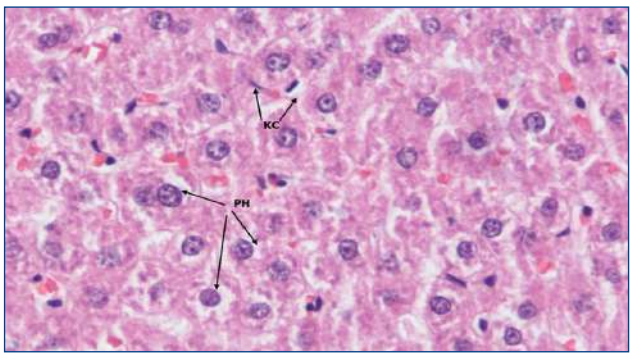

Figure 2c (Aflatoxin Group): Congested liver cells, perinuclear haloes (PH) and Kupffer cell proliferation (KC) were observed microscopically Haloes were observed around congested hepatocyte nuclei (perinuclear halo, PH). (HEX400).

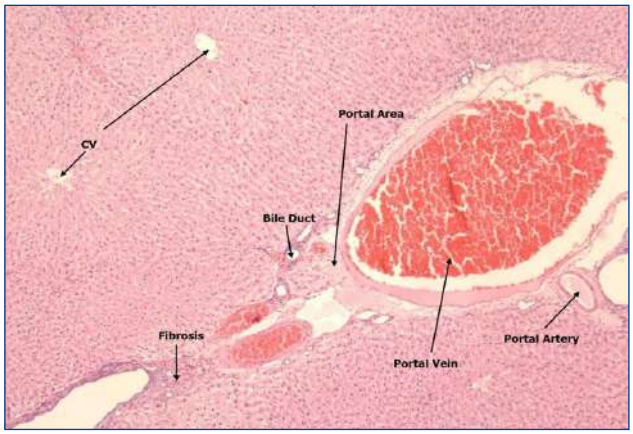

Figure 2d (Aflatoxin Group): Porto-portal fibrosis, dilatation of the portal area and portal vein, proliferation of the biliary duct and congestion of the portal artery and veins in the portal area were observed microscopically (HEX40).

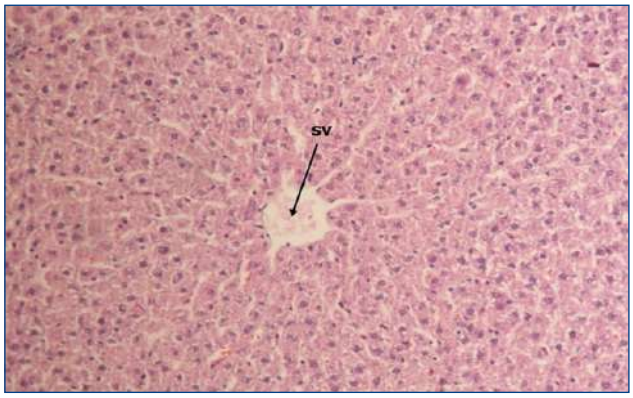

Figure 3 (Propolis Group): Normal liver tissue histology, similar to that of the control group, was observed in the Propolis administered group microscopically (HEX40).

DISCUSSION

The study titled "Antimicrobial activity and pollen composition of honey samples collected from different provinces in Turkey" has reported that "Honey proved to be more effective on bacteria than antibiotics and these natural products contain carbohydrates, vitamins, coenzymes, polyphenols, aromatic compounds and phytosterols, which are collected and concentrated by honeybees in the nature, as well as numerous terpenes and terpenoids, aliphatic compounds and volatile compounds such as fatty acids, the functions of which are not fully known (18). It is also reported that methanolic extracts of pollen and propolis demonstrate antibacterial activity (6). The study titled "Anti- allergic effect of bee pollen phenolic extract and myricetin in ovalbumin-sensitized mice" reported that "The bee pollen is used in folk medicine to alleviate allergic reactions. The bee pollen phenolic extract (BPPE) consists in phenolic compounds (flavonoids) from plants picked by Apis mellifera bee and myricetin is one of the compounds that is present in this the extract, The results of this study support the hypothesis that myricetin is one of the flavonoids of BPPE responsible for the anti-allergic effect and a potential tool to treat allergies (16).

The study titled "Antioxidant Activity of Polyphenolic Extract of Honeybee-collected Pollen" reported that "The antioxidant capacity related to the phenolic composition of honeybee- collected pollen extract acts as an inhibitor of lipid peroxidation on mouse hepatic microsomal preparations in an in vitro biological system (2). The results of this study indicate that bee pollen is an important source of flavonoids, which can be considered as natural antioxidants. Pollen extracts have demonstrated antioxidant activity related to the flavonol concentration in both the in vitro-biological system and the in vivo system but it was reported that a high concentration of flavonols in the extract of pollen can also have a pro-oxidant effect. It is also reported that bee products prevent lipid peroxidation and scavenge a number of free oxygen radicals that are known oxidants and carcinogenic agents (22-23). In another study, the effect of pesticides (Carbaryl) on the oxidative stress markers in rats was examined, demonstrating he ameliorative effect of bee pollen (11). Antioxidants are defense molecules that are brought in by diet from herbal sources, protecting the organism against oxidative degeneration. The bee pollen is promoted as a health food with a wide range of nutritional and therapeutic properties, however it is reported that antioxidants that are brought in by diet or generated by the organism cannot be stored in vivo. They are ingested and egested on a regular basis. Antioxidants such as Vitamin A and E function in hydrophobic environments. On the other hand, many compounds such as ascorbic acid (Vitamin C) and phenolic substances (gallic acid, catechin, quercetin, caffeic acid, cinnamic acid, ferulic acid, coumaric acid, resveratrol, rutin, kaempferol, naringin, apigenin and luteolin) are effective in hydrophilic environments. It is reported that all antioxidants are responsible for absorbing the impact of radical agents with their protective properties to protect all other biomolecules against all kinds of oxidative damage (23).

The importance of honey and its products for human health is emphasized. It is aimed to show the harm that aflatoxin B1 will cause in humans on rats. It has been shown that propolis reduces the negative effects of Aflatoxin B1 on the liver and blood tissue.

AST and GGT parameters were examined in a study conducted on 34 bovines which were given Aflatoxin B1, and it was reported that GGT activity has increased significantly after Aflatoxin B1 was administered but AST levels were not altered considerably (14,17). Varying amounts of Aflatoxin B1 was added artificially to the fodder of dairy ewes in a 14 day study. It was reported that the levels of blood parameters AST, GGT, ALP and

LDH have increased significantly (7). The study titled "Effect of Ascorbic Acid Supplement on Hematological Parameters and some enzyme activities of Male Rabbits Exposed to Aflatoxin B1" has reported that plasma AST, ALT and LDH levels have increased significantly and plasma.

AST, ALT, LDH and ALP activities have also increased as diagnostic indicators of liver injury (22). The study titled "Antioxidant Effects of Herbal Extracts on Rats Contaminated with Aflatoxin" has reported an increase in serum AST, ALP, cholesterol, total bilirubin, LDH and urea levels (16). It was reported that, biochemical changes were observed prior to the emergence of clinical symptoms in aflatoxin contamination, resulting from the damage sustained by the cells and tissues depending on the level of toxins received and the duration of exposure, the levels of serum ALP, GGT, LDH, ALT, AST and serum bilirubin were elevated, and the levels of serum protein, non-protein nitrogen, urea, hemoglobin and coagulation factor have decreased significantly (5,29).

The biochemical parameters obtained under the present study are generally in accord with the literature, where administering Aflatoxin B1 and Aflatoxin B1 + Propolis have caused statistical differences in the GGT, AST, ALT and ALP levels of blood. The GGT, ALT and ALP levels of groups that were administered Aflatoxin B1 and Aflatoxin B1 + Propolis were higher than those of the control group. Administering Aflatoxin B1 alone increased AST levels whereas administering Aflatoxin B1 + Propolis decreased AST levels.

The study titled "Bioactive Properties of Apitherapeutic bee Products (honey, pollen, propolis and royal jelly) and their Roles in the Prevention of Liver Damage" has examined the antioxidant properties of propolis and its role in the prevention of liver damage. The roles played by ALT and AST enzymes, and enzymes such as MDA, SOD and CAT in the formation of liver damage as well as the changes in the histopathological tests of liver tissue were examined. It was observed that the antioxidant activities of the bee products used in the study have varied depending on their total phenolic compound content and that propolis had the highest antioxidant capacity amongst these bee products (20). It was reported that most types of the CAT enzyme are capable of increasing the rate of free radical formation in certain body organs and thus antioxidant enzymes play a vital role both in preserving the stability of the cells and eradication of free radicals (8).

Table 3 demonstrates that Administering Aflatoxin B1 and Aflatoxin B1 + Propolis have increased the MDA levels but decreased the CAT levels, and this decrease is statistically significant. Administering Aflatoxin B1 causes the MDA levels to be higher and the CAT levels to be lower than administering Aflatoxin B1 + Propolis. Administering Aflatoxin B1 + Propolis has resulted in a similar level of GPx with the control group. However, administering Aflatoxin B1 alone has resulted in a GPx level that is lower than both other groups. When we compare the effect of Aflatoxin B1 on CAT activity with the control group in the present study, we see that CAT activity has significantly decreased statistically. Our findings are in line with the literature. The liver is the sole organ in the human body that carries out all biosynthesis and regulation activities including but not limited to regulating blood sugar, storing minerals, generating bile acid and cholesterol, and regulating blood coagulation factors (13-19-21). Hepatocytes, which are referred to as the liver cells, are the most functional cells in the human body (10-25-26).

We have observed inflammatory cell infiltration in the portal area and haloes around congested hepatocyte nuclei (perinuclear halo, PH) on rats in the Aflatoxin B1 administered group. The liver tissues of the rats in the Aflatoxin B1 administered group also exhibited sinusoidal dilatation (S), Kupffer cell proliferation (KC), congestion of the central vein (CV) and inflammatory cell infiltration in the portal area. Fibrotic tissue is formed in the liver in response to direct toxic damage causing inflamation. These fibrous connective tissues conjugate in various areas of the liver (portal-portal-, portal-central, central-central) in time. This is referred to as bridging fibrosis. In contrast to all other recoverable lesions, fibrosis in particular and hepatic damage in general are not recoverable, resulting in cirrhosis (4).

We have observed sinusoidal dilatation (S), Kupffer cell proliferation (KC) and congestion of the central vein (CV), inflammatory cell infiltration in the portal area, haloes around congested hepatocyte nuclei (perinuclear halo, PH) and porto-portal fibrosis in the liver tissues of rats in the Aflatoxin B1 administered group under the present study, confirming the findings of Armbrust et.al.

The liver is the largest organ and gland in the human body, located between the gastrointestinal system and portal circulation, and peripheric organs and systematic circulation, receiving blood supply both from the hepatic artery and from the hepatic portal vein. The liver is confronted with all drugs, toxic substances and microbic agents that are received physiologically or biochemically, orally, or parentally and is exposed to their harmful effects. The liver detoxifies harmful substances that ingress the human body or responses to the damage caused by them with its regenerative capabilities on an ongoing basis. There are numerous causes that damage the liver, some of which are commonly observed (1-9- 27).

Most harmful chemicals damage the liver by inhibiting protein synthesis indirectly whereas others damage the liver by inhibiting protein synthesis directly. For

example, the fungal toxin called alpha- Amanitin stops all kinds of protein synthesis by directly inhibiting the RNA polymerase II enzyme (25). Liver damage will be escalated if the antioxidant/oxidant balance is disturbed in favor of oxidation and mitigated if it is disturbed in favor of antioxidation. Consequently, all antioxidants that are brought in by diet will be effective in protecting liver cells and the rest of the somatic system against oxidation. An increase in liver enzyme levels is considered as a diagnostic indicator of liver damage (3). These enzymes are released to the circulatory system as in the case of liver damage exhibiting hepatocellular lesions and parenchymal cell necrosis[28]. Aflatoxins are the strongest known carcinogens of the liver (24).

This effect has been demonstrated in many animal groups. For instance, up to 100% of female and male rats develop liver cancer within 80 weeks and 70 weeks respectively upon intoxication with 15 ppb of aflatoxin in their feed, even only once. Aflatoxins also cause kidney tumors, colonic mucinous adenocarcinoma, sarcoma and fibrosarcoma (14). Histopathological effects of aflatoxins are particularly seen in liver and biliary duct cells. These effects are manifested in the form of biliary duct cell hyperplasia, nucleus dilatation, nucleus inclusions and hepatocyte dilatation (12). In the present study, we have observed proliferation of biliary duct cells and congestion of portal arteries in the portal area in the rats that were administered Aflatoxin B1, confirming the findings of Hastings et.al (13).

CONCLUSIONS

The findings of the present study, supported by the literature, indicate that propolis, the bee product with the highest apitherapeutic effect, prevents liver injury by blocking oxidative damage, and accelerates treatment with its antibacterial, antiviral, anti-inflammatory and anti- tumoral activities. Consequently, it is considered that both healthy individuals and hepatitis patients will be healthier by increasing propolis intake in their diets. Therefore, it is recommended to use extracts containing propolis on a regular basis with a view to protecting the liver against oxidative damage and enhancing the immune system. Propolis is a natural food product capable of performing numerous phytobiological activivties including but not limited to wound therapy, treatment of upper respiratory tract infections and preventing carcinogenesis.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was carried out with the permission of Çanakkale Onsekiz Mart University Animal Research Ethics Committee (Decision No: 2018/11-08).

Informed Consent: All patients signed the free and informed consent form.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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ORIGINAL ARTICLE
ORİJİNAL ARAŞTIRMA

Comparison of the 15-Day, 30-Day and 90-Day Outcomes of 61 Patients who Underwent Intragastric Balloon due to Obesity by Gender

Obezite Nedeniyle İntragastrik Balon Uygulanan 61 Hastanın 15 Günlük, 30 Günlük ve 90 Günlük Sonuçlarının Cinsiyete Göre Karşılaştırılması

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ABSTRACT

Aim: To compare the 15-day, 30-day and 90-day outcomes of 61 patients who underwent intragastric balloons (IGBs) due to obesity by gender.

Gereç ve Yöntem: This retrospective study was conducted on patients who underwent IGB between January 2020 and May 2022. Patients under 18 and patients who were followed up in our clinic after balloon insertion were excluded from the study. The post-procedural outcomes and weight losses were compared with appropriate statistical tests between the gender groups.

Results: The mean age of the 61 patients included in the study was 31.09±8.38 years (18-55), and 49 (80.3%) of all patients were women. The patients' mean body mass index (BMI) was 32.22 kg/m², the highest BMI was 39.45 kg/m², and the lowest was 28.23 kg/m² before the IGB procedure. The mean per cent weight loss on day 15, day 30, and day 90 was 5.9%, 10.23%, and 14.88%, respectively. Post-procedural complications were seen in 42 (68.9%) patients. The most common complications were nausea (41%) and abdominal pain (32.8%). Only three of 61 patients required hospitalisation after the procedure. In male patients, the rate of comorbid disease before IGB (p=0.048), mean height (p<0.001), the mean rank of weight (p<0.001), the mean rank of BMI (p=0.002), and the amount of weight lost (in kilograms) in all three follow-up periods were higher. In the post-procedure follow-ups, the weight-loss rates at the 15th, 30th and 90th days were similar in both genders. In addition, all post-procedure complications were similar in both genders.

Conclusion: The amount of weight loss in male patients was higher in male patients, and the rate of weight loss was similar in both genders. Due to identical complication rates, IGB is a method that can be used safely by both genders in the fight against obesity.

Keywords: Gastric balloon, gender, weight loss

ÖZ

Amaç: Obezite nedeniyle intragastrik balon (İGB) uygulanan 61 hastanın 15 günlük, 30 günlük ve 90 günlük sonuçlarını cinsiyete göre karşılaştırmak.

Gereç ve Yöntem: Bu retrospektif çalışma Ocak 2020-Mayıs 2022 tarihleri arasında İGB yapılan hastalarda yapılmıştır. 18 yaş altı ve balon takıldıktan sonra kliniğimizde takip edilen hastalar çalışma dışı bırakıldı. İşlem sonrası sonuçlar ve kilo kayıpları, cinsiyet grupları arasında uygun istatistiksel testlerle karşılaştırıldı.

Bulgular: Çalışmaya alınan 61 hastanın yaş ortalaması 31,09±8,38 (18-55) yıl olup, tüm hastaların 49'u (%80,3) kadındı. Hastaların İGB işlemi öncesi ortalama vücut kitle indeksi (VKİ) 32,22 kg/m², en yüksek VKİ 39,45 kg/m² ve en düşük 28,23 kg/m² idi. 15. günde, 30. günde ve 90. günde ortalama kilo kaybı yüzdesi sırasıyla %5,9, %10,23 ve %14,88 idi. 42 (%68,9) hastada işlem sonrası komplikasyon görüldü. En sık görülen komplikasyonlar bulantı (%41) ve karın ağrısı (%32,8) idi. İşlem sonrası 61 hastadan sadece üçünün hastaneye yatırılması gerekti. Erkek hastalarda İGB öncesi komorbid hastalık oranı (p=0,048), boy ortalaması (p<0,001), ortalama ağırlık sırası (p<0,001), ortalama VKİ sıralaması (p=0,002) ve her üç takip döneminde kaybedilen kilo miktarı (kilogram cinsinden) daha yüksekti. İşlem sonrası takiplerde 15., 30. ve 90. günlerdeki kilo verme oranları her iki cinsiyette de benzerdi. Ek olarak, tüm işlem sonrası komplikasyonlar her iki cinsiyette de benzerdi.

Sonuç: Erkek hastalarda kilo verme miktarı erkek hastalarda daha fazlaydı ve kilo verme oranı her iki cinsiyette de benzerdi. İGB, aynı komplikasyon oranları nedeniyle obezite ile mücadelede her iki cinsiyet tarafından da güvenle kullanılabilecek bir yöntemdir.

Anahtar Kelimeler: Mide balonu, cinsiyet, kilo kaybı

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INTRODUCTION

Obesity is a multifactorial and complex disease that occurs due to the interaction of genetic and environmental factors. Although our knowledge about the formation of obesity is not complete yet, it is understood that social, behavioural, cultural, psychological, metabolic and genetic factors play important roles (1,2). The World Health Organization (WHO) closely monitors the changes in the prevalence of overweight and obesity over the years and tries to take measures to protect public health (3). According to the 2015 data by WHO, it is estimated that approximately 39% of the world's population is overweight and obese (4). Obesity is now accepted as a global pandemic, and medical and surgical treatment efforts are being made to reduce its prevalence.

Obesity is a disease that must be treated because of the various health problems it causes (5). The treatment aims to reduce the morbidity and mortality risks by targeting a realistic body weight loss, to make the individual gain adequate and balanced nutrition habits and regular physical activity habits, and to increase the quality of life (6). Nutrition therapy, exercise and behaviour modification therapy are the first steps of the obese individual's treatment program (5). Pharmacological and interventional treatments should be tried in cases that do not benefit first-line treatment. The intragastric balloon (IGB) is one of the interventional treatments used to treat obesity and has become popular. Weight loss results after IGB are promising (7).

This study aimed to compare the 15-day, 30-day and 90-day outcomes of 61 patients who underwent IGBs due to obesity by gender.

MATERIAL AND METHOD

This retrospective study was conducted after ethical approval (KAEK 2022/07-80). Patients who performed IGBs between January 2020 and May 2022 were included in the study. Patients under 18 and patients who were followed up in our clinic after balloon insertion were excluded from the study.

The IGB Implantation Process

All patients underwent a routine clinical examination before the IGB procedure. The weight and height of the patients were measured with light clothing and no shoes.

Before obtaining informed written consent, patients have explained the procedures' risks, benefits, and alternatives. During the procedure, the patient was connected to monitoring devices at the left lateral position. The device was implanted under sedation and analgesia. Intravenous medications were administered through an indwelling cannula. Oxygen was provided continuously through a nasal cannula. Bari Globe® IGB was placed in the stomach through endoscopy. All balloons were filled with methylene blue with a maximal volume of 500 mL.

Searched Parameters

Demographic data (age, gender), weight and height of the patients were collected. All patients' body mass indexes (BMIs) were calculated before the balloon procedure. BMI was calculated by dividing the patient's weight (kg) by the square of the height in meters. Weight measurement and BMI calculation were repeated on the 15th, 30th and 90th days after the balloon. Changes in weight and BMI between measurement periods were also evaluated. It is aimed to compare the 15-day, 30-day and 90-day outcomes of 61 patients who underwent IGBs due to obesity by gender.

Statistical Analysis

Statistical analyses were performed using the IBM Statistical Analyses for Social Sciences (SPSS) ver. 23.0 for Windows. Quantitative variables were expressed as mean ± standard deviation (SD), median, minimum-maximum, interquartile range and interval. Qualitative variables were reported as numbers and percentages. Kolmogorov Smirnov and Shapiro Wilk tests were used to evaluating the normality distribution. Due to normality test results, the Mann-Whitney U test and independent-sample t-test were used to compare groups. A Fisher's exact test was used to compare qualitative variables. A p-value below 0.05 was considered statistically significant.

RESULTS

The mean age of the 61 patients included in the study was 31.09±8.38 (18-55), and 49 (80.3%) of all patients were women. The mean BMI of the patients was 32.22, the highest BMI was 39.45, and the lowest was 28.23 before the IGB procedure. The mean per cent weight loss on day 15, day 30, and day 90 was 5.9%, 10.23%, and 14.88%, respectively. Clinical parameters and follow-up outcomes of the patients are shown in **Table 1**.

Post-procedural complications were seen in 42 (68.9%) patients. The most common complications were nausea (41%) and abdominal pain (32.8%). Only three of 61 patients required hospitalisation after the procedure. While 2 of 3 hospitalised patients were hospitalised due to acute pancreatitis, the remaining patient was hospitalised due to severe nausea and vomiting. All hospitalised patients were discharged without complications.

Table 1. Clinical parameters and follow-up outcomes of the patients

Parameters	N (%) or value
Pre-procedural	
Age	31.09±8.38 (18-55)
Gender	
Female	49 (80.3)
Male	12 (19.7)
Additional disease	
Yes	5 (8.2)
No	56 (91.8)
Weight (kg)	88.88±13.67 (72-134)
Height (meter)	1.65±0.81 (1.50-1.89)
BMI	32.22±2.65 (28.23-39.45)
Post-procedural	
15-day outcomes	
Weight	83.57±12.56 (67-126)
BMI	30.31±2.44 (26.72-36.93)
Weight loss (%)	5.90±1.61 (2.60-8.89)
30-day outcomes	
Weight	79.75±12.25 (60-121)
BMI	28.91±2.35 (25.22-35.35)
Weight loss (%)	10.23±2.18 (5.19-15.28)
90-day outcomes	
Weight	75.47±10.90 (60-113)
BMI	27.38±2.05 (23.88-32.51)
Weight loss (%)	14.88±4.27 (5.13-25.60)
Complications	
Nausea	
Yes	24 (41)
No	36 (59)
Vomiting	
Yes	13 (21.3)
No	48 (78.7)
Abdominal pain	
Yes	20 (32.8)
No	41 (67.2)
Acute pancreatitis	
Yes	2 (3.3)
No	59 (96.7)

Comparison of Clinical Parameters and Follow-up Outcomes by Gender

Age distribution was similar in both genders. However, in male patients, the rate of another disease before IGB (p=0.048), mean height (p<0.001), the mean rank of weight (p<0.001), the mean rank of BMI (p=0.002), and the amount of weight lost (in kilograms) in all three follow-up periods were higher. In the post-procedure follow-ups, the weight-loss rates at the 15th, 30th and 90th days were similar in both genders. In addition, all post-procedure complications were similar in both genders. A comparison of clinical parameters and follow-up outcomes by gender is shown in **Table 2**.

Table 2. Comparison of clinical parameters and follow-up outcomes by gender.

Parameters	Female (N=49)	Male (N=12)	P-value
Pre-procedural			
Age (mean rank)	29.45	37.33	0.167*
Additional disease			0.048**
Yes	2 (4.1)	3 (25)	
No	47 (95.9)	9 (75)	
Weight (mean rank)	25.51	53.42	<0.001*
Height (mean±sd)	1.62±0.06	1.77±0.05	<0.001***
BMI (mean rank)	27.47	45.42	0.002*
Post-procedural			
15-day outcomes			
Weight loss (mean rank)	27.73	44.33	0.003*
Weight loss (%) (mean±sd)	5.85±1.69	6.11±1.28	0.629***
30-day outcomes			
Weight loss (mean±sd)	8.67±2.25	11.00±2.44	0.003***
Weight loss (%) (mean±sd)	10.27±2.26	10.09±1.93	0.809***
90-day outcomes			
Weight loss (mean rank)	28.27	42.17	0.015*
Weight loss (%) (mean±sd)	14.73±4.04	15.47±5.28	0.594***
Complications			
Nausea			0.745**
Yes	21 (42.9)	4 (33.3)	
No	28 (57.1)	8 (66.7)	
Vomiting			0.432**
Yes	12 (24.5)	1 (8.3)	
No	37 (75.5)	11 (91.7)	
Abdominal pain			0.083**
Yes	19 (38.8)	1 (8.3)	
No	30 (61.2)	11 (91.7)	
Acute pancreatitis			1.000**
Yes	2 (4.1)	0 (0)	
No	47 (95.9)	12 (100)	

*Mann Whitney U test, **Fisher's exact test, ***Independent samples t-test.

DISCUSSION

World Health Organization defines obesity as an "abnormal or excessive fat accumulation in adipose tissue to the extent that health may be impaired8. The global prevalence of obesity is higher in women than men on all continents, in both developed and developing countries (9). This study compared the weight loss process by gender. Before the procedure, in men, the presence of any comorbid diseases, mean height, the mean rank of weight, and the mean rank of BMI were higher. In addition, the amount of weight lost (in kilograms) in all three follow-up periods was higher in males. In the post-procedure follow-ups, only the 30th-day weight loss rate was higher in females, while the weight-loss rates at the 15th and 90th days were similar in both genders. In addition, all post-procedure complications were similar in both genders. This study is the first to compare the early period weight loss process according to gender.

The IGB has been used as an artificial object to induce satiety by decreasing the capacity of the gastric reservoir; the main part of weight loss with the IGB occurs in the first few months. Machytka et al. showed that after six weeks of IGB, the mean weight loss was 2.4 kg, and the mean per cent excess weight loss (%) was 12.4 % (10). The study by Dogan et al. showed that weight loss after balloon procedure in the first month was between 0 and 28 kg with a mean of 7±5.7 kilograms and a mean of body weight loss (%) of 5.2±3.2 (0–12). The same study also found that five per cent of body weight loss after one month of treatment may predict long-term weight maintenance (11). In our study, weight loss (%) in the first month was 12.63±1.72 (8.21 to 15.28). In addition, weight loss in kilograms was higher in men. However, mean weight losses (%) were similar between the gender groups.

According to data obtained from previous studies, the mean % excess weight loss was around 40% (12). In a study with ten patients, the pre-procedural BMI of the patients was 40.2kg/m² (36.5-48.7), and the mean third-month BMI was 37.4kg/m² (33-45) (13). In another study with 112 patients, the weight loss in the third month after the IGB was 10.1±6.8 kilograms, and the mean total weight loss (%) was 10.7%. In the same study, total body weight loss in women was higher than in men (14.4±5.0 vs 13.8±5.2) (14). In the study of Mion et al., median weight loss in kilogram on the third-month insertion of an IGB was 5.0 (0-12), and median excess weight loss (%) was 36.2 (range 0 to 118) (15). In this study, weight loss (%) in the third month was 14.88±4.27 (range from 5.13 to 25.60); in men, weight loss in kilograms was higher. However, there was no difference in the percentage of both sexes.

The most common complications following IGB administration are nausea, vomiting and abdominal pain. Vomiting can be controlled with discontinuation of oral intake, intravenous fluid administration, methochlorpropamide or ondansetron treatments and usually disappears within a few days (16). However, there may be vomiting unresponsive to treatment and may require removal of the balloon. It can lead to dehydration and electrolyte imbalance. Other reported complications include esophagitis, GER, peptic ulcer, gastrointestinal bleeding, acute pancreatitis, oesophagal perforation, acute gastric dilatation, gastric perforation, and death due to aspiration (17). The most common complications of the present study were nausea and abdominal pain. Only three patients required hospitalisation, 2 of them due to acute pancreatitis and the remaining due to severe nausea and vomiting.

CONCLUSION

Obesity is a multifactorial and complex disease, and IGB is one of the treatment methods in treating this disease. While the amount of weight loss in male patients was higher in male patients, the rate of weight loss was similar in both genders. Due to identical complication rates, IGB is a method that can be used safely by both genders in the fight against obesity.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was carried out with the permission of Erzurum Regional Education and Research Hospital Non-invasive Clinical Research Ethics Committee (Decision No: 2022/07-80).

Informed Consent: Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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ORIGINAL ARTICLE
ORİJİNAL ARAŞTIRMA

The Effect of the Pandemic on Characteristics of Pediatric Intensive Care Hospitalizations

Pandeminin Pediatrik Yoğun Bakım Yatışlarının Özelliklerine Etkisi

Ahmet Osman Kılıç, Fatih Akın

Kurum bilgileri eksik!!!!!

ABSTRACT

Aim: SARS CoV-2 virus has spread all over the world after creating a local epidemic in Wuhan, China. The pandemic has made changes in the characteristics of hospital admissions as well as in all aspects of life. Our aim in this study is to compare the characteristics of the patients hospitalized in the pediatric intensive care unit before and during the pandemic.

Material and Method: The records of the patients hospitalized in Necmettin Erbakan University Meram Medical Faculty Pediatric Intensive Care Unit between March 11th, 2019 and March 11th, 2021 were analyzed from the medical database. The study group was divided into two as patients hospitalized before March 11th, 2020, and after March 11th, 2020. The patients' age, gender, diagnosis, length of stay, respiratory support treatment methods, time spent on mechanical ventilation and tracheostomy procedure were recorded.

Results: There was no significant difference in terms of the frequency of hospitalization in the intensive care unit, length of hospital stay, duration of mechanical ventilator support, and patient diagnoses. A significant, positive and strong correlation was found between the length of stay of the patients and the time they spent on mechanical ventilator.

Conclusion: The pandemic had no effect on the clinical and demographic characteristics of the patients hospitalized in our pediatric intensive care unit.

Keywords: Invasive ventilation, non-invasive ventilation, pandemic, pediatric intensive care, SARS CoV-2

ÖZ

Amaç: SARS CoV-2 virüsü, Çin'in Wuhan kentinde yerel bir salgın oluşturduktan sonra tüm dünyaya yayıldı. Pandemi, hayatın her alanında olduğu gibi hastane başvurularının özelliklerinde de değişiklikler yaptı. Bu çalışmadaki amacımız çocuk yoğun bakım ünitesinde yatan hastaların pandemi öncesi ve pandemi sırasındaki özelliklerini karşılaştırmaktır.

Gereç ve Yöntem: Necmettin Erbakan Üniversitesi Meram Tıp Fakültesi Çocuk Yoğun Bakım Ünitesi'nde 11 Mart 2019 - 11 Mart 2021 tarihleri arasında yatan hastaların kayıtları tıbbi veri tabanından analiz edildi. Çalışma grubu 11 Mart 2020'den önce ve 11 Mart 2020'den sonra hastaneye yatırılan hastalar olarak ikiye ayrıldı. Hastaların yaşı, cinsiyeti, tanısı, hastanede kalış süresi, solunum desteği tedavi yöntemleri, mekanik ventilasyona harcanan süre ve trakeostomi işlemi yapıldı kaydedildi.

Bulgular: Yoğun bakım ünitesinde yatış sıklığı, hastanede kalış süresi, mekanik ventilatör desteği süresi ve hasta tanıları açısından anlamlı fark yoktu. Hastaların hastanede kalış süreleri ile mekanik ventilatörde geçirdikleri süre arasında anlamlı, pozitif ve güçlü bir ilişki bulundu.

Sonuç: Pediatrik yoğun bakım ünitemizde yatan hastaların klinik ve demografik özelliklerine pandeminin etkisi olmamıştır.

Anahtar Kelimeler: Çocuk yoğun bakım, invaziv ventilasyon, non-invaziv ventilasyon, pandemi, SARS-CoV-2

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INTRODUCTION

SARS CoV-2 virus has spread all over the world after creating a local epidemic in Wuhan, China (1). The World Health Organization declared the disease as a pandemic on March 11, 2020 (2). In our country, the first case was detected on March 11, 2020. During the pandemic period, measures such as the closure of schools, social distance rules and curfews have been applied. These measures have influenced the number and characteristics of admissions to hospitals (3).

SARS CoV-2 infection is more severe in adults than children (Rajapakse N, Dixit D. Human and novel coronavirus infections in children: a review. Paediatr Int Child Health 2021 Feb;41(1):36–55.). It has been reported that mortality rates are higher in adults and pandemic caused a significant burden on adult intensive care units (4,5). On the other hand, it is known that SARS CoV-2 infection in pediatric patients generally has a mild course and the number of patients requiring intensive care is less than adults (6).

There are studies conducted in many countries of the world investigating the number and characteristics of patients hospitalized in pediatric intensive care units during the pandemic period (7-9). However, there are differences in the restriction measures implemented by countries. These differences may cause changes in the characteristics of patients admitted to the pediatric intensive care unit. In our country, there are few studies on this topic.

Our aim in this study is to compare the characteristics of the patients hospitalized in the pediatric intensive care unit before and during the pandemic, and to contribute to the literature about the effects of the pandemic on pediatric intensive care units in our country.

MATERIAL AND METHOD

The study was carried out retrospectively with the patients who were followed up in pediatric intensive care unit of Necmettin Erbakan University Meram Medical Faculty, between 11th March 2019 and 11th March 2021. The clinical and demographic data of the patients were obtained from the hospital medical database. Patients whose data could not be accessed or patients with missing data were not included in the study. The study group was divided into two as patients hospitalized before March 11th, 2020, and after March 11th, 2020. Patient discharges from intensive care unit were divided into three as recovery, referral and death.

The patients' age, gender, hospitalization diagnosis, length of stay, respiratory support treatment methods (mechanical ventilator, continuous positive airway pressure (CPAP), bilevel positive airway pressure (BPAP)), time spent on mechanical ventilation and tracheostomy procedure were recorded.

Ethical approval and permissions

The study was conducted with the permission of Necmettin Erbakan University Ethics Committee (2022-3825). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

Statistical analysis

Data were analyzed using SPSS 20.0 software (IBM Corporation, Armonk, NY, USA). Data were presented as median (Inter quartile range: 25th percentile-75th percentile) for numerical variables and percentages for categorical variables. The Shapiro-Wilk test of normality was used to determine whether the variables had a normal distribution. Chi-square ($\chi 2$) test was used to compare categorical variables and frequencies. The Mann-Whitney U test was used for the analysis of non-normally distributed variables between the two groups. Spearman correlation analysis was used for non-normally distributed variables to determine the relationship between variables. All statistical analyzes were performed at 95% confidence interval and p values below 0.05 were considered statistically significant.

RESULTS

Of the patients included in the study, 37 (40.7%) were girls and 54 (59.3%) were boys. The median age of the study group was 2.73 (IQR: 0.73-11.10). Forty-four (48.4%) patients were treated in the intensive care unit before the pandemic and 47 (51.6%) during the pandemic. The rate of discharge from the intensive care unit with recovery was 34 (37.4%), 1 (1.1%) referral, and 56 (61.5%) death. The median length of stay in the intensive care unit was 10 (IQR: 3-36) days. Diagnostic distribution of the patients is given in **Table 1.**

Of the patients, 79 (86.8%) received mechanical ventilation therapy in the intensive care unit.The median time spent on mechanical ventilation was 5 (IQR: 1-21) days. The distribution of respiratory support treatments received by the patients is given in **Table 2.**

Intensive care mortality rates were 61% in the before pandemic group and 61.2% in the during pandemic group. There was no significant difference between the before and during pandemic groups in terms of mortality rates and reasons for leaving the intensive care unit. (p=0.125)

There was no significant difference between the patients' age, the frequency of hospitalization in the intensive care unit, and the duration of connecting to the mechanical ventilator before and during the pandemic. (p=0.294, p=0.965, p=0.333, respectively). There was no significant difference between the diagnosis distributions according to the period before and during the pandemic groups. (p>0.05 for all diagnoses).

Table 1. Diagnostic distribution of patients

Diagnoses	Number (n)	Percent (%)
Brain hemorrhage (Subdural hemorrhage, subarachnoid hemorrhage, subdural hematoma)	4	4.4
Heart diseases (Heart failure, Atrial Septal Defect, Ventricular Septal Defect, Dilated Cardiomyopathy, Supraventricular tachycardia)	6	6.6
Spinal muscular atrophy	4	4.4
Respiratory distress	45	49.5
Acute lymphoblastic/myeloblastic leukemia-lymphoma	11	12.1
Down Syndrome	7	7.7
Metabolic diseases (Glycogen storage, lipid storage, mucopolysaccharidoses, unidentified metabolic diseases)	17	18.7
Thalassemia-Fanconi Aplastic Anemia	2	2.2
Primary Immunodeficiencies	6	6.6
Prematurity	5	5.5
Gastrointestinal system diseases (Biliary atresia, bleeding, congenital hepatic fibrosis, esophageal variceal bleeding, neonatal cholestasis, chrone disease, ileus)	11	12.1
Sepsis, septic shock, multiorgan failure	25	27.5
Post operative follow-up	6	6.6
Cerebral palsy	16	17.6
Kawasaki disease	1	1.1
Diabetes mellitus	1	1.1
Central nervous system diseases (hydrocephalus, meningitis, encephalitis, ventriculoperitoneal shunt dysfunction, epilepsy, neurobrucellosis)	15	16.5
Pulmonary tuberculosis	1	1.1
Trauma	2	2.2
Acute/chronic kidney failure	2	2.2
Multisystem inflammatory syndrome-child	2	2.2

There was no significant difference between the patients' before pandemic and during pandemic groups, according to gender, mechanical ventilator attachment, home mechanical ventilator use, cpap and bipap needs. (p=0.963, p=0.458, p=0.876, p=0.619, p=0.215, respectively).

A significant, positive and strong correlation was found between the length of stay of the patients and the time they spent on mechanical ventilator. (rs=0.789, p<0.001).

Table 2. Distribution of respiratory support therapy types

Type of respiratory support therapy	Number (n)	Percent (%)
Mechanical ventilator	79	86.8%
Household mechanical ventilator	18	19.8%
CPAP*	12	13.2%
BPAP**	24	26.4%
Tracheostomy	24	26.4%

*CPAP: Continous positive airway pressure, **BPAP: Bilevel positive airway pressure

DISCUSSION

In our study, no difference was found in the distribution of diagnosis, length of stay in the intensive care unit, and the need for mechanical ventilator and noninvasive respiratory support before and during the pandemic period. These results show that the pandemic did not make a difference on the working schedule of our pediatric intensive care unit

In our study, no significant difference was found in terms of the frequency of hospitalization in the pediatric intensive care unit between before and after the pandemic. In a study conducted in Brazil, it was reported that the pandemic led to a decrease in the number of hospitalizations in pediatric intensive care units (10). In the study of Graciano et al. which conducted in USA, it was reported that the pandemic caused a decrease in the rate of hospitalization in the pediatric intensive care unit (11).In the study conducted by Breining et al. in pediatric intensive care units in France, it was reported that hospitalization rates decreased by 23% during the pandemic period (12). Wilder et al. reported that, in USA, which dealt with the long-term before and during the pandemic, it was reported that the pandemic period did not cause a change in the frequency of hospitalization in pediatric intensive care units (13). It is seen that the pandemic shows different results in different countries in terms of its effect on hospitalizations in pediatric intensive care units. In addition, in the first years of the pandemic, social restriction measures were put into effect at different times in each country. The fact that the period in which the studies were carried out was the period of restrictions may have led to these results. Since our study covered a one-year period before and during the pandemic, it may have differed from the results reported in the literature.

In our study, no significant difference was found between the mortality rates before and during the pandemic groups. Similarly, Araujo et al. and Breinig et al. also reported that the pandemic process did not change the mortality rates in the pediatric intensive care unit (10-12). The fact that SARS CoV-2 infection in children does not generally cause severe clinical conditions. and continuing to apply to the hospital during the pandemic period of children with severe disease requiring intensive care may explain the similar mortality rates. In our study, no significant difference was found between the study groups in terms of the patients' age, length of stay in the intensive care unit, and the time they spent on mechanical ventilator. In addition, a positive and strong correlation was found between the length of stay of the patients in the intensive care unit and the time spent on mechanical ventilator. Wilder et al. reported that the pandemic had no effect on the length of stay in the pediatric intensive care unit and the age of the patients (13). In the study of Breinig et al. it was reported that the pandemic had no effect in terms of age in intensive care admissions, but the length of stay in the intensive care unit was longer during the pandemic period (12). In the study of Emeksiz et al. which was conducted in Turkey, it was reported that there was a significant decrease in the length of stay on the mechanical ventilator and in the intensive care unit during the pandemic period, but the age of the patients hospitalized in the intensive care unit did not differ in the period before and during the pandemic (14). The fact that the majority of the patients hospitalized in our pediatric intensive care unit have comorbid diseases and most of them needed respiratory support may have caused no change in the time required for a mechanical ventilator support and the length of stay in the intensive care unit before and during the pandemic. The correlation between the length of stay and the time spent on the mechanical ventilator support may also be related to the fact that the reason for hospitalization in the intensive care unit is mostly due to respiratory distress.

In our study, it was determined that the needs of home typed mechanical ventilator, CPAP and BPAP did not differ before and during the pandemic. In addition, when the diagnoses of the patients in the intensive care unit were examined, it was seen that there was no difference between the periods. Emeksiz et al. found that there was no significant difference between the pandemic periods in terms of invasive and noninvasive respiratory support given to patients. In this respect, our study is compatible with the literature. Because the majority of the patients in the intensive care unit need respiratory support and the diagnosis distribution is not related to the pandemic, these may explain the lack of the difference in terms of invasive and non-invasive respiratory support.

Limitations

Our study has some limitations. Among the limitations are the retrospective design of the study and the lack of classification according to the restriction measures applied after the declaration of the pandemic.

CONCLUSION

In our study, it was determined that the pandemic process did not differ frequency of hospitalization in our pediatric intensive care unit, length of stay, hospitalization diagnoses, mortality rates, time spent on mechanical ventilator and noninvasive respiratory support before and during the pandemic.Large-scale randomized controlled studies are needed to examine the effect of the pandemic process on pediatric intensive care units.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was conducted with the permission of Necmettin Erbakan University Ethics Committee (2022- 3825). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

Informed Consent: All patients signed the free and informed consent form.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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ORIGINAL ARTICLE
ORİJİNAL ARAŞTIRMA

The Comparison of Transvaginal Ultrasonography and Histopathology Results in the Evaluation of the Endometrium in Patients with Postmenopausal Bleeding

Postmenopozal Kanamalı Hastalarda Endometriumun Değerlendirilmesinde Transvajinal Ultrasonografi ve Histopatoloji Sonuçlarının Karşılaştırılması

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ABSTRACT

Introduction: Postmenopausal bleeding (PMB) accounts for 5% of gynecological hospital admissions. The most important step in endometrial pathologies is to exclude malignancy. We aim to evaluate transvaginal ultrasonography (TVUSG) findings and endometrial biopsy results in patients with PMB, to compare them in terms of correlation.

Material and Method: Patients who admitted to hospital with PMB between January 2016 and January 2021 were retrospectively included. Demographic datas, age at menarche, duration of menopause and duration of PMB were recorded. Histopathology results of endometrial biopsy and TVUSG findings were compared. The sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of endometrial thickness (ET) measured by TVUSG in terms of histopathological positivity and adenocarcinoma were investigated. Continuous and categorical variables analyzed. The t-test, Mann-Whitney U test and Chi-squared or Fisher's exact probability were used.

Results: Overall 200 women included; the median age was 53.5 years (min 40-max 60) and 12.5% were nulliparous. In TVUSG, ET was ≤5 mm in 34.0% (n=68) of the patients, 6-10 mm in 32.5% (n=65), 11-15 mm in 21.5% (n=43) and 12.0%. in (n=24) was >15 mm. The parity number was found to be statistically significantly lower in patients with ET 0-5 mm (respectively, 2 vs. 4) (p=0.027). Endometrial polyps were detected on TVUSG in 27.5%. The adenocarcinoma and endometrial atrophy rates were 5.5% and %6.0, respectively. The frequency of adenocarcinoma was statistically significantly higher in patients with ET >15 mm on TVUSG (p=0.031). The mean ET of the patients with adenocarcinoma was 13.8 (SD±8.9) mm. The sensitivity, specificity, PPV and NPV of ET >5 mm in TVUSG for histopathological endometrial pathology and adenocarcinoma were 76.1%-92.9%, 31.2%-34.9%, 68.8%-90.9% and 40.8%-93.3, respectively.

Conclusion: TVUSG is a non-invasive, easy-to-use method with rapid results for PMB. Although it is guiding and has high sensitivity, it is not a definitive diagnosis method. If in doubt, endometrial biopsy should be performed.

Keywords: Postmenopausal bleeding, transvaginal ultrasonography, endometrial biopsy, adenocarcinoma, endometrial polip

ÖZ

Giriş: Postmenopozal kanama (PMK), jinekolojik hastane başvurularının %5'ini oluşturur. Endometrial patolojilerde en önemli nokta maligniteyi dışlamaktır. Bu çalışmada, PMK'lı hastalarda transvajinal ultrasonografi (TVUSG) bulguları ile endometriyal biyopsi sonuçlarını değerlendirerek korelasyon açısından karşılaştırmayı amaçladık.

Gereç ve Yöntem: Ocak 2016 ile Ocak 2021 arasında PMK ile hastaneye başvuran hastalar retrospektif olarak dahil edildi. Demografik veriler, menarş yaşı, menopoz süresi ve PMK süresi kaydedildi. Endometrial biyopsinin histopatolojik sonuçları ile TVUSG bulguları karşılaştırıldı. TVUSG ile ölçülen endometrial kalınlığın (EK) histopatolojik pozitiflik ve adenokarsinom açısından duyarlılığı, özgüllüğü, pozitif prediktif değeri (PPV) ve negatif prediktif değeri (NPV) araştırıldı. Devamlı ve kategorial değişkenler analiz edildi. T-test, Mann-Whitney U test ve ki-kare ya da Fisher's exact test kullanıldı.

Bulgular: Çalışmaya 200 PMK olan hasta dahil edildi; ortanca yaş 53.5 yıl (min 40-maks 60) ve %12.5'i nullipardı. Hastaların TVUSG'de bakılan EK'ları %34.0'unda (n=68) ≤5 mm, %32.5'inde (n=65) 6-10 mm, %21.5'inde (n=43) 11-15 mm ve %12.0'ında (n=24) >15 mm idi. Endometrial kalınlığı 0-5 mm olan hastalarda parite sayısı istatistiksel olarak anlamlı derecede düşük bulundu (p=0.027). TVUSG'de %27.5'inde endometrial polip saptandı. Adenokarsinom ve endometriyal atrofi oranları sırasıyla %5.5 ve %6.0 idi. TVUSG'de EK>15 mm olan hastalarda adenokarsinom sıklığı istatistiksel olarak anlamlı derecede yüksekti (p=0.031). Adenokarsinomlu hastaların ortalama EK'si 13.8 (SD±8,9) mm idi. Histopatolojik endometriyal patoloji ve adenokarsinom için TVUSG'de ET >5 mm'nin duyarlılığı, özgüllüğü, PPV'si ve NPV'si sırasıyla %76.1-%92.9, %31.2-%34.9, %68.8-90.9 ve %40.8-93.3 idi.

Sonuç: TVUSG, PMK için hızlı sonuçları olan, invaziv olmayan, kullanımı kolay bir yöntemdir. Yol gösterici ve duyarlılığı yüksek olmasına rağmen kesin tanı yöntemi değildir. Şüpheli durumlarda endometrial biyopsi yapılmalıdır.

Anahtar Kelimeler: Postmenopozal kanama, transvajinal ultrasonografi, endometriyal biyopsi, adenokarsinom, endometrial polip

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INTRODUCTION

Vaginal bleedings show different etiologies according to the age and productivity of women. During the productive period, pregnancy, endocrine disorders and infections constitute the etiology; atrophic endometrium, endometrial hyperplasia, exogenous estrogen use, anticoagulant drug intake, endometrial polyps and submucous myomas cause vaginal bleeding during menopause and postmenopausal period (1,2). Postmenopausal bleeding (PMB) accounts for 5% of gynecological hospital admissions (3). While endometrial atrophy is reported as the most common cause of PMB; it is responsible for 30% of vaginal bleeding and 60-80% of uterine bleeding (4). Endometrial cancers constitute approximately 15% of PMB (2).

The most important step in endometrial pathologies is to exclude malignancy. For this, the most reliable and frequently used diagnostic modality today is endometrial tissue biopsy (5). Although it is a minor surgical procedure, experienced personnel, appropriate surgical conditions and adequate equipment and patient consent are required for a correct endometrial biopsy. For all these reasons, there is a need for non-invasive, easy-to-apply methods or methods that can be used as a screening test in order to distinguish benign from malignant in endometrial lesions or to determine the etiology (5).

Transvaginal ultrasonography (TVUSG) is a first-line method that shows the endometrium and endometrial thickness (ET), and it can be applied non-invasively, painlessly, quickly and easily (6,7). TVUSG is recommended as an alternative to endometrial tissue biopsy in the initial evaluation of patients with PMB (7). It has been reported that TVUSG can be used to exclude malignancy in cases where there is an ET of 4-5 mm or less in these patients (7, 8).

Our aim in this study is to evaluate TVUSG findings and endometrial biopsy results in patients with PMB, to compare them in terms of correlation and to investigate the reliability of TVUSG in the evaluation of endometrial pathologies.

MATERIAL AND METHOD

All pateints who admitted to tertiary gynecologic hospital with PMB between 40-65 years were included in the study during January 2016 and January 2021, retrospectively. Women with a known diagnosis of endometrial, cervix or ovarian cancer, younger than 40 years old, older than 65 years old, women who are not in the postmenopausal period and who applied for routine screening were excluded from the study. The study was initiated with the approval of the local ethics committee (Date: 26/05/2021, No: 2021-178). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

Demographic datas (gender, age), comorbidity, and type of birth were analyzed. Age at menarche, duration of menopause, duration of PMB and family history of endometrium cancer were recorded. Histopathology results of endometrial biopsy by pipelle and TVUSG findings [presence of endometrial polyps, ET (mm)] were compared. The sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of ET measured by TVUSG in terms of histopathological positivity and adenocarcinoma were investigated.

Datas were analysed using the SPSS 25.0 (IBM, Armonk, NY: IBM Corp.) program Continuous variables and categorical variables analyzed. The t-test and Mann-Whitney U test were used to independent groups for the parametric and non-parametric test. The Chi-squared or Fisher's exact probability tests used to compare demographics. In all analyses, $p < 0.05$ was considered statistically significant.

RESULTS

The median age of 200 women included in the study was 53.5 years (minimum 40 - maximum 60, IQR 50 - 56 years) and 12.5% were nulliparous (**Table 1**). The median number of gravida was 4 (minimum 0 – maximum 14, IQR 3-6) and the median parity number was 3 (minimum 0 – maximum 21, IQR 2-4). While 2.0% (n=4) of the patients had a family history of endometrial cancer; 16.0% (n=32) had chronic disease. The mean age at menarche was 12.3 (SD ± 0.9) years, the median menopausal time was 5.0 years (minimum 1.0 - maximum 25.0, IQR 3.0 - 8.0 years), and also, the median PMB time was 15 days (minimum 1 day - maximum 1 year) (**Table 1**) .

Table 1. Demographic characteristics of women with postmenopausal bleeding.

Age (year) [median (min-max, IQR)]	53.5 (40-60, 50-56)
Age of menarche (year) [mean (±SD)]	12.3 (±0.9)
Menopause time (year) [median (min-max, IQR)]	5.0 (1-25, 3-8)
PMD time (day) [median (min-max)]	15 (1d – 1 year)
Gravida (n) [median (min-max, IQR)]	4 (0-14, 3-6)
Parity (n) [median (min-max, IQR)]	3 (0-21, 2-4)
Family history of EC [n (%)]	
+	4 (2.0)
-	196 (98.0)
Chronic Disease [n (%)]	
+	32 (16.0)
-	168 (84.0)
TVUSG'de ET (mm) [n (%)]	
≤5	68 (34.0)
6-10	65 (32.5)
11-15	43 (21.5)
>15	24 (12.0)

EC: endometrial cancer, IQR: interquartile range, min: minimum, max: maximum, PMD: postmenopausal bleeding, SD: standart deviation

In TVUSG, ET was ≤5 mm in 34.0% (n=68) of the patients, 6-10 mm in 32.5% (n=65), 11-15 mm in 21.5% (n=43) and 12.0%. in (n=24) was >15 mm (**Table 1**). There was no correlation between the age of the women, the duration of menopause, menarche age and the duration of PMB with ET. In addition, there was no relationship between the number of gravida and ET; The parity number was found to be statistically significantly lower in patients with ET 0-5 mm (respectively, 2 vs. 4) (p=0.027).

The histopathology results of the patients who underwent endometrial tissue biopsy are shown in Table 2. Endometrial polyps were detected on TVUSG in 27.5% (n=55) of the patients (**Table 2**). While 5.5% of the patients were found to have adenocarcinoma; The frequency of endometrial atrophy was 6.0%. The frequency of adenocarcinoma was statistically significantly higher in patients with ET >15 mm on TVUSG (p=0.031) (Table 3). The mean ET of the patients with adenocarcinoma was 13.8 (SD±8.9) mm. Also, it was observed that there was no relationship between other histopathological findings and TVUSG. Although the frequency of adenocarcinoma was higher in nulliparous patients, it was not statistically significant. In addition, it was observed that the age of menarche in patients with adenocarcinoma was lower than the others (p=0.007) (**Table 3**).

Table 2. Histopathology results of patients who underwent endometrial tissue biopsy

Histopathology results	n (%)
Endometrial atrophy	12 (6.0)
Insufficient material	47 (23.5)
Proliferative secretory endometrium	23 (11.5)
Endometrium under the influence of estrogen	5 (2.5)
Superficial epithelial fragments	25 (12.5)
Endometrium under the influence of progesterone	13 (6.5)
Cystic glandular hyperplasia	9 (4.5)
Adenocarcinoma	11 (5.5)
Endometrial polyp	55 (27.5)

Table 3. The comparison of age of menarche, menopause and PMD time, pregnancy numbers, and ET on the TVUSG with adenocarcinoma.

	Adenocarcinoma		p
	+	-	
Age of menarche [median (min-max)]	13 (12-15)	12 (11-14)	0.007
Menopause time (year) [median (min-max)]	8 (1-10)	5 (1-25)	0.235
PMD time (day) [median (min-max)]	15 (7-90)	15 (3-365)	0.637
Pregnancy [n (%)]			0.216
Nulliparous	2 (12.5)	14 (87.5)	
Primipar/Multipar	9 (4.9)	175 (95.1)	
TVUSG ET (mm) [n (%)]			0.031
≤5	1 (1.5)	66 (98.5)	
6-10	4 (6.2)	61 (93.8)	
11-15	1 (2.3)	42 (97.7)	
>15	5 (20.8)	19 (79.2)	

ET: endometrial thickness, min: minimum, max: maximum, PMD: postmenopausal bleeding, TVUSG: transvaginal ultrasonography

The sensitivity of ET >5 mm in TVUSG for histopathological endometrial pathology was 76.1%, the specificity was 31.2%, PPV was 68.8%, and NPV was 40.8%. In addition, detection of ET >5 mm on TVUSG had a sensitivity of 92.9% and a specificity of 34.9% for histopathological diagnosis of adenocarcinoma, while PPV was 90.9% and NPV was 93.3%.

DISCUSSION

Endometrial tissue biopsy, which is the gold standard method for diagnosis in postmenopausal women, is an invasive method and requires general anesthesia in hospital conditions. On the other hand, TVUSG is an easily applicable, inexpensive and non-invasive method. In this study, tissue biopsy, an invasive method recommended as the gold standard for predicting endometrial pathologies in postmenopausal women, and TVUSG findings were compared.

In the literature, Aker et al. (9) conducted a study on 765 postmenopausal women with bleeding, and the most common causes were reported as endometrial polyp (34.6%), insufficient material sample (23.3%), and atrophic endometrium (17.8%). On the other hand, in the study conducted by Dadali et al. (10) from our country, the most common tissue biopsies were found to be insufficient material (25%), atrophic endometrium (19%) and cystic glandular hyperplasia (19%). In our study, the most common endometrial polyp (27.5%) was found; this was followed by insufficient material (23.5%) and proliferative secretory endometrium (11.5%). It was shown that our results supported the literature and that the most common endometrial polyps and insufficient material were detected in tissue biopsies of women presenting with PMB. All biopsy procedures were conducted in polyclinic conditions, and this would explain why the insufficient material was taken.

Although PMB is a very important problem in women, the first sign of endometrial cancer may occur in approximately 10-15% of them (2). In the study of Dadali et al. (10) in postmenopausal women, the frequency of endometrial cancer was found to be 10%; it was found to be 8% in the study by Gredmark et al. (11), and 7.5% in the study by Turhan Cakir et al (12). In our study, the frequency of endometrial cancer was found to be 5.5%. According to the literature, the frequency of the endometrium was found to be slightly less. Early and frequent referral to the physician, and more frequent use of TVUSG may explain this result.

Therefore, in women with PMB, it is primarily necessary to exclude malignancy. For this purpose, the evaluation of ET thickness with TVUSG, which is a non-invasive and easily applicable method, is used as a first-line diagnostic tool (7, 13). However, there is no consensus on the accepted cut-off value for ET to define endometrial

pathologies. Although there are definitions of ET ≤4 mm or ET ≤5 mm in the guidelines, the normal range for ET in postmenopausal women is accepted as 4-5 mm in the literature (14-17). In the literature, it has been reported in different studies that the mean ET detected in endometrial cancer is between 13.0 and 21.1 mm (10, 18-20). In our study, the mean ET was found to be 13.8 mm in patients with endometrial cancer, similar to the literature.

The risk of endometrium is increased 64 times in postmenopausal women (13). On the other hand, if postmenopausal women are screened with TVUSG and ET is accepted as ≤4 mm, malignancy cases are not missed (13). For this reason, TVUSG, which is a non-invasive method, is reported as a method that must be used before tissue biopsy is required (13). In the study conducted by Alfhaily F et al. (21) in 8 different multicenter centers in 1168 patients with postmenopausal bleeding, no malignancy was detected in TVUSG analysis in any patient with ET <5 mm, and it was stated that tissue biopsy was not required in these patients. In addition, the American Society of Obstetrics and Gynecology reported that tissue biopsy is unnecessary in postmenopausal women with ET ≤4 mm (7). In our study, it was observed that the frequency of adenocarcinoma increased in patients with ET >15 mm on TVUSG; only one of the women with ET between 0-5 mm was found to have adenocarcinoma and no malignancy was found in 90.9% of them. The ET of this adenocarcinoma case was 5 mm.

In a study comparing the results of TVUSG performed just before biopsy in 81 postmenopausal women with histopathology results, ET of 5 mm and above was considered pathological in TVUSG, and the sensitivity of TVUSG to detect endometrial pathologies was 95.8%, and the specificity was 45.5% (22). In a study by Yumru et al. (23) in 298 women, the sensitivity of ET>5 mm in TVUSG in detecting endometrial pathologies was reported as 78.9%, specificity as 88.6%, PPV as 76.9% and NPV as 89.7%. In our study, the histopathological sensitivity of ET >5 mm in TVUSG was 76.1%, the specificity was 31.2%, PPV was 68.8%, and NPV was 40.8%. The sensitivity of TVUSG was found to be lower than the literature for PPV and NPV. The application of complicated cases as a result of the study being conducted in a tertiary center and the experience of the physician who performed TVUSG may explain this result. In addition, detection of ET >5 mm on TVUSG had a sensitivity of 92.9% and a specificity of 34.9% for histopathological diagnosis of adenocarcinoma, while PPV was 90.9% and NPV was 93.3%.

In the literature, Begum J et al. (24) showed that,there was no any correlation with regard to age at presentation, age at menopause, parity and PMB. Similar to the literature, we found no relationship between menopausal age and parity and PMB.

Limitations of this study; (1) retrospective method is the main limitation, (2) being a single-center study and the low number of cases constitute important limitations in the generalization of our results.

CONCLUSION

In women with postmenopausal bleeding, TVUSG is a non-invasive, easy-to-use method with rapid results. Although it is guiding and has high sensitivity, it is not a definitive diagnosis method. If in doubt, endometrial biopsy should be performed.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was initiated with the approval of the Demiroglu Bilim University Faculty of Medicine Scientific Researches Ethics Committee (Date: 26/05/2021, Decision No: 2021-178).

Informed Consent: Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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ORIGINAL ARTICLE
ORİJİNAL ARAŞTIRMA

Self-Efficacy Scale for Appropriate Medication Use: Turkish Adaptation, Validity and Reliability Study

Uygun İlaç Kullanımı için Öz Yeterlilik Ölçeği: Türkçe Uyarlaması, Geçerlik ve Güvenirlik Çalışması

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ABSTRACT

Aim: Drug use in chronic diseases is a severe problem noticed by physicians in our country. Chronic disorders are treatable with medicine however, ensuring drug compliance is difficult. The Turkish translation of the Self-Efficacy for Appropriate Medication Use Scale is forthcoming. Its reliability and validity will be examined among patients with at least a year of chronic illness.

Material and Method: Between July 2021 and December 2021, 414 individuals were interviewed face-to-face at Isparta Family Health Centers. The participants were administered the Turkish versions of the Self-Efficacy for Appropriate Medication Use Scale (T-SEAMS), the General Self-Proficiency Scale, and the Morisky Medication Adherence Scale (MMAS-8). There were evaluations of construct validity, convergent validity, internal consistency, and test-retest reliability.

Results: According to the item analysis, item-to-total correlations varied between 0.349 and 0.607. One exploratory factor with factor loadings ranging from 0.496-0.811 explained 51.48% of the total variance. Acceptable results were obtained from a confirmatory factor analysis (X2/df= 3,031, RMESA= 0.070, CFI= 0.965, GFI= 0.945, and TLI= 0.952). Positive correlations were found between the convergent validity of the T-SEAMS and the validated MMAS-8 and General-Self-Proficiency Scale (r=0.607, p=0.001, r=0.349, p=0.001, respectively). Excellent internal consistency (Cronbach's alpha = 0.916) and test-retest reliability (Pearson's correlation coefficient = 0.702, p=0.001) were observed.

Conclusion: The T-SEAMS is a quick and good psychometrically analyzing instrument for evaluating medication adherence self-efficacy in Turkish people with chronic diseases.

Keywords: Self-efficacy, medication therapy management, chronic disease, medication adherence, self-assessment

ÖZ

Amaç: Kronik hastalıklarda ilaç kullanımı ülkemizde hekimler tarafından fark edilen ciddi bir sorundur. Kronik hastalıklar ilaçla tedavi edilebilir ancak ilaç uyumunu sağlamak zordur. Çalışmamızda, buna katkıda bulunacağına inandığımız Uygun İlaç Kullanımı için Öz Yeterlilik Ölçeği'nin en az bir yıllık kronik hastalığı olan hastalar arasında Türkçe uyarlamasını, geçerlik ve güvenirliğini yapmayı amaçladık.

Gereç ve Yöntem: 1 Temmuz 2021 ve 31 Aralık 2021 tarihleri arasında Isparta Aile Sağlığı Merkezlerinden rastgele seçilen bir tanesinde 414 kişiyle yüz yüze görüşüldü. Katılımcılara Uygun İlaç Kullanımı için Öz Yeterlilik Ölçeği, Genel Öz Yeterlilik Ölçeği ve Morisky İlaç Uyum Ölçeği'nin (MMAS-8) Türkçe versiyonları uygulandı. Yapı geçerliliği, iç tutarlılık ve test-tekrar test güvenilirliği değerlendirildi.

Bulgular: Madde analizine göre, madde-toplam korelasyonları 0.349 ile 0.607 arasında değişmekteydi. Faktör yükleri 0.496-0.811 arasında değişirken, tek bir faktör toplam varyansın %51.485'ini açıklamaktaydı. Doğrulayıcı faktör analizinden kabul edilebilir sonuçlar elde edilmiştir (X2/df = 3.031, RMESA = 0.070, CFI = 0.965, GFI = 0.945 ve TLI = 0.952). T-SEAMS ile geçerliliği kanıtlanmış MMAS-8 ve Genel Öz-Yeterlilik Ölçeği arasında pozitif korelasyonlar bulundu (sırasıyla r=0,607, p=0.001; r=0,349, p=0.001).Ölçeğin mükemmel iç tutarlılık (Cronbach's alpha = 0.916) ve test-tekrar test güvenilirliği (Pearson korelasyon katsayısı = 0.702, p=0.001) olduğu saptandı.

Sonuç: T-SEAMS'in, kronik bir hastalığı olan Türk bireylerde ilaca bağlılık öz yeterliliğini değerlendirmek için hızlı ve psikometrik olarak sağlam bir araç olduğu tespit edildi.

Anahtar Kelimeler: Öz-yeterlilik, ilaç tedavisi yönetimi, kronik hastalık, ilaç uyumu, öz-değerlendirme

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INTRODUCTION

Chronic diseases are the major causes of death worldwide and are among the most critical health issues of the 21st century. The World Health Organization (WHO) revealed in 2018 that chronic diseases were responsible for 71% of the 57 million deaths globally in 2016, and 89% of the 455 thousand deaths in Turkey (1).

The management of chronic diseases frequently employs disease-specific protocols. While a condition-specific guideline is effective for a single disease, it may not be suitable for people with numerous disorders (2-6). The comprehensive, ongoing, and collaborative approach are one of the fundamental first-stage components of chronic disease care (7). These characteristics make primary health care services suitable for the management of chronic diseases. According to the Turkish Chronic Diseases and Risk Factors study, 61% of patients do not adapt to their medications, and 25% do not adapt to non-medical treatments (8).

This study aimed to increase drug adherence by assessing the validity and reliability of the Turkish version of the Self-Efficacy for Appropriate Medication Use Scale (SEAMS) and determining self-sufficiency in individuals with chronic conditions.

MATERIAL AND METHOD

This study is a methodical evaluation of the validity and reliability of the Turkish version of the Self-Efficacy for Appropriate Medication Use Scale (SEAMS). From 01 July to 31 December 2021, in-person surveys were conducted at the randomly selected Yedişehitler Family Health Center of Isparta. The study comprised patients between the ages of 40 and 70 who were mentally and physically capable of self-administering their medications, who had been diagnosed with chronic conditions for at least a year, and who had not used neurological and psychiatric drugs.

For general psychometric techniques, it is recommended to have at least 10 participants for each item of the instrument (9,10) given that at least 130 participants are scheduled for this scale of 13 items and 300-500 participants are necessary for various research (11). Therefore, at least 300 persons have been attempted to contact. People who applied to the family health center between the specified dates, completed the questionnaire, and met the inclusion requirements were examples of the study. No power analysis was performed.

Instruments

- **Socio-Demographic Data Form:** In this form, created by the researcher by studying the relevant literature, age, gender, marital status, education status, occupation, income level, social security, other diseases, duration of chronic illness, the frequency of doctor control, the number of medications taken per day, the presence of the person who helped with the medication, the preferred drug usage form, the time of day when the drug was being forced, whether the use of the drugs given was sufficiently explained.
- **The Morisky Medication Adherence Scale (MMAS-8):** The Morisky-8 medication adherence scale, developed by Donald E. Morisky (12) is commonly used to evaluate patient harmony. In numerous nations, it has been validated and found to be valid and reliable for use with various patient populations (13,14) and so reliable for various diseases, including diabetes, hypertension, asthma, and chronic obstructive pulmonary disease (15, 16). The first seven items on the scale are yes-no, and the eighth item is a 5-point Likert scale: 'never,' 'almost never,' 'occasionally,' 'frequently,' and 'always.' Every 'yes' response for the first seven questions - the answers are reversed except for question 5 - receives 0 points, while every 'no' response receives 1 point. Question 8 awards 1 point for the response "never" and 0 for all other responses. The scale's minimum value is 0, and its maximum value is 8. Below a score of six on the Morisky scale, compliance is considered low, whereas a score between seven and eight indicates complete compliance (17,18).
- **Self-Efficacy for appropriate Medication use Scale (SEAMS):** Risser and Arc developed the original SEAMS. Reduced from the original 21 items to 13 for patients with chronic disease. The final scale consists of thirteen questions regarding patients' medication perspectives. The 3-point Likert scale is encoded with the responses 'i'm not sure I can get my medicine right' (1 point), 'i'm somewhat certain I can get my medicine right' (2 points), and 'i'm very certain I can get my medicine right' (3 points). The scale has a minimum of 13 points and a maximum of 39 points. Higher scores indicate greater drug compliance and self-sufficiency (19). Numerous countries have evaluated the validity and reliability of the scale, which is valid and reliable (19-23).
- **General Self-Proficiency Scale:** Schwarzer and Jerusalem in Germany first developed in 1979. The scale, developed initially with 20 items, was reduced to 10 items in 1981 and brought to its final state in 1995 with corrections made by the same researchers. The 4-point Likert scale is encoded with a 1-point response to 'completely incorrect' and a 4-point response to 'fully correct' (24). The Turkish version of the scale is valid and reliable and has 0.80 Cronbach's alpha coefficient for the total scale (25).

Translation and Adaptation of the Scale

Following Risser's approval for the adaptation and usage of the SEAMS, we translated it as the following global standards (26):

Translation and back translation: First of all, two translators, one of them was the mother tongue of English, and the other was fluent in both languages. Then another translator made the reverse translation, related to family metdicine and chronic illnesses. Both were compared, and necessary adjustments were made. Both translations were observed, and some words/sentences were corrected.

Content Validity (Expert Committee): Using a content validity index (CVI) with a four-point rating scale, specialists evaluated the relevance and repetition of the material in each item of the original SEAMS in the Turkish culture. According to the experts' evaluation, the SEAMS CVI was 0.87, indicating that its content was sufficient and valid.

Pilot Study: Using the Test-Retest method, researchers administered the scale to 18 individuals after a 2-week delay to demonstrate the scale's independence from time and assess the items' readability. It was decided that T-SEAMS was acceptable and understandable (**Figure 1**).

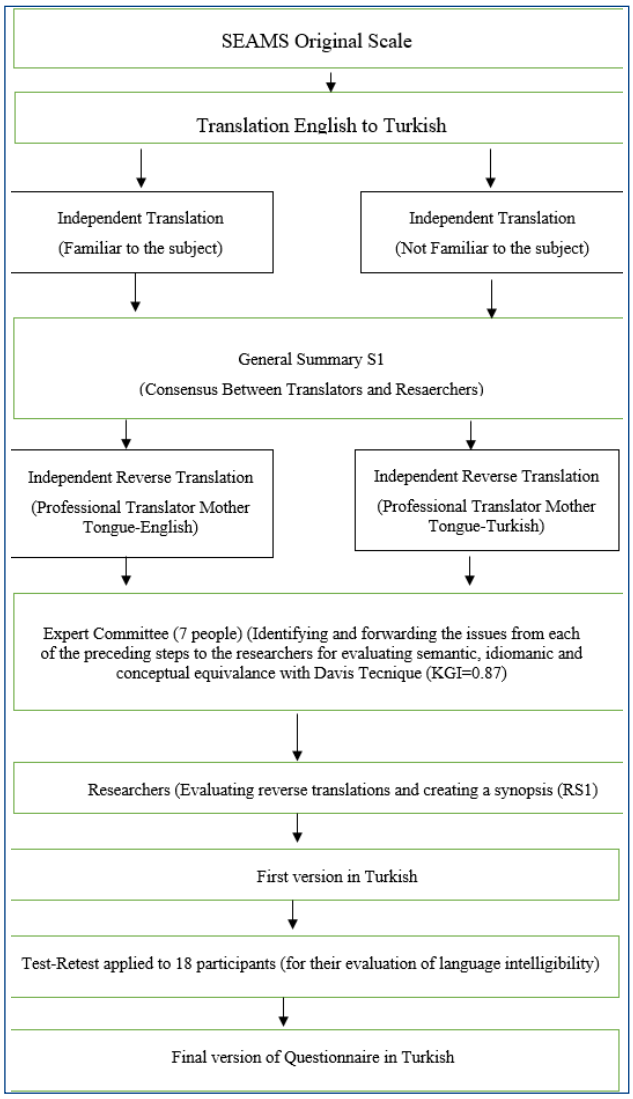

Figure 1. Steps followed during adaptation

Data Collection

Researchers approached participants with an information sheet; after obtaining informed consent, questionnaires were distributed. If there were unanswered questions on a questionnaire, it was excluded from the study. Participants completed the surveys independently, with assistance provided if they displayed signs of fatigue or had difficulty writing their responses.

Statistical Analysis

It was finished in five phases. These were item analysis, structure and content validity, internal consistency, and test-retest reliability.

AMOS 20.0 (IBM Corporation) was used for confirmatory factor analysis (CFA), and SPSS 26 (SPSS Inc., Chicago, IL, USA) was used for all other analyses. The sample was described using mean values, standard deviations, frequencies, and percentages.

An EFA was conducted to evaluate the scale's structural validity and the relationship between variables. CFA was performed to validate the factor analysis results. After performing explanatory factor analysis, the KMO-Barlett test is conducted. When two measurements that are believed to measure the same underlying processes yield comparable results or a strong correlation, convergent validity is present (27). Using Pearson's correlation coefficients, convergent validity was established between T-SEAMS and MMAS-8 scale scores. It was anticipated that participants with higher T-SEAMS scores would have higher MMAS-8 scores. The correlation between scale point values was computed using the Pearson moments multiplication formula, with the MMAS-8 scale and the SEAMS used concurrently to evaluate the validity of the criteria.

To determine scale reliability, internal consistency and test-retest reliability methods were utilized. The Cronbach's alpha coefficient was calculated to determine the reliability of the internal consistency. A Cronbach's alpha of 0.70 or greater indicates good internal consistency (9) in most cases. To determine the test-retest reliability of the scale, the time-versus-time invariability of the scale was calculated using the "Test-Retest Method" and a sample of 18 individuals. The correlation coefficient can range between -1 and 1, with values between 0.40 and 0.60 denoting moderate to substantial agreement and values above 0.60 denoting substantial agreement.

Ethical Considerations

The dates 04.01.2021 and 72867572-050.01.04-677 have been approved by the Ethics Board of Clinical Studies at the Süleyman Demirel University Faculty of Medicine.

The dates 13.04.2021 and E-16657963-799 were obtained from the Isparta Provincial Health Directorate to survey Family Medicine units.

This study utilized the "Self-Efficacy for appropriate Medication Use Scale" (SEAMS). This scale was obtained via email on 13.02.2022 from Jessica Risser Corwin, the principal author of the development team.

RESULTS

A total of 414 people were included in the study. The average age of the participants was 55.38±10.04. 57.5% of respondents (n=238) were women, 42.5% (n=176) were men. 83.6% (n=346) of respondents were married, 16.4% (n=68) were single. The other socio-demographical features are listed in **Table 1**.

Table 1. Demographics of the participants

Features	Mean±SS	Median (Min-Max)
Age	55.38±10.04	56 (40-70)
	n	%
Gender		
Woman	238	57.5
Male	176	42.5
Marital Status		
Married	346	83.6
Single	68	16.4
Education		
No reading. no writing	26	6.3
It's just reading and writing	13	3.1
Elementary school	152	36.7
Secondary school	41	9.9
High school	94	22.7
University/College	88	21.3
Working Status		
Not working	171	41.3
Retired	88	21.3
Officer	116	28.0
Free trade	39	9.4
Income Level		
Less than minimum wage	70	16.9
Minimum wage level	114	27.5
Above minimum wage	230	55.6
Social security		
None	13	3.1
SII	234	56.5
Retired	145	35.0
Green card	21	5.2
Special Insurance	1	0.2

Sd: Standart Deviation SII: Social Insurance Institution

Analysis Results of Validity and Reliability

In item analysis, SEAMS average points of items vary between 1.76 and 2.70, while Cronbach's alpha values vary between 0.905 and 0.912. Cronbach's alpha would not have improved if any scale items were eliminated (**Table 2**).

Table 2. Mean, Standard Deviation, and Cronbach α values of SEAMS Items

Number	Mean±SD	Cronbach α
1	2.55±0.63	0.908
2	2.52±0.62	0.907
3	2.47±0.68	0.906
4	2.36±0.69	0.906
5	1.76±0.84	0.919
6	2.63±0.62	0.909
7	2.49±0.61	0.906
8	2.40±0.67	0.905
9	2.15±0.77	0.909
10	2.32±0.71	0.909
11	2.70±0.56	0.910
12	2.47±0.75	0.912
13	2.61±0.66	0.912

EFA and CFA results

Exploratory factor analysis was performed to assess the scale's structural validity. The KMO value and Bartlett test were looked at to determine the factorability of the sample. The scale has a KMO value of 0.887 (very good). The results of the Barlett Test, which were made to test the homogeneity of the prevalence of the dispersions, were determined as $x2=3316.15$, $p<0.001$, and this result was evaluated as an advanced significance. Basic components analysis and the varimax rotation method were used to explain the factor structure that formed the scale. When the scale's factor structure was examined, the scale was evaluated in the initial variance analysis and scree plot values in accordance with the 2-factor structure. Still, since there is a moderate correlation between the factors of the scale, it was decided that they could not be able to examine as entirely separate topics. It was found that the single factor explained 51.48% of the total variation. As the variant value described on the scale is > 0.40, it has been decided that it is sufficient for a single factor (**Table 3**) (28). This was also preferred because the scale was originally single-factor.

Table 3. Patterns Coefficients of Factor Analysis with Varimax Rotation loaded into a Single Factor

Items	Factor 1
8. If your order is compromised	0.811
7.If you didn't get the medicine at the right time	0.784
3. If you're not home	0.783
2.If you use the same drug more than once a day	0.779
4. If your day is a little busy	0.779
1.If you take a few different medications every day	0.755
6. If no one reminds you to take the medicine	0.733
11.If you feel ill (such as cold or flu)	0.701
10.If you are not sure what time of day you will take the medicine	0.689
9.If you're not sure how to use the drug	0.684
12.If you have taken the drugs you are using and some of these drugs appear to be different from normal	0.640
13. If the doctor changes your medication	0.630
5. If the drugs have side effects	0.496

Table 4. The total variance of substances and Factors in Factor Analysis with Load of substances to a Single Factor

Items	Total	Variance (%)	Total	Variance (%)	Cumulative (%)
1	6.693	51.485	6.693	51.485	51.485
2	1.232	9.478			
3	1.026	7.889			
4	.782	6.018			
5	.617	4.746			
6	.551	4.240			
7	.471	3.620			
8	.441	3.389			
9	.317	2.438			
10	.277	2.127			
11	.232	1.785			
12	.223	1.713			
13	.139	1.071			

Confirmatory Factor Analysis (CFA) was made to verify the factor analysis results with the Amos package program. And one-factor model was tested with CFA (**Figure 2**). Chi-square/degree-of freedom ratio (X2/df), root-mean-square error of approximation (RMSEA), goodness-fit index (GFI), adjusted goodness-of-fit index (AGFI), and comparative fit index (CFI) were used to measure the overall fitness of the data model (**Table 5**).

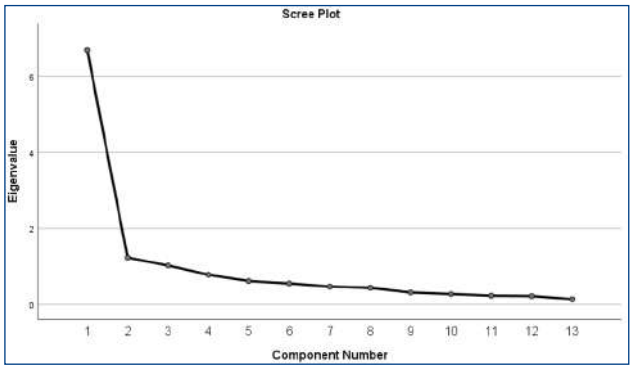

Figure 2. Scree plot graph of SEAMs factor analysis results

Table 5. SEAMS CFA Model Compliance Criteria

Acceptable Compliance Indexes	Calculated Compliance Indexes
χ2/df<5	3.031
RMSEA<0,08	0.070
CFI>0,90	0.965
GFI>0,90	0.947
IFI>0,90	0.966
TLI>0,90	0.952
SRMR<0,05	0.017

CFA: Confirmatory Factor Analysis, χ2/sd: Chi-Square / Degrees of Freedom, RMSEA: Root Mean Square Error of Approximation, CFI: Comparative Fit Index, GFI: Goodness of Fit Index, IFI: Incremental Fit Index, TLI: Tucker-Lewis Index, SRMR: Standardized Root Mean Square Residual

When the correlation analysis between the total scores of the scale was examined, the MMAS-8 was a statistically significant positive correlation with each other, with a high correlation with SEAMS (r=0.607; p<0.001), with General Self-Proficiency Scale (r=0.349; p<0.001), and weak positive correlation. The General Self-Proficiency Scale and SEAMS had a statistically significant medium-positive correlation with each other (r=0.422; p<0.001) (**Table 6**).

Table 6. Correlation Table between Scale Total scores

	MMAS-8 total score (r)	SEAMS total score (r)	General- self-proficiency scale total score (r)
MMAS-8 total score			
SEAMS total score	0.607**		
General- self-proficiency scale total score	0.349**	0.422**	

MMAS-8: Morisky-8 medication adherence scale, **Pearson Correlation Analysis, **p<0.001

The validity analysis method with similar simultaneous scales as the criteria-dependent validity method is used, and Morisky-8 medication adherence scale has been used for this method. In addition, the overall General Self-Proficiency scale and individual self-sufficiency were tested, and the treatment harmonization was evaluated together.

A high level and statistically significant correlation were found in the Pearson correlation analysis between MMAS-8 and SEAMS (r=0.607; p<0.001) (**Table 6**).

The critical test of the difference between the two measurements evaluated whether there is a meaningful difference between the two score means. There was no significant difference between the two measurements (p=0.235). And also a Statistically significant high-positive correlation between SEAMS applied twice at different times (r= 0.702; p<0.001)

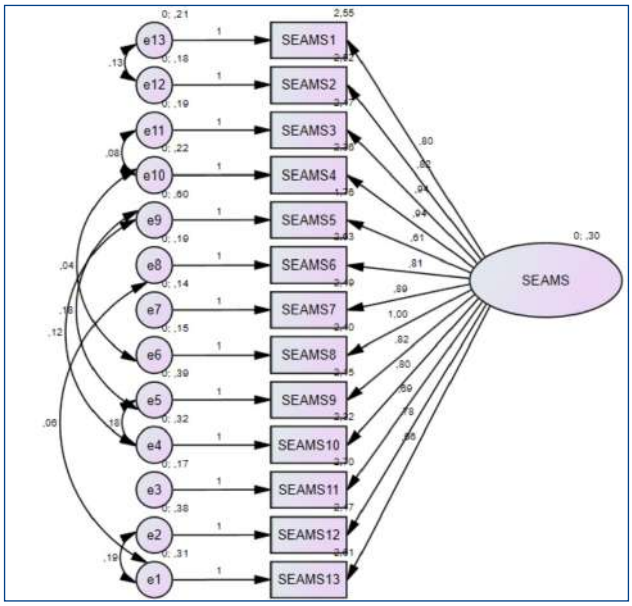

Figure 3. CFA results of T-SEAMS.

DISCUSSION

In our study, explanatory factor analysis was performed to assess the structural validity of the SEAMS scale. The Turkish version of the scale has a value of 0.887 (very good). The results of the Barlett Test, which were made to test the homogeneity of the prevalence of the dispersions, were determined as x2=3316.15, p<0.001, and this result was evaluated as an advanced significance. In the validity reliability study of the SEAMS Thai version, the scale was found to have a KMO value of 0.67, and Barlett Test results were x2=273,016, p ≤ 0.001 (96), and in the SEAMS Chinese version, the KMO value was 0.828, Barlett Test x2=2.055.683, p<0.001 (21). In the SEAMS study performed on elderly Chinese patients, the value of KMO was 0.787, the Barlett Test p <0.01 (29).

The validity analysis method with similar simultaneous scales as the criteria-dependent validity method is used, and Morisky-8 medication adherence scale has been used for this method. The Pearson moments multiplication correlation between MMAS-8 and T-SEAMS found a high and statistically significant correlation in the correlation analysis (r=0.607; p<0.001). Original SEAMS was tested by Risser and others in patients with chronic disease and reduced from 21-item initial to 13-item. In the same study, the Morisky medication adherence scale was used the same way as our work, and a strong relationship with the T-SEAMS was detected (r=0.51; p=0.001) (19).

In our study, T-SEAMS average points of matter range from 1.76 to 2.70, while the average total score was 31.42 and the standard deviation was 6.31. In the original SEAMS validity reliability study by Risser and others, the average points of the article were between 1.91 and 2.91 (19). In the Arabic version of SEAMS, the average score of the article was between 2.24 and 2.74, while the average total score was 32.36 and the standard deviation was 5.31 (22). In the Chinese version of SEAMS, the average article scores range from 1.55 to 2.34 (21), while the average score for each article was between 2.14 and 2.97 (23) in the study of older Chinese patients.

In our study, when the substance of the T-SEAMS scale was removed, the Cronbach's alpha coefficient and corrected material total correlation of the questions were looked at, the Cronbach's alpha was found to be 0.916, and the scale was considered very reliable. Our study found that the total correlation of corrected material varies between 0.446 and 0.747. In the original SEAMS, the Cronbach's alpha internal consistency test of 0.89 was detected, the scale was found to be valid and reliable, and the total correlation of the substance was determined to vary between 0.36 and 0.67 (19). In the study where the validity and reliability of the SEAMS Taiwan version were performed, the Cronbach's alpha internal consistency test was 0.931, and the Cronbach's alpha values calculated if each item on the scale was removed changed between 0.922 and 0.929, and the total correlation coefficient of the substance changed between 0.584 and 0.781 (20). In the Arabic version of SEAMS, the substance-total correlation coefficient varies between 0.48 and 0.82, while the overall scale has a Cronbach's alpha value of 0.88, pointing to good internal consistency (22). In the validity reliability study of the SEAMS Chinese version, the Cronbach alpha value is 0.915 and the corrected material total correlation varies between 0.362 and 0.672, 12. It was determined that Cronbach's alpha value would not increase by erasing any material on the scale, where all materials except the article showed a medium-strong correlation with the total scale (21). Another study on Chinese patients found that the Cronbach's alpha value of 0.768 for the whole scale was found to vary between 0.715 and 0.799 of the Cronbach's alpha values calculated if each substance on the scale was removed (29), and the Cronbach's alpha value was 0.90 in the validity reliability study of the SEAMS Thai version (30).

In our study, when the results of the test and retest of the SEAMS scale were compared to the descriptive statistics and the significant test of the difference between the two cones, there was no significant difference between the two measures (p=0,235). According to the answers from the 18 participants, the test-retest reliability of the original SEAMS scale of 21 points was found moderately (r=0.62; p<0.001) (19). In the Chinese version of SEAMS, test-retest reliability is slightly higher than the original scale (r=0.642; p<0.001) and (21), test-retest reliability is r=0.784; p<0.001 (29) for another study on Chinese patients.

The limitation of our study was that some people had left some parts of the scale and question form blank due to the application of surveys within a limited period has caused these surveys not to be evaluated.

The number of patients collected due to the decrease in the number of patients in the pandemic process has remained limited.

CONCLUSION

The Turkish Self-Efficacy for appropriate Medication use Scale (T-SEAMS) has been adapted in Turkish as the Self-Competency Scale to match the Pharmaceutical Treatment. The adapted scale has been determined to be valid and reliable. In our study, the method of validity analysis with similar simultaneous scales and the Morisky-medication adherence scale were used. In addition, the General Self-Proficiency Scale and the individual's self-sufficiency were tested, and the treatment harmonization was evaluated. It was found that the single factor explained 51.48% of the total variance. The internal consistency analysis determined that the Cronbach's alpha values calculated if each item on the scale was removed changed between 0.905 and 0.912 and that total internal consistency was high (Cronbach alpha=0.916).

As s result, this scale, validated in Turkish, can be used to determine the medication compliance status of people with chronic diseases. The medications to be taken by people can be decided according to the determined situation.

ETHICAL DECLARATIONS

Ethics Committee Approval: The dates 04.01.2021 and 72867572-050.01.04-677 have been approved by the Ethics Board of Clinical Studies at the Süleyman Demirel University Faculty of Medicine.

Informed Consent: All patients signed the free and informed consent form.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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ORIGINAL ARTICLE
ORİJİNAL ARAŞTIRMA

Hemşirelik Öğrencilerinin Santral Venöz Kateter Bakımı Konusundaki Bilgi Düzeylerinin, Tutum ve Davranışlarının Araştırılması

Investigation of Nursing Students' Knowledge Levels, Attitudes and Behaviors on Central Venous Catheter Care

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ÖZ

Amaç: Çalışma, hemşirelik öğrencilerinin santral venöz kateter (SVK) bakımı ile ilgili bilgi düzeylerini, tutum ve davranışlarını değerlendirmek amacıyla yapıldı.

Gereç ve Yöntem: Araştırma tanımlayıcı tipte gerçekleştirildi. Veriler, 15-30 Şubat 2022 tarihleri arasında toplandı. Çalışma toplam 320 hemşirelik öğrencisi, 281 gönüllü katılımcı ile yürütüldü. Verilerin toplanmasında, "Katılımcı Bilgi Formu" ve "Santral Venöz Kateter Hemşirelik Bakımı Bilgi Formu" kullanıldı. Veri toplama araçları, Google forms üzerinden katılımcılara online olarak iletildi.

Bulgular: Katılımcıların yaş ortalaması 20,69±2,08 yıl olarak bulundu. Katılım gösteren öğrencilerin %69'unun kadın, %49.8'inin 1.sınıf olduğu görüldü. Katılımcıların sadece %50 si SVK ifadesini duyduğunu, %80'i ise SVK bilgi düzeyini yeterli bulmadığını ifade etti. Çalışmada, kateter çalışmadığı zaman klempler/ kapaklar kapalı tutulmalıdır sorusuna katılımcıların % 53,5'u bilmiyorum, katater çeşitleri sorusuna yine %58,8'i bilmiyorum cevabını verdi. Katater kullanılmaya başlamadan önce kanama, şişlik kontrolü yapılmalımıdır sorusuna katılımcıların %46,5 'i bilmediklerini belirtti. Kataterli hastaya ateş durumunda yaklaşım şekli katılımcıların %41.8'inin bilmiyorum olarak cevapladığı bir diğer soru idi. Çalışmanın önemli bulgularından olan SVK bakımının kim tarafından yapıldığı sorusuna katılımcıların %46'sı servis hemşiresi, ''SVK uygulamalarından hangisi steril olarak yapılmalıdır" sorusuna ise %44'ü kateterin çıkış yerinin bakımı ve pansumanının değiştirilmesi cevabını vermiştir.

Sonuç: Çalışma sonuçları, hemşirelik öğrencilerinin SVK bilgi ve bakımı hakkında yeterli bilgi ve deneyime sahip olmadığını, bu konuda eğitime ihtiyaçları olduğunu göstermektedir.

Anahtar Kelimeler: Santral venöz kateter, hemşirelik öğrencisi, katater bakımı

ABSTRACT

Aim:This study aimed to evaluate the knowledge, attitude, and behavior levels of nursing students about central venous catheter (CVC) care.

Material and Method: This was a descriptive type of study. Study data were collected between 15-28 February 2022. The study was carried out with 281 volunteer participants out of 320 nursing students. "The Participant Information Form" and "The Central Venous Catheter Nursing Care Information Form" were used to collect the data.

Results: The mean age of the participants was 20.69±2.08 years. 69% of the participating students were female and 49.8% were 1st class students. 50% of the participants stated that they heard the term CVC, 80% did not find the level of CVC knowledge sufficient. In the study, 53.5% of the participants answered the question "clamps / caps should be kept closed when the catheter is not working" and 58.8% of the participants answered that they do not know. When asked whether bleeding and swelling should be checked before the catheter is used, 46.5% of the participants stated that they did not know. The approach to the catheter patient in case of fever was another question that 41.8% of the participants answered as unknowing. One of the important findings of the study is that 46% of the participants answered the question of who should care for the CVC as a service nurse and 44%of the participants answered the question "Which of the CVC applications should be performed sterile" as the caring for the exit points of the catheter and changing the dressing.

Conclusion: According to the study results, it shows thatthe nursing students do not have sufficient knowledge about CVC and experience with CVC care.This shows that they need training on this subject.

Keywords: Central venous catheter, nursing student, catheter care

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GİRİŞ

Santral venöz kateter (SVK) kritik hastalarda yaygın olarak kullanılmaktadır.Dahili ve cerrahi birimler, yoğun bakım ve son yıllarda artan bir şekilde onkoloji ünitelerinde etkili ve yaygın bir şekilde uygulanmaktadır(1,2).Bu bağlamda sık kullanılan venler arasında; internal ve eksternal juguler venler, subklaviyan ven, özellikle antekübital, sefalik, bazilikvenler, femoral venler,bazı durumlarda portal, inferior vena kava ve hepatik venler bulunmaktadır (5,6).Karmaşık bir girişim olan SVK uygulamaları bakım ve uygulama yetersizliği nedeniyle hastanede yatış süresini uzatmakta, ölüm oranını yükseltmekte, enfeksiyon gelişim riskini artırmakta, hasta ve hasta yakınlarını ekonomik, sosyal ve psikolojik yönden etkilemektedir. Kullanım endikasyonlarının başında,venöz basınç ölçüm gerekliliği, uzun süren intravenöz (IV) tedaviler, yoğunluğu yüksek sıvı ve ilaç uygulamaları, total parenteral nutrisyon sıvıları ile beslenme durumu, irritan özellikli kemoterapötik ajanlar, kök hücre toplanması, yüksek yoğunluklu antibiyotik içerikli solüsyonlar, hemodiyaliz, kan ve kan ürünleri transfüzyonu, yoğun cerrahi tedaviler iledoku hasarına bağlı periferal venöz yolların kullanılmaz hale gelmesi gibi durumlar gelmektedir (1-4).Bu zorlu katater kullanımı beraberinde çok fazla komplikasyonaneden olmaktadır. Başta enfeksiyon, ağrı ve kanama olmak üzere pnömotoraks, hava embolisi, yanlış konumlama, hemotoraks, hareket kısıtlılığı gibi SVK'ya bağlı komplikasyonlaraneden olmakta ve hastanın yaşam kalitesini düşürmektedir (4,5).Öncesinde yayınlanmış bir çalışmanın sonuçları,SVK komplikasyonları nedeniyle hastaneyatış sürelerinin 7-21 gün kadar uzadığı yönündedir (3)SVK uygulanan hastalarda görülen komplikasyonlarıazaltmak ve istenmeyen durumların önüne geçebilmek için, doğru damar seçimi ve aseptik şartlara uygunluk oldukça önemlidir.

SVK uygulamalarında, hastanın hazırlık aşamasından, bakım ve komplikasyonların önlenmesine kadar süreç boyunca hemşire önemli role sahiptir. Karmaşık uygulamalardan biri olan kateterizasyon işlemlerinin tümünde olduğu gibi, SVK uygulama ve bakımında da hemşireler sürecin çok önemli bir parçasını oluştururlar (6-10). Bu yüzden hemşirelerin SVK bilgi düzeyleri ve yaklaşımları önem arz etmektedir. Hemşirelik eğitim müfredatlarında konuya yer verilmeli ve eğitim yılları boyunca mutlaka SVK gözlemi, girişimi ve bakımı deneyimlemeleri sağlanmalıdır.Bu şekilde mesleki açıdan donanım sağlayabileceklerdir (11,12).

GEREÇ VE YÖNTEM

Mevcut çalışmada amaç, hemşirelik öğrencilerinin SVK uygulamaları konusunda bilgi düzeyi, tutum ve davranışlarını incelemektir. Bu araştırma tanımlayıcı tipte gerçekleştirildi. Araştırmada örneklem seçimine gidilmeden evreni oluşturan 320 hemşirelik öğrencilerinden gönüllüler çalışmaya dahil edildi. Araştırma, anketin tamamını eksiksiz dolduran toplam 281 (evrenin %87,5'u) gönüllü katılımcı ile yürütüldü. Araştırma verileri 15-30 Şubat 2022 tarihleri arasında sosyal medya üzerinden Google forms oluşturularak toplandı. Verilerin toplanmasında, araştırmacılar tarafından literatür doğrultusunda11,14 hazırlanan "Katılımcı Bilgi Formu" ve "Santral Venöz Kateter Hemşirelik Bakımı Formu" kullanıldı. Değişkenler için normallik varsayımının sağlanmamasına rağmen örneklem sayısının otuzdan büyük olması nedeni ile Merkezi Limit Teoremi uyarınca T-testi ve tek yönlü Anova testi kullanılarak analizler gerçekleştirildi. T-testi ve Tek Yönlü Anova testi istatistikleri, testlerin p-değerleri ve grupların bilgi düzeyi ortalamaları ile standart sapmaları **Tablo** 5'te verildi

Katılımcı Bilgi Formu

Katılımcı bilgi formu, katılımcıların demografik özelliklerini sorgulayan ;katılımcıların yaşı, cinsiyeti ,kaçıncı sınıf öğrencisi olduğu… gibi sorulardan oluşturuldu.

Santral Venöz Kateter Hemşirelik Bakımı Formu

Bu form toplam üç bölümden oluşturuldu. Birinci bölümde, SVK ile ilgili toplam dört soru bulunmakta idi. İkinci bölüm, katılımcıların SVK uygulamalarına ilişkin soruların bulunduğu bölümdü. Bu bölümde toplam dokuz soru bulunmakta idi. Üçüncü bölümde ise, katılımcıların SVK ve uygulamaları hakındaki bilgi seviyelerini ölçen toplam yedi soru bulunmakta idi.

Çalışmanın Etik Yönü

Çalışma öncesi, Bitlis Eren Üniversitesi Rektörlüğü Etik İlkeleri ve Etik Kurulu'ndan 22/01-6 sayılı ve E.1654 evrak kayıt numaralı kararıyla onay alındı. Ayrıca, katılımcılardan onam alındı.

Verilerin Analizi ve Değerlendirilmesi

Verilerin değerlendirilmesinde IBM SPSS 22 paket programı kullanıldı. Yaş değişkeninin analizinde ortalama ve standart sapma (SS) kullanıldı; cinsiyet, katılımcıların okumakta oldukları sınıf ve SVK ile ilgili sorulara verdikleri cevaplar yüzde (%) ve frekans dağılımı ile analiz edildi. Katılımcıların bilgi düzeylerinin cinsiyet, okumakta oldukları sınıf ve SVK hakkında profesyonel eğitim alıp almamalarına bağlı olarak farklılık gösterip göstermediği T- testi ve tek yönlü Anova testi ile analiz edildi. Analizlerde $p<0,05$ olması istatistiksel olarak anlamlı olarak kabul edildi.

BULGULAR

Araştırmaya katılan hemşirelik öğrencilerinin demografik özellikleri **Tablo 1**'de sunuldu. Öğrencilerin yaş ortalaması 20,69±2,08 olarak bulundu. Katılım gösteren öğrencilerin % 69'u kadın, %31'i erkek ; %49.8'i 1.sınıf, % 13.5'i 2.sınıf, %12.1'i 3.sınıf ve % 24.6'sı 4.sınıf öğrencileri olarak bulundu.

Tablo 1. Katılımcıların demografik özelliklerinin dağılımı		
Yaş (yıl)		
Ortalama	20.69	
Standart sapma	2.08	
Cinsiyet	**Sayı**	**Yüzde**
Kadın	194	69
Erkek	87	31
Katılımcının sınıfı	**Sayı**	**Yüzde**
1. sınıf	140	49.8
2.sınıf	38	13.5
3.sınıf	34	12.1
4.sınıf	69	24.6

Katılımcıların SVK ile ilgili sorulara verdikleri cevaplara bakıldığında, katılımcıların %50'si daha önce SVK ifadesini duyduğunu bildirdi. Sadece % 6'sı SVK konusunda yeterli bilgiye sahip olduğunu düşünürken, %80 i SVK konusunda bilgilerinin yetersiz olduğunu ifade etti. Benzer şekilde %86'sı SVK konusunda profesyonel eğitim almadığını ifade etti, % 6'sı ise SVK ile ilgili profesyonel eğitim aldığını, %45'i SVK ile ilgili bilgileri üniversiteden aldığını bildirdi (**Tablo 2**).

Tablo 2. Katılımcıların santral venöz kateter ile ilgili sorulara verdikleri cevapların dağılımı		
Santral venöz kateter diye bir şey duydunuz mu?		
	Sayı	**Yüzde**
Evet	140	50
Hayır	103	37
Emin değilim	38	13
Santral venöz kateter konusunda bilgi seviyenizin yeterli olduğunu düşünüyor musunuz		
	Sayı	**Yüzde**
Evet	17	6
Hayır	225	80
Emin değilim	39	14
Santral venöz kateter konusunda profesyonel eğitim aldınız mı		
	Sayı	**Yüzde**
Evet	17	6
Hayır	241	86
Emin değilim	23	8
Santral venöz kateter bilgi kaynağınız nedir		
	Sayı	**Yüzde**
Okul/üniversite	125	45
İnternet/sosyal medya	57	21
Gazete/TV	7	3
Arkadaş/aile	23	8
Hastane	5	2
Bilgim yok	111	40

Tablo 3, katılımcıların SVK uygulamalarına ilişkin sorulara verdikleri cevapların dağılımını göstermekte idi. Buna göre, katılımcıların SVK niçin takılır sorusuna, %28'i uzun süreli intravenöz (ı.v.) tedavi, %25'i ise venöz basınç ölçümü, %22 si yüksek konsantrasyonlu sıvı ve ilaçların verilmesi, %21'i kan ve kan ürünlerinin transfüzyonu cevabını verirken, %47 oranında katılımcı ise fikrim yok şeklinde ifade etti. Katılımcıların %53'ü SVK'nın endikasyonlarını doğru bilirken %47 oranında yetersiz bilgiye sahip oldukları görülmekte idi.

Tablo 3. Katılımcıların santral venöz kateter uygulamalarına ilişkin sorulara verdikleri cevapların dağılımı		
Santral venöz kateter sizce hangi durumlarda takılır (Birden fazla seçenek)		
	Sayı	**Yüzde**
Venöz basınç ölçümü	70	25
Uzun süreli intravenöz tedavi	79	28
Yüksek konsantrasyonlu sıvı ve ilaçların verilmesi	61	22
Total parenteral beslenme	47	17
İrritan ilaçlarla kemoterapi	35	13
Yüksek konsantrasyonlu antibiyotik solüsyonları	25	9
Uzun süreli kan ve kan ürünleri ile tedavi	60	21
Hemodiyaliz	45	16
Plazmaferez	16	6
Daha önceki süreçlerde yoğun tedavi, cerrahi ve doku hasarına bağlı periferal venöz yolların yokluğu	54	19
Fikrim yok	131	47
Santral venöz kateter komplikasyonları sizce nelerdir (Birden fazla seçenek)		
	Sayı	**Yüzde**
Hemotoraks	61	22
Malpozisyon	27	10
Pnömotoraks	56	20
Hava embolisi	75	27
Enfeksiyon	89	32
Fikrim yok	157	56
Santral venöz kateteri sizce kim takar (Birden fazla seçenek)		
	Sayı	**Yüzde**
Kalp damar cerrahisi uzmanı	86	31
Yoğun bakım uzmanı	78	28
Acil uzmanı	39	14
Anesteziyoloji uzmanı	42	15
Herhangi bir branştan doktor	23	8
Servis hemşiresi	30	11
Yoğun bakım hemşiresi	58	21
Tablo III. (Devamı) Fikrim yok	139	50
Santral venöz kateteri sizce bakımı kim tarafından yapılmaktadır (Birden fazla seçenek)		
	Sayı	**Yüzde**
Kalp damar cerrahisi uzmanı	47	18
Yoğun bakım uzmanı	56	22
Acil uzmanı	39	15
Anesteziyoloji uzmanı	24	9
Herhangi bir branştan doktor	18	7
Servis hemşiresi	120	46
Yoğun bakım hemşiresi	116	45
Hemodiyaliz hemşiresi	73	28
Hastanın kendisi	18	7
Fikrim yok	59	23

Santral kateterle ilgili bu uygulamalardan hangisi steril olarak yapılmalıdır.(Birden fazla seçenek)		
	Sayı	**Yüzde**
Kateterin çıkış yerinin bakımı ve pansumanının değiştirilmesi	122	44
Kateter lümenlerinin yıkanması	99	36
Kateter kapaklarının değiştirilmesi	109	39
Kateterin takılması	113	41
Fikrim yok	125	45
Hangileri santral kateter bakımı için gerekli malzemelerdendir. (Birden fazla seçenek)		
	Sayı	**Yüzde**
Cerrahi maske	92	33
Steril olmayan eldiven	21	8
Steril eldiven	123	44
Antiseptik	104	37
Steril gazlı bez (spanç)	111	40
Elastik sabitleme bandı (önceden kesilip hazırlanmış)	101	36
Heparin flakon	49	18
Serum fizyolojik sıvı	77	28
Enjektör	81	29
Tıbbi atık kutusu	96	34
Fikrim yok	132	47
Kateter örtüleri ile ilgili hangisi doğrudur.(Birden fazla seçenek)		
	Sayı	**Yüzde**
Steril gazlı bez kullanılıyorsa iki günde bir değiştirilmelidir	73	26
Şeffaf (transparan) pansuman örtüleri kullanılıyorsa yedi günde bir değiştirilmelidir	42	15
Tablo III. (Devamı) Kirlendikçe, ıslandıkça ya da kenarından açılmışsa hemen değiştirilmelidir.	86	31
Fikrim yok	162	59
Santral venöz kateter komplikasyonları hayati risk oluşturabilecek/ ciddi komplikasyonlara neden olabilecek bir durum mudur?		
	Sayı	**Yüzde**
Evet	113	41
Hayır	16	06
Fikrim yok	147	53

SVK uygulamalarına ilişkin bir başka bulgu SVK komplikasyonları nelerdir sorusuna katılımcılar, %32 oranında enfeksiyon, %27 oranında hava embolisi, %22 oranında hemotoraks, %20 oranında ise pnömotoraks cevabını verdi. SVK kim tarafından takılmalıdır sorusuna, katılımcıların verdikleri cevaplar, %31 kalp damar cerrahı, %28'i yoğun bakım uzmanı cevabını verirken, %21 oranında yoğun bakım hemşiresi şeklinde idi. Çalışmanın önemli bulgularından biri olan SVK bakımı kim tarafından yapılmalıdır sorusuna katılımcıların %46'sı servis hemşiresi, %45'i yoğun bakım hemşiresi, %28'i hemodiyaliz hemşiresi, %22'si ise yoğun bakım uzmanı cevabını verdi.

SVK uygulamalarından hangisi steril olarak yapılmalıdır sorusuna katılımcılar, %44 oranında kateterin çıkış yerinin bakımı ve pansumanının değiştirilmesi, %41 oranında kataterin çıkarılması, %39 oranında katater kapaklarının değiştirilmesi, %36 oranında ise katater lümenlerinin yıkanması şeklinde cevaplar verdi. Katılımcıların bu konudaki bilgi düzeyleri düşük olarak bulundu. SVK bakımında kullanılan malzemelerin sorgulandığı bölümde katılımcıların verdikleri cevaplar, %44 steril eldiven, % 40 steril spanç, %37 antiseptik solüsyon, %34 tıbbi atık kutusu, %33 cerrahi maske, %28 serum fizyolojik cevabını verdi.Katılımcıların SVK bakımında kullanılan malzeme bilgi düzeyleri düşük bulundu. Öğrencilerin SVK malzeme bilgi düzeyleri ancak 1/3 oranında idi.Kateter örtüleri ile ilgili sorulara katılımcıların verdikleri cevaplar, %31oranında; kirlendikçe, ıslandıkça ya da kenarından açılmışsa hemen değiştirilmelidir, %26 oranında "steril gazlı bez kullanılıyorsa iki günde bir değiştirilmelidir" şeklinde idi.

Tablo 4'te likert ölçeği kullanılarak hazırlanan, katılımcıların SVK hakkındaki bilgi seviyelerini ölçmeyi hedefleyen soruların dağılımı verildi. **Tablo 4**'te yer alan sorulara doğru cevap veren katılımcılara bir puan, yanlış cevap verenlere veya "bilmiyorum" cevabını verenlere sıfır puan verilerek, her katılımcı için bir bilgi düzeyi puanı hesaplandı. Maksimum bilgi düzeyi puanı 7, minimum bilgi düzeyi puanı '0' puan olarak hesaplandı. Bilgi düzeyi puanının katılımcının cinsiyetine, okumakta olduğu sınıfa veya SVK hakkında profesyonel eğitim alıp almamasına göre değişim gösterip göstermediği araştırıldı. Çalışmada, katater çalışmadığı zaman klempler/ kapaklar kapalı tutulmalıdır sorusuna katılımcıların % 53,5'u bilmiyorum, katater çeşitleri sorulduğunda %58,8'i bilmiyorum cevabını vermiştir. Katater kullanılmaya başlamadan önce yerinin doğruluğu teyit edilmelidir sorusuna %39,5 oranında doğru cevap verirken, katater kullanılmaya başlamadan önce kanama, şişlik kontrolü yapılmalıdır sorusuna % 46,5 ' bilmiyorum cevabını vermiştir. Kataterli hastaya ateş durumunda yaklaşım şekline katılımcıların %41,8 'i bilmiyorum yanıtını vermiş, katater bakımı öncesi eller yıkanmalıdır sorusuna % 47,1 oranında doğru yanıt verirken, katater bakımı öncesi steril eldiven giyilmelidir sorusuna ise % 44,6'sı doğru cevap vermiştir.

Katılımcıların bilgi düzeyleri ile cinsiyetleri arasında istatistiksel olarak anlamlı bir ilişki bulunmadı (t (279) = -0,84, p-değeri= 0,933). Kadınların bilgi düzeyi ortalaması 3,05±2,66; erkelerin ortalaması 3,08±2,71 puan olarak bulundu.

Katılımcıların okumakta oldukları sınıf ile bilgi düzeyleri arasında istatistiksel olarak anlamlı bir ilişki bulundu(F(3,277) = 47,409, p-değeri <0,01). 1.sınıfta okuyan katılımcıların bilgi düzeyi puan ortalaması 1,52±2,12; 2.sınıfta okuyan katılımcıların ortalaması 4,05±2,44; 3.sınıfta okuyan katılımcıların ortalaması 4,59±2,31 ve 4.sınıfta okuyan katılımcıların ortalaması 4,88±2,09 puan bulundu. SVK hakkında profesyonel eğitim alan ve almayan/ emin olmayan katılımcıların bilgi düzeyi puan ortalamaları arasında istatistiksel olarak anlamlı bir fark bulundu (t(27,72) = -8,905, p-değeri<0,01). Profesyonel eğitim alanların bilgi düzeyi puan ortalaması 5,82±1,19; eğitim almayan veya emin olmayanların bilgi düzeyi puan ortalaması 2,88±2,64 bulundu.

Tablo 4.Katılımcıların santral kateter hakkındaki bilgi seviyelerini ölçen soruların dağılımı					
Kateter kullanılmadığı zaman klempler ve kapaklar her zaman kapalı tutulmalıdır.					
	Bilmiyorum	Hiçbir zaman	Bazen	Genellikle	Her zaman
Sayı	147	15	32	26	55
Yüzde (%)	53.5	5.5	11.6	9.5	20.0
Santral venöz kateterler tünelsiz (geçici) ve tünelli (kalıcı) olmak üzere iki tiptedir.					
	Bilmiyorum	Hiçbir zaman	Bazen	Genellikle	Her zaman
Sayı	161	23	33	26	31
Yüzde (%)	58.8	8.4	12.0	9.5	11.3
Kateter takıldıktan hemen sonra, kullanılmaya başlanmadan önce doğru yere yerleştirildiğinden emin olunmalıdır.					
	Bilmiyorum	Hiçbir zaman	Bazen	Genellikle	Her zaman
Sayı	108	19	30	10	109
Yüzde (%)	39.1	6.9	10.9	3.6	39.5
Kateterin yeri akciğer grafisiyle doğrulandıktan ve belgelendikten sonra, giriş yerinde şişlik, kanama gibi belirtiler yoksa hekimin bilgisi dahilinde kullanılmaya başlanır.					
	Bilmiyorum	Hiçbir zaman	Bazen	Genellikle	Her zaman
Sayı	128	21	24	24	78
Yüzde (%)	46.5	7.6	8.7	8.7	28.4
Kateteri olan bir hastanın ateşi çıkarsa, Kateter enfeksiyonunun dışlanması gereklidir. Hastanın ateşi varsa hemen hastanın doktoruna haber verilmelidir. Hasta evdeyse hemen hastaneye getirilmelidir					
	Bilmiyorum	Hiçbir zaman	Bazen	Genellikle	Her zaman
Sayı	115	17	34	19	90
Yüzde (%)	41.8	6.2	12.4	6.9	32.7
Santral venöz kateter bakımına başlamadan önce eller mutlaka yıkanmalıdır.					
	Bilmiyorum	Hiçbir zaman	Bazen	Genellikle	Her zaman
Sayı	91	21	27	7	130
Yüzde (%)	33.0	7.6	9.8	2.5	47.1
Santral venöz kateter bakımına başlamadan önce mutlaka steril eldiven giyilmelidir.					
	Bilmiyorum	Hiçbir zaman	Bazen	Genellikle	Her zaman
Sayı	94	16	31	12	123
Yüzde (%)	34.1	5.8	11.2	4.3	44.6

Tablo 5. T-testi ve tek yönlü Anova testi istatistikleri				
Cinsiyet				
	Ortalama	Standart sapma	t istatistiği	p değeri
Kadın	3,05	2,66	-0,84	0,933
Erkek	3,08	2,71		
Santral venöz kateter hakkında profesyonel eğitim alıp almadığı				
	Ortalama	Standart sapma	t istatistiği	p değeri
Evet	5,82	1,19	-8,905	<0,01
Hayır/emin değilim	2,88	2,64		
Katılımcının okumakta olduğu sınıf				
	Ortalama	Standart sapma	F istatistiği	p değeri
1.sınıf	1,52	2,12	47,409	<0,01
2.sınıf	4,05	2,44		
3.sınıf	4,59	2,31		
4.sınıf	4,88	2,09		

TARTIŞMA

SVK izlemi ve kullanımı hemşirenin çok önemli sorumluluklarından biridir. Son yıllarda yoğun olarak kullanılan SVK uygulamaları beraberinde yüksek riskli ve bazen ölümle sonuçlanan komplikasyonları beraberinde getirmektedir. SVK'ya bağlı olarak gelişen komplikasyonların önlenmesinde kaliteli katater bakımı ve üst düzey hemşirelik bilgisi gerekmektedir. Bu bağlamda, öğrenci hemşirelerin konuya ilişkin yeterli deneyim ve bilgi birikimine sahip olması mesleğe atandıktan sonraki katater bakımı için önemlidir (9-12).Çalışmamız, hemşirelik bölümünde eğitim gören öğrenciler ile yürütüldü. Ancak literatürde SVK uygulamaları ile ilgili öğrenciler üzerine yapılmış çalışma oldukça sınırlıdır. Bu nedenle çalışma sonuçları çoğunlukla literatür doğrultusunda tartışıldı.

Katılımcıların SVK ile ilgili sorulara verdikleri cevaplar incelendi. Buna göre; katılımcıların %50'si daha önce SVK ifadesini duyduğunu bildirdi. Sadece % 6'sı SVK konusunda yeterli bilgiye sahip olduğunu düşünürken, %80 i SVK konusunda bilgilerinin yetersiz olduğunu ifade etti. Benzer şekilde %86'sı SVK konusunda profesyonel eğitim almadığını ifade etti, % 6'sı ise SVK ile ilgili profesyonel eğitim aldığını, %45'i SVK ile ilgili bilgileri üniversiteden aldığını bildirdi.

Katılımcıların genel olarak SVK ile ilgili bilgi düzeylerinin yetersiz olduğu görülmektedir. Mlinar ve arkadaşlarının hemşirelik öğrencileri üzerine yaptıkları bir çalışmada (2015) öğrencilerin SVK bilgi düzeyleri yetersiz bulundu (13).Benzer sonuçların bulunduğu farklı çalışmalarda mevcuttur(14,15).

Katılımcıların SVK uygulamalarına ilişkin verdikleri cevaplar incelendi. Buna göre, katılımcıların SVK niçin takılır sorusuna,%28'i uzun süreli ı.v tedavi, %25'i ise venöz basınç ölçümü, %22 si yüksek konsantrasyonlu sıvı ve ilaçların verilmesi, %21'i kan ve kan ürünlerinin transfüzyonu cevabını verirken, %47 oranında katılımcı ise fikrim yok şeklinde ifade etti. Katılımcıların %53'ü SVK'nın endikasyonlarını doğru bilirken %47 oranında yetersiz bilgiye sahip oldukları görülmektedir. Literatürde konuya ilişkin sınırlı sayıda çalışmaya rastlandı. SVK bakımı konusunda, hemşireler üzerine yapılan bir çalışmada katılımcılar SVK endikasyonlarını; acil ilaç uygulamak, uzun süreli parenteral beslenme, hipovolemik hastaların sıvı takibi olarak belirtilmiştir ve mevcut çalışmada katılımcıların yalnızca %36,8'inin SVK endikasyonlarını doğru cevapladığı bildirilmiştir(3).

SVK uygulamalarına ilişkin bir başka çalışmada''SVK komplikasyonları nelerdir" sorusuna katılımcılar; %32 oranında enfeksiyon, %27 oranında hava embolisi, %22 oranında hemotoraks, %20 oranında ise pnömotoraks cevabını vermiştir. Çalışma burada katılımcıların SVK komplikasyonları konusunda bilgi düzeylerinin yetersiz olduğunu göstermiştir ve bu yönüyle literatürü destekler niteliktedir (5,8,12). Ancak literatürde aksi yönde çalışmalarda mevcuttur. Mlinar ve ark. yaptıkları çalışmada hemşirelik öğrencilerinin SVK komplikasyonlarını doğru bilme oranını % 95 olarak bulmuşlardır (13).

SVK kim tarafından takılmalıdır sorusuna, katılımcıların verdikleri cevaplar, %31 kalp damar cerrahı, %28'i yoğun bakım uzmanı cevabını verirken, %21 oranında yoğun bakım hemşiresi şeklindedir. Çalışmanın önemli bulgularından biri olan SVK bakımı kim tarafından yapılmalıdır sorusuna katılımcıların %46'sı servis hemşiresi, %45'i yoğun bakım hemşiresi, %28'i hemodiyaliz hemşiresi, %22'si ise yoğun bakım uzmanı cevabını verdiler. Katılımcıların bu konuda bilgi düzeylerinin yetersiz olduğu görülmektedir. Literatür bilgileri ve günlük uygulamalarda SVK takma işleminin hekim tarafından yapıldığı bildirilmektedir(5,18) SVK uygulamalarından hangisi steril olarak yapılmalıdır sorusuna katılımcılar, %44 oranında kateterin çıkış yerinin bakımı ve pansumanının değiştirilmesi, %41 oranında kataterin çıkarılması, %39 oranında katater kapaklarının değiştirilmesi, %36 oranında ise katater lümenlerinin yıkanması şeklinde cevaplar verildi. Katılımcıların bu konudaki bilgi düzeyleri düşük olarak bulundu. Literatür incelendiğinde, SVK bakım ve pansuman uygulamaları sırasında steril eldiven giyilmesi gerektiğini düşünen katılımcıların oranı %66.7 olarak belirtilmişken, katılımcıların ancak 1/3'ünün SVK pansumanı doğru bir şekilde yapabilme bilgisine sahip olduğu bildirilmiştir(1,13). SVK bakımında kullanılan malzemelerin sorgulandığı bölümde katılımcıların verdikleri cevaplar, %44 steril eldiven, % 40 steril spanç, %37 antiseptik solüsyon, %34 tıbbi atık kutusu, %33 cerrahi maske, %28 serum fizyolojik şeklinde idi. Katılımcıların SVK bakımında kullanılan malzeme bilgi düzeyleri düşük bulundu. Öğrencilerin SVK malzeme bilgi düzeyleri ancak 1/3 oranındadır.

Kateter örtüleri ile ilgili sorulara katılımcıların verdikleri cevaplar, %31oranında; kirlendikçe, ıslandıkça ya da kenarından açılmışsa hemen değiştirilmelidir, %26 oranında ''steril gazlı bez kullanılıyorsa iki günde bir değiştirilmelidir" şeklindedir. Literatür incelendiğinde, katater örtülerininSVK giriş noktasını kapatmak için kateter giriş noktasının izlenmesini sağlayan şeffaf bandajlar kullanılması görüşü yaygındır. SVK'nin güvenli yapılmasına olanak tanıyan bandajlar kullanılması önerilmektedir. Şeffaf bandajlar 7 günde bir değiştirilir veya yangılanma, enfeksiyon durumlarında veya ıslak, kirli veya kanlı bandaj olması halinde daha sık değiştirilebilir görüşü hakimdir (1,13-19).

Katılımcıların SVK ile ilgili bilgi bilgi düzeylerini ölçen sorulara verdikleri cevaplar **Tablo 4'**te verildi. Veriler incelendiğinde, ''Kateter kullanılmadığı zaman klempler ve kapaklar her zaman kapalı tutulmalıdır" sorusuna katılımcıların %20'si,'SVK tünelsiz (geçici) ve tünelli (kalıcı) olmak üzere iki tiptedir" sorusuna ise %11.3'ü doğru cevap verdi. Çalışma bulgusu literatür ile uyumludur (20). Katılımcıların SVK bilgi düzeyleri düşük bulundu. Benzer bir çalışmada, Arpa ve ark., hemşirelerin kateter bakımı ile ilgili bilgi düzeylerini düşük olarak bulmuşlardır(21). Literatür çalışmalarında hemşire grupları ile yapılan çalışmalarda bilgi düzeyi genellikle orta yada yüksek bulunurken, öğrenci hemşireler ile yapılan çalışmalarda bilgi düzeyleri düşük olarak bulunmuştur. Bu durumun nedeni, araştırma grubunun öğrenci hemşirelerden oluşması, temel mesleki derslerin yeni alınıyor olması, yeterince uygulama gözlemi yapılmaması, yeterince vaka izleme şansı olmaması gibi nedenlerden kaynaklanıyor olabilir (22). Çalışmada''Kateter takıldıktan hemen sonra, kullanılmaya başlanmadan önce doğru yere yerleştirildiğinden emin olunmalıdır" sorusuna doğru cevap veren katılımcı oranı %39.5 olarak bulundu. Literatür bilgisi bu yönde olmasına rağmen

(23) çalışmada bu oran düşük (39,5) bulunmuştur. Katılımcıların bu soruya verdiği doğru cevap oranı orta düzeye yakındır. Literatürde, ''Kateterin yeri akciğer grafisiyle doğrulandıktan ve belgelendikten sonra, giriş yerinde şişlik, kanama gibi belirtiler yoksa hekimin bilgisi dahilinde kullanılmaya başlanır" (24,25) bilgisi mevcuttur. Bilgi düzeyi ölçen bu soruya katılımcıların ancak %28.4'ünün doğru cevap verdiği, dolayısıyla katılımcıların bilgi seviyesinin düşük olduğu görüldü. Katılımcıların %32.7'si ''Kateteri olan bir hastanın ateşi çıkarsa, kateter enfeksiyonunun dışlanması gereklidir. Hastanın ateşi varsa hemen hastanın doktoruna haber verilmelidir. Hasta evdeyse hemen hastaneye getirilmelidir" sorusunu doğru yanıtladı. 'SVK bakımına başlamadan önce eller mutlaka yıkanmalıdır" sorusuna %47.1 oranında doğru cevap verildi. 'SVK bakımına başlamadan önce mutlaka steril eldiven giyilmelidir" sorusuna %44.6 oranında doğru cevap vermişlerdir. Katılımcıların SVK takma ve bakımı konusunda steril uygulamalara ilişkin bilgi düzeyleri orta düzeye yakındır. Literatür incelendiğinde benzer verilerin bulunduğu çalışmalara rastlanmıştır (20,22,26).

Katılımcıların bilgi düzeyleri ile cinsiyetleri arasında istatistiksel olarak anlamlı bir ilişki bulunmadı (t (279) = - 0,84, p-değeri= 0,933). Kadınların bilgi düzeyi ortalaması 3,05±2,66; erkek ortalaması 3,08±2,71 puan olarak bulundu. Literatürde aksi yönde çalışmalar mevcuttur. Susam ve arkadaşlarının yaptığı benzer bir çalışmada (27), kadın katılımcıların uygulama farkındalık ortalaması erkek katılımcılara göre istatistiksel olarak yüksek bulundu. Benzer şekilde Biçer ve Temizin yaptığı bir başka çalışmada ise, erkek öğrencilerin IV Kateter Bakımı Bilgi Düzeyi puanları, kız öğrencilerin puanlarına göre istatiksel olarak anlamlı düzeyde yüksek bulundu (22).

Çalışmada, öğrencilerin SVK hakkındaki bilgi düzeyleri kısmen yetersiz olarak tesbit edildi. Katılımcılar sorulara ancak ortalama %30 oranında doğru cevap verdiler. Bu durumun nedeni olarak, son 2 yıldır pandemi nedeniyle hemşirelik öğrencilerinin klinik ve laboratuvar uygulamalarından yoksun kalması, kateterizasyon işlemlerinde kanıta dayalı uygulamaların komplikasyon gelişme riskini önemli düzeyde etkilemesi ve ancak öğrenci eğitimlerinde kanıta dayalı uygulamalara yeterince yer verilmemesi ve bir başka neden olarak da çalışmaya 1. sınıfların da dahil edilmesi gösterilebilir.

Katılımcıların okumakta oldukları sınıf ile bilgi düzeyleri arasında istatistiksel olarak anlamlı bir ilişki bulundu (F(3,277) = 47,409, p-değeri <0,01). 1.sınıfta okuyan katılımcıların bilgi düzeyi puan ortalaması 1,52±2,12; 2.sınıfta okuyan katılımcıların ortalaması 4,05±2,44; 3.sınıfta okuyan katılımcıların ortalaması 4,59±2,31 ve 4.sınıfta okuyan katılımcıların ortalaması 4,88±2,09 bulundu. Çalışma bu yönüyle literatür ile uyumludur. Bunun nedeni olarak, sınıf düzeyi yükseldikçe, öğrenci bilgi, klinik uygulama ve beceri düzeyinin yükselmesi olduğu düşünüldü. Temel konuların hemşirelik eğitiminin ilk yıllarında, girişimsel uygulama ve derslerin 2.3.ve 4. sınıflarda verildiği düşünülürse, konuların pekiştirilmesi ve klinik uygulama fırsatının üst sınıflarda daha fazla olması sınıflararası bilgi ve beceri farklılıklarına neden olduğu düşünülebilir.

Çalışmadan elde edilen önemli diğer bir bulgu ise, santral venöz kateter hakkında profesyonel eğitim alan ve almayan/emin olmayan katılımcıların bilgi düzeyi puan ortalamaları arasında istatistiksel olarak anlamlı bir fark bulundu (t(27,72) = -8,905, p-değeri<0,01). Profesyonel eğitim alanların bilgi düzeyi puan ortalaması 5,82±1,19; eğitim almayan veya emin olmayanların bilgi düzeyi puan ortalaması 2,88±2,64 bulundu. Literatür incelendiğinde benzer sonuçların elde edildiği çok sayıda çalışmaya rastlanmıştır. Palioğlu ve İpek Çoban'ın yaptığı çalışmada, SVK konusunda eğitim alan hemşirelerin almayan hemşirelere göre bilgi düzeylerinin daha yüksek olduğu bildirilmiştir(12).Hemşirelerin çalıştıkları kurumdan SVK ile ilgili %22,2'si eğitim almıştır. Aynı şekilde, Batı ve arkadaşlarının 2015'te yaptığı çalışmada, hemşirelerin SVK uygulamaları ile ilgili %16.2'sinin eğitim aldıkları ve eğitim alanların bilgi puanlarının anlamlı bir şekilde yüksek olarak bulunması çalışma sonucumuzu destekler niteliktedir (3,12).

Literatürde, SVK uygulamalarının sağlıklı bir şekilde yürütülmesi, hemşirelik öğrencilerinin tüm kateterizasyon işlemleri için kanıta dayalı uygulamalara yer verilmesi, kanıt gücü yüksek çalışmaların öğrenciler ile paylaşılması, konuyla ilgili uzmanlar tarafından anlaşılır, kısa ve öz rehberler hazırlanması, bilgi ve uygulama düzeylerinin sürekli dinamik tutulması, öğrenci motivasyonunun yükseltilmesi, SVK bakımı konusunda cesaretlendirilmesi ve uygulama fırsatı verilmesi öğrencilerin SVK bakımı ve uygulaması konusunda olumlu etki oluşturacağı ve bilgi düzeylerini artıracağını düşündürmektedir (28-30).

SONUÇ

Çalışmadan elde edilen sonuçlara baktığımızda, çalışmaya katılan hemşirelik öğrencilerinin SVK bilgi ve bakımı hakkında yeterli bilgi ve deneyime sahip olmadığını göstermektedir. Yeterli pratik ve teorik bilgi olmadan SVK'nin doğru ve güvenli bir şekilde kullanılması mümkün değildir. Araştırmacılar, hemşirelik öğrencilerinin bilgilerini geliştirmek için, SVK'nin kullanılmasında bireysel prosedürlerin tam olarak ve işlem sırasına göre gösterilmesinin ve öğrencileri mümkün olduğunca aktif bir şekilde SVK eğitimi, uygulaması ve gözlemlenmesine teşvik edilmesi, etkili bir öğrenim süreci için uygulamalı derslerin daha küçük gruplarla yürütülmesinin sağlanması SVK bakım ve uygulamalarına sık katılım göstermelerinin sağlanması, gerektiği görülmektedir.

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ORIGINAL ARTICLE
ORİJİNAL ARAŞTIRMA

The Pan-Immune-Inflammation Value Predicts the Survival of Patients with ER-positive, HER-2-Negative Metastatic Breast Cancer Treated with CDK4/6 inhibitors

Pan-İmmün-İnflamasyon Değeri CDK4/6 İnhibitörleri ile Tedavi Edilen ER-Pozitif, HER-2-Negatif Metastatik Meme Kanseri Hastalarında Genel Sağkalımı Etkiler

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ABSTRACT

Aim: To define the prognostic value of pan immune-inflammation value (PIV) in patients with estrogen receptor (ER) positive, Human epidermal growth factor receptor-2 (HER-2) negative metastatic breast cancer receiving cyclin-dependent kinase 4/6 (CDK4/6) inhibitors.

Material and Method: The present study enrolled patients diagnosed with HR-positive, HER-2 negative metastatic breast cancer who were treated with novel CDK4/6 inhibitors palbociclib or ribociclib at Suleyman Demirel University Hospital, Turkey, and Antalya Hospital of Health Sciences University, Turkey from 2015 to 2020. The cut-off value of c-reactive protein albumin ratio (CRP/alb), neutrophil lymphocyte ratio (N/L), lymphocyte monocyte ratio(L/M), platelet lymphocyte ratio (Plt/L), systemic immune-inflammation index (SII), and PIV is determined by using the receiver operating characteristic (ROC) analysis. Progression-free survival (PFS) comparisons of palbociclib and ribociclib treatments, and CRP/alb, N/L, SII, and PIV were performed using Kaplan-Meier curves and median survival times. PIV was calculated as neutrophil x platelet x monocyte /lymphocyte count (10^9/L).

Results: Ninety-one patients were included in this study. The patients' mean age was 58.4±11.7 years. At a median follow-up of 48 months, 11% (10) of patients died. 53.8% (49) of patients had the metastatic disease when they were diagnosed. 87.9% (80) were postmenopausal, and 39.6% (36) received ribociclib, 60.4% (55) palbociclib. The cut-off value of PIV is calculated as 476.5 using the receiver operating characteristic (ROC) analysis. The Cox regression analysis for PFS showed that PIV (HR:4.68; p=0.022) and drugs combined with CDK4/6 (HR:4.68; p=0.022) were the only independent prognostic markers for PFS. Median progression-free difference was not significantly significant between ribociclib and palbociclib groups (27.9 vs 25.5 months respectively; %95 CI, 25.9-29; p=0.654).

Conclusions: PIV is a simple and inexpensive, easily calculated marker to predict the survival of patients with ER-positive, HER-2-negative metastatic breast cancer. This technique can assist physicians in putting tailored and focused treatment plans in place. Between ribociclib and palbociclib, there is no statistically significant difference in PFS.

Keywords: Pan immune-inflammation value, breast cancer, ribociclib, palbociclib

ÖZ

Amaç: Pan immün-inflamasyon değerinin (PIV) sikline bağımlı kinaz 4/6 (CDK4/6) inhibitörleri alan östrojen reseptörü (ER) pozitif , İnsan epidermal büyüme faktörü reseptörü-2 (HER-2) negatif olan metastatik meme kanseri hastalarında prognostik değerini tanımlamak.

Gereç ve Yöntem: Çalışmaya 2015-2020 yılları arasında Türkiye Süleyman Demirel ve Antalya Sağlık Bilimleri Üniversitesi Hastanesi'nde CDK4/6 inhibitörleri palbociclib veya ribociclib ile tedavi edilen hormon reseptörü (HR) pozitif HER-2 negatif metastatik meme kanseri tanılı hastalar dahil edildi. C-reaktif protein albümin (CRP/alb), nötrofil lenfosit (N/L), lenfosit monosit (L/M), trombosit lenfosit oranı (Plt/L), sistemik immün inflamasyon indeks (SII) ve PIV sınır değerleri, alıcı işletim karakteristik (ROC) analizi kullanılarak belirlendi. Palbosiklib ve ribosiklib tedavileri ile CRP/alb, N/L, SII ve PIV değerlerinin progresyonsuz sağkalım (PFS) açısından karşılaştırmaları, Kaplan-Meier eğrileri ve medyan sağkalım süreleri kullanılarak yapıldı. PIV değeri nötrofil x trombosit x monosit /lenfosit sayısı (109/L) olarak hesaplandı.

Bulgular: Bu çalışmaya 91 hasta dahil edildi. Yaş ortalaması 58.4±11.7 yıldı. Medyan 48 aylık takipte hastaların %11(10)'i hayatını kaybetti. Hastaların %53.8'i (49) metastatik evrede tanı aldı. Hastaların %87.9'i (80) postmenopozaldi, %39.6'u (36) ribociclib, %60.4'ü (55) palbociclib ile tedavi edildi. PIV'in sınır değeri ROC analizi kullanılarak 476.5 hesaplandı. PFS için yapılan COX regresyon analizinde PIV (HR:4.68;p=0.022) ve CDK4/6 ile kullanılan ilaç kombinasyonu (HR:2.66;p=0.006) PFS için bağımsız prognostik belirteçler olarak değerlendirildi. Ribosiklib ve palbosiklib hasta grupları arasındaki medyan PFS süreleri arasındaki fark istatistiksel olarak anlamlı bulunmadı (27.9'a karşı 25.5 ay; %95 CI,25.9-29;p=0.654).

Sonuç: PIV ER-pozitif, HER-2-negatif metastatik meme kanseri hastalarının sağkalımını predikte etmek için kullanılabilen basit, ucuz ve kolayca hesaplanabilen bir belirteçtir. Bu yöntem, klinisyenlere kişiye özel tedavi planı belirlemek için yardımcı olabilir. Ribociclib ve palbociclib tedavileri arasında PFS'yi belirlemek açısından istatistiksel olarak anlamlı bir fark bulunmadı.

Anahtar Kelimeler: Pan immün-inflamasyon değeri, meme kanseri, ribociclib, palbociclib

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INTRODUCTION

Breast cancer is the most common cancer with an annual rate of approximately 226,000 (11.7%) new cases. It is the most common cause of cancer-related death (15.5%) in women (1). Breast cancer can be broadly classified into three major groups based on the expression of the estrogen receptor (ER), the human epidermal growth factor receptor 2 (HER-2) (ER positive or negative), and the absence of both the ER and HER-2 receptors (triple negative), which can influence the biological decision regarding the course of treatment.

The most common biological subtype of metastatic breast cancer is the ER positive HER-2 negative subgroup. Cyclin-dependent kinases (CDK4 and CDK6), which control the cell cycle, are crucial for the growth and development of tumors. Particularly in breast cancer, where estrogen promotes tumor growth, this pathway is regarded to be the primary one for the genesis of cancer (2). Studies have been published in which three CDK4/6 inhibitors, ribociclib, palbociclib and abemaciclib developed in recent years contributed to overall survival in ER-positive HER-2-negative patients with metastatic breast cancer patients (3-5).

Chronic inflammation and cancer have a complex relationship that has been ssearched a lot; inflammation is now recognized as one of the characteristics that make this relationship possible. Utilizing plasma tumor biomarkers has the advantages of being, practical, and affordable (6). Sata et al. found a statistically significant relationship between, CRP, neutrophil, and lymphocyte count and overall survival of patients with metastatic breast cancer receiving eribulin (7). In addition to being a carrier protein, albumin also controls tissue repair, metabolism, and immunity of cells, when it is low, immune system activity weakens and tumor cachexia develops, and tumor prognosis worsens. In the study conducted by Liu, the high CRP/albumin ratio is related to worse disease-free survival and OS in patients with luminal B subtype breast cancer (8). Fuca proposed a new prognostic marker, calculated as neutrophil x platelet x monocyte/lymphocyte, pan-immune-inflammation value (PIV) for patients with metastatic colon cancer patients (9). PIV is studied as a prognostic marker for patients with breast cancer undergoing operation (10), receiving neoadjuvant chemotherapy (11), receiving first-line trastuzumab, pertuzumab, and docetaxel therapy (12), and at young age (13).

In this study we aimed to investigate the prognostic value of CRP/albumin, neutrophil/lymphocyte ratio, PIV, and define the PFS and OS in patients with HR-positive, HER-2 negative metastatic breast cancer receiving CDK4/6 inhibitors palbociclib and ribociclib followed up at medical oncology units of 2 centers in Turkey.

MATERIAL AND METHOD

The present study enrolled patients diagnosed with HR-positive, HER-2 negative metastatic breast cancer who were treated with novel CDK4/6 inhibitors palbociclib or ribociclib at Süleyman Demirel University Hospital, Turkey, and Antalya Hospital of Health Sciences University, Turkey from 2015 to 2020. Because the investigation was retrospective, there was no need for scientific research funding. Ninety-nine patients were identified, but eight were excluded from the study because they dropped out of follow-up. patients with metastatic breast cancer who were treated at the medical oncology clinic were assessed. All patients were over the age of 18, had follow-up and treatment in our unit, and had records that we could access. Patients' age, clinicopathological characteristics, laboratory results,co-morbid diseases, metastasis locations and numbers, treatments and laboratory results, last outpatient clinic control, and death dates were recorded retrospectively.

Statistically Analysis

Study data were analyzed using SPSS (Statistical Package for the Social Sciences) 23.0 and MedCalc 20.110. Numeric data are expressed as the median and interquartile range (IQR), and frequent data are expressed as rates. A comparison of the two groups with numeric data was performed using the Mann-Whitney U test. Pearson's chi-square and Fischer's exact tests were used to comparing the two groups with categorical variables.

Progression-free survival (PFS) comparisons of palbociclib and ribociclib treatments, and CRP/albumin, neutrophil/lymphocyte ratio, systemic immune inflammation index, and PIV were performed using Kaplan-Meier curves and median survival times. A comparison of the two groups in the Kaplan-Meier analysis was carried out using the log-rank test. Univariate and multivariate backward Cox regression analyses were used to establish hazard ratios with 95% confidence intervals for each variable. The cut-off value of CRP/alb, N/L, L/M, Plt/L, SII, and PIV is determined by using the receiver operating characteristic (ROC) analysis (**Table 1**)(**Figure 1**). The hypotheses were constructed as two-tailed, and an alpha value of 0.05 was accepted as significant.

Table 1. ROC curve analysis determining cut-off values

	AUC	SS	%95 CI	cut off	Sensitive (%)	Spesifite (%)
PIV	0,557	0,113	0,336-0779	476,50	40,00	60
SII	0,554	0,103	0,352-0,756	836,50	50,00	68,00
Crp/Alb	0,543	0,102	0,342-0,743	6,50	40,00	77,00
N/L	0,558	0,102	0,359-0,757	3,50	20,00	91,00
L/M	0,459	0,113	0,237-0,681	6,50	50,00	59,00
Plt/L	0,576	0,104	0,371-0,780	242,00	20,00	80,00

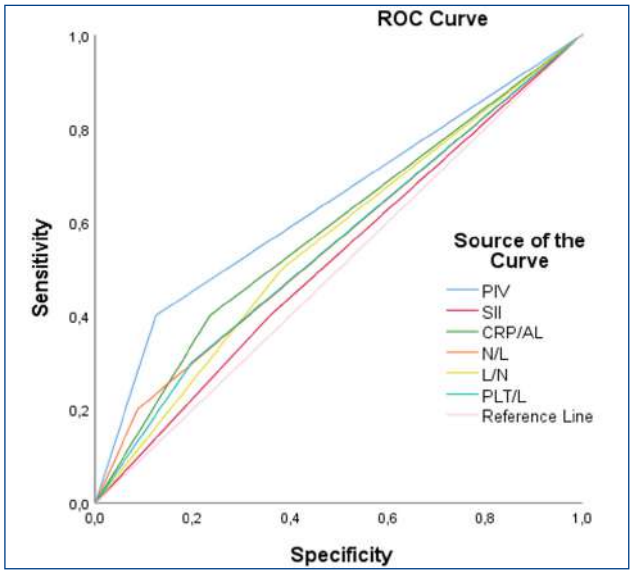

Figure 1. ROC curves defining the sensitivity and specificity of cut-off values

RESULTS

Ninety-one patients were included in this study. The patients' mean age was 58.4±11.7 years. At a median follow-up of 48 months, 11% (10) of patients died. 53.8% (49) of patients had the metastatic disease when they were diagnosed. 87.9% (80) were postmenopausal, and 39.6% (36) received ribociclib, 60.4% (55) palbociclib. The clinicopathological characteristics of patients, the other prognostic markers, and the comparison of PIV are shown in **Table 2**. PIV was statistically related to CDK4/6 (p=0.005), SII, N/L, L/M, and death (p<0.05).

The Cox regression analysis for PFS showed that PIV (HR:4.68; p=0.022) and drugs combined with CDK4/6 (HR:4.68; p=0.022) were only independent prognostic markers for PFS (**Table 3**).

Table 3. COX regression analysis for PFS

	PFS Univariate HR (95% CI for HR)			p
Age	1,746	0,436	6,985	0,431
Comorbidity	0,911	0,245	3,392	0,889
Diagnostic stage	1,623	0,665	3,960	0,287
PS	3,847	0,980	15,110	0,054
Menopause	0,899	0,112	7,188	0,920
CDK4/6	0,730	0,183	2,920	0,657
CDK4/6 combined	2,663	1,329	5,336	0,006
Metastasis	1,723	0,771	3,854	0,185
PIV	4,682	1,253	17,499	0,022
SII	1,443	0,387	5,377	0,585
CRP/Alb	2,296	0,616	8,556	0,216
N/L	3,000	0,605	14,866	0,179
L/M	1,250	0,335	4,657	0,740
Plt/L	1,983	0,495	7,955	0,334

Table 2. Comparison of clinicopathologic characteristics and PIV

	PIV				P
	<476,5		>476,5		
	N	%	N	%	
Age					0,093
<60	40	51,9	4	28,6	
>60	37	48,1	10	71,4	
Comorbidity					0,243
no	44	57,1	6	42,9	
yes	33	42,9	8	57,1	
Diagnostic Stage					0,083
1	3	3,9	0	0,0	
2	18	23,4	2	14,3	
3	18	23,4	1	7,1	
4	38	49,4	11	78,6	
PS					0,528
0	2	2,6	0	0,0	
1	67	87,0	12	85,7	
2	8	10,4	2	14,3	
Menopause					0,466
Postmenopausal	67	87,0	13	92,9	
Peri/premenopausal	10	13,0	1	7,1	
CDK 4/6					0,005
Ribociklib	35	45,5	1	7,1	
Palbociklib	42	54,5	13	92,9	
CDK4/6 combined					0,974
Letrozole	46	59,7	7	50,00	
Fulvestrant	24	31,2	7	50,00	
Exemestane	6	7,8	0	0,00	
Anastrozole	1	1,3	0	0,00	
Metastasis					0,340
Bone	23	29,9	8	57,1	
Visceral	17	22,1	0	0,0	
Bone+Visceral	37	48,1	5	35,7	
Bone+Bone marrow	0	0,0	1	7,1	
SII					0,001
<836,5	55	71,4	3	21,4	
>836,5	22	28,6	11	78,6	
CRP/Alb					0,252
<6,5	56	72,70	12	85,7	
>65	21	27,30	2	14,3	
N/L					0,004
<3,5	73	94,8	9	64,3	
>3,5	4	5,2	5	35,7	
L/M					0,000
<6,5	41	53,2	14	100,0	
>6,5	36	46,8	0	0,0	
Plt/L					0,400
<242	60	77,9	12	85,7	
>242	17	22,1	2	14,3	
Death					0,044
Alive	71	92,2	10	71,4	
Exitus	6	7,8	4	28,6	

PS performance score,SII systemic immune-inlammation index, N/L neutrophil-lymphocyte ratio,L/M lymphocyte-monocyte ratio,CRP/Alb c-reactive proteion-albumin ratio, Plt/L platelet-lymphocyte ratio,

In PIV high group the progression risk was 4.68 times higher than in the low group. In the fulvestrant group, the progression risk was 2.66 times higher than the letrozole or exemestane group.

Median PFS was 28.3 months in PIV low group and 22.1 in the high group; it was statistically significant (%95 CI,25.9-29; p=0.011) (**Figure 2**). Median PFS was 27.9 months with ribociclib and 25.5 with palbociclib, but it was not statistically significant (%95 CI,25.9-29;p=0.654) (**Figure 3**)

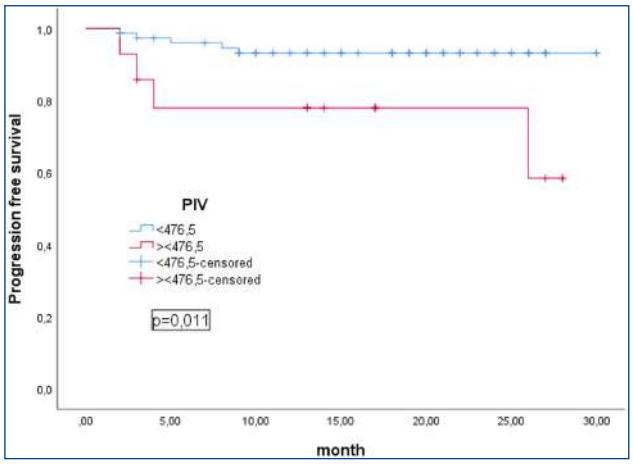

Figure 2. Kaplan-Meier curve representing PFS according to PIV low and high groups

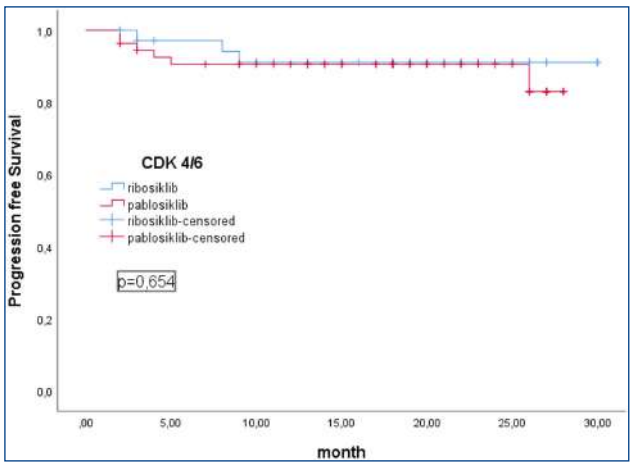

Figure 3. Kaplan-Meier curve representing PFS according to ribociclib and palbociclib

DISCUSSION

With the use of novel CDK4/6 inhibitors, the overall survival of patients with HR+, HER-2- metastatic breast cancer has increased to over 5 years (3, 4). Inflammatory cells play a significant role in the development of tumors and the prognosis of cancer patients, particularly when it comes to certain physiological responses to inflammation (14). The stability of the normal intracellular environment can be destroyed by inflammatory mediators, which promote aberrant cell growth and subsequent cell degeneration (15). Numerous cancers have been researched to determine the association between the ratio of neutrophils, lymphocytes, platelets, and monocytes in peripheral blood and the prognosis of patients with cancer. In a meta-analysis including 8563 patients with breast cancer, conducted by Ethier high NLR was associated with worse DFS and OS; however this effect was more prominent in ER -, HER-2- subtype (16).

Ma searched the prognostic value of NLR, PLR, and LMR in patients with metastatic breast cancer undergoing neoadjuvant chemotherapy, and found LMR as an independent prognostic marker (17).

We don't have enough prognostic markers to guide the therapy and predict the survival of patients. PIV is a novel and simple marker calculated with the blood parameters. In the current study, the results showed that PIV was an independent prognostic marker for patients with HR+, HER-2 – metastatic breast cancer. Ligorio searched the prognostic impact of PIV in HER-2+ metastatic breast cancer undergoing trastuzumab, docetaxel, and pertuzumab therapy. High PIV was an independent prognostic factor for worse OS (12).

Sahin searched the prognostic value of PIV in patients undergoing neoadjuvant chemotherapy with metastatic breast cancer (11). Demir searched the prognostic impact of PIV in young patients with breast cancer. High PIV was associated with worse OS in their study but it was not statistically significant (13). Our study is the first to search the prognostic impact of PIV in patients with metastatic ER+, HER-2- breast cancer receiving CDK4/6 inhibitors. The calculation of PIV is simple and inexpensive. Therefore it is a useful marker to predict the prognosis in this group of patients.

The second end-point of this study is to define the PFS in months with ribociclib and palbociclib. The median PFS was 27.9 months with ribociclib and 25.5 with palbociclib. This result is consistent with the MONALEESA-2 and PALOMA-2 clinical trials (3, 4).

Our study's limitations include the relatively small number of patients analyzed, the retrospective character of the research, and the brief follow-up period.

CONCLUSION

PIV is a simple and inexpensive, easily calculated marker to predict the survival of patients with ER-positive, HER-2-negative metastatic breast cancer. This technique can assist physicians in putting tailored and focused treatment plans in place. Between ribociclib and palbociclib, there is no statistically significant difference in PFS.

ETHICAL DECLARATIONS

Ethics Committee Approval: This study is approved by Ethics Comittee of Süleyman Demirel University with id 17.08.2022/224.

Informed Consent: Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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ORIGINAL ARTICLE
ORİJİNAL ARAŞTIRMA

Investigation of the Effect of Spinal Stabilization and Fusion on Intervertebral Disc Structures Using Density

Spinal Stabilizasyon ve Füzyonun İntervertebral Disk Yapıları Üzerine Etkisinin Dansite Kullanılarak İncelenmesi

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ABSTRACT

Introduction: The effects of stabilization and fusion on the intervertebral discs in the fusion region of the spine and adjacent segments have been rarely studied in the literature. In the literature, few animal experiments and biomechanical studies have shown that the disc structure undergoes some metabolic changes and degeneration develops after posterior fusion. The response of cells in the intervertebral discs to inmobilization or overmobilization was thought to occur mostly due to the effect of mechanical forces on disc nutrition. The aim of our study; To determine the density (IVDD) changes in the intervertebral discs in the early and late postoperative period in patients who underwent posterior spinal fusion and to contribute to the few studies in the literature.

Material and Method: The records of patients who were diagnosed with lumbar spondylosis and narrow canal in our clinic between 2015-2021 were reviewed retrospectively. Postoperative early (day 1) and postoperative late (4-6 months) lumbar computed tomography (CT) scans of patients who underwent L2-3-4-5 transpedicular screw and L2-3-4 lumbar laminectomy were examined. Density measurements were made in the fusion region and adjacent segment. The results were evaluated statistically.

Results: The difference between early and late IVDD values performed at the same disc level in all disc levels was statistically significant ($p<0.001$). In repeated measurements, postoperative early postoperative IVDD values of disc levels were statistically insignificant ($p>0.05$), while late-term IVDD values were significant ($p<0.001$).

Conclusion: In patients who underwent rigid fusion of the lumbar with the posterior instrumentation technique, significant density differences develop in the disc segments in the fusion region and less frequently in the adjacent disc segments in the fusion region within a period of 4-6 months. This may support that the rigid fusion technique causes a degenerative process in disc structures.

Keywords: Spinal stabilization, spinal fusion, intervertebral disc degeneration

ÖZ

Giriş: Stabilizasyon ve füzyonun omurganın füzyon bölgesinde ve de komşu segmentlerdeki intervertebral diskler üzerine etkisi literatürede nadiren incelenmiştir. Literatüterde az sayıda yapılmış hayvan deneylerinde ve biyomekanik çalışmalarda posterior füzyon sonrasında disk yapısının metabolik bazı değişikliklere uğradığı ve dejenerasyon geliştiği gösterilmiştir. İntervertebral disklerdeki hücrelerin inmobilizasyona veya aşırı mobilizasyona verdiği tepki daha çok mekanik güçlerin disk beslenmesi üzerine etkisi nedeniyle oluştuğu düşünülmüştür. Çalışmamızın amacı; posterior spinal füzyon yaptığımız hastalarda postoperatif erken ve geç dönemde intervertebral disklerdeki dansite (İVDD) değişikliklerini belirlemek ve literatüredeki az sayıda çalışmaya katkı sunmaktır.

Gereç ve Yöntem: Kliniğimizde 2015-2021 yılları arasında lomber spondiloz ve dar kanal tanısı almış hastaların kayıtları retrospektif olarak incelendi. L2-3-4-5 transpediküler vida ve L2-3-4 lomber laminektomi uygulanmış hastaların postoperatif erken dönem (1. Gün) ve posoperatif geç dönem (4-6 ay) lomber bilgisayarlı tomografileri (BT) incelendi. Füzyon bölgesinde ve komşu segmentte dansite ölçümleri yapıldı. Sonuçlar istatistiksel olarak değerlendirildi.

Bulgular: Tüm disk seviyelerinde aynı disk seviyesinden yapılan erken ve geç dönem İVDD değerleri arasındaki fark istatiksel olarak anlamlı idi ($p<0,001$). Tekrarlı ölçümlerde disk seviyelerinin postoperative erken dönem İVDD değerleri istatiksel olarak anlamsız ($p>0,05$), geç dönem İVDD değerleri ise anlamlı ($p<0,001$) idi.

Sonuç: Posterior enstrümantasyon tekniği ile lomber rijit füzyon yapılan hastalarda postoperative 4-6 ay gibi bir sürede füzyon bölgesindeki disk segmentlerinde belirgin, üstteki komşu disk segmentinde ise daha az oranda dansite farklılıkları gelişmektedir. Bu durum rijit füzyon tekniğinin disk yapılarında dejeneratif bir sürece neden olduğunu destekleyebilir.

Anahtar Kelimeler: Spinal stabilizasyon, spinal füzyon, intervertebral disk dejenerasyonu

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INTRODUCTION

Lumbar intervertebral disc degeneration; It is one of the causes of chronic low back pain, which is very common in society and causes severe movement restriction (1). Disc degeneration also increases with advancing age (2). If lumbar disc degeneration continues for a long time; lumbar disc hernias, facet joint hypertrophies, posterior longitudinal ligament and ligamentum flavum hypertrophy/calcifications, narrowing of the spinal canal and neural foramen, anterior or posterior listesis, etc. degenerative diseases may develop (3,4). Analgegic and anti-inflammatory drugs are used in medical treatment. Restriction of movement with physiotherapy and corset may also be partially beneficial. Patients who do not benefit from these treatments are treated with surgery (4).

Posterior lumbar spinal instrumentation; It is often performed to reorganize the sagittal and/or coronal balance caused by degeneration, to eliminate instability, and to strengthen the spinal structure as a result of decompression and fusion in the spinal canal and neural tissues (5). There are rigid and dynamic fusion options. In both, it is aimed to relieve pain due to degeneration (6). This bona fide surgical procedure causes changes in the biomechanics of the spine and the biological characteristics of the associated soft tissues (7,8,9).

The effect of spinal instrumentation and fusion on intervertebral discs, both at the fusion site and adjacent segments, is a rarely explored issue. In the literature, few animal experiments and biomechanical studies have shown that the disc structure undergoes some metabolic changes and degeneration develops after posterior fusion. The response of the cells in the intervertebral discs to immobilization was thought to occur mostly due to the effect of mechanical forces on disc nutrition (5,7,10,11,12). The aim of our study; To determine the density (IVDD) changes in the intervertebral discs in the early and late postoperative period in patients who underwent posterior spinal fusion and to contribute to the literature.

MATERIAL AND METHOD

The records of patients who were diagnosed with lumbar spondylosis and narrow canal in our clinic between 2015 and 2021 were reviewed retrospectively. L2-3-4-5 transpedicular screw and L2-3-4 lumbar laminectomy were applied to all patients. Postoperative early period (day 1) and postoperative late period (4-6 months) CT scans of the patients were examined. Density measurements were made using the SECTRA field density measurement program at the distances of L4-5 L3-4 L2-3 in the fusion region and L1-2 intervertebral disc distances as the adjacent segment. Hounsfield Unit (HU) was used as the density unit. Continuous variables were defined as mean ± standard deviation. The results were statistically evaluated with the SPSS 25.0 (IBM, Armonk, NY, USA) program. Paired samples t test was used for the significance of the difference between the early and late postoperative density values of a disc level, and analysis of variance was used for repeated measurements. Statistical significance level was accepted as $p<0.05$.

RESULTS

Nine patients who underwent rigid fusion to L2-3-4-5 vertebrae with posterior transpedicular instrumentation technique to L2-3, L3-4 and L4-5 intervertebral disc segments in our clinic between 2015-2021 were included in the study. Six of the patients were female and 3 were male. The mean age was 58.89±3.82 (54-65). The lowest IVDD and disc level measured in the early postoperative period; It was L2-3 level with 65.72 in female patients and L3-4 disc level with 68.88 in male. The highest IVDD and disc levels measured in the early postoperative period were 127, L3-4 and 105, L2-3 levels in women and men, respectively. Likewise, the highest and lowest IVDD and disc levels measured in the late postoperative period were 87.24, L3-4 in female and male, respectively; 36.44, L3-4; 85.44, L2-3; 39.76 was the L2-3 disc level (**Table 1**).

Table 1. Measurement of the disc spaces with Hounsfield unit

Patient Number	Age	Sex	Density of L4-5 Disc Space		Density of L3-4 Disc Space		Density L2-3 Disc Space		Density L1-2 Disc Space	
			Postoperative Early	Postoperative Late	Postoperative Early	Postoperative Late	Postoperative Early	Postoperative Late	Postoperative Early	Postoperative Late
1	56	F	102±30.65	72.99±111	127±34.16	80.46±117	91.78±43.29	70.55±97.79	91.88±76.35	82.66±98.76
2	64	F	88.31±44.52	47.97±51.71	81±64.28	36.44±63	65.72±43.23	44.32±26.53	76.88±93.51	73.73±86
3	58	F	87.93±145	50.14±83.35	118±149	87.24±72.77	117±140	74.37±81.35	82.83±179	69.75±77.21
4	59	M	90.05±43.03	72.11±83.07	86.55±43.46	61.27±72.61	105±51.28	71.55±94.11	89.12±60.77	85.44±70.12
5	54	F	70.12±98.32	54.17±69.79	86.24±113	62.43±101	88.94±118	64.59±91.93	74.77±100	71.46±83.02
6	65	M	76.72±53.7	43.5±19.58	80.94±37.47	41.14±20.45	71.94±64	39.76±18.18	73.29±56.66	65.7±83.91
7	58	M	81.72±65.64	53.12±70.71	68.88±59.23	43.17±51.69	73.41±71.2	45.39±60.1	82.31±88.55	76.23±37.12
8	55	F	95.19±11.47	70.55±30.91	102±17.74	80.22±28.71	99.86±17.26	81.86±24.06	99±25	84.25±24.31
9	61	F	84.54±54.06	55.43±77.6	88.91±57.54	60.73±27.17	91.47±55.82	64.24±77.10	76.74±46.65	71.9±65.49

The highest and lowest IVDD values measured in the early postoperative period according to disc levels; It was 99 and 73.29 in L1-2, 117 and 65.72 in L2-3, 127 and 68.88 in L3-4, 102 and 70.12 in L4-5. Likewise, the highest and lowest IVDD values measured in the late postoperative period according to disc levels; 85.44 and 65.70 in L1-2, 81.86 and 39.76 in L2-3, 87.24 and 36.44 in L3-4, 72.99 and 43 in L4-5 was 50. Postoperative early and late IVDD mean values with standard deviation; 82.98±8.74 and 75.68±6.97 at L1-2, 89.46±16.76 and 61.85±15.03 at L2-3, 93.28 at L3-4 It was ±18.83 and 61.46±18.55, and 86.29±9.51 and 57.78±11.17 in L4-5. The difference between early and late IVDD values performed at the same disc level in all disc levels was statistically significant ($p<0.001$) (**Table 2**, **Figure 1**). In repeated measurements, postoperative early postoperative IVDD values of disc levels were statistically insignificant ($p>0.05$), while late-term IVDD values were significant ($p<0.001$) (**Table 3**).

Table 2: General distribution of variables

Variables	Meant±SS	Min	Max
Age	58,89±3,82	54,00	65,00
L4-5 Disc Space Postoperative Early	86,29±9,51	70,12	102,00
L4-5 Disc Space Postoperative Late	57,78±11,17	43,50	72,99
p	<0,001		
L3-4 Disc Space Postoperative Early	93,28±18,83	68,88	127,00
L3-4 Disc Space Postoperative Late	61,46±18,55	36,44	87,24
p	<0,001		
L2-3 Disc Space Postoperative Early	89,46±16,76	65,72	117,00
L2-3 Disc Space Postoperative Late	61,85±15,03	39,76	81,86
p	<0,001		
L1-2 Disc Space Postoperative Early	82,98±8,74	73,29	99,00
L1-2 Disc Space Postoperative Late	75,68±6,97	65,70	85,44
p	0,001		

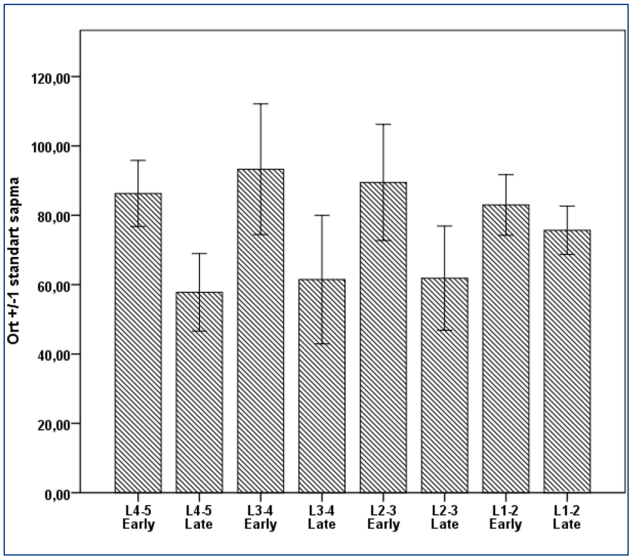

Figure 1: Standard deviation bar graph for measurements

Table 3: Relationship between repeated measures Analysis of variance was used for repeated measures. (ab): A common letter as a colon indicates statistical insignificance.

	Mean±SS
L4-5 Disc Space Postoperative Early	86,29±9,51
L3-4 Disc Space Postoperative Early	93,28±18,83
L2-3 Disc Space Postoperative Early	89,46±16,76
L1-2 Disc Space Postoperative Early	82,98±8,74
p	0,336
L4-5 Disc Space Postoperative Late	57,78±11,17 (a)
L3-4 Disc Space Postoperative Late	61,46±18,55 (ab)
L2-3 Disc Space Postoperative Late	61,85±15,03 (ab)
L1-2 Disc Space Postoperative Late	75,68±6,97 (b)
p	0,001

DISCUSSION

As we mentioned before, there is no study in the literature investigating the effect of posterior lumbar instrumentation on intervertebral discs, except for a small amount of animal experiments and biomechanical studies. In these studies, histochemical and metabolic changes of the interverbral disc were examined (5,7,8,9,10,11,12). We believe that our study, which presents the density changes by measuring the early and late IVDD of patients with whom we had posterior fusion, will contribute significantly to the literature. In addition, we included the density values of the L1-2 disc level in our study, since the adjacent disc segment just above the fusion region is also very affected by fusion stress (6).

The average densities of non-degenerated lumbar intervertebral discs on tomography are above 90 (13) and decrease below 50 in patients who underwent discectomy (on the 3rd-6th days postoperatively) (14). Since we did not perform discectomy on the patients in our study, the early measurements (postoperative day 1) actually reflect the preoperative IVDD values. Physiological lumbar disc degeneration due to spinal aging begins in the 5th decade (15). In our study, the mean age of our patients was 58.89 years and the mean early period IVDD of L1-2, L2-3, L3-4, L4-5 disc distances were 82.98 , 89.46 , 93.28, 86.29, respectively. shows that the degeneration started partially preoperatively. In addition, IVDD differences between intervertebral disc levels are not statistically significant.

Holm S et al. (7) proved with animal experiments that there is a decrease in IVDD in the immobilized segments and adjacent segments after posterior spinal fusion. In this study, an average of 30% decrease in IVDD was reported at the 5th month postoperatively, 50% in the 8th month, and 10% in the adjacent segment in the fusion segments. In our study, there was a 33% decrease in IVDD at the level of the fused segments L4-

5, 34% at the level of L3-4, 31% at the level of L2-3, and 9% at the adjacent segment L1-2 in the postoperative 4-6th months. Postoperative IVDD mean values on the 1st day and 4-6th months; 82.98 and 75.68 in L1-2, 89.46 and 61.85 in L2-3, 93.28 and 61.46 in L3-4, 86.29 and 57 in L4-5 was .78. The decrease in IVDD at all disc levels was statistically significant.

In accordance with the literature, we also; We believe that the degeneration of the lumbar intervertebral discs in the region where the fusion was performed with the posterior instrumentation method and the disc in the adjacent segment are caused by the restriction of flexion-extension movements and the mechanical forces on the spine in the vertical plane towards gravity cause structural and histochemical changes in the disc content (7).

There are some reasons why we used CT for IVDD measurements in our study. In our clinic, patients undergoing posterior instrumentation routinely undergo lumbar CT on the 1st postoperative day in order to evaluate transpedicular screw placements and laminectomy areas. In addition, during the control examinations of the patients, screw malposition, screw loosening, screw or rod breakage, screw or rod removal, etc. CT examination is also performed for complications caused by instrumentation materials. These CTs are archived in the physical or digital files of our patients. IT has been preferred because it is easy to reach and allows working on it thanks to the advancing computer technology.

The most important limitation of our study; the absence of an unoperated control group at the same mean age. The reasons for this situation; Health and legal concerns arising from the radiation inclusion of CT, the difficulty in daily practice of having healthy individuals undergo CT at least twice within 4-6 months, and the retrospective nature of our study. If we had a control group, it would be possible to compare the normal course of the lumbar intervertebral discs with the response of the discs in the fused region to fusion. Another limitation of ours; Our study was conducted on patients who underwent posterior lumbar rigid fusion, and our patients who underwent dynamic fusion were not included. The reason for this is that the dynamic fusion technique is applied only in patients who underwent short segment fusion in our clinic. However, since there is no study similar to our study in the literature sources we can reach, we still think that our results may be pioneering for academics.

CONCLUSION

In patients undergoing rigid lumbar fusion with the posterior instrumentation technique, significant density changes develop in the disc segments in the fusion region, and less frequently in the adjacent disc segment, within 4-6 months postoperatively. This result may support the development of a degenerative process in disc structures. This may lead to revision of the stabilization and fusion technique. We think that studies with more patients and longer follow-up periods are needed.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was planned retrospectively and the data were obtained digitally, ethics committee approval is not required.

Informed Consent: Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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ORIGINAL ARTICLE
ORİJİNAL ARAŞTIRMA

Impact of the COVID-19 Pandemic on Cervical Cancer Screening; Experiences of a Tertiary Hospital

COVID-19 Pandemisinin Serviks Kanseri Taramasına Etkisi; Tersiyer Bir Hastanenin Deneyimleri

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ABSTRACT

Aim: To evaluate the number and outcomes of patients who underwent cervical cancer screening at our hospital before and during the pandemic and to demonstrate changes in rates of cervical cancer screening.

Material and Method: Patients presenting to the gynecology outpatient clinic between January 2018 and March 2022 were included in the study. The plan was to compare patients who attended cervical cancer screening in the pre-pandemic period (January 2018 to February 2020) and in the post-pandemic period (March 2020 to March 2022). Rates of regular cervical cancer screening were determined by calculating the total number of patients who enrolled before the pandemic and during the pandemic period.

Results: During the study period, a total of 50486 patients presented to the gynecology outpatient clinic, 6330 smears were taken, and 231 colposcopies were performed. Comparing the pre-pandemic and post-pandemic periods, the number of smears was statistically significantly lower in patients who presented to the outpatient clinic in the pre-pandemic period, while the number of patients who underwent colposcopy was statistically significantly higher. There was no significant difference between the histopathological results of the smear before and after the pandemic. There was no significant difference between the histopathologic results of patients who underwent colposcopy before and after the pandemic. However, it was found that smear histopathology results reported as "inadequate" increased in the post-pandemic period (p:0.002). Histopathology results of patients who underwent colposcopy did not differ significantly between time periods.

Conclusion: Cervical cancer is an important problem for women's health and each country has established its own routine screening program for cervical cancer. Routine screening is interrupted in situations such as pandemics. These interruptions can lead to an increased risk of cervical cancer in later years. To ensure that the routine screening program reaches the target population as soon as possible after the pandemic, new action plans should be established and the potential increase in cervical cancer risk prevented.

Keywords: COVID-19, colposcopy, pandemic, cervical cancer, smear test, screening

ÖZ

Amaç: Pandemi öncesi ve pandemi sırasında hastanemizde serviks kanseri taraması yapılan hasta sayısı ve sonuçlarını değerlendirmek ve serviks kanseri tarama oranlarındaki değişiklikleri ortaya koymaktır.

Gereç ve Yöntem: Ocak 2018 ile Mart 2022 tarihleri arasında jinekoloji polikliniğine başvuran hastalar çalışmaya dahil edildi. Pandemi öncesi dönem (Ocak 2018 ile şubat 2020) ile pandemi döneminde (mart 2020 ile mart 2022) servikal kanser taraması yapılan hastaların karşılaştırılması planlandı. Pandemi öncesi ile pandemi döneminde başvuru yapan toplam hasta sayıları hesaplanarak dönemsel olarak serviks kanser tarama oranlarının belirlendi.

Bulgular: Çalışma süresince jinekoloji polikliniğine başvuru toplam 50486 hastadan 6330 smear alındı ve 231 kolposkopi yapıldı. Pandemi öncesi ve pandemi sonrası dönemler karşılaştırıldığında pandemi öncesi dönemde polikliniğe başvuran hastalardan alınan smear sayısı istatistiksel olarak anlamlı derecede düşük, kolposkopi yapılan hasta sayısı ise istatistiksel olarak derecede yüksekti. Pandemi öncesi ve sonrası dönemlerde smear histopatoloji sonuçları arasında anlamlı fark yoktu. Ancak pandemi sonrası dönemde 'Yetersiz' olarak raporlanan smear histopatoloji sonuçlarının arttığı tespit edildi (p:0,002). Kolposkopi yapılan hastaların histopatolojik sonuçları zaman dilimleri arasında anlamlı farklılık göstermedi.

Sonuç: Serviks kanseri kadın sağlığı için önemli bir sorundur ve her ülke serviks kanseri için kendi rutin tarama şemasını belirlemiştir. Pandemi gibi durumlarda rutin taramalar aksamaktadır. Bu aksamalar ilerleyen yıllarda serviks kanser riskinin artmasına neden olabilir. Pandemi sonrası rutin tarama programının hedef kitleye bir an önce ulaşılabilmesi için yeni eylem planları oluşturulmalı ve olası serviks kanseri risk artışının önüne geçilmelidir.

Anahtar Kelime: COVID-19, kolposkopi, pandemi, serviks kanseri, smear, tarama

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INTRODUCTION

Since the World Health Organization (WHO) declared the new coronavirus that spread from China's Wuhan province a pandemic on March 11, 2020, more than 15 million cases have been diagnosed in Turkey and more than 560 million cases worldwide, and more than 6 million people have died (1). All areas of daily life, including health care, were affected by the pandemic. Routine or private health care was temporarily suspended as individuals were shunned, noncritical health problems were postponed, curfews were imposed, and existing health care workers were assigned to COVID -19 cases (2-4). Cancer screening programs, which offer early detection to people with cancers for which there is not yet a definitive cure, occupy an important place in the fight against this disease and make a significant contribution to public health. During the pandemic, timing changes in cervical cancer screening programs and interruptions in follow-up scheduled for screening led to a decrease in screening in the target population (5). Post-pandemic interventions must be carefully planned to reach the target population.

The purpose of this study is to evaluate the number and outcomes of patients who underwent cervical screening at our hospital before and during the pandemic and to show the change in rates of cervical screening.

MATERIAL AND METHOD

The records of cases in which smears and colposcopies were performed at the Department of Obstetrics and Gynecology, Tokat Gaziosmanpaşa University between January 2018 and March 2022 were retrospectively analyzed. The data for this retrospective cross-sectional case-control study were obtained from hospital records. It was approved by the Clinical Research Ethics Committee of Tokat Gaziosmanpaşa University (date: 26.05.2022, project number: 22-KAEK-122). It was planned to compare the patients who had undergone cervical cancer screening in the pre-pandemic period (January 2018 to February 2020) and in the pandemic period (March 2020 to March 2022). The aim was to evaluate the age of the patients, the indication for smear and/or colposcopy, the results of the smear and/or colposcopy, and the treatment of pathologic results. The objective was to determine regular rates of cervical cancer screening by calculating the total number of patients who enrolled before the pandemic and during the pandemic period. The inclusion criteria for the study were patients who had a pap smear and colposcopy performed at our hospital. As criteria for non-inclusion in the study: patients who were referred to our hospital with smear and/or colposcopy results from an external center were excluded from the study.

Statistical Analysis

Descriptive statistical methods (mean, standard deviation, median, frequency, ratio, minimum, maximum) were used in the analysis of study data. Comparison of study groups was performed using the test for significance of the difference between two percentages. When p-values below 0.05 were calculated, it was considered statistically significant. Minitab prepackaged statistical software was used for the calculations. (Ver.16 Minitab Inc, State College, PA)

RESULTS

Comparing the pre-pandemic and post-pandemic periods, the number of smears was statistically significantly lower in patients presenting to the outpatient clinic in the pre-pandemic period, whereas the number of patients undergoing colposcopy was statistically significantly higher. The demographic characteristics of patients before and after the pandemic are shown in **Table 1**.

Table 1. Demographic characteristics of the patients

	Pre-pandemic period [Mean age+St (min-max)]*	Post-pandemic period [Mean age+St (min-max)]*	p
Patient age from which the smear was taken	44,17±6,28 (21-88)	45,38±5,85 (22-96)	-
Age of patient Colposcopy performed	43,54±3,71 (23-66)	44,21±2,93 (23-67)	-
Number of patients with smear	2836	3494	<0,001†
Number of patients with performed colposcopy	154	77	<0,001†
Number of outpatient clinic requests	26529	23957	-

*: St: standard deviation,, min: minimum, max: maxium, †: p: Two Sample Proportions Test

There was no significant difference between the results of smear histopathology before and after the pandemic. However, there was a significant difference between the pre-pandemic and post-pandemic histopathology results reported as inadequate. Inadequate smear histopathology results after the pandemic were observed more frequently. The smear histopathology results of the patients are shown in **Table 2**.

Table 2. Results of the histopathological smear

Pathology result	Pre-Pandemic Period (n:2836)	Post-Pandemic Period (n:3494)	p
Normal	1868	2362	0,146
ASC-US	426	480	0,149
ASC-H	56	61	0,504
LSIL	291	325	0,202
HSIL	152	177	0,601
AGC	6	8	0,883
Insufficient	37	81	0,002*

*: p: Two Sample Proportions Test

There was no significant difference between the histopathologic results of patients who underwent colposcopy before and after the pandemic. It was noted that 154 patients had undergone colposcopy in the pre-pandemic period. The histopathologic results of these patients were reported as normal in 51, infection in 79, CIN-I in 17, CIN II-III in 5, and carcinoma in 2 patients. In the post-pandemic period, 77 patients underwent colposcopy. The histopathologic results of these patients were reported as normal in 35, infection in 30, CIN-I in 9, CIN II-III in 2, and carcinoma in one patient.

DISCUSSION

The pandemic COVID -19 has had a direct or indirect impact on people's physical and mental health, significantly affecting daily life in many ways. After global measures to contain the spread of the disease failed, proposals for social restrictions or ordinances and later curfews were introduced in many countries. Situations such as curfews and fear of infection have resulted in delayed or no requests for routine follow-up or even symptomatic illness at health facilities (6). Delayed requests for screening may result in individuals developing diseases at a more advanced stage than expected because of the delay. These diseases can be controlled with screening programs for the most common breast, cervical, and colorectal cancers (7). If treatment is delayed, say by six months, this can lead to an incurable state for many cancers (8-10). In addition, many simulation model studies predict that cancer-related mortality rates may be higher than expected in the future (11). This study shows that the number of patients presenting to a tertiary center for cervical cancer screening decreased between the pre-pandemic and post-pandemic periods. At our hospital, it was noted that the number of smears taken for screening and the number of colposcopies used to diagnose advanced lesions were significantly lower than in the pre-pandemic period. The number of cervical cancer screenings in the United States was found to be 35% lower after the relaxation of full closure than in the pre-pandemic period. Compared with the expected number of screenings calculated on the basis of previous years, a 67% shortfall was found. Although patient reluctance cannot be clearly identified, the limitation of preventive health services can be cited as a reason for this situation (12,13). A survey conducted in December 2020 among 1520 family physicians providing primary health care in 75 provinces (81 provinces) in Turkey found that the number of preventive examinations decreased by more than 90% during the pandemic (14). In a study by Ozsarı involving 114,727 people, it was found that screening for breast, colorectal, and cervical cancer had decreased by half compared with the pre-pandemic period, and when patients with a definitive cancer diagnosis by biopsy were evaluated, a 50% decrease was found in the number of people undergoing smear/HPV biopsy (15). In a study conducted by Erdoğan and Akkaya in Niğde Province, it was found that smear/HPV screening decreased during the pandemic period (16). In a study by Önal and Katırcı, it was found that colposcopic pathologic evaluations showed fewer normal and early lesions compared with advanced lesions, which increased as CIN3 during the pandemic period (2). In our study, no difference was observed between the histopathologic results of smear and colposcopy before and after the pandemic. However, it was found that the histopathologic result of smear, which was reported to be inadequate in the post-pandemic period, increased. It was suggested that the reason for this might be that health care workers tried to stay as far away from the patient as possible and take a smear quickly. During the pandemic, cervical cancer screenings were compromised, as with all cancer screenings. The American College of Obstetricians and Gynecologists (ACOG), the Italian Society for Colposcopy and Cervico-vaginal Pathology, and the British Society for Colposcopy and Cervical Pathology have announced their recommendations for triage and safe postponement. In light of this, the European Colposcopy Federation and the European Society of Gynecological Oncology have also published their considerations for cervical cancer screening. During the pandemic and in screening programs, treatment of screening-positive women and preinvasive and invasive lesions of the lower genital tract was recommended (10). Accordingly, it was recommended that high-risk groups and lesions be screened without delay and over a four-week period. Low- or no-risk groups were recommended to be screened over a period of 6 to 12 months.

CONCLUSION

Efforts should be made to reach the acceptable number of screenings by creating action plans for primary care workers for cervical screening programs that have declined due to the pandemic to reach the target population as soon as possible.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was approved by Tokat Gaziosmanpaşa University Clinical Research Ethics Committee (Date: 26.05.2022, Project No: 22-KAEK-122).

Informed Consent: Because the study was designed retrospectively, no written informed consent form was obtained from patients.

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ORIGINAL ARTICLE
ORİJİNAL ARAŞTIRMA

Investigation of Brucella Knee Prosthetic Joint Infections by Pool Analysis Method

Brucella Diz Protetik Eklem Enfeksiyonlarının Havuz Analizi Yöntemiyle İncelenmesi

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ABSTRACT

Aim: Brucellosis is a zoonotic disease seen globally. It is endemic in many development countries. Although it is rare sometimes prosthetic joint infections may occur, even cases were reported from non-endemic countries. With this study, we aimed to shed light on clinical diagnosis and treatment management by examining prosthetic infections due to brucella in the literature with the pool analyze method.

Material and Method: To find the published series, four databases (Scopus, Google Scholar, PubMed, and the Web of Science database) were searched. The study was conducted using key words ['Brucella' or 'Brucella spp.' and 'knee' and 'infection' and 'prosthetic joint' or 'knee arthroplasty' or 'loosening' or 'arthroplasty']. Only studies published in English language or with English abstracts were included.

Results: 27 publications and 28 reported cases were identified of patients with brucella knee prosthetic joint infections. The cases were reported from 14 different countries. The average age of the patients for whom data were provided was 65.59±8.42 years. 13 of the cases were female and 14 were male, in one publication did not have gender information. Eating unpasteurized dairy products (50%) was the common risk factor. Systemic symptoms and fever were reported 53.57% of the cases.

Conclusion: Successful results are observed with 2-stage revision arthroplasty and at least dual antibiotic therapy in prosthetic infections due to Brucella. In addition, it is beneficial that the cement used is antibiotic proof. The use of long-term combined antibiotics is important in the success of treatment.

Keywords: Brucella, knee prosthesis, prosthesis infection, revision arthroplasty

ÖZ

Amaç: Bruselloz tüm dünyada görülen zoonotik bir hastalıktır. Gelişmekte olan birçok ülkede endemiktir. Nadir de olsa bazen protez eklem enfeksiyonları oluşabilmekle birlikte, endemik olmayan ülkelerden bile vakalar bildirilmiştir. Bu çalışma ile literatürdeki brusellaya bağlı protetik enfeksiyonları havuz analizi yöntemi ile inceleyerek klinik tanı ve tedavi yönetimine ışık tutmayı amaçladık.

Gereç ve Yöntem: Yayınlanan seriyi bulmak için dört veritabanı (Scopus, Google Scholar, PubMed ve Web of Science veritabanı) tarandı. Çalışma, anahtar kelimeler ['Brucella' veya 'Brucella spp.' ve 'diz' ve 'enfeksiyon' ve 'protez eklem' veya 'diz artroplastisi' veya 'gevşetme' veya 'artroplasti'] kullanılarak yapıldı. Yalnızca İngilizce dilinde veya İngilizce özetleri ile yayınlanan çalışmalar dahil edilmiştir.

Bulgular: Brusella diz protezi eklem enfeksiyonu olan hastalarda 27 yayın ve bildirilen 28 vaka tespit edilmiştir. Vakalar 14 farklı ülkeden bildirildi. Verileri sağlanan hastaların yaş ortalaması 65,59±8.42 yıl idi. Olguların 13'ü kadın, 14'ü erkekti, bir yayında cinsiyet bilgisi yoktu. Pastörize edilmemiş süt ürünleri (%50) yemek ortak risk faktörüydü. Olguların %53,57'sinde sistemik semptomlar ve ateş bildirilmiştir.

Sonuç: Brucella'ya bağlı protetik enfeksiyonlarda 2 aşamalı revizyon artroplastisi ve en az ikili antibiyotik tedavisi ile başarılı sonuçlar gözlenmektedir. Ayrıca kullanılan çimentonun antibiyotik geçirmez olmasında fayda vardır. Tedavinin başarısında uzun süreli kombine antibiyotik kullanımı önemlidir.

Anahtar Kelimeler: Brucella, diz protezi, protez enfeksiyonu, revizyon artroplasti

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INTRODUCTION

Brucellosis is a zoonotic disease seen globally. It is endemic in many development countries. Especially Mediterranean countries (Portugal, Spain, Southern France, Italy, Greece, Turkey, North Africa), Middle East, Eastern European countries are endemic regions for this disease. It is known that it is transmitted to humans as a result of contact with small-bovine animals (such as sheep, goats and cattle) or by consuming infected meat, milk, dairy products (1,2).

This disease can affect many organs with the capability of Brucella bacteria cause bacteremia, and may be accompanied by focal symptoms (3). Often reported focal complications are hematological, osteoarticular, genitourinary, neurologic, cardiovascular, gastrointestinal and ocular involvements (4). Bone and joint involvement of the disease is a frequent and the incidence of this involvement ranges from 10% to 85% (5).

Although it is rare sometimes prosthetic joint infections may occur, even cases were reported from non-endemic countries. Brucella knee prosthetic joint infection was first described in the year 1991 by Agarwal et al (6).

In this study we aimed to investigate the clinical features of published Brucella knee prosthetic joint infection cases by using pool analysis method.

MATERIAL AND METHOD

To find the published series, four databases (Scopus, Google Scholar, PubMed and the Web of Science database) were searched. As the data from congress books were heterogeneous, they were not included in the study. Pediatric series, evaluation of any other than the knee joint articles and without data not available for search criteria were excluded. Due to the limited data available on this topic, case reports or case series were included.

The study was conducted using key words ['Brucella' or 'Brucella spp.' and 'knee' and 'infection' and 'prosthetic joint' or 'knee arthroplasty' or 'loosening' or 'arthroplasty']. Only studies published in English language or with English abstracts were included. Two independent reviewers separately completed the search, and the results were duplicated two times by each reviewer. Each case was evaluated separately. All data were analyzed with SPSS for Windows, version 23.00.

All published cases were evaluated as similar features. The following data categories were extracted from articles: year, country, age, gender, risk factors, symptoms, physical examination findings, laboratory/ radiological findings, diagnostic criteria, treatments, and outcomes.

RESULTS

As a result of the search with the defined keywords, 27 publications and 28 reported cases were identified of patients with brucella knee prosthetic joint infections (**Figure 1**).

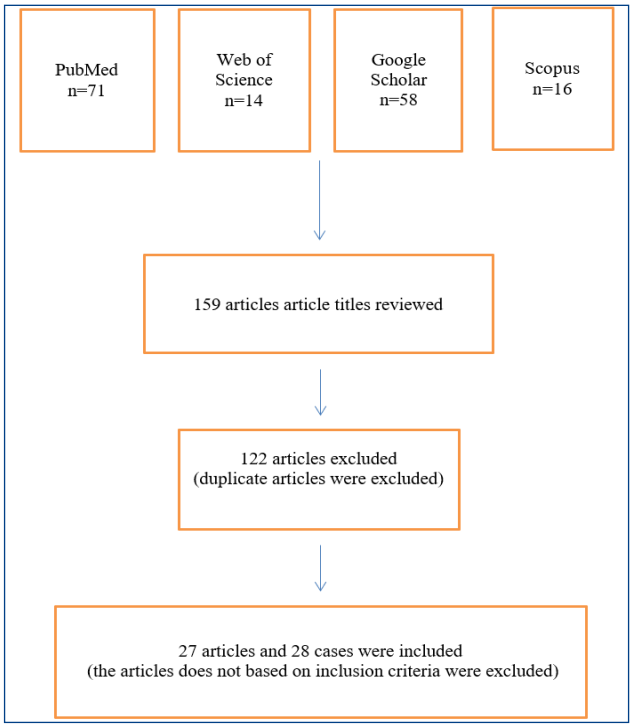

Figure 1. The flowchart details the method of retrieval of published articles.

The cases were reported from 14 different countries (Turkey:5, Iran:4, Israel:3, Italy:3, Greece:2, Saudi Arabia:2, Spain:2, Canada:1, Germany:1, Lebanon:1, Oman:1, Portugal:1, Switzerland:1, United Kingdom:1). In addition, the cases reported from Switzerland and Germany was originating from Turkey and the case reported from United Kingdom was originating from Thailand. Three of the cases were not from endemic areas. In the year 2016, maximum number of cases reported per year (n=4) (**Figure 2**).

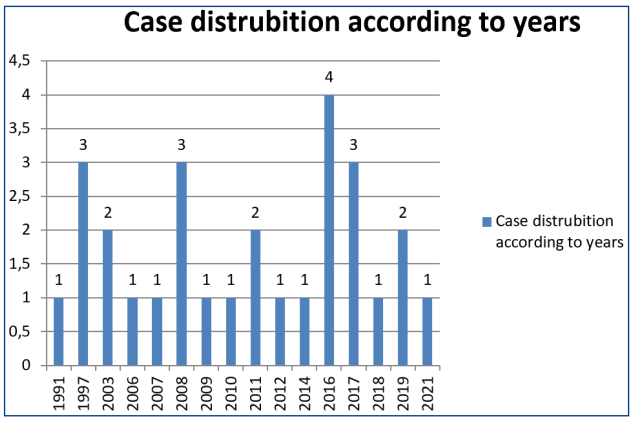

Figure 2. Distribution of the reported cases according to year

The average age of the patients for whom data were provided was 65.59±8.42 years. 13 of the cases were female and 14 were male, in one publication did not have gender information. Eating unpasteurized dairy products (50%) was the common risk factor. Systemic symptoms and fever were reported 53.57% of the cases. **Table 1**; It summarizes the gender, comorbid disease, symptom, and risk factor status of 28 patients.

Table 1. Demographics properties of published cases.

	n =28	%
Gender (male)	14	50
Comorbidities		
Arthrosis	2	7.14
Hemophilia	1	3.57
Idiopathic local osteonecrosis	1	3.57
Psoriatic arthritis	1	3.57
Diabetes mellitus	1	3.57
None	1	3.57
Juvenile rheumatoid arthritis	1	3.57
No information	20	71.42
Risk factors (* more than one risk factor)		
Unpasteurized dairy products	14	50
Shepherd	1	3.57
Consumed raw meat	2	7.14
Contact with goat	2	7.14
No information	5	17.85
None	1	3.57
Previously brucella infection	1	3.57
Working in a restaurant as a kitchen assistant	1	3.57
Travelling to the endemic areas	3	10.71
Other brucellar infection		
Systemic symptoms	15	53.57
None	13	46.42

Table 2 summarizes data on joint infection findings, clinical serological tests, cultures, x-ray findings, treatment modalities, and relapse.

DISCUSSION

Brucella is a zoonotic bacterium that usually causes systemic infection and affects osteoarticular tissues in 10-85% of patients (7). Although prosthetic joint infections have been discussed in detail in the literature, there are not enough publications in the literature about septic arthritis after knee arthroplasty caused by Brucella (8). Difficulties are also experienced in diagnosis and treatment due to the lack of clinical experience in non-endemic areas. In this publication, we wanted to contribute to the literature by analyzing the cases reported so far.

Brucella is transmitted frequently through consumption of contaminated food and beverage, through inhalation, and due to skin wounds (9). Among these, consumption of unpasteurized dairy products in 14 of 28 cases, as stated in our study, caused knee prosthesis infection due to brucella.

Table 2. Clinical laboratory radiological summaries of reported cases by using pooled analyses method.

Joint infection symptoms/ findings		
Pain	24	85.71
Swelling	12	42.85
Limitation in the knee joint movements	8	28.57
Warmth	7	25
Tenderness	3	10.71
Redness	4	14.28
Effusion	4	14.28
Loosening	18	64.28
Fever	15	53.57
Brucella subtype isolated from cultures		
Brucella melitensis	15	53.57
Brucella spp.	2	7.14
Brucella suis	1	3.57
Laboratory tests performed*		
Blood cultures	6	21.42
Aspiration culture fluid cultures	20	71.42
Serological testes	23	82.14
Cultures taken from the sinus tract discharge	2	7.14
Tissue culture	20	71.42
Histopathological examination	1	3.57
Brucella spp. isolation cite		
Aspiration culture	5	17.85
Tissue culture	7	25
Blood culture	1	3.57
Aspiration culture in blood culture bottles	2	7.14
Serological test result		
Positive	22	78.57
Negative	1	3.57
No Information	5	17.85
Radiological tests performed*		
X ray	10	35.71
Computed tomography	1	3.57
Three-phase scintigraphy	1	3.57
Bone scanning	5	17.85
Treatment		
Only medical	8	28.57
Medical+surgical	20	34.48
Removal of the previous prosthesis	15	53.57
Given therapies*(more than 1 antibiotics)		
Streptomycin	4	14.28
Rifampisin	28	100
Doxycycline/ tetracycline	27	96.42
Cotrimoxazole (trimethoprim sulfamethoxazole)	3	10.71
Gentamicin	5	17.85
Levofloxacin	1	3.57
Combinations therapies		
2 antibiotics regimen	16	57.14
3 antibiotics regimen	12	42.85
Surgical procedure (Total: 20)		
1 stage revision	2	7.14
2 stage revision	14	50
DAIR (Debridement, antibiotics, and implant retention) procedure	1	3.57
No Information	3	10.71
Outcome		
Cured	26	92.86
Relapse	2	7.14

Serological test positivity and tissue and joint fluid culture positivity were significant in the diagnosis, serological test positivity was found to be 78.57%. The symptoms are nonspecific, culture from joint fluid, serological tests, and a history of Brucella infection are important in diagnosis (10). In the cases, the mean erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) levels were high, while the white blood cell level was normal on average. All the information here is compiled from the publications listed in Table 3 (6, 9, 12, 14-16, 18-23, 25-40).

Table 3. Brucella knee prosthetic joint infection cases included in the present study.

1st author	Publication country, Year
Agarwal S	Saudi Arabia, 1991
Atay T	Turkey,2008
Balkhair A	Oman,2019
Çetin ES	Turkey,2008
Dauty M	Portugal,2009
Erdogan H	Turkey,2010
Flury D	Switzerland,2017
Hamdi A	Saudi Arabia,2019
Hashemi SH	Iran,2007
Iglesias G	Spain,1997
Jabalameli M	Iran,2016
Jabalameli M	Iran,2021
Karaaslan F	Turkey,2014
Kasim RA	Lebanon,2004
Kim SJ	Republic of Korea,2017
Klassov Y	Israel,2016
Lewis JM	United Kingdom,2016
Maalouf P	Lebanon,2018
Malizos KN	Greece,1997
Marbach F	Italy,2007
Marchese M	Italy,2006
Mortazavi SMJ	Iran,2017
Ortega-Andreu M	Spain,2002
Ortí A	Spain,1997
Oner M	Turkey,2012
Papastergiou SG	Greece,2011
Ruiz-Iban MA	Spain,2006
Sazegari MA	Iran,2016
Tassinari E	Italy,2008
Tena D	Spain,2007
Turvey S	Canada,2017
Walsh J	Ireland,2019
Weil Y	Israel,2003
Wünschel M	Germany,2011
Total	28

In most of the cases, the authors recommended at least 6 weeks of treatment (10-13). High relapse rates have been reported with monotherapy in the treatment of Brucella knee infections. Rifampin, doxycycline, ciprofloxacin, trimethoprim-sulfamethoxazole, and aminoglycosides are effective in the treatment of brucellosis. Long-term antibiotherapy is recommended in the treatment of prosthetic infections due to Brucellosis, and the recommended combinations are Doxycycline-Streptomycin, Rifampicin-Doxycycline, Rifampicin-Cotrimoxazole, and the duration of treatment varies between 6 months and 26 months (14-21). It is important for the success of the treatment to determine a common approach by acting together with orthopedists, infectious diseases specialists and microbiologists in treatment. While the authors thought that brucella-related knee prosthesis infections without radiological loosening could be treated with double or triple antibiotic therapy without surgery, they considered that two-stage revision surgery should be performed in cases where there is radiological loosening (20, 22).

In the reported cases, Weil et al. Recurrence was observed in a patient who was treated with tetracycline twice by their patients (10, 22). In 2016, Klassove et al. added trimethoprim-sulfamethoxazole as the third antibiotherapy in their patients who could not achieve the desired results with two-stage revision surgery and rifampin and doxycycline, and they achieved success after 6 months of triple antibiotic therapy (18, 23). In studies, the use of bone cement with antibiotics reduced the infection rate. and it has been shown to prevent recurrence (10, 24).

CONCLUSION

Successful results are observed with 2-stage revision arthroplasty and at least dual antibiotic therapy in prosthetic infections due to Brucella. In addition, it is beneficial that the cement used is antibiotic proof. The use of long-term combined antibiotics is important in the success of treatment. Care should be taken after traveling to endemic regions, and care should be taken about the consumption of non-pasteurized dairy products. New studies on this subject, which has very few publications in the literature, will guide us in terms of appropriate treatment.

ETHICAL DECLARATIONS

Ethics Committee Approval: This study data were obtained digitally, ethics committee approval is not required.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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ORIGINAL ARTICLE
ORİJİNAL ARAŞTIRMA

The Clinical Characteristics and Ultrasonographic Findings of Ovarian Torsion: One-Year Tertiary Center Experience

Over Torsiyonunun Klinik Özellikleri ve Ultrasonografik Bulguları: Bir Yıllık Tersiyer Merkez Deneyimi

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ABSTRACT

Aim: We aimed to determine the clinical characteristics, diagnostic features and ultrasonographic (USG) findings of ovarian torsion.

Material and Method: Overall 264 patients diagnosed with ovarian torsion between April 2020 and April 2021 were analyzed, retrospectively. Patients requiring surgical and medical treatment were compared with those requiring only medical treatment regarding demographic characteristics clinical and USG findings.

Results: Of all diagnosed ovarian torsion surgically, 82 (47.95%) was detected in the right-sided and 89 (52.04%) in the left-sided. The mean diameter of affected ovaries by torsion was significantly higher than that measured in normal ovaries (69.2±25.2 mm vs 11.1±7.9 mm) ($p<0.05$). Blood flow was not revealed in 8.5% of affected ovaries based on transvaginal and transabdominal USG findings. Patients who examined only transabdominal USG had 45.7% incorrect negative diagnoses. Transvaginal USG has higher accuracy in detecting ovarian torsion ($p<0.05$). Also, when patients have chronic diseases the probability of ovarian torsion can be higher ($p<0.05$). All the statistical tests were considered significant at $p<0.05$

Conclusion: We re-demonstrates the challenges of diagnosing ovarian torsion and the limitations of USG, specifically colour Doppler. Transvaginal USG is strongly recommended in case of clinical doubtfulness to torsion. It can be an excellent choice to perform sonography by a radiologist when possible.

Keywords: Ovarian torsion, USG, transvaginal ultrasonography

ÖZ

Amaç: Over torsiyonunun klinik özelliklerini, tanısal özelliklerini ve ultrasonografik (USG) bulgularını belirlemeyi amaçladık.

Gereç ve Yöntem: Nisan 2020 ile Nisan 2021 arasında over torsiyonu tanısı konan toplam 264 hasta retrospektif olarak analiz edildi. Cerrahi ve medikal tedavi gerektiren hastalar ile sadece medikal tedavi gerektiren hastalar demografik özellikleri, klinik ve USG bulguları açısından karşılaştırıldı.

Bulgular: Cerrahi olarak doğrulanan tüm over torsiyonlarının 82'si (%47.95) sağda, 89'u (%52.04) sol tarafta tespit edildi. Torsiyone olan overlerin ortalama çapı, normal normal overlerden anlamlı derecede daha yüksekti (69.2±25.2 - 11.1±7.9 mm) ($p<0.05$). Transvajinal ve transabdominal USG bulgularına göre torsiyone overlerin sadece %8.5'inde kan akımı saptanmadı. Sadece transabdominal USG uygulanan hastalarda %45.7 yanlış negatiflik vardı. Transvajinal USG over torsiyonunu saptamada daha yüksek sensitiviteye sahipti ($p<0.05$). Ayrıca kronik hastalığı olan hastalarda over torsiyonu olasılığı daha yüksekti ($p<0.05$). Tüm istatistiksel testler $p<0.05$'te anlamlı kabul edildi

Sonuç: Transvajinal USG over torsiyonunu saptamada daha yüksek sensitiviteye sahiptir ve tanı iin öncelikle tercih edilmelidir.

Anahtar Kelimeler: Over torsiyonu, USG, transvajinal ultrasonografı

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INTRODUCTION

As the ovaries rotate around their own axis and vascular peduncle, they become torsioned, and as a result, disruptions in arterial, venous or lymphatic drainage occur in both arterial and venous system and lymphatic drainage. If this continues for a long time, infarct, massive congestion, and necrosis develop (1, 2).

Ovarian torsion is one of the most common gynecological emergencies in women (3). Patients often consult a doctor with complaints of abdominal pain, nausea and vomiting (3, 4). Diagnosing is not always easy. There is no specific laboratory finding for diagnosis, and imaging methods are frequently used (5, 6). The first imaging method used in diagnosis is ultrasonography (7). Both abdominal and transvaginal USG can be used. Especially Doppler USG is the most commonly used method, and its diagnostic success is quite high (7). On the other hand, magnetic resonance imaging (MRI) is also used in some cases because the patient may miss it (8, 9).

Our aim in this study is to analyze the clinical findings of women who are thought to have ovarian torsion and to determine the true diagnosis after the operation. To compare the abdominal and transvaginal USG findings of the patients and to evaluate the results.

MATERIAL AND METHOD

Patients diagnosed with ovarian torsion were retrospectively between 01/04/2020 and 01/04/2021 in the tertiary gynecology center. Patients under the age of 18 and over the age of 45 and pregnant patients at the time of diagnosis of ovarian torsion were not accepted. Ethics committee approval was given by the local medical faculty scientific research ethics committee (Date: 2021, No: 2021-195). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

A gynecology specialist recommends patients under transabdominal sonography (Volusan GE) using 2-5 MHZ probes and 4-9 MHZ endocavity probes. In addition, transabdominal sonography was performed by a radiologist on the same day for all patients. Both transabdominal sonography results were compared with the definitive postoperative outcomes.

Data were analyzed using the SPSS 25.0 (IBM, Armonk, NY: IBM Corp.) program. Continuous variables were expressed as mean ± standard deviation, median (interquartile range, IQR), and categorical variables as numbers (n) and percentages (%). Student's t-test and Mann-Whitney U test were used to compare differences between independent groups.

RESULTS

A total of 264 patients were analyzed and the mean age was 31,97±8,66 years (Table 1). Also, the mean age women who diagnosed and not diagnosed ovarian torsion were 32.1±8.7 and 31.8±8.7 years (Table 1). While the majority of patients (92.0%) presented with complaints of pain (abdominal/groin), 6.1% (n=16) also had vaginal discharge and 4.5% (n=12) had vaginal bleeding (Table 1). There was no statistical significance between the two groups (p=0.795). Sixteen of those were diagnosed with ovarian torsion, and 28 patients were diagnosed with other diseases via surgery. When we underwent surgical intervention to the patients we had diagnosis of study participants included: 171 torsion (64.8%), ovarian cyst/ruptured ovarian cysts/ hemorrhagic cyst 56 (21.2%), endometrioma/ruptured endometrioma 10 (3.8%), appendicitis 9 (3.4%), pelvic/ adnexial mass 7 (2,7%), pelvic inflammatory disease (PID) 5 (1.9%), omentum torsion 3 (1.1%), ectopic pregnancy 3 (1.1%) (**Table 1**).

Table 1. Demographic characteristics of women with ovarian torsion.

Age (year) [mean (±SD)]	31.97 (±8.66)
Ovarian torsion	32.1 (±8.7)
Other	31.8 (±8.7)
Complaints [n (%)]	
Pain (abdominal/groin)	243 (92.0)
Vaginal discharge	16 (6.1)
Vaginal bleeding	12 (4.5)
Diagnosis [n (%)]	
Ovarian torsion	171 (64.8)
Ovarian cyst	56 (21.2)
Endometrioma	10 (3.8)
Appendicitis	9 (3.4)
Pelvic/adnexial mass	7 (2.7)
PID	5 (1.9)
Omentum torsion	3 (1.1)
Ectopic pregnancy	3 (1.1)
Comorbidity [n (%)]	
-	128 (89.5)
+	15 (10.5)

PID: pelvic inflammatory disease, SD: standart deviation

According to our statistical analysis, there is no correlation between ovarian torsion and count of previous pregnancy (p=0.236) and count of final delivery (p=0.167). However, we found that when patients have chronic diseases (diabetes mellitus, hypertension, coroner artery syndrome), the probability of ovarian torsion can be higher (p<0.05).

The transvaginal ultrasound correctly diagnosed 74.3% of ovarian torsion cases and missed 25.7% of these cases (false negatives). However, patients who examined only transabdominal ultrasonography had 45.7% incorrect negative diagnoses. Transvaginal ultrasonography has

higher accuracy in detecting ovarian torsion ($p<0.05$). The ultrasonography performed by gynecologists (whether transvaginal or transabdominal) had 36.5% false negativity. But radiology specialists have 12.3% false negativity, and there was a statistically meaningful relationship between the two groups ($p<0.05$).

Of all diagnosed ovarian torsion surgically, 82 (47.9%) was detected in the right-sided and 89 (52.0%) in the left-sided. The mean diameter of affected ovaries by torsion was significantly higher than that measured in normal ovaries (69.23 ± 25.21 mm versus 11.15±7.85 mm) ($p<0.05$). Blood flow was not revealed in 8.5% of affected ovaries based on transvaginal and transabdominal sonography findings.

DISCUSSION

This study sought to determine the value of gynecologists' and radiologists' transvaginal and transabdominal USG assessment for diagnosing ovarian torsion compared to surgical observation.

The frequency of ovarian torsion in gynecological emergencies in women is reported to be 2.7%. Although it is generally seen in all age groups, it occurs more frequently in women of reproductive age (13, 14). In our study, similar to the literature, the mean age of women with ovarian torsion was found to be 32.1±8.7 years and all of them were in the reproductive period.

Sometimes difficulties may be experienced during diagnosis. Since appendicitis, nephrolithiasis, acute gastroenteritis and diverticulitis in the differential diagnosis will create the same picture, there are delays in the diagnosis. After this delay, necrosis in the torsioned ovary may cause patients to lose their ovaries or decrease their follicle reserve (15, 16). Therefore, appropriate radiological imaging method should be used for timely and accurate diagnosis. Radiological imaging is necessary to facilitate early diagnosis and timely surgical intervention. In our study, endometrioma (3.8%), appendicitis (3.4%), PID (1.9%), omental torsion (1.1%) and ectopic pregnancy (1.1%) were seen in patients who were operated for ovarian torsion.

The first method used in diagnosis is USG. It is used as the first imaging tool in ovarian torsion because it can be used both abdominal and transvaginal, does not contain radiation, and can be applied immediately (17, 18). Especially Doppler USG is very valuable during diagnosis. However, cut-off values are not available due to ovarian blood flow variations, although they give very important findings during diagnosis. In the literature, it has been reported that Doppler USG can diagnose 87% of ovarian torsion (19). In addition, Doppler USG has been shown to have arterial flow loss in only 60-73% of patients with ovarian torsion (20, 21). The basic USG method in the evaluation of pelvic pain is transvagimal USG (22). The most important advantage is that it shows the anatomy of the ovaries and the findings of the disease with high resolutions (23). In our study, the detection rate of trosion by transvaginal USG was significantly higher than transabdominal USG. Transvaginal ultrasonography is a better option for diagnosing ovarian torsion when it's possible to perform.

Limitations of this study; (1) being a single-center study (2) There is no any information on the number of acute abdomen.

CONCLUSION

Our study re-demonstrates the challenges of diagnosing ovarian torsion and the limitations of ultrasound, specifically colour doppler. The diagnosis of adnexal torsion remains a challenging mission. According to the study findings, transvaginal sonography is strongly recommended in case of clinical doubtfulness to torsion. It can be an excellent choice to perform sonography by a radiologist when possible.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was initiated with the approval of the Demiroglu Bilim University, Ethics Committee (Date: 07-04-2021, No: 2021-129).

Informed Consent: Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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ORIGINAL ARTICLE
ORİJİNAL ARAŞTIRMA

Factors Determining Early Period Outcomes in Geriatric Patients Receiving Inguinal Hernia Repair

Kasık Fıtığı Onarımı Yapılan Geriatrik Hastalarda Erken Dönem Sonuçları Belirleyen Faktörler

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ABSTRACT

Aim: This study is aimed to evaluate the relationship between early period outcomes and clinical features in geriatric patients who were operated on for an inguinal hernia.

Material and Method: Geriatric age patients who were operated on due to an inguinal hernia at a tertiary health centre between 2010 and 2020 were searched retrospectively. Patients aged 65 and over were included in the study, while patients under 65 were excluded. After the clinical features of the patients were collected, the effects of clinical features on the early results were investigated with Chi-Square Test and Likelihood ratio test, assuming that the p value was below 0.05 as significant.

Results: One hundred and fifty-one patients were included in this study. The mean age of the patients was 71.99±5.74 years (range from 65 to 94), and 137 (90.7%) were men. Overall morbidity increased only in emergency surgery (p=0.018), and its rate was 13.2%. The haematoma rate increased in emergency surgery (p=0.001) and the patients with bilateral-side hernias (p=0.019). However, surgical site infection decreased with the presence of comorbid disease (p=0.040). On the other hand, ileus and rare complications were not affected by any clinical factors.

Conclusion: In patients diagnosed with an inguinal hernia at old age, elective surgery should be planned to reduce the overall morbidity, regardless of surgery type, anaesthesia method, and hernia localisation.

Keywords: Emergency, morbidity, hematoma, ileus, surgical site infection

ÖZ

Amaç: Bu çalışmada kasık fıtığı nedeniyle ameliyat edilen geriatrik hastalarda erken dönem sonuçlar ile klinik özellikler arasındaki ilişkinin değerlendirilmesi amaçlanmıştır.

Gereç ve Yöntem: 2010-2020 yılları arasında üçüncü basamak bir sağlık merkezinde kasık fıtığı nedeniyle ameliyat edilen geriatrik yaştaki hastalar geriye dönük olarak tarandı. 65 yaş ve üstü hastalar çalışmaya dahil edilirken, 65 yaş altı hastalar çalışma dışı bırakıldı. Hastaların klinik özellikleri toplandıktan sonra, p değerinin 0,05'in altında olduğu anlamlı varsayılarak, klinik özelliklerin erken sonuçlara etkisi Ki-Kare Testi ve Olabilirlik oranı testi ile araştırıldı.

Bulgular: Bu çalışmaya yüz elli bir hasta dahil edildi. Hastaların yaş ortalaması 71,99±5,74 yıl (65-94 yaş arası) ve 137'si (%90,7) erkekti. Genel morbidite sadece acil cerrahide arttı (p=0,018) ve oranı %13,2 idi. Acil cerrahide (p=0,001) ve bilateral yan fıtığı olan hastalarda (p=0,019) hematom oranı arttı. Ancak komorbid hastalık varlığı ile cerrahi alan enfeksiyonu azaldı (p=0,040). Diğer yandan ileus ve nadir görülen komplikasyonlar herhangi bir klinik faktörden etkilenmedi.

Sonuç: İleri yaşta kasık fıtığı tanısı konan hastalarda, ameliyat tipi, anestezi yöntemi ve fıtık lokalizasyonu ne olursa olsun genel morbiditeyi azaltmak için elektif cerrahi planlanmalıdır.

Anahtar Kelimeler: Acil, morbidite, hematom, ileus, cerrahi alan enfeksiyonu

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INTRODUCTION

The population of geriatric patients is increasing globally. An increase in age likely raises the prevalence of some specific surgical diseases among this subset of patients. One such disease is an inguinal hernia. The incidence of inguinal hernia increases with age, and the median age at diagnosis is 40-59 years (1). On the other hand, the incidence of inguinal hernia is approximately 110 per 100,000 individuals aged 16-24 to 2000 per 100,000 persons aged 75 years or above in men (2).

Comorbidities are frequent companions of elderly patients requiring surgery (3). Reluctance for operation leads to complications at some stage. Many studies have pointed out that mortality and morbidity increase many folds if such hernias are operated on in emergency in elderly patients (4). Patients present with giant hernias and only seek medical advice when they develop some life-threatening complication. Comorbidities coupled with complications and emergency surgery increase the lifetime risk many folds (5).

The morbidity rate after inguinal hernia operations varies in a wide range between 1-14% in the literature (6). In addition, with ageing, the bowel resection rate increases in inguinal hernias. In addition, the length of hospital stay also increases due to resection. Therefore, early outcomes (morbidity and mortality) increase.

This study evaluated the relationship between early outcomes and clinical factors in geriatric patients who were operated on for an inguinal hernia.

MATERIAL AND METHOD

The study was carried out with the permission of Erzurum Regional Education and Research Hospital Non-invasive Clinical Research Ethics Committee (Date: 01.03.2021, Decision No: 2021/05-113), this retrospective study included patients 65 and older obtaining inguinal hernia repair over ten years (between 2010 and 2020). Patients under 65 years of age and upper 65 years old who were operated on for an inguinal hernia at an external centre and then referred to our hospital for follow-up were excluded from the study. During the research period, 191 patients were operated on for an inguinal hernia. But 40 patients were excluded due to lack of data, and 151 patients were included in the study.

Patients' demographic data (age and gender of the patients), comorbidities, preoperative hernia recurrence, diagnosis methods, surgical urgency, hernia side, anaesthesia type, surgery type, operative technical factors (prosthetic material use, organ resection, spermatic cord lipoma excision, and drainage catheter insertion), and length of hospital stay were investigated parameters. Early outcomes were defined as complications and mortality detected within the first 30 days after surgery. Since there was no mortality, the relationship between preoperative and intraoperative factors and mortality could not be evaluated. After collecting data from all patients, the effect of the collected parameters on morbidity was investigated.

Statistical analyses were performed using the IBM Statistical Analyses for Social Sciences (SPSS) ver. 22.0 for Windows. The data were given as mean, standard deviation, frequency and percentage. In addition, the Chi-Square and Likelihood ratio tests were used to compare variables. A p valuebelow 0.05 was considered statistically significant.

RESULTS

Of 151 patients, 137 (90.7%) were men, and the mean age of all patients was 71.99±5.74 years (range from 65 to 94). One hundred and one (66.9%) patients had at least one comorbid disease, and the most common was a cardiac disease, with a rate of 30.5%. 8 (5.3%) patients had a previous hernia surgery. One hundred and thirteen (74.8%) patients were operated on only based on physical examination findings, 30 (19.9%) patients with ultrasonography (USG) confirmation after physical examination, and 8 (5.3%) patients had computed tomography (CT) correlation after physical examination. After evaluation with physical examination and/or USG/CT, the right-sided hernia was found in 93 (61.6%) patients, left-sided hernia in 47 (31.1%) patients, and bilateral hernia in 11 (7.3%) patients. One hundred and seventeen patients (77.5%) were operated on as elective cases.

The most preferred anaesthesia method was spinal anaesthesia in 118 (78.1%) patients. In the patients with a unilateral hernia (n=140), 89 (63.6%) patients had a direct inguinal hernia, 45 (32.1%) patients had an indirect inguinal hernia, and 6 (4.3%) patients had a femoral hernia. One hundred and forty-five (96%) underwent open surgery, and hernia defects of 133 (88.1%) patients were repaired with prosthetic material. A drainage catheter was placed in 41 (27.2%) patients. Fourteen patients had an intra-abdominal organ incarcerated within the hernia sac. Organ resection was performed in only 4 (2.6%) of all patients due to strangulation and unresponsiveness to wait-watch for 30 minutes, small bowel resection in 3 patients and colon resection in one patient. In the remaining ten patients, organ resection was not required. The resection rate at emergency hernia surgeries was 11.7% (4/34).

Most inguinal hernia surgeries (86.8%) were performed without complication, but overall morbidity was 13.2%, with no mortality. The mean hospital stay was 3.83±3.04 days (range from 1 to 20 days). Surgical site infection was seen in 7 (4.6%) patients, hematoma in 7 (4.6%) patients, and ileus in 2 (1.3%) patients. Rare complications were seen in 4 (2.6%) patients; persistent post-herniorrhaphy pain in 2 patients, deep vein thrombosis in one patient, and hydrocele with orchitis in one patient. The clinical factors of the patients are shown in **Table 1**.

Table 1. Clinical factors of the patients.

Clinical factors	Value or n (%)
Preoperative factors	
Age [a]	71.99±5.74 (65-94)
Gender [b]	
Male	137 (90.7)
Female	14 (9.3)
Comorbidity [b]	
Yes	101 (66.9)
One comorbid disease	62 (41.1)
Cardiac disease	46 (30.5)
Pulmonary disease	8 (5.3)
Urinary disease	7 (4.6)
Endocrinological disease	1 (0.7)
Two or more comorbid disease	39 (25.8)
No	50 (33.1)
Preoperative recurrent hernia [b]	
Yes	8 (5.3)
No	143 (94.7)
Diagnosis method [b]	
PE	113 (74.8)
PE and USG	30 (19.9)
PE and CT	8 (5.3)
Hernia side [b]	
Right	93 (61.6)
Left	47 (31.1)
Bilateral	11 (7.3)
Surgical urgency [b]	
Elective	117 (77.5)
Emergency	34 (22.5)
Intraoperative factors	
Anaesthesia type [b]	
General	29 (19.2)
Spinal	118 (78.1)
Local	4 (2.7)
Type of surgery [b]	
Laparoscopic	6 (4)
Open	145 (96)
Spermatic cord lipoma [b]	
Yes	5 (3.3)
No	146 (96.7)
Drainage catheter [b]	
Yes	41 (27.2)
No	110 (72.8)
Prosthetic material use [b]	
Yes	133 (88.1)
No	18 (11.9)
Organ resection [b]	
Yes	4 (2.6)
No	147 (97.4)
Postoperative factors	
Hospital stays [a]	3.83±3.04 (1-20)
Early outcomes [b]	
Overall morbidity	20 (13.2)
SSI	7 (4.6)
Hematoma	7 (4.6)
Ileus	2 (1.3)
Rare complications	4 (2.6)
Overall mortality	0 (0)

[a]: mean ± standard deviation (range), [b]: n (%). PE: Physical examination, USG: Ultrasonography, CT: Computed tomography, SSI: Surgical site infection.

According to the statistical test results, only emergency surgery increased the overall morbidity (p=0.018). However, comorbidity interestingly decreased the surgical site infection (p=0.040). Postoperative hematoma increased in patients operated under emergency conditions and patients with bilateral inguinal hernia, p=0.001 and p=0.019, respectively. On the other hand, any clinical factors did not affect ileus and rare complications. The relationship between the clinical characteristics and early outcomes is shown in **Table 2**.

DISCUSSION

Inguinal hernia operations are more common in old than young ones due to the weakening of the connective tissue, increased risk of chronic disease, and increased intra-abdominal pressure (7). There was a male gender dominance of up to 100% in the distribution of hernia cases (8,9). In parallel with the literature, the male-to-female ratio of the present study was 9.78. Comorbid diseases are high in elderly patients and increase the likelihood of complications (5,10). When elderly patients present with complications such as incarceration or strangulation, the morbidity rate is much higher (11). On the other hand, Uğur et al. found no correlation between comorbidity and morbidity (12). The present study also found no correlation between comorbid disease and morbidity (12.9% vs 14%). In the study of Pavlidis et al., inguinal hernia repairs were done due to recurrences in about 1.5% of patients (13). On the other hand, Liem et al. (14) reported 6% postoperative recurrence. In this study, 5.3% of inguinal hernia repairs are done due to recurrences, comparable with the literature.

The morbidity of emergency operations is higher than in elective hernia repairs. Early elective surgery is recommended in elderly patients to avoid morbidity and mortality (15). Uğur et al. found that the elderly patients who were operated on in emergency conditions had higher complications (12). On the other hand, Pavlidis et al. (13) stated that hernia repair is safe and well-tolerated in the elderly. Vatansev et al. (7) concluded in their study that elderly patients diagnosed with a hernia should be operated on under elective conditions as much as possible. In this study, the overall morbidity and hematoma rate were higher in the emergency surgery group. However, emergency surgery did not affect the percentage of surgical site infection, ileus, and other rare complications.

General anaesthesia is usually preferred in the emergency setting, whereas local or loco-regional anaesthesia is the first option for elective hernia repair (15). Several studies suggested that local anaesthesia for hernia repair reduces morbidity by up to 30% (17). Antonio et al. performed inguinal hernia repair under

Table 2. Relationship between clinical factors and early outcomes.

	Overall morbidity (n=20)	p value	SSI (n=7)	p value	Hematoma (n=7)	p value	Ileus (n=2)	p value	Rare (n=4)	p value
Gender		0.400*		0.128*		1.000*		0.177*		1.000*
Male	17 (12.4%)		5 (3.6%)		7 (5.1%)		1 (0.7%)		4 (2.9%)	
Female	3 (21.4%)		2 (14.3%)		0 (0%)		1 (7.1%)		0 (0%)	
Comorbidity		0.847*		**0.040***		0.426*		1.000*		1.000*
Yes	13 (12.9%)		2 (2%)		6 (5.9%)		2 (2%)		3 (3%)	
No	7 (14%)		5 (10%)		1 (2%)		0 (0%)		1 (2%)	
Recurrent Hernia		0.286*		0.322*		0.322*		1.000*		1.000*
Yes	2 (25%)		1 (12.5%)		1 (12.5%)		0 (0%)		0 (0%)	
No	18 (12.6%)		6 (4.2%)		6 (4.2%)		2 (1.4%)		4 (2.8%)	
Diagnosis Method		0.580**		0.507**		0.607**		0.150**		0.308**
PE	15 (13.3%)		4 (3.5%)		6 (5.3%)		1 (0.9%)		4 (3.5%)	
PE and USG	3 (10%)		2 (6.7%)		1 (3.3%)		0 (0%)		0 (0%)	
PE and CT	2 (25%)		1 (12.5%)		0 (0%)		1 (12.5%)		0 (0%)	
Surgical Emergency		**0.018***		0.655*		**0.001***		0.401*		0.575*
Elective	11 (9.4%)		5 (4.3%)		1 (0.9%)		1 (0.9%)		4 (3.4%)	
Emergency	9 (26.5%)		2 (5.9%)		6 (17.6%)		1 (2.9%)		0 (0%)	
Hernia Location		0.287**		0.246**		**0.019****		0.765**		0.139**
Right	10 (10.8%)		3 (3.2%)		2 (2.2%)		1 (1.1%)		4 (4.3%)	
Left	7 (14.9%)		4 (8.5%)		2 (4.3%)		1 (2.1%)		0 (0%)	
Bilateral	3 (27.3%)		0 (0%)		3 (27.3%)		0 (0%)		0 (0%)	
	Overall Morbidity (n=20)	**p value**	**SSI (n=7)**	**p value**	**Hematoma (n=7)**	**p value**	**Ileus (n=2)**	**p value**	**Rare (n=4)**	**p value**
Anaesthesia Type		0.615**		0.766**		0.085**		0.595**		0.367**
General	5 (17.2%)		1 (3.4%)		3 (10.3%)		1 (3.4%)		0 (0%)	
Spinal	14 (11.9%)		6 (5.1%)		3 (2.5%)		1 (0.8%)		4 (3.4%)	
Local	1 (25%)		0 (0%)		1 (25%)		0 (0%)		0 (0%)	
Type of Surgery		1.000*		1.000*		1.000*		1.000*		1.000*
Laparoscopy	0 (0%)		0 (0%)		0 (0%)		0 (0%)		0 (0%)	
Open	20 (13.8%)		7 (4.8%)		7 (4.8%)		2 (1.4%)		4 (2.8%)	
Spermatic Cord Lipoma		1.000*		1.000*		1.000*		1.000*		1.000*
Yes	0 (0%)		0 (0%)		0 (0%)		0 (0%)		0 (0%)	
No	20 (13.7%)		7 (4.8%)		7 (4.8%)		2 (1.4%)		4 (2.7%)	
Drainage Catheter		0.054*		1.000*		0.087*		0.072*		1.000*
Yes	9 (22%)		2 (4.9%)		4 (9.8%)		2 (4.9%)		1 (2.4%)	
No	11 (10%)		5 (4.5%)		3 (2.7%)		0 (0%)		3 (2.7%)	
Prosthetic Material		0.710*		1.000*		0.597*		0.225*		0.401*
Yes	17 (12.8%)		7 (5.3%)		6 (4.5%)		1 (0.8%)		3 (2.3%)	
No	3 (16.7%)		0 (0%)		1 (5.6%)		1 (5.6%)		1 (5.6%)	
Organ Resection		1.000*		1.000*		1.000*		1.000*		1.000*
Yes	0 (0%)		0 (0%)		0 (0%)		0 (0%)		0 (0%)	
No	20(13.6%)		7 (4.8%)		7 (4.8%)		2 (1.4%)		4 (2.7%)	

SSI: Surgical Site Infection, PE: Physical Examination, USG: Ultrasonography, CT: Computed Tomography. *Chi-Square test, **Likelihood Ratio test.

local anaesthesia in 454 patients and stated they did not encounter any severe complications (18). In our study, spinal was the type of anaesthesia most frequently used in elderly patients; however, anaesthesia type did not affect morbidity in this study.

Laparoscopic inguinal hernia repair could be performed safely without increasing morbidity in old age. A meta-analysis showed that the laparoscopic approach positively affected local complications and pain-related parameters (19). However, the number of laparoscopically operated patients in the present study is low, and the overall morbidity of the laparoscopic surgery group was 0%. However, the morbidity rate in the open surgery group was 13.8%, comparable to other studies.

In the Cochrane systematic review published in 2018, patients who underwent inguinal hernia repair with mesh had a higher wound infection rate than the non-mesh repair group. However, the hematoma rate in the operation area was lower than in the non-mesh repair group in the mesh group. Also, in the same study, the risk of postoperative wound infection was higher in the mesh repair group, while the risk of postoperative pain was higher non-mesh repair group (19). However, a study (20) emphasised that using mesh in inguinal hernia repair did not increase postoperative morbidity as in this study.

Surgical site infections (SSI) with a 5% prevalence are a rare complication after hernia repair (20). In our study, the prevalence of SSI was 4.6%, a little more than the literature. Postoperative hematoma occurs

between 0.3 and 26% (21). Previous studies examining the causes of postoperative hematomas following inguinal herniorrhaphy have focused on perioperative anticoagulation. This study's relationship between perioperative anticoagulation and morbidity could not be examined due to a lack of information. On the other hand, in our research, the hematoma frequency was higher in emergency surgeries and bilateral cases.

In the study of Lebeau et al., bowel necrosis requiring bowel resection is the factor of unfavourable postoperative results (22). The presence of bowel necrosis modifies the prognosis and the treatment of strangulated inguinal hernia (23). In past studies, the infection rate in inguinal hernia was between 13 and 50 (22,24,25). This study's resection rate was 11.7% lower than the literature. In addition, bowel resection did not increase overall morbidity.

Limitations

There were some limitations in this study. The main limitation was that the presented study was a retrospective study from a single institution and a file-based study. Due to a lack of data, 40 patients have excluded from the study. In addition, anticoagulant use was excluded from the evaluation because reliable data could not be obtained.

CONCLUSION

Emergency inguinal hernia repair increased overall morbidity. However, the presence of comorbidity interestingly decreased the surgical site infection rate. Emergency cases and bilateral cases increased the rate of hematoma. On the other hand, any clinical factors did not affect ileus and rare complications. In patients diagnosed with an inguinal hernia at old age, elective surgery should be planned to reduce the overall morbidity, regardless of surgery type, anaesthesia method, and hernia localisation..

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was carried out with the permission of Erzurum Regional Education and Research Hospital Non-invasive Clinical Research Ethics Committee (Date: 01.03.2021, Decision No: 2021/05-113).

Informed Consent: Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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ORIGINAL ARTICLE
ORİJİNAL ARAŞTIRMA

The Role of Inflammatory Markers in the Evaluation of Cerclage Success

Serklaj Başarısının Değerlendirilmesinde İnflamatuvar Belirteçlerin Rolü

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ABSTRACT

Aim: The aim of this study was to investigate the role of inflammatory markers in predicting cerclage success in patients who underwent a cerclage procedure.

Material and Method: Pregnant women who had undergone McDonald cerclage were included in the study. Sixty-one pregnant women participated in the study, of whom 32 (52.46 %) underwent elective cerclage and 29 (47.54 %) emergency cerclage. Laboratory analysis determined neutrophil-to-lymphocyte ratio (NLR), monocyte-to-lymphocyte ratio (MLR), platelet-to-lymphocyte ratio (PLR), and systemic immune inflammation index (SII). Patients undergoing cerclage were compared into two groups, elective and emergency cerclage groups.

Results: The mean gestational week for cerclage insertion was 13.41±0.83 weeks for elective cerclage and 17.45±4.37 weeks for emergency cerclage. No significant difference was found between the groups in terms of age, gravid, week of delivery, mode of delivery and neonatal outcomes (p>.05). However, a significant difference was found in the values for history of abortion, cervical length, and period from cerclage placement to delivery (p<.05). No significant difference was found between the NLR, MLR, PLR, and SII values between the two groups in the study (p>.05), but a significant negative correlation was found between the SII value and the week of delivery (p<.05, r= -0.278).

Conclusion: The NLR, MLR, and PLR values were not found to be beneficial in predicting the success of the cerclage procedure in prolonging the duration of pregnancy. In contrast, the negative correlation between the SII value and the week of delivery proved to be inexpensive and easily determined prognostic marker that could be used to specify the success and prognosis of cervical cerclage.

Keywords: Cerclage, inflammatory marker, McDonald, neutrophil, systemic immune inflammatory index

ÖZ

Amaç: Serklaj prosedürü uygulanan hastalarda inflamatuar belirteçlerinin serklaj başarısını öngörmedeki rolünü araştırmaktır.

Gereç ve Yöntem: Çalışmaya McDonald yöntemi ile 32'sine (%52.46) elektif serklaj, 29'una (%47.54) acil serklaj uygulanan 61 gebeler dahil edildi. Laboratuvar analizinde hastaların nötrofil-lenfosit oranı (NLR), monosit-lenfosit oranı (MLR), trombosit-lenfosit oranı (PLR) ve sistemik immün inflamasyon indeksi (SII) belirlendi. Serklaj uygulanan hastalar elektif ve acil serklaj grupları olmak üzere iki gruba ayrıldı.

Bulgular: Ortalama serklaj uygulama haftası elektif serklaj için 13.41±0.83 hafta, acil serklaj için 17.45±4.37 hafta idi. Gruplar arasında yaş, gravide, doğum haftası, doğum şekli ve yenidoğan sonuçları açısından anlamlı fark bulunmadı (p>.05). Ancak düşük öyküsü, servikal uzunluk ve serklaj uygulamasından doğuma kadar geçen süre değerlerinde anlamlı fark bulundu (p<.05). Çalışmada iki grup arasında NLO, MLR, PLR ve SII değerleri arasında anlamlı fark bulunmadı (p>.05) ancak SII değeri ile doğum haftası arasında anlamlı negatif korelasyon bulundu (p<.05, r = -0.278).

Sonuç: NLO, MLR ve PLR değerleri, serklaj prosedürünün gebelik süresini uzatmadaki başarısını öngörmede faydalı bulunmadı. Buna karşılık, SII değeri ile doğum haftası arasındaki negatif korelasyonun, servikal serklaj başarısını ve prognozunu öngörmede kullanılabilecek ucuz ve kolay saptanan prognostik bir belirteç oldugu tespit edildi.

Anahtar Kelimeler: Serklaj, inflamatuar belirteç, McDonald, nötrofil, sistemik immün inflamatuar indeks

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INTRODUCTION

Cervical insufficiency is a disease whose etiology is not fully known. It causes miscarriage and preterm labor in the second trimester of pregnancy without symptoms such as uterine contraction and rupture of the membranes (1). Cervical cerclage is a surgical method commonly used in pregnant women who experience preterm delivery due to cervical insufficiency (2). Cervical insufficiency is seen in only 1% of the total obstetric population (3).

When diagnosing cervical insufficiency, it is more informative to detect cervical shortness on transvaginal ultrasound (TVUSG) than on vaginal examination (1). Cervical shortness is defined as a cervical length below the 5th percentile or below 25 mm on TVUSG in the second trimester (4). Cervical cerclage can be performed vaginally (McDonald or Shirodkar cerclage) or abdominally. The McDonald and Shirodkar cerclage procedures are not superior to each other (5). Cerclage is performed as a prophylactic/elective (indicated by history) or emergency/rescue cerclage (cervical shortness on TVUSG or cervical dilation for vaginal examination).

Cerclage insertion can lead to complications such as chorioamnionitis, cervical laceration, hemorrhage, infection, and maternal sepsis (6). Cerclage suturing can lead to uterine activation in the presence of subclinical infection (7), and this inflammatory process can lead to preterm labor (8). The platelet-to-lymphocyte ratio (PLR) and neutrophil-to-lymphocyte ratio (NLR) reflect the severity of inflammation (9).

There are few studies in the literature on noninvasive inflammatory markers that predict how long cerclage can delay labor in patients with cervical insufficiency. The aim of this study was to evaluate the role of maternal inflammatory markers in predicting latency to delivery (clinical success of cerclage) in patients undergoing cerclage under prophylactic or emergency conditions.

MATERIAL AND METHOD

A total of 61 pregnant women who underwent McDonald cerclage at the Department of Obstetrics and Gynecology, Tokat Gaziosmanpaşa University between January 2018 and December 2021 were included in the study. In this retrospective cross-sectional study, patient information was obtained from hospital records. Prior to the study, approval was obtained from the ethics committee of our hospital (Date: 17.06.2021/ Project No: 21-KAEK-161).

Patients between 12 and 25 weeks of gestation who had a previous painless abortion and a second-trimester delivery, who had a cervical length of less than 25 mm or a cervical dilatation of less than 5 cm, and intact membranes in their current pregnancy were included in the study. Week of gestation was confirmed using the first day of last menstrual period (LMP) or by ultrasound measurements in first-trimester patients whose LMP was unknown. In each patient, cervical dilation and length were determined by TVUSG (CL). TVUSG was performed by taking at least 3 measurements with mild suprapubic compression while the patients' bladders were empty. Patients were divided into two groups: prophylactic/elective (indicated by history, n:32) and emergency/rescue cerclage (indicated by ultrasound and vaginal examination, n:29). Patient demographics, age, gravidity, history of abortion, cervical length, time from cerclage placement to delivery, weeks of delivery, modes of delivery, and neonatal outcomes (birth weight, APGAR score) were recorded. Laboratory analyzes determined NLR, monocyte lymphocyte (MLR), PLR, and systemic immune inflammatory index (SII) values. Inflammatory parameters were compared between the elective and emergency cerclage groups. A regularly maintained device (Mindray BC-6800, China) was used for complete blood count.

Cerclage procedure: The patient was prepared under general anesthesia in lithotomy position under surgical conditions. Povidone iodine was applied to the cervix. The upper and lower lips of the cervix were then held in place with ring forceps. McDonald cerclage was performed by passing a 5-mm MERSILENE polyester suture from the nearest point to the internal os of the cervix. In patients with prolapsed membranes, the membrane was pushed into the uterine cavity using ring forceps with wet gauze, and a cerclage was placed after reduction. Each cerclage patient received progesterone (oral progesterone 200 mg S:2*1) and antibiotics (1st generation cephalosporin 2 g IV S:1*1 single dose). After the procedure, a single dose of a suppository containing 100 mg of a prostaglandin synthesis inhibitor and 1 ampule of hydroxyprogesterone caproate IM were administered. After the procedure, progesterone tablets were continued until 37 weeks' gestation or delivery. The cerclage suture was removed immediately in patients with active pain, chorioamnionitis, and rupture of the membranes; it was removed between 36 and 38 weeks of gestation in patients without the aforementioned complaints. If the method of delivery was cesarean section (CS), the suture was removed during surgery. In pregnant women with active vaginal bleeding, ruptured amniotic membrane, fetal anomaly, and dilatation greater than 4 cm, cerclage was not performed. Pregnant women who delivered between 24 and 34 weeks' gestation received 12 mg betamethasone in 2 doses 24 hours apart IM. Pregnant women who underwent abdominal cerclage, had a known multiple pregnancy, or underwent conization and whose data could not be determined were excluded from the study.

Statistical Analysis

Statistical analyzes were performed with SPSS version 20.0 (SPSS, Inc. Chicago). The Kolmogorov-Smirnov test was used to evaluate the distribution model of the variables. Categorical variables were expressed as percentages and compared with the chi-square test. The correlation between categorical variables and parametric variables was analyzed with Student's t test. For analysis of multiple categorical variables, a one-way ANOVA test was used. Data were planned to be presented as mean ± standard deviation (SD). For correlation of parametric data, Pearson's correlation analysis was performed. $P < 0.05$ was considered statistically significant.

RESULTS

The elective cerclage group consisted of 32 pregnant women and the emergency cerclage group consisted of 29 pregnant women. In 5 (8.2%) patients, it was the first pregnancy. The remaining 56 (91.8%) patients had undergone a painless abortion and second trimester delivery. Twenty (32.8%) patients had a history of painless abortion before 20 weeks and 36 (59%) had a history of a painless delivery after 20 weeks. Of the patients, 5 had a history of cerclage. The CLs of 18 (62%) patients who underwent emergency cerclage were less than 25 mm on TVUSG examination, whereas the cervical dilatation of 8 (27.5%) patients ranged from 1 to 4 cm on vaginal examination. The mean age of the patients included in the study was 29.70±5.26 years, while the mean gestational week at the time of cerclage placement was 15.33±2.51 weeks. While the APGAR score was 8 and above in 25 of the infants in the elective cerclage group, the APGAR score was 8 and above in 14 of the infants in the emergency cerclage group. No statistically significant value was found when APGAR scores and inflammatory markers were compared. Demographic characteristics of the groups are compared in **Table 1**.

The mean preoperative and postoperative white blood cell (WBC) values of the elective cerclage patients were 12.17±1.07 and 10.85±3.34, respectively, whereas the mean WBC values of the emergency cerclage patients were 11.78±1.09 and 9.92±3.51, respectively. The inflammatory markers of the two groups are compared in **Table 2**.

In the emergency cerclage group, two patients experienced cervical rupture during labor. The bleeding was controlled by suturing the laceration under anesthesia with a size 0 absorbable suture. Chorioamnionitis did not occur in any of the patients. No statistically significant results were obtained when comparing inflammatory markers in the group with APGAR scores below and above 8. In correlation analyzes, positive correlations were found between APGAR score and the number of parities, type of delivery (abortion, CS, NVB), week of birth, and birth weight. There were also positive correlations between the number of parities and week of delivery, birth weight, and between cervical length, gravid number and abortion number. A statistically significant negative correlation was observed between SII and week of delivery (r= -0.278). There was no correlation between cerclage history and week and other parameters. The correlation analyzes are shown in **Table 3**.

Table-1. Comparison of demographic characteristics between groups

	Prophylactic/ Elective cerclage (n=32)	Emergency/ Rescue cerclage (n=29)	P value
Age (years)	29.25±6.10	30.21±4.35	0.48
Gravity	3.97±1.15	3.34±1.71	0.09
Parity	1.38±.79	1.38±1.17	0.98
Miscarriage history	1.69±0.20	0.97±.25	0.029*
Cervical length (mm)	31.16±3.36	15.52±5.78	<0.001*
Cerclage week of pregnancy (wk)	13.41±0.83	17.45±4.37	<0.001*
Time cerclage placement to birth (wk)	22.06± 4.74	14.59±8.50	<0.001*
week of birth (wk)	35.41±4.91	32.10±6.70	0.031*
Newborn weight (gr)	2727±890	2246±966	0.052
APGAR	8.44±2.03	7.17±3.25	0.071
Delivery modes			-
CS	26	14	
NVB	5	12	
Miscarriage	1	3	

Data are mean (standard deviation); Wk:week; gr:grams; mm:milimetres; CS:caesarean section; NVB: normal vaginal birth, *:P<0.05

Table-2. Comparison of inflammatory markers between groups

	Prophylactic/ Elective cerclage (n=32)	Emergency/ Rescue cerclage (n=29)	P value
Preop WBC (10^3/mL)	12.17±1.07	11.78±1,09	.16
Preop Hb (gr/dL)	9.61±2.15	10.10±2,84	.45
Neutrophils (10^3/mL)	6941±1990	7494±2618	.35
Lymphocytes (10^3/mL)	1998±498	1792±505	.11
Monocyte (10^3/mL)	540±180	565±200	.61
PLT (10^3/mL)	251.6±71.3	241.6±42.7	.51
MPV	9.96±1.24	9.74±1.17	.48
PDW	13.70±2.99	13.69±3.01	.99
NLO	3.66±1.51	4.31±2.04	.16
MLO	0.28± 0.11	0.35±0.17	.10
PLO	131.6±45.6	137.2±45.3	.63
SII	918±407	1012±512	.44
Postop WBC (10^3/mL)	10.85±3.34	9.92±3.51	.29

Data are mean (standard deviation); preop: preoperative; postop: postoperative WBC:White blood cells; Hb: Hemoglobin; PLT:platelet; MPV:Mean platelet volume; PDW: platelet distribution width; NLO: Neutrophil/lymphocyte ratio;MLO: Monocyte / Lymphocytes ratio ;PLO: Platelet Lymphocytes ratio; SII: systemic immune inflammatory index

Table-3. Correlation table of parametric data

	Parity	Gravity	Miscarriage	APGAR	Cerclage history	Cerclage week	Delivery modes	Delivery week (wk)	Newborn weight (gr)	SII
Gravity	.536**									
Miscarriage	-.142	.731**								
APGAR	.314*	.227	.021							
Cerclage history	.098	.112	.082	.142						
Cerclage week	-.136	-.066	.046	-.083	-.121					
Delivery modes	.126*	.077	-.220	.333**	-.129	.262				
Delivery week (wk)	.477**	.375**	.060	.598**	.074	-.212	.252*			
Newborn weight (gr)	.348*	.344*	.111	.477**	.059	-.278	.011	.926**		
SII	-.110	-.060	.068	-.240	-.190	.154	-.024	-.278*	-.130	
Cervical length (mm)	-.009	.373*	.457**	.257	.122	-.441**	-.237	.269	.265	.112

Data are mean (standard deviation) ; *. Correlation is significant at the 0.05 level (2-tailed); **.Correlation is significant at the 0.01 level (2-tailed). wk:week; SII: systemic immune inflammatory index; gr:grams; mm:milimetres

DISCUSSION

Preterm labor is the most common obstetric cause of neonatal death, and cervical insufficiency is one of the causes. There are several treatment options to prevent preterm labor and miscarriage, such as pessaries, progesterone, tocolytic therapy, cervical cerclage, and bed rest. Apart from cerclage, there are no invasive treatments for cervical insufficiency (10). In a study of 108 pregnant women, Harpham et al. reported that insertion of a cerclage before 14 weeks resulted in worse pregnancy outcomes in pregnant women who had previously suffered a mid-trimester miscarriage than in women who had not suffered a miscarriage (10). In Stupin et al.'s study of 161 pregnant women, the average birth weight of emergency cerclage patients was 1340 g, which had a positive effect on perinatal outcomes (11). In our study, prophylactic and emergency cerclage procedures were found to prolong pregnancy and have a positive impact on neonatal outcomes in both patients with and without previous mid-trimester miscarriage. Cerclage outcomes may differ in prophylactic and emergency situations. For example, a meta-analysis compared prophylactic cerclage patients with emergency cerclage patients, with patients in the emergency cerclage group delivering their babies earlier and having lower newborn weights (12).

Some studies have shown that elective cerclage prolongs pregnancy and leads to better neonatal outcomes (12-14). In the present study, the procedure in the prophylactic cerclage group was performed at an earlier gestational week, the latency to delivery was longer, and better neonatal outcomes (8< Apgar score) were obtained. Our study is consistent with the literature. In emergency cerclage patients, cerclage success decreases when cervical dilatation > is 1.5 cm and the amniotic membrane is prolapsed (13). In the study by Terkildsen et al., emergency cerclage was performed in two groups with and without prolapsed membranes, and the procedure was more successful in patients without prolapsed membranes (15). Patients undergoing emergency cerclage are more likely to experience complications such as ruptured membranes and chorioamnionitis (16). Therefore, when performing a cerclage, the patient should be informed that pregnancy may be prolonged and positive neonatal outcomes may be achieved, but negative feto-maternal complications may also occur (17). Chorioamnionitis did not occur in the present study, and cervical laceration was observed in two patients during labor. Administration of antibiotics and tocolysis is a common method to alleviate the complications of cervical cerclage and increase its success (18). There are studies showing that amnioreduction is performed before the procedure to decrease the perioperative complications (rupture of membranes) of cerclage and increase its success (19). In our opinion, this seems contradictory because it could increase the risk of intrauterine infection and decrease the success of cerclage. Further prospective studies on this topic are needed.

NLR and PLR have been studied as prognostic factors in obstetrics and gynecology. Neutrophil granulocytes and lymphocytes are markers that can be easily obtained from a complete blood count (9). NLR has been studied as a prognostic factor in oncologic disease, ovarian torsion, preeclampsia, and acute-chronic inflammatory processes (20-23). Because labor is an inflammatory process, NLR may predict preterm labor. In patients with cervical cerclage, an increased rate of NLR has been associated with preterm labor before 28 weeks (2). PLR is also known to be associated with ovarian, breast, and colorectal cancer (24,25). In our study, we concluded that NLR, MLR, and PLR values have no prognostic significance in predicting the success of prophylactic and emergency cerclage procedures. There are studies in the literature that suggest that NLR can predict spontaneous and late preterm labor, and there are studies that accept 4.7 (2) and 6.2 (26) as cut-off values, although no specific NLR values are available for predicting the above labor. In a clinical study, Song et al. showed that NLR is a valuable factor for predicting pregnancy outcome after cerclage (1). In our study, no significant results were obtained between the prophylactic and emergency cerclage groups when both cut-off values were considered.

The value of mean platelet volume (MPV), one of the complete blood parameters, indicates platelet activity and function. In one study, it was reported that low MPV values indicate the severity of inflammation in various inflammatory diseases. MPV were found to decrease in highly inflammatory diseases such as acute/chronic obstructive pulmonary disease, active rheumatoid arthritis, and familial Mediterranean fever (27). In contrast, İncebıyık et al. reported low MPV in pelvic inflammatory diseases (28). To predict this, we thought that MPV could be checked in addition to NLR and PLR because labor is an inflammatory process. In the present study, MPV was not statistically significant in the emergency cerclage group, but it was lower than in the elective cerclage group. More extensive studies are needed to determine the cut-off value of this parameter. SII is a parameter that reflects the systemic inflammatory response based on the combination of platelet count and neutrophil-to-lymphocyte ratio and can be easily determined from the complete blood count. SII was used by Hu et al. to determine hepatocellular carcinoma and by Hong et al. to determine inflammatory and immune status in patients with squamous cell carcinoma (29). It was found that the SII was more significant than NLR and PLR in assessing poor prognosis. This may be because the SII is based on the number of lymphocytes, neutrophils, and platelets and reflects the balance of host inflammatory and immune status more comprehensively than other scores. Therefore, we thought it might precede other parameters in predicting preterm labor. In our study, the SII was not statistically significant in the emergency cerclage group, but it was higher than that in the elective cerclage group. When the correlation between the SII and the week of labor was analyzed, a statistically significant negative correlation was found. This result suggests that the SII may be useful to indicate poor prognosis. More extensive studies with control groups are needed to determine the cut-off value of this parameter. To our knowledge, this study is the first to use the SII value to determine pregnancy prognosis in cerclage patients. The limitation of the study is that it is a retrospective study at a single center with a limited number of patients.

CONCLUSION

Prophylactic and emergency cerclage procedures can be performed in patients with cervical insufficiency considering their clinical status. Timely placement of a cerclage in appropriate patients results in better neonatal outcomes. The SII can be used as a simple and inexpensive prognostic marker to determine the success and prognosis of cervical cerclage. However, prospective studies with larger groups of patients are needed for the SII to be incorporated into practical application.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was approved by Tokat Gaziosmanpaşa University Clinical Research Ethics Committee (Date: 17.06.2021, Project No: 21-KAEK-161).

Informed Consent: Because the study was retrospective, written informed consent wasnot obtained from patients.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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ORIGINAL ARTICLE
ORİJİNAL ARAŞTIRMA

Investigation of Thrombotic Tendency in Hypertensive Urgencies

Hipertansif Acillerde Trombotik Yatkınlığın Araştırılması

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ABSTRACT

Aim: Hypertension is a significant risk factor for the development of thrombotic events. Mean platelet volume is a marker that correlates closely with platelet activity in uncontrolled hypertension. In this study, we aimed to monitor changes in MPV and other laboratory parameters during a 2-hour follow-up in patients diagnosed with hypertensive urgency and who were administered captopril or amlodipine treatment.

Material and Method: In this study, a total of 100 patients who were considered to have hypertensive urgency in the ED were separated into two groups in a randomized controlled manner. To reduce their blood pressure, 25 mg captopril tablets were orally given to fifty patients and 5 mg amlodipine tablets were orally given to fifty patients. MPV and other laboratory parameters were recorded at 0 minutes, 60 minutes, and 120 minutes.

Results: There was no difference between the two groups in terms of the patients' first MPV values (p>0.05). MPV was increased after 60 minutes in the captopril group. However, despite the evidence of a decrease at the end of 120 minutes, the difference was not found (p>0.05). MPV was decreased in the amlodipine group at the end of 60 and 120 minutes, but no difference was found (p>0.05).

Conclusion: In this study, the decrease in MPV values caused by amlodipine was more remarkable than that caused by captopril. We believe that for patients who present with hypertensive urgency, MPV values should be reduced in the early period for the prevention of thrombosis.

Keywords: Hypertensive urgency, mean platelet volume, thrombosis

ÖZ

Amaç: Hipertansiyon, trombotik olayların gelişimi için önemli bir risk faktörüdür. Ortalama trombosit hacmi, kontrolsüz hipertansiyonda trombosit aktivitesi ile yakından ilişkili bir belirteçtir. Bu çalışmada, hipertansif aciliyet tanısı alan ve kaptopril veya amlodipin tedavisi uygulanan hastalarda 2 saatlik takipte ortalama trombosit hacmi ve diğer laboratuvar bulgularındaki değişiklikleri izlemeyi amaçladık.

Gereç ve Yöntem: Bu çalışmada acil serviste hipertansif ivedi durum olduğu düşünülen toplam 100 hasta randomize kontrollü olarak iki gruba ayrıldı. Tansiyonlarını düşürmek için elli hastaya 25 mg kaptopril tablet ve elli hastaya da 5 mg amlodipin tablet oral yolla verildi. 0 dakika, 60 dakika ve 120 dakikadaki MPV ve diğer laboratuvar parametrelerindeki değişiklikler kaydedildi.

Bulgular: Hastaların başlangıç ortalama trombosit hacimleri açısından iki grup arasında fark yoktu (p>0.05). MPV, kaptopril grubunda 60 dakika sonra yükseldi. Ancak 120 dakika sonunda azalma olduğuna dair kanıtlara rağmen fark bulunamadı (p>0.05). 60 ve 120 dakika sonunda amlodipin grubunda MPV azaldı, ancak fark bulunmadı (p>0.05).

Sonuç: Bu çalışmada, amlodipinin neden olduğu MPV değerlerindeki düşüş, kaptoprilden daha fazla dikkat çekiciydi. Hipertansif ivedi durum ile başvuran hastalarda trombozun önlenmesi için erken dönemde MPV değerlerinin düşürülmesi gerektiğini düşünmekteyiz.

Anahtar Kelimeler: Hipertansif aciller, ortalama trombosit hacmi, tromboz

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INTRODUCTION

Hypertension is an independent risk factor for coronary artery disease (CAD), heart failure (HF), stroke, and renal failure (RF) and can cause death (1). According to the WHO, cardiovascular (CV) causes take the first place among the "preventable causes of death." In addition, hypertension is considered to be the most important disease among the preventable causes of death in the world (2).

Worldwide, a total of 1.38 billion people were reported to have hypertension in 2010. The prevalence of hypertension is 30.1% in women and 31.9% in men (3). Approximately 75% of patients with hypertension are aware of their high blood pressure (BP) and receive appropriate treatment. Proper management of hypertension greatly reduces the risk of stroke and mortality (4). It has been shown that most of the patients who applied to the ED with high BP measurements had an undetected chronic BP elevation (5). Acute elevation of BP is defined as a hypertensive crisis and is classified as a hypertensive emergency (HE) in the presence of end-organ damage and hypertensive urgency (HU) in the absence of it. Accurate diagnosis and appropriate treatment in patients with hypertension are of critical importance (6,7).

Platelets are activated in uncontrolled hypertension and contribute immensely to the increased tendency to thrombosis. MPV is one of the indicators closely related to platelet activity (8). It has been shown that MPV is higher in patients with hypertension (9).

In our study, we aimed to monitor the changes in MPV and other laboratory parameters levels, which is one of the indicators of susceptibility to thrombosis, by controlling the BP in patients who reported to the ED with any complaints, had high BP, and were thought to have HU. In addition, we ensured that patients with high BP were referred to hypertension outpatient clinics and received treatment at the earliest to prevent possible thromboembolic events in the future.

MATERIAL AND METHOD

The study involved 100 patients, whose written consent was obtained, in the Emergency Medicine Clinic of Kayseri Training and Research Hospital between Jun 1, 2013, and March 31, 2014. Nontraumatic patients with hypertension who applied to the ED as an outpatient or were brought in by an ambulance constituted the study group. Patients who were thought to have a diagnosis of HE with end-organ damage were not included in the study, whereas those with a diagnosis of HU were the target population of the study. Before the study, permission was obtained from the Ethics Committee of Erciyes University with the number 2013/332 dated May 7, 2013.

Data Collection and Patient Selection

The study included nontraumatic, conscious patients who came to the ED with any complaints had a systolic BP (SBP) of >140 mmHg and/or a diastolic BP (DBP) of >90 mmHg measured in both arms and were thought to have HU. There was no sex discrimination in the selection of the patients, and all patients with hypertension between the ages of 18 and 90 years who were eligible for the study were included after obtaining their verbal and written consent. The selection of the patients was performed with a controlled, randomized, and double-blind study design. The patients were divided into two groups as captopril angiotensin-converting enzyme inhibitor-ACEI) and amlodipine (calcium channel blocker-CCB) groups of 50 people. The demographic data, vital signs, and examination findings of the participants were recorded. To lower the BP, 25 mg captopril tablets were given to the patients in the first group, with the drug name covered. The name of the drug given to the patients was revealed during their discharge from the ED. With the same method, 5 mg amlodipine tablets were given orally to the second group of patients, and the name of the drug was revealed during their discharge from the ED. Complete blood count, biochemical markers, and lipid levels were measured in the patients belonging to both groups in the hospital laboratory a total of three times, i.e., before the treatment (0 minutes), at the 1st hour, and the 2nd hour. The obtained MPV and other blood parameters were recorded. SBP, DBP, mean arterial pressure (MAP), and heart rate of the patients were also recorded.

At the beginning of the study, those with a history of type II diabetes mellitus, dyslipidemia, CAD, obesity (body mass index>30 kg/m^2), chronic RF, liver failure, stroke, major surgery, or disease in the last 6 months, history of smoking, severe aortic insufficiency or stenosis, or used drugs that affect platelet function (heparin, acetylsalicylic acid, Clopidogrel, or warfarin) were excluded. During the study, which lasted approximately 14 months, 2785 (1.08%) of the 256,945 patients who applied to the ED on an outpatient basis or a stretcher were accepted as having hypertensive attacks. Of these, 1868 patients were excluded from the study according to the exclusion criteria stated above. The remaining 817 (29.3%) were diagnosed with HE and, hence, excluded from the study. After applying the exclusion criteria, 100 patients with HU (3.59%) were finally included in the study.

Statistical Analysis

The SPSS v 21.0(Statistical Package for Social Sciences) program was used for statistical analyses. Kolmogorov-Smirnov test was used for the normality analysis of the variables. Normally distributed continuous variables were presented as mean values and standard deviations. Analysis of parametric variables between groups was done with a student's t-test. Mann-Whitney U test was used for non-parametric variables that did not show normal

distribution. Qualitative variables were summarized as percentages. Chi-square tests were employed to compare categorical expressions. Correlation analysis was performed to determine the relationship between the variables. The paired-sample t-test was used to analyze the distribution of variables over time. Pearson's and Spearman's correlation analysis was used to evaluating the relationship between variables. p<0.05 was accepted as statistical significance in all tests.

RESULTS

Twenty (40%) patients in the captopril group and 13 (26%) patients in the amlodipine group were men. Into the groups in terms of age, sex, biochemical parameters, and blood lipid values were no significant differences (p>0.05), but body mass index (BMI) was significantly higher in the amlodipine group (p<0.05) (**Table 1**).

Table 1. Demographic, biochemical, and blood lipid characteristics of the participants

	Reference range	Captopril group n = 50	Amlodipine group n = 50	p value
Age (years)	18-90	60.2± 13.5	61.8± 13.9	0.56
BMI	18.5-29.9	26.2±2.7	27.3±2.2	0.039
Sex (male)		20(40%)	13(26%)	0.137
Glucose (mg/dL)	70-110	154.7±80.6	143.8±69.9	0.049
BUN (mg/dL)	7-20	18.8±7.2	16.8±6.1	0.132
Creatinine (mg/dL)	0.6-1.3	1.02±0.8	0.8±0.2	0.049
ALT U/L	0-45	21±14.3	20.5±13.4	0.863
AST U/L	0-41	22.7±7.9	23.7±10.8	0.608
Triglyceride (mg/dL)	35-150	202.4±122.2	224±159.7	0.451
Total cholesterol (mg/dL)	0-200	209.1±44.7	216.6±50.5	0.432
LDL cholesterol (mg/dL)	0-135	125.7±33.9	133.4±40.4	0.306
HDL cholesterol (mg/dL)	40-60	45.9±9.5	46.3±8.9	0.552
D- Dimmer (ng/mL)	0-500	193.8±144.6	307.3±550.6	0.162
Troponin I (ng/mL)	0-0.1	0.2±0.04	0.2±0.07	0.736
CK-MB (U/L)	0-25	18.5±11.7	16.4±6.4	0.262

BUN: blood urea nitrogen, ALT: alanine aminotransferase, AST: aspartate aminotransferase, LDL: low-density lipoprotein, HDL: high-density lipoprotein, CK-MB: creatine kinase-myocardial band

Baseline parameters (0 minutes) such as hemoglobin, white blood cell (WBC) count, platelet count, red blood cell distribution width (RDW), platelet distribution width (PDW), hematocrit values, MPV and neutrophil groups/lymphocyte (N/L) ratio there was no significant difference between the groups. (p>0.05) (**Table 2**).

Baseline parameters (0 minutes) such as MPV, N/L ratio, SBP, DBP, pulse pressure (PP), MAP, and heart rate (HR) values there was no significant difference between the groups (p>0.05) (**Table 3**). While there was a significant difference in the captopril group in terms of SBP, DBP, MAP, and PP values at the end of the first hour (p<0.05), there was no significant difference in MPV, N/L ratio, and HR values (p>0.05). In the captopril group, there was a statistically significant difference in N/L ratio, SBP, DBP, MAP, PP, and HR at the end of the 2nd hour (p<0.05), but no significant difference was found in the MPV values (p>0.05) (**Table 4**).

Table 2. Baseline (0 min) biochemical and hematological characteristics of the participants

	Reference range	Captopril group n = 50	Amlodipine group n = 50	P value
Hemoglobin (Hgb)	13-17 g/ dL	14± 1.57	14 ± 1.62	0.975
WBC	4.6-10.2 (10^3/uL)	8.27±2.81	8.72±2.83	0.428
Platelet value	130-400 (10^3/uL)	237.2±58.4	245.9±68.3	0.513
MPV value	7.2-11.1 fL	8.7±1.4	8.9± 1	0.471
PDW value	12 -26%	15.9±2.3	16.1±0.44	0.61
RDW value	37% -54%	39.3±8.9	40.9±3.02	0.243
Hematocrit value (Htc)	40% -52%	41.4±7.64	42.7±4.56	0.316
N/L ratio		3.6±4.4	2.6±1.9	0.145

WBC: white blood cell, MPV: mean platelet volume, N/L: neutrophil /lymphocyte ratio

Table 3. Patients' baseline (0 minutes) blood pressure and heart rate values

	Captopril group n = 50	Amlodipine group n = 50	P value
MPV (fL)	8.7±1.4	8.9± 1	0,471
N/L ratio	3,6±4,4	2,6±1,9	0,145
SBP	172,1±22,3	172±18,1	0,984
DBP	101±12,4	99±11,7	0,411
MAP	120,7±20,9	123,7±12,3	0,378
PP	71,4±19,9	72,6±15,4	0,754
HR	88±20,5	86,8±25,4	0,795

SBP: systolic blood pressure, DBP: diastolic blood pressure, MAP: mean arterial pressure or mean blood pressure, PP: pulse pressure, HR: heart rate

Table 4. Changes in the captopril group at the 1st and 2nd hour compared with the baseline parameters

	Baseline (0 hour) values n = 50	1st-hour values n = 50	2nd-hour values n = 50	P1 value *	P2 value **
MPV (fL)	8,69± 1,4	8.73± 1.5	8,65± 1,5	0,623	0,623
N/L ratio	3,59±4,4	3,76±3,8	4,39±4,9	0,712	0,712
SBP	172±22,3	141,6±20,1	127,7±16,2	<0,001	<0,001
DBP	101±12,4	82,3±12,5	76,7±9,3	<0,001	<0,001
MAP	120,7±20,92	101,7±13,8	91,1±16,6	<0,001	<0,001
PP	71,4±19,9	59,4±16,3	51±14,2	<0,001	<0,001
HR	88±20,5	85,4±14,8	82,3±12,2	0,126	0,126

MPV: mean platelet volume, N/L: neutrophil/lymphocyte ratio, SBP: systolic blood pressure, DBP: diastolic blood pressure, MAP: mean arterial pressure, NB: pulse pressure, HR: heart rate
*Comparison of baseline (0 minutes) parameters and 1st-hour values
** Comparison of baseline (0 minutes) parameters and 2nd-hour values

Furthermore, in the amlodipine group, there was no significant difference in baseline (0. min) MPV, N/L ratio, and HR (p>0.05), but there was a significant difference in SBP, DBP, MAP, and PP values (p<0.05). Although there was a significant difference in the N/L ratio, SBP, DBP, MAP, and PP values at the end of the 2nd hour in the amlodipine group (p<0.05), there was no difference in MPV and HR (p>0.05) (**Table 5**).

Table 5. Changes in the amlodipine group at the 1st and 2nd hour compared with the baseline parameters

	Baseline (0 hour) values n = 50	1st-hour values n = 50	2nd-hour values n = 50	P1 value *	P2 value **
MPV (fL)	8.87± 1	8.85±0.94	8,81± 0,96	0,754	0.450
N/L ratio	2,58±1,96	3,25±2,2	3,25±2,2	0,038	0,038
SBP	172±18,07	136,9±20,9	128,2±18,4	<0,001	<0,001
DBP	99±11,7	79,5±12,9	73,5±10,1	<0,001	<0,001
MAP	123,7±12,3	98,6±14,2	91,6±11,8	<0,001	<0,001
PP	71,4±19,9	59,4±16,3	54,7±13,3	<0,001	<0,001
HR	86,8±25,4	83,2±13,7	82,3±12,1	0,256	0,177

MPV: mean platelet volume, N/L: neutrophil/lymphocyte ratio, SBP: systolic blood pressure, DBP: diastolic blood pressure, MAP: mean arterial pressure, PP: pulse pressure, HR: heart rate
*Comparison of baseline (0 minutes) parameters and 1st-hour values
** Comparison of baseline (0 minutes) parameters and 2nd-hour values

When the MPV change between the groups at the 1st and 2nd hour was examined, although there was a slightly higher decrease in MPV at the end of the 2nd hour in the amlodipine group compared with the captopril group, there was no significant difference (p>0.05) (**Figure 1**).

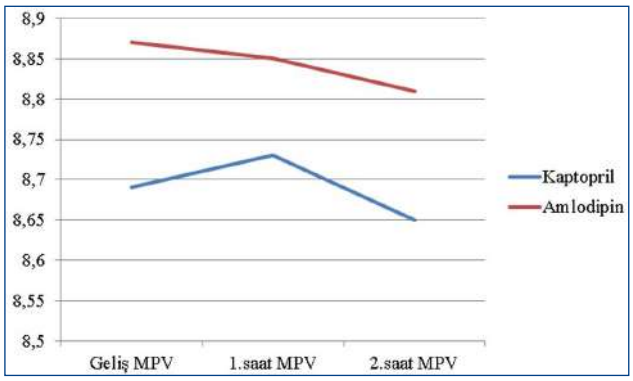

Figure 1. Mean platelet volume change with treatment between Captopril and Amlodipine groups (Baseline MPV, 1st hour MPV, 2nd hour MPV)

In the correlation evaluations, no correlation was found between the MPV change at the 1st hour and the decrease in the SBP value. Moreover, there was no correlation between the MPV change at the 2nd hour and SBP (p>0.05).

DISCUSSION

Hypertension is a serious health problem, and its proper management greatly reduces the risk of stroke and mortality (10). Among more than 145 million emergency patients in the USA each year, the estimated prevalence of high BP is close to 45% (11). It is estimated that globally approximately 1 billion people have hypertension and 7.1 million people die annually (6). In a multicenter study, 1546 of 333,407 patients admitted to the ED were found to have a hypertensive crisis (0.46%), and 391 of these patients (25.3%) were found to have HE (12). Similarly, in our study, 2785 (1.08%) of 256,945 patients who applied to the ED were found to have a hypertensive crisis and 817 (29.3%) of these patients were diagnosed with HE.

In hypertension, platelets are activated for various reasons. Platelets secrete numerous substances, such as β-thromboglobulin, PF4, P-selectin, thrombospondin, and glycoprotein Ia, IIa, and IIIb, which are important mediators of coagulation, thrombosis, inflammation, and atherosclerosis. Platelets of patients with hypertension are more sensitive to angiotensin II and catecholamines, which are potent stimulants of activation and aggregation of circulating platelets (8,13). Furthermore, platelets of patients with hypertension express more alpha2-adrenoceptors (14). MPV alone is also considered a platelet activation marker. Changes in MPV are very important for the early diagnosis of prothrombotic and thrombotic events. Because the larger platelets are metabolically more active, the volume of platelets is one of the determinants of their functions (15). Li Gang et al. reported that higher MPV values were an independent risk factor for the increased incidence of hypertension, supporting the role of platelet activation (16). MPV has been identified as an independent risk factor for hypertension, stroke, myocardial infarction (MI), pulmonary thromboembolism (PE), DM, preeclampsia, and deep vein thrombosis (17-19). In addition, increased MPV levels in patients with hypertension have been established to be an independent predictor of major cardiac side effects (19). In a study on the variability of MPV in the acute stroke phase, it was documented that MPV values increased as the size of the infarction increased (20). In light of all these studies, the changes in baseline MPV values recorded in the ED and the alterations in MPV values during hospitalization support the hypothesis that it can provide an idea about platelet reactivation and prognosis.

With antihypertensive treatment, hypertension-induced thrombocyte activation and prothrombotic status can be improved. It has been supported by many studies that endothelial dysfunction, platelet activation, and hemostasis disturbances are regressed with the treatment of hypertension (8,21). Several studies have indicated that most of the patients admitted to the ED with high BP had an undetected chronic high BP. It is of critical importance to reduce the morbidity and mortality of patients who are thought to have hypertension, with the correct diagnosis and appropriate treatment approach (5,6). In our study, we aimed to reduce the thrombotic process by regressing the existing endothelial dysfunction and platelet activation. This was achieved by facilitating the decrease in MPV in the acute period by administering 25 mg captopril or 5 mg amlodipine. Demirtunc et al. examined the effect of amlodipine on MPV in metabolic

syndrome and found that the daily administration of 10 mg of amlodipine did not have a significant effect on MPV (22). No study has been conducted so far investigating the effects of captopril and amlodipine on MPV. In our study, although there was a tendency of increased MPV in the captopril group at the end of the 1st hour compared with the baseline values of the participants, no statistical significance was found. A slight decrease was observed in the amlodipine group compared with the baseline values of the participants, but no difference was found. The reason for the increase in the MPV value in the captopril group at the end of the 1st hour is unknown, but the MPV value at the end of the 2nd hour decreased compared with the baseline values of the participants. Nonetheless, the decrease was not statistically significant. In the amlodipine group, there was a decrease in the MPV value compared with the baseline values of the participants at the end of the 2nd hour. However, there was no statistically significant difference.

Multifactorial causes, such as genetic factors, obesity, environmental factors such as lifestyle and excessive salt consumption, alcohol consumption, lack of physical activity, and psychosocial factors, play a role in the etiopathogenesis of hypertension (13). In their study, Doğru et al. expressed the relationship between MS components and MPV in 888 patients who were thought to have metabolic syndrome (MS); nevertheless, they did not find a relationship between the two (23). We found similar results in our study. It has also been stated in the literature that increased MPV values may be associated with complications in patients with hyperlipidemia and hypertriglyceridemia (24,25). In our study, there was no significant difference between the groups in terms of total cholesterol, LDL, TG, and other measured biochemical parameters. We think that the effect of these parameters on MPV is not different between groups. In their study, Muscari et al. observed that body fat percentage was associated with high (>8.4 fL) MPV values (26). In our study, patients with a BMI of ≥30 were excluded. There was a significant difference in BMI in the amlodipine group compared to the captopril group. However, in terms of baseline MPV values of the participants, the mean MPV value in the amlodipine group was higher than that in the captopril group. Interestingly, the decrease in MPV was greater in the amlodipine group at the end of the 2nd hour.

Comparing the MPV level between men and women, Bancroft et al. study showed that there was no difference between the two groups. Also, they showed that the MPV level is higher in young people than in the elderly population (27). It has been reported that while sex differences play a role in the prevalence and determination of prehypertension and hypertension, the rate of BP control is similar between women and men on antihypertensive drugs (28). In our study, the mean volume was found to be higher in women in all groups. However, there was no difference in terms of MPV elevation. Therefore, the data obtained in the present study are compatible with those in the literature.

According to the study conducted by Varol et al., the MPV values were found to be higher in patients with hypertension than in those without hypertension. In addition, MPV values of patients with prehypertension were found to be lower than those of patients with hypertension (29). In our study, there was no significant decrease in MPV 2 hours after the treatment in previously hypertensive participants in all groups. In participants who were not previously hypertensive, the decrease in MPV 2 hours after the treatment was greater. However, since there was no statistically significant difference, no conclusion could be drawn from this observation.

Numerous clinical studies have shown a positive correlation between total blood viscosity and the severity of arterial hypertension. Especially, severe hypertension is associated with red blood cell aggregation. On the contrary, ACEI, CCB, and α or β-adrenoreceptor blockers used to lower BP led to a significant improvement in blood flow or rheology. Abnormal blood flow or rheology is not directly related to arterial hypertension. However, it is associated with genetic or environmental factors, such as physical inactivity, obesity, smoking, and, chronic mental stress (18-20). High RDW may be associated with a risk of cardiovascular events, HF, and death in patients with MI (30). In our study, no difference was found in terms of baseline hematological parameters (hemoglobin, WBC, platelet, MPV, PDW, RDW, hematocrit, and N/L ratio).

Restoration of endothelial functions and reduction of increased platelet aggregation is one of the goals of modern antihypertensive therapy in essential hypertension. Therefore, the effect of ACEI inhibitors on endothelial and platelet functions is important. In a study, it was shown that after 1 week and 1 month of perindopril treatment, there was no significant change in thrombomodulin and β-thromboglobulin levels but a significant decrease in platelet aggregation was detected (31). In another study, it was established that ACE inhibitors did not cause a significant alteration in thrombomodulin and β-thromboglobulin levels and that there was no change in platelet count and size (32). None of the studies in the literature has investigated MPV change in the early (2 hours) period of hypertensive emergencies admitted to the ED. Furthermore, no study has been performed on the acute effects of captopril or amlodipine on MPV. This lack of investigations in the field highlights the importance of our research.

CONCLUSION

Identification and early treatment of hypertensive crisis in the ED are very important to prevent complications. MPV, which is an indicator of platelet activation, plays a role in the pathogenesis of complications related to thrombosis in many diseases. We think that lowering MPV in hypertensive emergencies is important in terms of early prevention of thrombosis. A slight decrease in MPV was observed with the use of captopril and amlodipine in the acute phase (the first 2-hour period). Notably, amlodipine, one of the drugs used in our study, lowered MPV more than captopril. However, because of the small number of participants and the short MPV follow-up of 2 hours, the effects of the drugs may differ in case of larger participation and longer follow-up periods. We suggest that amlodipine should be preferred over captopril for the reduction of MPV, which is an indicator of thrombosis, during the early period in patients diagnosed with HU.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was approved by the Erciyes University Clinical Research Ethics Committee with date May 7, 2013 and number 2013/332.

Informed Consent: Because the study was retrospective, written informed consent wasnot obtained from patients.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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ORIGINAL ARTICLE
ORİJİNAL ARAŞTIRMA

Ability of Metabolic Score for Insulin Resistance to Detect Insulin Resistance

İnsülin Direnci için Metabolik Skorun İnsülin Direncini Tespit Edebilme Yeteneği

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ABSTRACT

Aim: To evaluate the usability of metabolic score for insulin resistance (METS-IR), a novel insulin resistance index, in our country and to determine the optimal cut-off value of this index for detecting insulin resistance.

Material and Method: One thousand five hundred sixty seven individuals who participated in our check-up program between 2020 and 2021 were retrospectively evaluated with the patient files for inclusion in the study. Insulin resistance was accepted when HOMA-IR≥2.7. Subjects were divided into 4 quartiles according to their METS-IR levels. Receiver-operating characteristic curve was used to determine the indices' predictive performance and the optimal cut-off value of METS-IR to identify insulin resistance. Binary logistic regression model was used to associate insulin resistance with the varying indexes.

Results: Among the 494 participants, 294 (59.5%) were women and the mean age of the subjects was 48.61±12.90 years. As the quartile of METS-IR increased, prevalence of male gender, metabolic syndrome, fatty liver, and levels of age, blood pressure, cigarette smoking, obesity, and insulin resistance indexes, HbA1c increased (all, p<0.001). METS-IR had the highest predictive value for the presence of insulin resistance (AUC=0.813, p<0.001). The highest sensitivity and specificity were achieved at METS-IR between 39–42. The increase in METS-IR is more significant when compared to other indexes for the prediction of insulin resistance (OR=1.332, p<0.001).

Conclusions: METS-IR can be used as a screening test for insulin resistance in settings such as primary care centers where insulin levels cannot be measured.

Keywords: insulin resistance, insulin resistance indexes, metabolic score for insulin resistance, primary health care.

ÖZ

Amaç: Yeni bir insülin direnci indeksi olan insülin direnci için metabolik skorun (METS-IR) ülkemizdeki kullanılabilirliğini ve bu indeksin insülin direncini tespit etmek için kullanılabilecek optimal kesme değerini belirlemektir.

Gereç ve Yöntem: 2020-2021 yılları arasında check-up programımıza katılmış olan 1567 kişi hasta dosyalarından geriye dönük olarak çalışmaya dahil edilmek üzere değerlendirildi. İnsülin direnci varlığı HOMA-IR≥2.7 kabul edildi. Bireyler METS-IR seviyelerine göre 4 çeyreğe ayrıldı. İndekslerin öngörücü performansını ve insulin direncini öngören METS-IR'in optimal kesme değerini belirlemek için ROC eğrisi kullanıldı. İnsülin direncini indekslerle ilişkilendirmek için ikili lojistik regresyon modeli kullanıldı.

Bulgular: Çalışmaya dahil edilen 494 katılımcının 294'ü (%59.5) kadındı ve olguların yaş ortalaması 48.61±12.90 yıldı. METS-IR çeyreği arttıkça, erkek cinsiyet, metabolik sendrom, yağlı karaciğer prevalansları ve yaş, kan basıncı, sigara içme miktarı, obezite ve insülin direnci indekslerinin ve HbA1c'nin seviyelerinin arttığı saptandı (tümü, p<0.001). METS-IR, insülin direnci varlığı için en yüksek öngörücü değere sahipti (AUC=0.813, p<0.001). En yüksek duyarlılık ve özgüllük METS-IR'in 39–42 değerleri arasında gözlemlendi. METS-IR'deki artış, insülin direncinin öngörülmesi için diğer indekslerle karşılaştırıldığında daha anlamlıdır (OR=1.332, p<0.001).

Sonuç: METS-IR, birinci basamak sağlık merkezleri gibi insülin düzeylerinin ölçülemediği ortamlarda insülin direnci için bir tarama testi olarak kullanılabilir.

Anahtar Kelimeler: insülin direnci, insülin direnci indeksleri, insülin direnci için metabolik skor, birinci basamak sağlık hizmetleri.

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INTRODUCTION

Insulin resistance (IR) leads to impaired glucose disposal by disrupting the biological response of tissues such as liver, muscle, adipose tissue to insulin, and causes metabolic changes secondary to compensatory hyperinsulinemia. It is generally considered to be a root causative factor for obesity-related type 2 diabetes, metabolic syndrome (MetS), non-alcoholic fatty liver disease (NAFLD), polycystic ovary syndrome, and atherosclerotic cardiovascular disease (1).

The hyperinsulinemic-euglycemic clamp test, is the gold standard method for measuring insulin sensitivity. However, it is costly, requires trained personnel, and is invasive (2). Homeostasis model assessment for insulin resistance (HOMA-IR), the most common index used to evaluate IR, is limited by the requirements for insulin measurement, which is not readily available everywhere. In addition, since the half-life of insulin is short, its basal level fluctuates, although it is considered significant in studies using large numbers of patients, a one-time measurement is not considered very reliable for the individual, this situation increases the use of c-peptide, which is produced from proinsulin together with insulin (3). Unfortunately, c-peptide measurement cannot be performed in every center either. Therefore, simpler methods for detecting IR have been sought and the need to develop non-insulin-based IR indices such as triglyceride-glucose index (TyG), triglyceride-high-density lipoprotein cholesterol ratio (TG/HDL), metabolic score for insulin resistance (METS-IR) has emerged (4).

In our country, insulin levels cannot be measured in family health centers that provide primary care. When the fasting blood glucose, which can be measured in these centers, begins to increase, the initial stage of insulin resistance has already passed. To the best of our knowledge, the cut-off values of METS-IR, which may be population specific, have not been studied before in the Turkish population. In this study, we aimed to investigate whether METS-IR is a useful tool for assessing insulin resistance in our population.

MATERIAL AND METHOD

This study included data from individuals who participated in a check-up program between 2020 and 2021 at our tertiary university hospital. The files of 1567 patients were retrospectively evaluated for inclusion in the study and the following parameters were noted: patients' height, weight, waist and hip circumferences, blood pressure values, smoking status, chronic diseases, medications, alcohol consumption, complete blood count, fasting glucose, fasting insulin, lipid values, uric acid, HbA1c, TSH and abdominal ultrasonography results. Patients with the following were excluded from the study: missing data, age <18 years, those with insulin-dependent diabetes mellitus, malignancies, hepatitis, HIV, use of antidiabetic drugs other than metformin, corticosteroids, use of parenteral nutrition, and those consuming alcohol (>20 g/day for women and >30 g/day for men). After consideration of exclusion criteria, four hundred ninety-four subjects were included in the study. MetS was diagnosed using IDF-2006 guidelines (5). According to the results of abdominal ultrasonography, patients with grade one or more adiposity were accepted as having NAFLD. Homeostasis model assessment of insulin resistance (HOMA-IR) was calculated as follows: Fasting Glucose (mg/dL) x Fasting Insulin (uIU/mL)/405 (6). Those with HOMA-IR≥2.7 were considered as having insulin resistance.

The following parameters and indexes were calculated: Body mass index (BMI): Weight in kilograms divided by height in meters squared, Waist/hip ratio (WHR): Waist circumference divided by hip circumference, Waist/height ratio (WHtR): Waist circumference divided by height, TG/HDL: TG (mg/dL) / HDL-C (mg/dL) (7), TyG: Ln (TG (mg/dL) × Fasting Glucose (mg/dL)/2) (8), VAI (women): WC/(36.58 + (1.89 × BMI))) × (TG (mmol/L)/0.81) × (1.52/HDL-C (mmol/L), VAI (men): WC/ (39.68 + (1.88 × BMI))) × (TG (mmol/L)/1.03) × (1.31/HDL-C (mmol/L) (9), METS-IR: Ln ((2 × Fasting Glucose (mg/dL)) + TG (mg/dL)) × BMI)/ (Ln (HDL-C (mg/dL)) (10).

Maltepe University Clinical Research Ethics Committee approved the study (Approval Date: 20.10.2021, Approval Number: 2021/900/105), which was carried out in adherence to the Declaration of Helsinki II.

IBM SPSS Statistics 25.0 software (IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.) was used for statistical analysis. Normality was tested using the Kolmogorov-Smirnov test. Continuous variables with a normal distribution are expressed as the mean±standard deviation, and those without a normal distribution are expressed as the median (min-max). Comparison between the continuous variables in the studied groups was achieved using student t-test, one-way ANOVA test, Mann–Whitney U-test or Kruskal–Wallis tests as appropriate and Chi-square test was used to compare categorical data. The ability of indices to detect IR and the optimal cut-off value of METS-IR to identify IR were determined using receiver operating characteristic (ROC) curve analysis. Binary logistic regression models were used to associate IR and MetS, using IR and MetS as the dependent and the indexes as the independent variables. A p-value ≤ 0.05 was taken as statistically significant.

RESULTS

Among the 494 participants, 294 (59.5%) were women and 200 (40.5 %) were men. The mean age of the subjects was 48.61±12.90 years. The prevalence of IR was 30.57% (n=151). Table 1 shows a comparative analysis of anthropometric, clinical, and biochemical characteristics between IR and non-IR groups. In subjects with IR, a higher

prevalence of male gender, MetS, NAFLD were observed as well as higher levels of blood pressure, WC, WHR, WHtR, BMI, triglyceride, uric acid, HbA1c, HOMA-IR, Tg/HDL, TyG, VAI, METS-IR and lower levels of HDL-C (all p<0.001). There was no statistically significant difference between the groups in terms of age, cigarette smoking, TSH or LDL-C values (**Table 1**).

The participants were categorized into four quartiles according to METS-IR, as shown in **Table 2**. As the quartile of METS-IR increased, prevalence of male gender, MetS, NAFLD and levels of age, blood pressure, cigarette smoking, WC, WHR, WHtR, BMI, HbA1c, HOMA-IR, Tg/HDL, TyG, and VAI increased (all, p<0.001).

Table 1: Comparison of Anthropometric, Clinical and Biochemical Characteristics of Patients with and without Insulin Resistance

	HOMA-IR <2.7 (n=343)	HOMA-IR ≥ 2.7 (n=151)	P value
Gender (F/M) (n)	229/114	65/86	<0.001
Age (years)	48.30±13.21	49.33±12.24	0.416
MetS (-/+)	267/76	56/95	<0.001
NAFLD(-/+)	156/173	33/113	<0.001
Smoking(pack-years)	8 (0-100)	10 (0-105)	0.110
SBP (mm Hg)	120.0 (90.0-220.0)	129.5 (90.0-161.0)	<0.001
DBP (mm Hg)	78.5 (58.0-110.0)	80.0 (60.0-110.0)	<0.001
WC (cm)	88 (61-130)	101 (66-160)	<0.001
WHR	0.86 (0.44-1.00)	0.94 (0.66-1.07)	<0.001
WHtR	0.52 (0.37-0.81)	0.59(0.40-0.94)	<0.001
BMI (kg/m2)	25.92±4.26	29.96±4.30	<0.001
Total Cholesterol (mg/dL)	223.44±47.87	218.84±40.83	0.305
HDL-C (mg/dL)	59 (11-126)	45 (25-87)	<0.001
LDL-C (mg/dL)	140.50±42.73	139.77±37.29	0.857
Triglyceride (mg/dL)	97 (13-835)	143 (31-531)	<0.001
Uric Acid (mg/dL)	4.52±1.27	5.66±1.42	<0.001
TSH (uIU/ml)	1.76 (0.01-24.00)	1.59 (0.05-13.20)	0.108
HbA1c (%)	5.5 (4.4-7.0)	5.6 (4.6-6.9)	0.001
HOMA-IR	1.63 (0.39-2.69)	3.49 (2.70-13.80)	<0.001
Tg/HDL	1.60 (0.19-28.79)	2.95 (0.44-20.42)	<0.001
TyG	8.46 (6.38-11.45)	8.91(7.35-10.47)	<0.001
VAI	2.79 (0.36-40.34)	4.90 (0.72-30.72)	<0.001
METS-IR	36.71±7.77	46.43±8.22	<0.001

Abbreviations: MetS: metabolic syndrome, NAFLD: non-alcoholic fatty liver disease, SBP: systolic blood pressure, DBP: diastolic blood pressure, WC: waist circumference, WHR: waist hip ratio, WHtR: waist-to-height ratio, BMI: body mass index, HOMA-IR: homeostatic model assessment for insulin resistance, Tg/HDL: triglyceride to HDL-C ratio, TyG: triglyceride to glucose ratio, VAI: visceral adiposity index, METS-IR: metabolic score for insulin resistance

Table 2: Characteristics of Study Participants According to METS-IR Index Quartiles.

	Q1	Q2	Q3	Q4	P value
METS-IR	(21.99-32.6)	(32.71-39.26)	(39.27-45.60)	(45.66-72.82)	
Gender (F/M) (n)	98/25	84/39	58/66	54/70	<0.001
Age (years)	42.46±12.35	49.61±12.37	51.72±13.44	50.67±11.47	<0.001
MetS (-/+)	119/4	95/28	72/52	37/87	<0.001
NAFLD(-/+)	97/22	49/68	34/86	9/110	<0.001
Smoking(pack-years)	5 (0-60)	8 (0-55)	7 (0-100)	15 (0-105)	0.012
SBP (mmHg)	110 (90-160)	120 (90-180)	120 (90-220)	126 (90-160)	<0.001
DBP (mmHg)	70 (58-100)	80 (60-102)	80 (60-110)	80 (60-110)	<0.001
WC (cm)	76 (61-102)	88 (70-113)	97 (69-130)	109 (72-160)	<0.001
WHR	0.78 (0.44-0.95)	0.86(0.75-1.00)	0.91(0.68-1.07)	0.97 (0.66-1.06)	<0.001
WHtR	0.45 (0.37-0.55)	0.53 (0.44-0.66)	0.56(0.42-0.77)	0.64(0.41-0.94)	<0.001
BMI (kg/m2)	21.81±2.07	25.74±1.74	28.30±2.19	32.70±3.48	<0.001
HbA1c (%)	5.3(4.5-6.5)	5.5(4.5-6.7)	5.6 (4.4-6.8)	5.6(4.8-7.0)	<0.001
HOMA-IR	1.38(0.39-3.01)	1.77 (0.50-5.16)	2.24 (1.03-6.98)	3.22(0.96-13.80)	<0.001
Tg/HDL	1.03(0.19-4.55)	1.69 (0.53-10.90)	2.49(0.79-13.32)	3.62(0.71-28.79)	<0.001
TyG	8.06(6.38-9.41)	8.49(7.20-9.86)	8.73 (7.76-10.34)	9.08(7.76-11.45)	<0.001
VAI	1.80(0.36-6.85)	2.95(0.79-20.31)	4.09(1.26-17.38)	5.85(1.45-40.34)	<0.001
METS-IR	28.70±2.60	35.92±1.77	42.30±1.84	51.67±5.62	<0.001

Abbreviations: METS-IR: metabolic score for insulin resistance, MetS: metabolic syndrome, NAFLD: non-alcoholic fatty liver disease, SBP: systolic blood pressure, DBP: diastolic blood pressure, WC: waist circumference, WHR: waist hip ratio, WHtR: waist-to-height ratio, BMI: body mass index, Tg/HDL: triglyceride to HDL-C ratio, TyG: triglyceride to glucose ratio, VAI: visceral adiposity index.

The highest predictive value of IR amongst the indexes was found to be for METS-IR (AUC=0.813, p<0.001). The remaining obesity and insulin resistance indexes also showed a significant predictive value for the presence of IR with AUC between 0.771 for WC and 0.725 for TyG (**Figure 1**, **Table 3**).

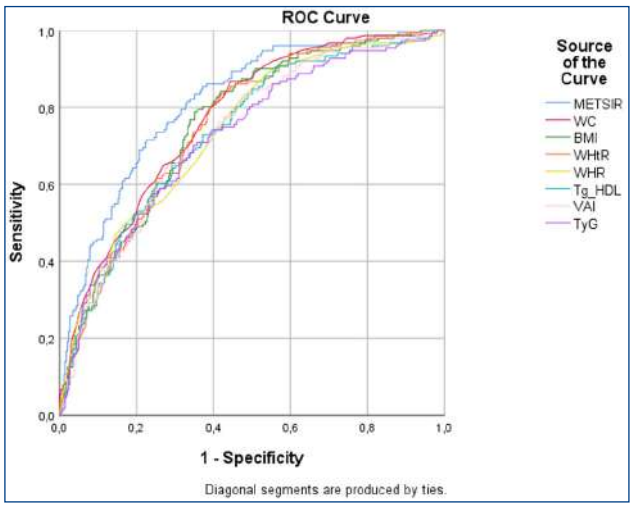

Figure 1: ROC curve of indexes to identify insulin resistance.

Abbreviations: ROC: receiver operating characteristic, METS-IR: metabolic score for insulin resistance, WC: waist circumference, BMI: body mass index, WHtR: waist-to-height ratio, WHR: waist hip ratio, Tg/HDL: triglyceride to HDL-C ratio, TyG: triglycerides–glucose index, VAI: visceral adiposity index.

Table 3: AUC comparison of indexes to identify insulin resistance.

INDEX	AUC (95% CI)	P value
METS-IR	0.813(0.774-0.853)	<0.001
WC (cm)	0.771(0.728-0.813)	<0.001
BMI (kg/m2)	0.757(0.713-0.801)	<0.001
WHtR	0.753(0.709-0.797)	<0.001
WHR	0.740(0.693-0.786)	<0.001
Tg/HDL	0.736(0.689-0.783)	<0.001
VAI	0.733 (0.687-0.780)	<0.001
TyG	0.725(0.676-0.773)	<0.001

A p-value ≤ 0.05 was taken as statistically significant. Abbreviations: AUC: area under the curve, CI: confidence interval, METS-IR: metabolic score for insulin resistance, WC: waist circumference, BMI: body mass index, WHtR: waist-to-height ratio, WHR: waist hip ratio, Tg/HDL: triglyceride to HDL-C ratio, TyG: triglycerides–glucose index, VAI: visceral adiposity index.

ROC curve was used to detect the optimum cut-off values for the highest sensitivity and specificity of METS-IR in predicting IR. At a cut-off value of 39.27, METS-IR had a sensitivity of 83.4% and a specificity of 65%; cut-off value of 39.69, METS-IR had a sensitivity of 81.5% and a specificity of 67%; cut-off value of 42.2, METS-IR had a sensitivity of 71.5% and a specificity of 77.5% (**Table 4**).

When the binary logistic regression model was used to associate MetS and IR as the dependent variables with indexes in **Figure 1** as the independent variables, although TyG and VAI creates a higher risk of MetS than METS-IR, the increase in METS-IR creates the highest risk of IR than the increase in other indexes (**Table 5**).

Table 5: Logistic Regression Models to Identify MetS and IR.

	MetS		IR	
	p	OR %95 CI	p	OR %95 CI
METS-IR	<0.001	1.332 (1.182-1.502)	<0.001	1.332 (1.189-1.492)
BMI (kg/m2)	<0.001	0.596 (0.480-0.741)	<0.001	0.695 (0.570-0.847)
WC	<0.001	1.080 (1.040-1.122)	0.006	1.046 (1.013-1.080)
TyG	<0.001	12.933 (5.108-32.747)	0.075	1.964 (0.934-4.133)
VAI	0.001	1.743 (1.252-2.427)	0.281	0.873 (0.683-1.117)
Tg/HDL	<0.001	0.293 (0.176-0.487)	0.564	0.888 (0.594-1.328)
HOMA-IR	0.045	1.291 (1.006-1.656)		

Binary logistic regression models were used to associate MetS and IR diagnosis as the dependent variables with insulin resistance and adiposity indexes as the independent variables. A p-value ≤ 0.05 was taken as statistically significant. Abbreviations: 95% CI = 95% confidence interval, BMI: body mass index, IR: Insulin resistance, MetS: metabolic syndrome, METS-IR: metabolic score for insulin resistance, OR: odds ratio, Tg/HDL: triglyceride to HDL-C ratio, TyG: triglycerides–glucose index, VAI: visceral adiposity index, WC: waist circumference.

DISCUSSION

METS-IR, a new insulin resistance index developed by Bello-Chavolla et al., is calculated using BMI, fasting glucose, triglyceride, and HDL-C measurements. It has been verified using the hyperinsulinaemic-euglycaemic clamp test, which is the gold standard method for measuring insulin resistance (10). As it does not require insulin measurement, which is not readily available in primary care centers, METS-IR may have an important role for primary prevention of metabolic diseases such as diabetes mellitus, through screening of IR. We evaluated the use of METS-IR for detecting IR and its optimal cut-off value in the Turkish population as METS-IR has been shown to be associated with IR in other ethnic groups and has been proven by several studies to predict metabolic disorders. METS-IR was found to have a better diagnostic performance than WC, BMI, WHtR, WHR, Tg/HDL, VAI and TyG indexes. The cut-off values of 39.27, 39.69 and 42.20 were found to be more associated with the IR. We observed that the increase in METS-IR created a higher risk of IR than the increase in other indices.

Table 4: The Cut-off Values of METS-IR to Identify Insulin Resistance.

	Cut-Off	Sensitivity (%)	Specificity (%)	AUC	95% CI	P
METS-IR	39.27	83.4	65	0.813	0.774-0.853	<0.001
METS-IR	39.69	81.5	67			
METS-IR	42.20	71.5	77.5			

The optimal cut-off value was obtained as the maximum sensitivity and specificity. A p-value ≤ 0.05 was taken as statistically significant. METS-IR: metabolic score for insulin resistance and AUC: area under the curve. 95% CI = 95% confidence interval.

At a study which included 12290 non-obese Japanese participants that were followed up for 5.5 years, investigated associations between the METS-IR and the risk of type 2 diabetes mellitus. Diabetes occurred in 176 participants and the risk of developing diabetes was reported to increase with the quartile of change in the METS-IR index, even after adjustment for multiple potential confounding factors. The HRs for the Q4 group versus the Q1 group was found 4.01 (11).

TyG, Tg/HDL and the METS-IR indexes were compared for the evaluation of metabolic status in 30291 individuals in China. Although the TyG index was more significant, all three indices were found to have high sensitivity and specificity for the identification of metabolic pathologies. Similar to this study, in the regression analysis, in which the relationship between TyG, Tg/HDL, METS-IR, BMI, WC, VAI and HOMA-IR with the presence of metabolic syndrome was examined, the highest significant value was observed with the TyG index (12).

Zhang et al. investigated the association of METS-IR and its six-year change with risk of incident diabetes mellitus in a Chinese population. They include 12107 participants with the mean age of 50.48 years. After six years of follow-up, type 2 diabetes mellitus developed in 758 participants. An increasing risk of incident type 2 diabetes mellitus with increasing METS-IR levels and six-years METS-IR changes by age, sex, and basal fasting glucose levels were found. The mean of baseline METS-IR levels were 42.19 in participants with diabetes, while it was 37.05 in those without diabetes. In our study, the METS-IR level of the group with insulin resistance was 46.43, while that of the group without insulin resistance was 36.71, in line with this study (13).

In a study of 142005 patients in which the relationship between TG/HDL, TyG, METS-IR indices and hypertension was investigated, and only METS-IR showed a significant correlation with blood pressure level. In our study, increased blood pressure levels were observed as the METS-IR quartiles increased (14).

Limitations of the Study

Our study had some limitations: First, the diagnosis of IR was made with HOMA-IR and not with the euglycemic–hyperinsulinemic clamp test, which is the gold standard. Secondly, our study is cross-sectional. However, we plan to follow the patient population with further studies to observe the diabetes incidence. Thirdly, the number of patients in our study is low because we do not measure insulin levels in every patient, therefore, we may not be able to generalize our findings to the entire population. However we believe that our study has given important and valuable preliminary data.

CONCLUSION

Inability to measure insulin levels in family health centers, which is the main center of preventive medicine, can hinder the early diagnosis of IR. Detection of IR, which as being a leading cause of future metabolic disorders, with simple anthropometric and biochemical methods can enable early precautions. Although there is a need for future studies on this subject, it has been revealed that METS-IR values between 39 – 42 may be associated with IR, especially in cases where insulin measurement cannot be performed, the use of this index can provide us with early diagnosis.

ETHICAL DECLARATIONS

Ethics Committee Approval: Maltepe University Clinical Research Ethics Committee approved the study (Approval Date: 20.10.2021, Approval Number: 2021/900/105).

Informed Consent: Because the study was retrospective, written informed consent wasnot obtained from patients.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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ORIGINAL ARTICLE
ORİJİNAL ARAŞTIRMA

The Child Protection Team in a Tertiary Care Center in Turkey: There Years Experience

Türkiye'de Eğitim ve Araştırma Hastanesinde Çocuk Koruma Birimi: Üç Yıllık Deneyim

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ABSTRACT

Introduction: The Child Protection Unit was established to minimize the traumatization of children who have been abused and neglected and to carry out all procedures in the best interest of the child at Gulhane Training and Research Hospital.The purpose of this article is to retrospectively review the case series followed by Gulhane Child Protection Unit's (GÜLÇOK) and to describe the establishment and functioning of the first child protection team structured among hospitals affiliated with the Ministry of Health.

Material and Method: In this study, 134 cases with the diagnosis and suspicion of abuse, neglect and admitted to GÜLÇOK between 2019 and 2022 were retrospectively analyzed.

Results: A total of 134 children, 86 (64.2%) girls and 48 (35.8%) boys, aged 1 day to 17 years were studied in GULÇOK. The mean age of the children evaluated in GULÇOK was 9.87±5.99 years. While girls are exposed to more physical and sexual abuse than boys, boys are exposed to more neglect (53.3%) (p=0.005). The rate of neglect at age 0-2 and sexual abuse rate at age 13-18 (72.7%) were statistically higher (p=0.001).

Conclusion: The perception of child abuse and neglect as a problem in Turkiye is still very recent. The number of child protection facilities and centers are increasing. However, these hospital-based centers are mostly located in university hospitals. Child protection units to be planned in hospitals affiliated to the Ministry of Health will not only serve more children, but also contribute to more accurate determination of the frequency of child abuse and neglect in Turkey. In addition, increasing the number of departments will ensure communication between departments, increase knowledge and experience regarding the interventions to be carried out, and strengthen the equipment of physicians in this regard.

Keywords; Abuse, neglect, child protection team, child

ÖZ

Giriş: Sağlık Bakanlığına bağlı Gülhane Eğitim ve Araştırma Hastanesinde (GEAH) çocuk koruma birimi istismara ve ihmale uğrayan çocukların süreçte örselenmesini en aza indirmek ve tüm işlemlerini çocuğun yüksek yararını gözeterek gerçekleştirmek amacıyla kurulmuştur. Bu makalenin amacı Gülhane Çocuk Koruma Birimi (GÜLÇOK) tarafından takip edilen olgu serisinin retrospektif olarak incelenmesi ve Sağlık Bakanlığına bağlı hastaneler arasında yapılandırılmış ilk çocuk koruma ekibinin kurulması ve uygulamalarının işleyişini tanımlamaktır.

Gereç ve Yöntem: Bu çalışmada 2019 ile 2022 tarihleri arasında GÜLÇOK'a başvuran istismar, ihmal tanısı ve şüphesi olan 134 olgu retrospektif olarak incelendi.

Bulgular: Bu çalışmada çocuk istismarı tanısı alan yaşları 1 günlük-17 yaş arasında değişen 86'sı (%64,2) kız, 48(%35,8)'i erkek toplam 134 çocuk değerlendirildi. Çocukların yaş ortalamaları 9.87±5.99 idi. Kız çocukları erkek çocuklara göre daha fazla fiziksel ve cinsel istismara maruz kalırken, erkek çocukları kız çocuklara göre daha fazla ihmale maruz kalmaktadır (%53,3)(p=0.005). 0-2 yaşta ihmal oranı ve 13-18 yaşta ise cinsel istismar oranı (%72.7) istatistiksel olarak daha yüksektir (p=0.001).

Sonuçlar: Türkiye'de çocuk istismar ve ihmalinin sorun olarak algılanması çok yenidir. Çocuk koruma birimi ve merkezlerinin sayısı artmaktadır. Ancak hastane temelli bu merkezler daha çok üniversite hastanelerinde bulunmaktadır. Sağlık Bakanlığına bağlı hastanelerde planlanacak çocuk koruma birimleri hem daha fazla sayıda çocuğa hizmet verecek hem de Türkiye'de çocuk istismarı ve ihmali sıklığını çok daha doğru tespit edilmesine katkıda bulunacaktır. Bunun yanı sıra birimlerin sayıca artması birimler arası bir iletişimin, dolayısıyla olgulara yapılacak müdahalelerde bilgi birikimi ve deneyimin artmasını, hekimlerin bu konudaki donanımının güçlenmesini de sağlayacaktır.

Anahtar Kelimeler: Istismar, ihmal, çocuk koruma birimi, çocuk

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İNTRODUCTION

Children have been abused and neglected throughout history, being subjected to events such as killing, abandonment, sacrifice, mutilation, strict disciplinary rules, and exploitation through child labor. The perception of child abuse and neglect as a problem as old as human history (1). Child abuse and neglect are affecting more and more children worldwide and remain a serious and significant problem. According to the World Health Organization (WHO), child maltreatment includes all forms of physical and emotional abuse, sexual abuse, neglect, and exploitation that are actually or potentially harmful to the child's health, development, or dignity (2,3).

The World Health Organization's (WHO) World Violence and Health Report in 2002 and the World Health Assembly in 2003 highlighted that child maltreatment is a public health problem (2).

It is estimated that 1 in 15 people under 18 years of age worldwide are victims of maltreatment each year (4). Cross-national comparison of child maltreatment prevalence rates and corresponding statistics is difficult because of many factors, including differences in legal frameworks and recording systems. In their study, Gilbert et al. determined the cumulative prevalence of maltreatment using self-reports from children aged 0-18 years in high-income countries (5). In this study, physical abuse was found to be 15-35%, sexual abuse 15-30% in girls and 5-15% in older children, emotional abuse 4-9%, and neglect 6-12%. The studies conducted in recent years show that the cases of child maltreatment in developed countries are gradually decreasing (5,6).

In Turkiye, according to Child Abuse and Domestic Violence Research, 51% of children between the ages of seven and eighteen are exposed to emotional abuse, 45% to physical abuse, and 25% to neglect(7).

Child abuse and neglect have been recognized as a health problem since 1995 when the Convention on the Rights of the Child came into force in Turkiye. In the last twenty-five years, various institutions and organizations have been activated in Turkiye to prevent child abuse and neglect and to treat their possible consequences. The Child Protection Units established in the University Hospitals have played a pioneering role in this regard(8).These facilities include pediatricians, physicians in fields such as child and adolescent psychiatry, pediatric surgery, forensic medicine, orthopedics and traumatology, ophthalmology, and social workers and nurses(8).

Besides the Child Protection Units, Child Monitoring Centers (CMC) established under the coordination of the Ministry of Health. CMC is an organization that established with the aim of carrying out procedures for child victims of abuse. Currently, there are 62 in CMC 59 provinces in Turkiye (9,10). Since there are no child protection departments in hospitals under the Ministry of Health, when doctors encounter a case of sexual abuse, they refer the child to the Child Monitoring Center with the support of the hospital's social services department. In the same way, an intervention plan is created by informing social workers for children who need social support or health interventions. For abused children who show signs of physical abuse, they contact the medical examiner's office, if available, otherwise the hospital police. (11).

In the absence of a multidisciplinary team, this situation leads to the child being traumatized in all assessments and reports, and sometimes problems arise in the decision to report. The Child Protection Unit (GÜLÇOK) at Gulhane Education and Research Hospital(GEAH), affiliated with the Ministry of Health, was established to minimize the traumatization of children who have been abused and neglected and to carry out all procedures in the best interest of the child. The purpose of this article is to retrospectively review the case series followed by GÜLÇOK and to describe the establishment and functioning of the first child protection team structured among hospitals affiliated with the Ministry of Health.

MATERIAL AND METHOD

This study retrospectively analyzed 134 cases referred to the GÜLÇOK, between 09/30/2019 and 08/30/2022 that were diagnosed with abuse and neglect. The study was approved by the Clinical Research Ethics Committee of the Gulhane Training and Research Hospital.

Age, sex, family characteristics, family risk factors, types of maltreatment, reporting unit, termination of maltreatment, and sociodemographic characteristics of cases were recorded. Characteristics of neglect, physical abuse, and sexual abuse were examined by age group, gender, reporting clinic, and child protective services decisions.

Descripitions

The following definitions were considered in determining the types of abuse.

1. Physical abuse of infants or children is defined as harm to physical health, development, and dignity through the intentional use of physical force by parents, caregivers, or others. This includes hitting on the head, choking, restraining hands and feet, sticking needles into the body, hitting, slapping, biting, pinching, pushing, kicking, hitting with an object, burning, scalding, contact of the body with harmful chemicals, shaking, overexertion, etc.(1)
2. Sexual abuse: Sexual abuse of children (SA) occurs when a child is subjected to sexual acts of which he or she cannot developmentally approve, the consequences of which he or she does not understand, or against which he or she resists because of legal

social taboos on sexual gratification by an adult or a child older than himself or herself.

3. Emotional abuse: includes caregiver behavior that negatively impacts the child's mental health and development, and failure to provide an appropriate and supportive environment for the child's healthy development.
4. Neglect: The failure of parents to meet the needs of their children, even though they have the power to meet their needs for healthy development (2).

About GÜLÇOK

GEAH is one of the largest training research hospital hospitals in Ankara and the region. It is also the hospital of the Faculty of Medicine of the University of Health Sciences. The number of patients in the pediatric emergency department of GEAH (largest and most crowded hospital in the region) was about 97,000 in 2019.

GULÇOK was established within Gulhane Training and Research Hospital with the approval of the Chief Medical Officer on September 30, 2019. As a result of the effort to establish a Child Protection Unit, it was determined that it could be established within Training and Research Hospitals with the approval of the Chief Medical Officer under the "Operating Rules for Residential Treatment Facilities" dated 10/9/1982 (3). The unit consists of personel who work, volunteer, or are assigned to the Gulhane Training and Research Hospital. The medical staff shall consist of at least one faculty member and/or specialist working in the clinics of child health and diseases (social pediatrics), child and adolescent psychiatry, forensic medicine, pediatric surgery, and psychiatry. In addition, consultation requests from departments such as orthopedics, neurosurgery, dermatology, ophthalmology, otolaryngology, and plastic surgery were answered on a voluntary basis, and a contribution was made to the child protection department as needed.

Statistics

Normality control was performed with Kolmogorov-Smirnov tests, histogram, Q-Q plot, and boxplot diagrams. Data were expressed as mean, standart deviation, median, minimum, maximum, frequency, and percentage. Data with normal distribution were analyzed with Student's t-test, and variables between two groups were analyzed with Mann Whitney U-test. Nominal variables were analyzed with Chisquare tests. Analyzes were performed using the SPSS 22 software program. The significance threshold was taken as $p < 0.05$ and bidirectional.

RESULTS

A total of 134 children, 86 (64.2%) girls and 48 (35.8%) boys, aged 1 day to 17 years were studied in GULÇOK. 5 (3.7%) of the children registered with suspicion of abuse and neglect were foreign nationals.

Sociodemographic Data

The mean age of the children evaluated in GULÇOK was 9.87±5.99 years. Although 6% (n=8) of the children who approached and were referred to GULÇOK were of school age, they did not attend school. 15.7% (n=21) of the children had a diagnosed illness.

The 47.8% (n=64) of the families were nuclear families, 10.5% (n=15) were extended families, and 32% (n=43) were divorced. More than half of the children (n=78; 58.2%) lived with their families and only two children were under the protection of the child protection unit of social services. The mean number of siblings (± standard deviation) of the children was 1.68±1.59 years (**Table 1**).

Tablo1. Demographic data of abused and neglected children.

	(n, %)
Age (years) (mean±standard deviation)	9.87±5.99 (min:0 max:18)
Number of siblings (mean±standard deviation)	1.68±1.59 (min:0 max:9)
Nationality (n. %)	
Turkish Citizen	129 (96.3)
Foreign	5 (3.7)
Gender (n. %)	
Male	48 (35.8)
Female	86 (64.2)
Education (n. %)	
Baby	31 (23.1)
Pre-school	14 (10.4)
Primary school	28 (20.9)
Middle School	16 (11.9)
High school	36 (26.9)
No Education	8 (6.0)
Disease history (n. %)	
No	113 (84.3)
Yes	21 (15.7)
Family structure (n. %)	
Single parent*	8 (5.9)
Nuclear family	64 (47.8)
Extended family	14 (10.5)
Divorced/separated	43 (32.1)
Child Protection Service**	2 (1.5)
Unknown	3 (2.2)
Family Risk Factors (n. %)	
Domestic violence	17 (12.7)
Mental illness or suicide	18 (13.4)
Alcohol problem	10 (7.5)
Drugs	4 (3.0)
Crime/ prison	1 (0.8)
Child who lives with (n. %)	
With family	78(58.2)
Child Protection Service**	2 (1.5)
With relative	8 (6.0)
Mother/'s and boyfriend	4 (3.0)
Mother	26 (19.4)
Father and stepmother	1 (0.7)
Mother and stepdad	4 (3.0)
Father	6 (4.5)
Unknown	5 (3.7)

* Parents unmarried/One died, ** Ministry Of Family, Labor And Social Services

The mean age of mothers is 36.9±9.3 (min:17 max:56), and that of fathers is 40.3±8.9 (min:19 max:58). 21.6% (n=29) of mothers are employed. On the other hand, 24.8% (n=29) of fathers are unemployed. The mothers of the employed parents mostly work in the private sector (10.4%) and the fathers (26.9%) work in their own businesses. When evaluating the educational level of the parents, it was found that 26.9% of the mothers have an elementary school degree and 26.1% of the fathers have a high school degree (**Figure 1**).

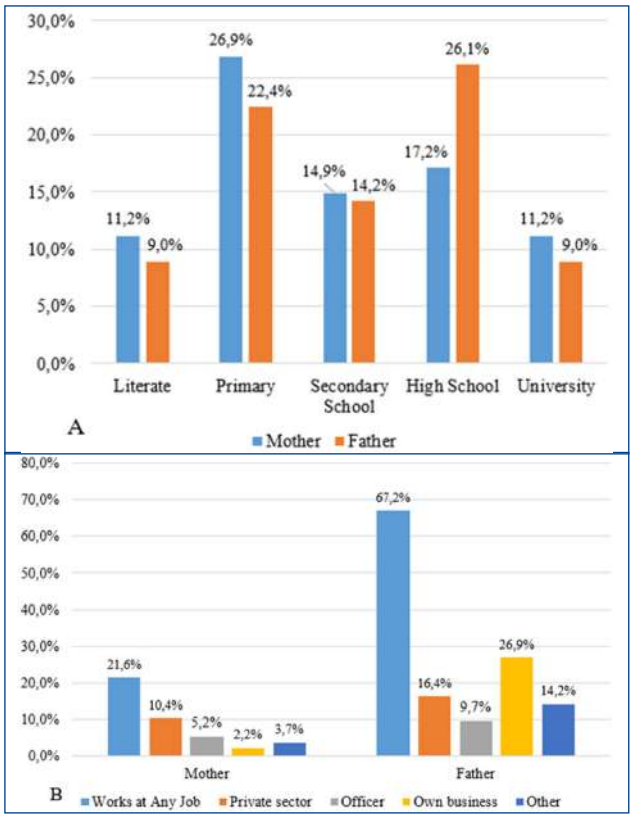

Figure 1. Education (A) and job (B) status of parents

Features of Abuse and Neglect

Almost all requests to the department (97.75%) came from within the hospital. Only three families from outside the hospital approached the department. The outcome of the investigations was that 26 (19.4%) children were not diagnosed with abuse or neglect. Sexual abuse (33;24.8%), emotional abuse (23;17.4%) and physical abuse (14;10.4%) were the most frequently diagnosed cases. Some cases were classified as children with suspected abuse or neglect. Sexual abuse was diagnosed in 15 (11.2%) children and physical abuse was suspected in 10 (7.5%) children (Figure 2). Of the children who were victims/suspected victims of abuse and neglect, 2 (1.6%) had a history of substance abuse and 5 (20%) had a history of previous abuse. It was noted that most inquiries to the agency were made by parents or their relatives. The most common abuser was the father at 22% (21). The most common referral was from the Child and Adolescent Psychiatry (CAP) clinic, which referred 62 (46.6%) children (**Table 2**).

Tablo 2. Findings of Abuse and Neglect

	(n, %)
Time to hospital admission (days) after abuse (mean±standard deviation)	564.95±1040.03
Reported Unit (n=134)	
Pediatric Emergency	33 (24.80)
Pediatrics Clinic	9 (6.80)
Child Mental Health Clinic	62 (46.60)
Gynecology Clinic	5 (3.80)
Others*	21 (15.65)
Applied directly	3 (2.25)
Substance abuse (n=133)	
No	131 (98,4)
Yes	2 (1.6)
History of previous abuse (n=18)	
No	107 (90.7)
Yes	11 (9.3)
Child Protection unit Assessment	
No notification	26 (19,4)
Prosecutor's Office(PO)	44 (32,8)
Ministry Of Family, Labor And Social Services (MFLSS)	59 (44.0)
PO and MFLSS	4 (3,0)

*,paediatric subspecials, dermatology, forensic medicine

In all cases of physical abuse, stab and bite wounds, nail marks, and ecchymosis were found on the body. Only one case was diagnosed with the shaken baby syndrome. The patient diagnosed with the shaken baby syndrome was cared for in an incubator for 28 months and was hospitalized for a long time at 2 months of age because of bite wounds, retinal hemorrhages, and subdural hematomas (**Figure 2**).

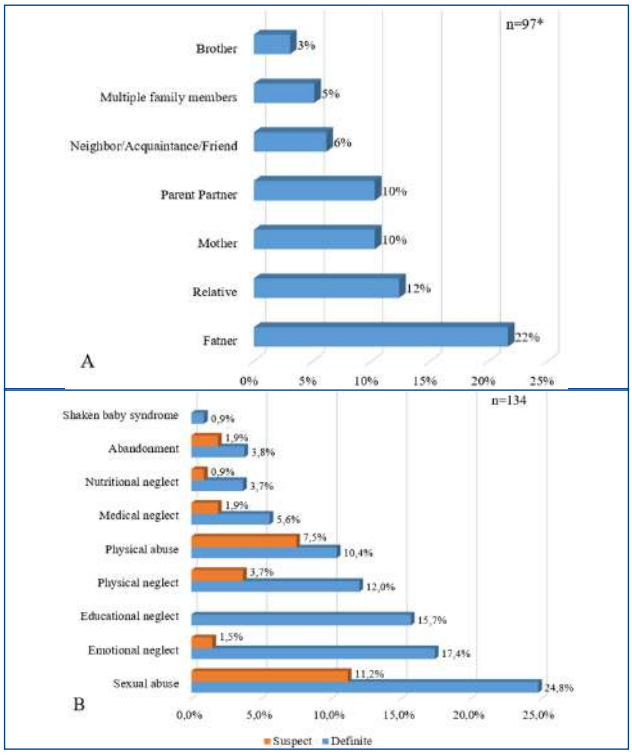

Figure 2. Relationship of Alleged Perpetrator to Child(A) Distribution of Cases According to Type of Abuse (B)

Comparison of related factors based on different types of abuse

When the gender distribution by types of maltreatment was examined, it was found that girls were more often physically and sexually abused (71% and 85%, respectively) than boys. The cases of neglect were higher in boys than in girls (53.3%) (p=0.005) (**Table 3**).

Tablo 3. Comparison of related clinical factors based on different types of abuse.

	Neglect n=30	Physical Abuse n=14	Sexual Abuse n=33	p
Gender				
Female (n, %)	14 (46.7)	10 (71.4)	28 (84.8)	0.005
Male (n, %)	16 (53.3)	4 (28.6)	5 (15.2)	
Age				
0-2 years	9 (30.0)	2 (14.3)	0	0.001
3-5 years	5 (16.7)	2 (14.3)	1 (3.0)	
6-12 years	6 (20.0)	1 (7.1)	8 (24.2)	
13-18 years	10 (33.3)	9 (64.3)	24 (72.7)	
Child Protection unit assessment				<0.001
Prosecutor's Office (PO)	1 (3.4)	5 (35.7)	29 (87.9)	
Ministry Of Family, Labor And Social Services (MFLSS)	25 (86.2)	6 (42.9)	2 (6.1)	
PO and MFLSS	0	1 (7.1)	2 (6.1)	
Reported Unit				0.004
Pediatric emergency	10 (33.3)	4 (28.6)	2 (6.3)	
Pediatrics clinic	2 (6.7)	0	0	
Child mental health	11 (36.7)	7 (50.0)	27 (84.4)	
Gynecology outpatient clinic	1 (3.3)	0	2 (6.3)	
Others*	6 (20.0)	2 (14.3)	1 (3.1)	
Time between abuse and reporting (days)		25.2±19.9	1279.6±236.9	<0.001

The neglect rate was statistically higher than the rate of sexual abuse in the 0-2 age group (30%), and the rate of sexual abuse was statistically higher than the neglect rate in the 13-18 age group (72.7%) (p=0.001) (**Table 3**).

The most common abuse reported to prosecutors was sexual abuse (87.9%), while the second most common was physical abuse (35.7%) (p<0.001). The Ministry of Family, Labor and Social Affairs most frequently reports neglect (86.2%), physical abuse (42.9%), and least frequently reports sexual abuse (6%), and this difference was significant (p <0.001). The frequency of neglect (33%) among children referred to GULÇOK by services was higher than that of sexual abuse (6.3%). The victims of sexual abuse were mostly referred by child psychiatry (36.7%) (p= 0.004) (**Table 3**).

The time that elapses between the child's maltreatment and the request for GULÇOK, we find that this time averages 25.2 days for physical abuse and is significantly longer for sexual abuse, averaging 1279.6 days. This duration is statistically significantly higher for sexual abuse (p <0.001) (**Table 3**).

DISCUSSION

UNICEF (United Nations International Children's Emergency Fund) research estimates that approximately 3,500 children under the age of 15 die each year in developed countries as a result of physical abuse and neglect. Globally, approximately 155,000 children die each year as a result of abuse or neglect (15). This number is almost double that of high-income countries (16). Although there is no general data in Turkey, there are studies compiled from case reports, forensic scans and newspaper reports (17,18).

In order to recognize, assess, and respond to child abuse and neglect, health professionals must be aware, know the potential risks, and consider this possibility. The most important point in diagnosing cases of child maltreatment is to keep in mind and suspect the possibility of abuse. If abuse is suspected, a detailed history should be obtained and recorded prior to the physical examination. Browne and Herbert have identified family characteristics that may be considered a risk for abuse and neglect as early as a child's birth(19). These factors include divorce, extramarital affairs, single parenthood, drug and alcohol addiction in the family, low educational level of mothers, and families with many children. There are studies that show that child abuse is more common in divorced families and in families with only one parent (20). Studies with children in Turkiye who had been the victims of abuse revealed that 37% to 42% of the children's families were divorced. (21). Similarly, in our study, 32% of families were separated/divorced and 6.7% lost their parents. A 2012 study published in a university hospital's clinic found that 68.5% of mothers and 78.7% of fathers of child victims of abuse/neglect had primary education(21). Oral et al. one of the first studies on child abuse in our country, found that 60% of the parents had a low level of education (2-2). The educational level of parents in our study is higher than in other studies. 26.9% of mothers and 22.4% of fathers had a primary school diploma. According to other studies, the fact that it is a new study, the increase in the level of education of society or the socioeconomic situation of the area around the hospital could be the cause.

In their study, Hurme et al. defined the risk factors for physical abuse of infants and their families as parental alcohol and drug use, prematurity of children, hyperactivity, and crying episodes.(23). The only patient who reported to us who was diagnosed with shaken baby syndrome was premature at 28 weeks, the mother was 18 years old, and the father was 19 years old, unemployed, and addicted to drugs.

According to the 2020 report published by WHO, 75% of children ages 2 to 4 experience violence by their caregivers and/or parents each year (24).One in four parents in the United States has reportedly inflicted violence on their children aged 2-17 years, and similarly, 22.3% of the

adult population in Canada has been exposed to physical abuse of varying degrees before the age of 16 years (25). According to studies conducted in Turkiye, mothers use physical abuse between 64% and 89.7% and emotional abuse between 63.3% and 79.5% (26)(27)(28). Fathers are more often accused as perpetrators of physical child abuse (29)(30). In our study, fathers ranked first in causing maltreatment to their children with a frequency of 22% and mothers with 10%.

Although emotional abuse is the most common form of child abuse, sexual abuse is the most studied form of abuse (31). The issue is same in Turkiye too, academically more research has been published about sexual abuse (32). In this study, the most common form of maltreatment is sexual abuse. When evaluating the types of abuse in our study, sexual abuse (24.8%) ranked first and emotional abuse (17%) ranked second. In the previously published data on child abuse from Gazi University, Hacettepe University, and Ege University, cases of sexual abuse ranked first and cases of physical abuse ranked second (21,33). In the Ankara Training and Research Hospital data (2009), neglect ranked first at 39.5% and physical abuse ranked second at 29.8% (34). In a hospital affiliated with the Ministry of Health in Eskişehir, the incidence of neglect was 75.9% (35). Neglect is more common in families with low socioeconomic status (36).

In this study, also educational neglect was found to be particularly prevalent among parents. Shortly after GULÇOK was established, the COVID-19 health crisis emerged. According to UNICEF reports, more and more households are falling into monetary poverty as families lose their sources of income and the global economy falls into recession due to COVID-19. It has been noted that many students do not have sufficient access to educational materials (computers, Internet, etc.) to participate in online classes (36). When students feel left alone during long-term school closures, their attachment to school diminishes as they move away from the classroom and their friends' environment, and the lost motivation causes them to turn away from the classroom.

According to a study conducted in Turkiye on child abuse and domestic violence, it was found that 10% of children aged 7-18 years witnessed the sexual abuse of another child, mostly in the school environment and 3% were sexually abused themselves (37). Girls are at higher risk for sexual abuse than boys (16,21,24,31). Family members, friends, acquaintances, babysitters, or strangers are usually responsible for child sexual abuse (33). In our study, 85% of children who were sexually abused were girls. The abusers were the people they knew.

Researchers have found that available statistical information is insufficient and that most sexual abuse cases are kept confidential, but only 15% of cases are reported (39). Collaboration should be established with health professionals, teachers, and families to identify child abuse and neglect at an early stage.

Another important finding of our study is that adolescents aged 13 to 18 are more likely to be exposed to physical and sexual abuse than other age groups. Adolescents' emotional focus on relationships with peers, especially of the opposite sex, their inability to recognize risk, their perception that they can do anything, and their desire for independence leads to conflict with their parents. As a result, the possibility of physical, emotional, and sexual abuse increases during this time. When adolescents stay away from their families and join friend groups, they become more vulnerable to abuse during this time (38).

Child abuse and neglect not only violate children's basic human rights, but also negatively impact their mental and physical health, lifelong development, and behavior. A meta-analysis that examined the relationship between physical abuse, emotional abuse, or neglect of children and their health outcomes concluded that abused individuals are three times more likely to suffer from depression than nonabused individuals. Mental disorders such as anxiety disorders, substance use, and suicidality are also more common (39). In our study, children reported at CAP for mental health and behavioral problems resulting from abuse and neglect, were referred to GULÇOK. Health care professionals, in the course of providing health care services, may encounter children who are neglected in terms of health, nutrition, and education or who are physically, sexually, emotionally, and economically abused. In such cases, however, they may not want to see what is there, overlook the findings, or have difficulty determining the appropriate intervention because they often do not have the knowledge, skills, and experience in dealing with the current situation.

Health care workers are not responsible for proving crime. However, it is part of their duties to report forensic cases when they encounter evidence of a crime (including suspected cases that have not yet been definitively diagnosed). This matter is stipulated in Article 280 of the Turkish Criminal Code. Judicial and administrative authorities, law enforcement officials, health and educational institutions, and nongovernmental organizations are required to report children in need of protection to social services and child protection authorities (Child Protection Law Article 6). Our study found that sexual abuse (87.9%) and physical abuse (35.7%) were most frequently reported to the prosecutor's office.

Strengthening the family through education, counseling, and social support to educate and nurture the child in the family; The Ministry of Family, Labor and Social Affairs Service (MFLSS) carries out the necessary services to identify children in need of protection, care and assistance and ensure their protection, care, placement

and rehabilitation (9). In the Child Protection Unit, most cases of neglect (86.2%) were diagnosed, followed by cases of physical abuse (42.9%) reported to MFLSS. The MFLSS requests the court to initiate the necessary social investigation on the victim child and request a court action with a social investigation report, which contains the appropriate precautionary proposal for the child depending on the results of this investigation.

The perception of child abuse and neglect as a problem in our country is still very recent. The number of child protection facilities and centers are increasing. However, these hospital-based centers are mostly located in university hospitals. According to the Yearbook of Health Statistics 2019, the number of outpatient applications is about 46,000 in university hospitals, about 400,000 in hospitals affiliated with the Ministry of Health, and about 70,000 in private hospitals (40). Hospital-based child protection centers will contribute to a more accurate determination of the incidence of child abuse and neglect in our country. In addition, increasing the number of child protection center will ensure communication between child protection center, increase knowledge and experience regarding the interventions to be carried out, and strengthen the equipment of physicians in this regard.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was approved by the Clinical Research Ethics Committee of the Gulhane Training and Research Hospital. (2020/04)

Informed Consent: Because the study was retrospective, written informed consent wasnot obtained from patients.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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Case Report
Olgu Sunumu

COVID-19 İlişkili Alt Ekstremite İskemisi Olgusu

A Case of COVID-19 Associated Lower Extremity Ischemia

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Öz

Koronavirüs hastalığı 2019 (COVID-19) başlangıçta bir solunum yolu enfeksiyonu olarak tanımlansa da hastalık birçok farklı sunumla karşımıza çıkabilmektedir. Hastalık asemptomatik enfeksiyondan, entübasyon gerektirecek solunum semptomlarından, farklı organ tutulumlarına ait bulgulara kadar çok farklı dunumlara neden olabilmektedir. COVID-19'un seyrinde gelişen inflamatuvar sürecin arteryal ve venöz komplikasyonlara neden olabileceği düşünülmektedir. Arteriyal komplikasyonlar, venöz komplikasyonlara göre kısmen daha az bildirilse de dünya çapında COVID-19 enfekte hasta sayısı arttıkça, arteriyal komplikasyonları olan vakalar konusunda da litaratür bilgisi gelişmeye başlamıştır. Bu olgu sunumunda, 66 yaşında bilinen diyabetes mellitüsü olan, asemptomatik COVID-19 enfeksiyonu olmasına rağmen alt ekstremite iskemisi gelişen ve mortal seyreden kötü prognozlu bir olgunun literatüre katılması amaçlandı.

Anahtar Kelimeler: COVID-19, akut alt ektremite iskemisi, kötü prognoz

ABSTRACT

Although the coronavirus disease 2019 (COVID-19) was initially defined as a respiratory tract infection, the disease can present in many different presentations. The disease can cause very different presentations, from asymptomatic infection to respiratory symptoms that require intubation or different organ involvement findings. It is thought that the inflammatory process developing in the course of COVID-19 may cause arterial and venous complications. Although arterial complications are reported slightly less than venous complications, as the number of COVID-19 infected patients worldwide increases, literature information on cases with arterial complications has begun to develop. In this case report, we aimed to contribute to the literature on a 66-year-old patient with known diabetes mellitus who developed lower extremity ischemia with poor prognosis despite his asymptomatic COVID-19 infection.

Keywords: COVID-19, acute lower extremity ischemia, poor prognosis

GİRİŞ

Son dönemde tüm dünyada etkili olarak pandemi kararı aldıran Koronavirus hastalığı 2019(COVID-19) ile tanıştık. COVID-19 dünya çapında deneyimler yaşatmış ve bu durum gelecekte de yeni viral enfeksiyonlara hazırlıklı olunması gerektiğini göstermiştir. Bu gibi sistemik viral enfeksiyonlar (H1N1, HIV ve hepatit) ile, inflamasyon ve pıhtılaşma oluşumu arasında ilişki olduğu daha önce tıp literatüründe bildirilmiştir (1).

Bu enfeksiyonlar pıhtılaşma kaskadı, trombosit fonksiyonu ve fibrinolitik sistemdeki değişikliklere bağlı olarak normal hemostazı değiştirebilir. Ortaya çıkan hiperkoagulabilite, artan koagülasyon faktörleri veya doku faktörünün artan ekspresyonu ile doğrudan endotel hasarından kaynaklanabilir. Viral bir enfeksiyon ayrıca prokoagülan mikropartiküllerin üretimini ve salınımını indükleyebilir ve trombosit yapışmasını artırarak tromboembolik olayların insidansını artırabilir(1-3).

COVID-19 SARS COV-2 virüsünün sebep olduğu asemptomatik enfeksiyondan ölüme kadar birçok farklı klinik tabloya neden olan bir viral enfeksiyon hastalığıdır. Ülkemizde 2020 Mart ayından beri vakalar görülmektedir. Tipik tutulumu viral pnömoni olan COVID-19'un birçok farklı tutulumunun da olduğu artan literatür verileri de anlaşılmaya başlanmıştır ve birçok hastalığın ayırıcı tanısında bu hastalık yer aldığı görülmüştür(4-7). Tipik bulguları ateş yüksekliği, solunum semptomları (nefes darlığı, boğaz ağrısı, burun akıntısı, öksürük), baş ağrısı, kas /eklem ağrısı, halsizlik, koku ve tat kaybı gibi bulgular olan COVID-19'da venöz ve arteryal tromboemboli gibi iskemik hadiseler de artan sayılarda bildirilmeye başla-

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mıştır (2,3,8-12).Hastalık seyrindeki, vasküler etkilerin, proinflamatuar ve protrombotik olayları kapsayan birçok faktörden kaynaklandığı bildirilmektedir. Bu durumun özellikle diyabetes mellitus, hipertansiyon, obezite gibi risk faktörleri olanlarda daha sık olduğu bildirilmiştir (2).

Bu olgu sunumunda alt ekstremite iskemisi ile başvuran COVID-19 olgusunu literatüre katılması amaçlandı.

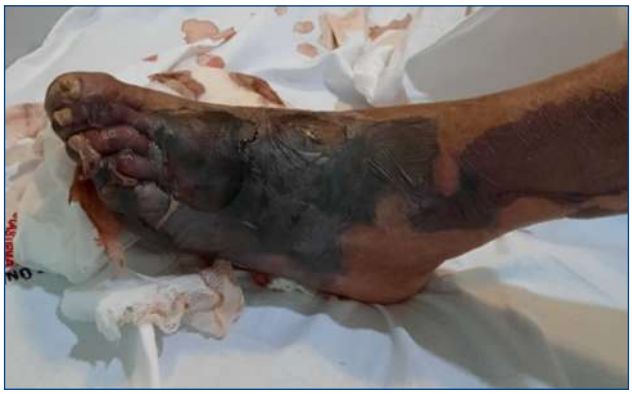
OLGU

Altmış altı yaş diyabetes mellitus tanılı erkek hasta acil servise sol ayakta ağrı, soğukluk ve morarma şikâyeti ile başvurmuştu. Hastanın ayaktaki ağrısı 5 gündür olup, renk değişikliği ise son 2 gündür oluşmuştu. Hasta tarafımıza danışıldı. Fizik muayenede genel durumu orta, ateş:37,0°C, nabız: 118/dk, tansiyon arteryal: 90/60 mm Hg, dakika solunum sayısı:24/dk, oda havasında oksijen saturasyonu: 88 idi.

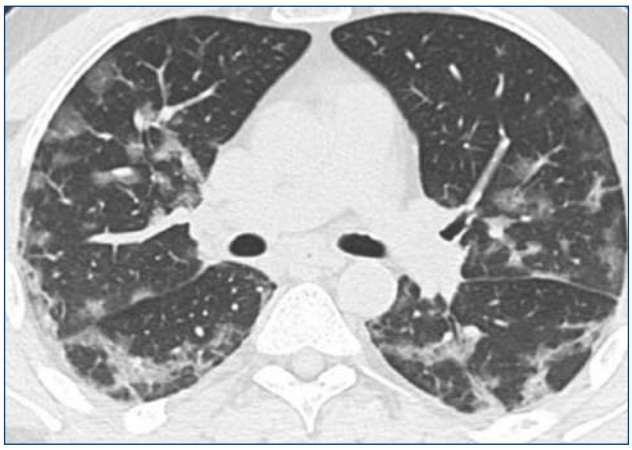
Laboratuvar incelemelerinde; glukoz: 323(70-100) mg/dL, beyaz küre: 12,9(4,60-10,20) K/uL, hemoglobin: 11,2(12,20-18,10) g/dl, lenfosit: 1,2 (0,60-3,40) K/uL, trombosit : 316000 K/uL, laktatdehidrogenaz (LDH): 814 (0-247) U/L, D-dimer: 1800 (0-500) ug FEU/L, ferritin: 882,41 ug/L, C-reaktif protein: 11,7 (0-5) mg/dL, uluslararası standardize oran (INR): 1,52 (0,80-1,30), protrombin zamanı: 13,4 (7,00-12,90) saniye, fibrinojen: 322 (200-400) mg/dL olarak saptandı.Venöz kan gazında; pH: 7,08 (7,35-7,45), paO2:84 (80-100) mmHg, paCO2: 48 (35-45) mmHg, HCO3: 18 (22-26) mmol/L olarak saptandı.

Hastanın sol alt ekstremitesinde ayakta nekroze görünüm vardı (**Resim 1**) ve periferik nabızları alınamıyordu. Hastada akut arter iskemisi düşünüldü. Hastanın sol bacak arteryal dopplerde akım alınamıyordu. Hastadan istenen enfeksiyon hastalıkları konsültasyonu sonucunda ayırıcı tanı amaçlı toraks bilgisayarlı tomografi (BT) istendi. Hastanın toraks BT'de bilateral buzlu cam görünümleri mevcuttu (**Resim 2**) ve COVID-19 pnömonisi ile uyumlu olarak saptandı. Hastanın öyküsünden 10 gün önce temaslı olması nedeniyle filyasyon ekipleri tarafından nazofarengeal ve orafarengeal SARS COV-2 polimeraz zincir reaksiyon testi (PCR) testi alındığı sonucunun pozitif olarak geldiği ve hastanın başvurduğu tarihteki TC Sağlık Bakanlığı COVID-19 Tedavi Rehberi'ne (13) göre 5 gün evde izolasyonla favipiravir tedavisi kullandığı öğrenildi. Hastanın öncesinde antikoagülan veya antitrombotik bir tedavi almadığı öğrenildi. Hastanın evde solunum sıkıntısı olmamıştı ve bu nedenle hastaneye başvurmamıştı. Ancak ayakta ağrı ve renk değişikliği şikâyeti olunca hasta acil servise başvurmuştu.

Hastaya diz altı ampütasyon önerildi. Ancak hasta ve yakını kabul etmedi. Hastanın ekstremite iskemisine yönelik medikal tedavisi düzenlendi. Ayrıca kan şekeri regülasyonu ve metabolik asidozu için dahiliye tarafından önerilen tedaviler verildi. Ancak hastanın hızlıca klinik bulgularının kötüleşmesi üzerine hasta COVID-19 yoğun bakıma alınmak istendi. Yer olmaması üzerine hasta başka bir merkeze sevk edildi. Hastanın yatışının 2. gününde exitus olduğu bilgisine ulaşıldı.



Resim 1. Sol ayakta ve bacakta nekroze görünüm.



Resim 2. Toraks BT'de alt zonlarda bilateral buzlu cam görünümü.

TARTIŞMA

Derin ven trombozu ve pulmoner emboli dahil olmak üzere venöz trombo-embolizmin, COVID-19'lu ağır hastalarda, özellikle yoğun bakım ünitesindeki (YBÜ) hastaların %10-40'unda saptandığı bildirilmiştir. Ancak akut inme (risk faktörleri olmaksızın 50 yaşın altındaki hastalarda bile) ve ekstremite iskemisini içeren arteriyel trombotik olaylar da bildirilmiştir (1-3,6,9,10-12). Bu olgu da akut arter iskemisi ile başvuran bir olgudur. Olgu diyabetes mellitus tanılı, 65 yaş üstü erkek bir olgudur. Hasta COVID-19 tanısını başvurudan 10 gün önce almış ve 5 gün favipiravir tedavisini o dönemki rehberdeki öneriler doğrultusunda evde tamamlamıştır. Hastanın nefes darlığı dahil olmak üzere COVID-19 açısından hastaneye başvuru gerektirecek semptomu olmamıştır.

Fransa'da yapılan bir erken pandemi dönemi çalışmasında, ağır COVID-19 enfeksiyonu olan 209 hastanın %9,6'unda arteriyel tromboembolik olay ve üçünde arter iskemisi varlığı bildirilmiştir. Bu hastaların 10/20'si (%50) tromboprofilaksi, 2/20'si (%10) tedavi dozunda antikoagülasyon ve 5/20'si (%25) antitrombositik tedavi almakta olduğu ayrıca dikkat çekici bir durumdur (14). Sunulan olgu ise öncesinde antikoagülan veya antitrombotik bir tedavi almıyordu.

Protrombotik bir durum, inflamasyon, endotel hasarı veya vasküler yaralanma gibi çeşitli mekanizmalar tarafından tetiklenebilir. Ancak COVID-19'da arteriyel tromboza yatkınlığın patogenezi henüz net değildir. Aterosklerozu olmayanlarda dahi akut tromboz gelişebildiği bildirilmiştir (9,14). COVID-19 hastalarında ciddi arteriyel trombozlar hastaneye yatış nedeni olabileceği gibi, bu hastaların hastaneye yatışları sırasında da ortaya çıkabilir(14). SARS-CoV-2 ile enfekte olmuş bir hastada yüksek serum D-dimer seviyeleri ve kutanöz değişiklikler ekstremitelerde trombotik mikroanjiyopatiyi düşündüren bulgular olarak bildirilmiştir (1). Sunulan olguda da ayakta renk değişikliği ve yükselmiş D-dimer seviyesi mevcuttu. Hasta yapılan görüntüleme bulguları ile de desteklenerek akut arteriyal iskemi tanısını almıştı. Hastanın öncesinde hastaneye yatış endikasyonu yokken gelişen arteryal iskemi sonucu yatış endikasyonu oluşmuştu.

Çin'in Wuhan eyaletindeki COVID-19 enfekte hastaların gözlemsel bir analizinde, d-dimer yüksekliği, uzamış protrombin zamanı (PT) ve aktive parsiyel tromboplastin (aPTT) zamanı dahil olmak üzere başvuru sırasında artan fibrin yıkım ürünleri olan hastalarda önemli ölçüde daha yüksek mortalite bulunduğu bildirilmiştir(15). Sunulan olguda COVID-19 asemptomatik seyretmiş olmasına rağmen, hastanın radyolojik tutulumu mevcuttu. D-dimer yüksekliğine sebep olabilecek, bir diğer durum olan pulmoner emboli açısından da görüntüleme yapılmış olup, pulmoner emboli saptanmamıştı. Ayrıca D-dimer yüksekliği, uzamış PT ve aPTT zamanı mevcut olan hastanın öncesine ait bilinen kan parametreleri mevcut değildi. Hastanın D-dimer yüksekliği, uzamış PT ve aPTT zamanındaki yükselme iskemik ayak zemininde gelişen doku nekrozuna da bağlı olabilir. Hasta nekroze alanların debridmanını kabul etmemiş ve gelişen derin metabolik asidoz sonucu exitus olmuştur. Bu durum altta yatan kan şekeri düzensizliğinin metabolik etkilerine de bağlı olabilir.

SONUÇ

Alt ekstremite iskemisi ile başvuran hastalarda COVID-19'un da ayırıcı tanıda düşünülmesi ve bu tablonun kötü prognoz ile ilişkili olabileceği unutulmamalıdır.

ETİK BEYANLAR

Aydınlatılmış Onam: Bu çalışmaya katılan hasta(lar)dan yazılı onam alınmıştır.

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Yazar Katkıları: Yazarların tümü; makalenin tasarımına, yürütülmesine, analizine katıldığını ve son sürümünü onayladıklarını beyan etmişlerdir.

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CASE REPORT
OLGU SUNUMU

Bilateral Sensorinöral İşitme Kaybının Nadir Bir Sebebi: Waardenburg Sendromu

A Rare Cause of Bilateral Sensorineural Hearing Loss: Waardenburg Syndrome

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Öz

Waardenburg sendromu (işitsel-pigmenter sendrom) otozomal dominant geçen, melanosit defektine bağlı pigmentasyon bozukluğu (ciltte, saçta ve gözlerde), kraniyofasiyal anomaliler ve konjenital sensonörinal işitme kaybı ile giden nadir bir sendromdur. Olgumuzda bilateral sensonörinal işitme kaybı, heterokromi ve distopia kantorum gibi tipik özellikler ile birlikte işitme kaybına bağlı konuşma gecikmesi dolayısıyla da öğrenme güçlüğü mevcuttu.

Anahtar Kelimeler: Waardenburg sendromu, konjenital sensonöral işitme kaybı, iris heterokromisi

ABSTRACT

Waardenburg (auditory-pigmentary) syndrome is a rare autosomal dominant syndrome that can produce pigmentation disorder (in hair, skin and eyes) due to the melanocyte defect, craniofacial abnormalities and congenital sensorineural hearing loss. Our case revealed typical features like congenital sensorineural hearing loss, heterochromia and dystopia canthorum and he had delayed speech and learning retardation because of hearing loss.

Keywords: Waardenburg syndrome, congenital sensorineural hearing loss, iris heterochromia

GİRİŞ

İşitsel-pigmenter sendrom da denilen Waardenburg sendromu (WS), otozomal dominant geçtiği bilinen bir herediter hastalıktır. İnsidansı, genel populasyonda 1/42.000, konjenital sağırlık olgularında ise %1-2'dir. Melanosit defektine bağlı cilt, saç ve gözlerde pigmentasyon bozukluğu, kraniyofasiyal anomaliler ve konjenital sensonörinal işitme kaybı ile giden nadir bir sendromdur (1).

Burada, bilateral sensonörinal işitme kaybı, heterokromi ve distopia kantorum gibi tipik özellikler ile birlikte işitme kaybına bağlı konuşma gecikmesi dolayısıyla da öğrenme güçlüğü olan nadir görülen bir vaka sunulmaktadır.

OLGU

6 yaşında erkek çocuk genel pediatri polikliniğine konuşma bozukluğu ve iştahsızlık şikayetleri ile getirildi. Hastanın öyküsünde doğduğundan beri işitme kaybı olduğu, sinirlilik, iştahsızlık şikâyetleri olduğu öğrenildi. Öz geçmişinde prenatal ve postnatal dönemde işitme kaybına neden olabilecek bir özellik yoktu. Soy geçmişinde anne ve baba arasında akrabalık yok, ailelerinde işitme kaybı olan birey yoktu. İki abisi sağlıklıydı.

Fizik muayenede genel durumu iyi, vücut ağırlığı 16 kg (SDS:-1,92), boy:112 cm (SDS:-0,39) idi. Sağ koklear implantı mevcuttu, sol koklear implant için başvuru yapıldığı öğrenildi. Hastanın yüksek ve geniş burun kökü, kaşların burun kökü üzerinde devamlılığı (synofris), yuvarlak geniş burun ucu, distopia kantarum (lakrimal punktum ve iç kantusun lateral yer değişimi) ve hipertelorizm mevcuttu. Gözlerin değerlendirilmesinde sağ gözün kristal berrak mavi, sol gözün kahverengi olduğu (iris heterokromisi), cilt değerlendirmesinde karın üst kadranda geniş hipopigmente alan, her iki dirsek iç büklüm bölgesinde hipopigmente alan, sakral bölgede hiperpigmente

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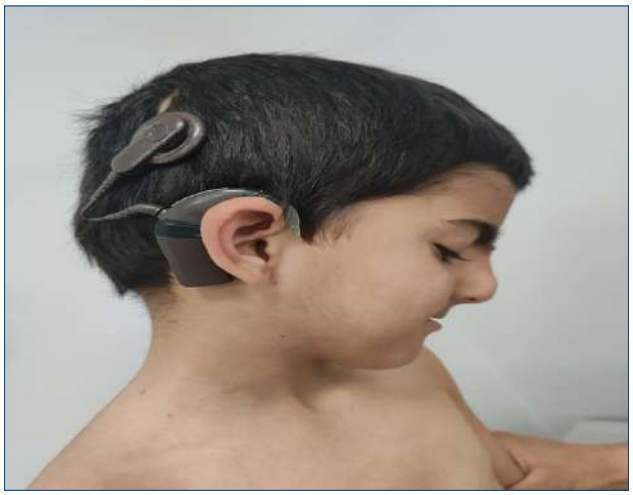
alan dikkat çekiyordu. Annesinden 3 yaşına kadar saçının önünde az miktarda beyaz bir perçem olduğu ve zamanla yok olduğu öğrenildi. Yapılan laboratuar değerlendirmelerinde hemogram, rutin kan biyokimyası ve tam idrar tetkiki normaldi. Radyolojik değerlendirmesinde kemik yapılara ait herhangi bir patoloji saptanmadı; batın-pelvis ultrasonografisi ve ekokardiyografi normal saptandı. Temporal kemik tomografisi ve kranyal manyetik rezonans görüntülemesi normal bulundu. Daha önce yapılmış olan işitsel uyarılmış beyin sapı yanıtlarında ve odiyometrik testlerde her iki kulakta derin sensöri-nöral işitme kaybı (SNİK) olduğu görüldü. İşitmenin rehabilitasyonu amacıyla sağ kulağa 4 yaşındayken koklear implant uygulanmış. Yavaş ve kısıtlı sayıda kelime kullanarak konuştuğu gözlemlendi. Genetik danışmanlık alması için aile genetik hastalıklar uzmanına yönlendirildi. Konuşmanın rehabilitasyonu için dil ve konuşma terapisine yönlendirildi. (Hastanın ebeveyninden olgu sunumu için şifahen izin verilmiştir.)

TARTIŞMA

WS'nun dört tipi olmakla beraber, saptanan genetik mutasyon değişiklik göstermektedir. Waardenburg sendromu tip 1 ve tip 2 çok sık görülür. Yüksek penetranslı otozomal dominant kalıtım özelliğine sahiptir. Waardenburg sendromu Tip-1'de (WS-1) konjenital SNİK, iris heterokromisi, beyaz perçem, distopia kantorum (hipertelorizim) görülürken tip-2'de (WS-2) tip 1 ile benzerlik gösterir ancak hipertelorizim eşlik etmez (1). Waardenburg sendromu Tip-3'de (WS-3) ekstremite anomalileri görülürken WS tip-4'e (WS-4) tip-2'nin özelliklerine ek olarak Hirschsprung hastalığı eşlik etmektedir (1). Waardenburg Sendromu tip 3 ek olarak üst ekstremitelerin tutulması ile ortaya çıkar ve genellikle WS tip 1'in daha ağır bir tipidir (1-4). Olgumuzda; yüksek ve geniş burun kökü, kaşların medialde birleşmesi (sinofris), hipertelorizm, distopia kantorum, iris heterokromisi, hipopigmente cilt bölgeleri, bilateral SNİK olması sebebiyle hastada ön planda WS tip-1 düşünüldü (**Resim 1a,b**).



Resim 1a. Hastamızın koklear implantı ve atipik yüz görünümü

Resim 1b. Hastamızda hipertelorizm, geniş ve yüksek burun kökü, iris heterokromisi, yuvarlık – geniş burun ucu, sinofriz görülmektedir.

Hastalarda görülen tipik fenotipik özellikler iris heterokromisi, geniş ve yüksek burun kökü, kaşların ortada birleşmesi (synofris), hipertelorizm, saçın farklı bölgelerinde görülebilen peyaz perçem (albinizm), distopia kantorumdur (1,2). İris heterokromisi parsiyel ya da tam olabilir. Ciltte farklı boyutta ve şekilde hipopigmente alanlar, saç, kaş yada kirpiklerin farklı bölgelerinde değişken miktarda beyaz perçem görülebilir (1-3). Cildteki hipopigmente alanlar doğuştan vardır ve hiperpigmente alanlardan keskin sınırlarla ayrılırlar. Hastalarda bunlara ek olarak ilerleyici olmayan bilateral SNİK görülür (1-3). Bu hastalarda işitme kaybına bağlı konuşma bozukluğu da gelişir. Hastalarda görülebilecek diğer atipik kraniyofasiyal özellikler; medial hipertrikozis ve synofriys, ala nasi hipoplazisi, belirgin metopik sütur, kare şeklinde çenedir. Vakamızda da konjenital bilateral SNİK olup, sol iris kahverengi sağ iris komplet mavi renkte, cildinde farklı boyutlarda hipopigmente alanlar, basık burun kökü ve synofris mevcuttu. Vakamızda 4 major ve 2 minör kriter pozitifliği mevcuttu. Ailesinde benzer özellikler taşıyan başka birey yoktu. Tanı koymak için 2 major ya da 1 major 2 minör kriter pozitifliği gereklidir (1-3). Tanı kriterleri **Tablo 1**'de belirtilmiştir (**Tablo 1**).

Tablo 1. Major ve minor tanı kriterleri

Major Kriterler	Minör Kriterler
Konjenital sensönöronal işitme kaybı (SNİK)	Prematür saç beyazlaması (yaş <30)
Beyaz perçem / ciltte hipopigmentasyon	Geniş ve/ya yüksek burun kökü
İrisde pigmentasyon anomalisi	Ala nasi kemiğinin gelişim bozukluğu
Distopia kantorum	Sinofris (kaşların medialde süreklilik göstermesi)
Birinci derece akrabalarda etkilenmiş olgu varlığı	Konjenital lökoderma

İşitme kaybı WS'nun önemli bir özelliğidir, unilateral ya da bilateral olup hafiften tam işitme kaybına kadar değişken derecede görülebilir. Doğumsal işitme kayıplarının rehabilitasyonuna yönelik olarak öncelikle hastanın işitme kaybının tipi ve işitme seviyesi belirlenmelidir. Bu hastaların mental retardasyonu yoktur. Normal bir yaşam sürmeleri mümkündür bu yüzden SNİK erken teşhis edilmeli ve kişinin yaşam kalitesi düzeltilmeye uğraşılmalıdır. Sendromun fenotipik belirtilerin özgünlüğü ve birçok disiplini ilgilendirmesine rağmen WS tanısı bir sendrom olarak düşünülmeyip gözden kaçabilmektedir.

SONUÇ

Ülkemizde Sağlık Bakanlığı Ulusal Yenidoğan Tarama Programı kapsamında tüm yenidoğanlara işitme taraması programı başarılı bir şekilde uygulanmaktadır (5). İşitme kaybı saptanan yenidoğanlarda iris heterokromisi, saç (beyaz perçem) ya da ciltte hipopigmentasyon eşlik ediyorsa ayrıcı teşhisinde WS düşünülmelidir (6). Genetik danışmanlık açısından yapılacak kromozomal mutasyon araştırması ve hastanın soy ağacı çıkarılarak, etkilenmesi muhtemel diğer aile bireylerinin tespiti ve daha sonra doğacak çocuklar için ailenin bilgilendirilmesi, etkilenen bireylerin hızlı şekilde tespit ve rehabilite edilmesi büyük önem taşımaktadır.

ETİK BEYANLAR

Aydınlatılmış Onam: Bu çalışmaya katılan hasta(lar)dan yazılı onam alınmıştır.

Çıkar Çatışması Durumu: Yazarlar bu çalışmada herhangi bir çıkara dayalı ilişki olmadığını beyan etmişlerdir.

Finansal Destek: Yazarlar bu çalışmada finansal destek almadıklarını beyan etmişlerdir.

Yazar Katkıları: Yazarların tümü; makalenin tasarımına, yürütülmesine, analizine katıldığını ve son sürümünü onayladıklarını beyan etmişlerdir.

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REVIEW
DERLEME

Turner Sendromu

Turner Syndrome

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ÖZ

En sık görülen kromozomal anomalilerinden biri olan Turner Sendromu (TS), X kromozomunun kısmi veya tam kaybı ile karakterizedir. Kadınlarda over yetmezliğinin ve boy kısalığının en önemli nedenlerinden biridir. TS, 1500-2500 canlı doğumda bir görülmektedir.

Anahtar Kelimeler: Turner sendromu, boy kısalığı, gonodal disgenezi

ABSTRACT

Turner syndrome (TS) is one of the most common chromosomal abnormalities, which is characterized by the partial or complete loss of one of the two X chromosomes. It is an important cause of short stature and ovarian failure in females. TS occurs in about one in every 1500-2500 live births.

Keywords: Turner sydrome,short stature, gonadal dysgenesis

TANIM, SIKLIK, MOLEKÜLER ETYOLOJİ

Turner Sendromu (TS) en sık görülen kromozom anomalilerinden birisidir. Boy kısalığının ve primer over yetmezliğinin en yaygın nedenleri arasında gösterilmektedir. İlk olarak 1938 yılında Henry Turner tarafından; kısa boy, yele boyun ve kubitus valgus klinik özelliklerini taşıyan 7 kadın olgu üzerinde tanımlanmıştır (1).

Doğru prevalansı belirlemek zor olmaktadır çünkü; belirgin klinik özellikler taşımayan ve hafif anomaliler ile seyreden olgular oldukça geç tanı almaktadır (2). Prenatal tanısal çalışmalar 45,X karyotipe sahip fetusların en az %10'unun spontan abortus ile sonuçlandığını göstermiştir (3).

Turner Sendromu; X kromozomunun parsiyel veya tamamının kaybına bağlı cinsiyet kromozom anomalisi olarak bilinmektedir. TS ile ilişkilendirilen karyotip 45,X (monozomi X) TS ile doğan olguların %45-50'sini oluşturmaktadır. Olguların yaklaşık %50'si de diğer karyotipleri taşımaktadır; bunların içerisinde mozaik yapıya sahip TS olguları ve mozaik yapı taşımayan 46,X,i(Xq) ya da 46,X,i(Xp), 46,XX,del(q) ya da 46,XX,del(p), 46,X,r(X) gibi varyant TS olguları vardır. Mozaik genetik yapı 45,X/46,XX ,45,X/46,XY, 45,X/47,XXX veya 45,X karyotipi ile birlikte, izo-kromozom X, ring komozom gibi diğer X kromozom yapısal anomalilerinin bulunmasıdır (4).

KLİNİK BULGULAR

1) Boy Kısalığı

Boy kısalığı TS olgularının hemen hemen tamamında bulunan en sık klinik özelliktir. Turner Sendromu'nda kısa boy kliniğinin ortaya çıkmasından sorumlu olan SHOX (Short stature homebox gene) genidir. SHOX geni üzerinde büyüme için gerekli olan birçok transkripsiyonal düzenleyiciler taşımaktadır. SHOX mRNA ve proteinler fetal ve çocukluk döneminde büyüme plaklarının bütün zonlarında bulunmaktadır (5).

Büyüme geriliği intrauterin dönemde başlamaktadır. Süt cocukluğu döneminde de bu gerileme devam eder. Puberte çağına kadar boydaki bu azalma yavaş bir biçimde devam etmekte ve nihayet puberte döneminde de pubertal boy sıçramasının olmaması nedeniyle boy kısalığı daha belirgin hale gelmektedir. Tüm bunların sonucunda bu olgular toplumların kendisi için saptanmış olan ortalama kadın boyundan 15-20 cm kısa kalırlar. Tedavisiz TS'li olguların final boyları topluma göre farklılık göstermekle birlikte, 137-148 cm arasında değişmektedir.Büyüme hormonu tedavisi ve fizyolojiye uygun olarak yerine konan cins steroidleri ile puberte indüksiyonu sonucunda TS 'lu hastaların erişkin boyunda kazanımlar olmaktadır (6, 7).

Büyüme izleminde TS'ye özel büyüme eğrileri kullanılmalıdır (8).

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2) Hipogonadizm ve Gonadal Disgenezi

Ana bulgu ergenlik gecikmesi ve amenoredir. Overler fetal yaşamın 15. haftasına kadar normal gelişirken daha sonra oositler dejenere olur ve kaybolmaya başlar ve overler fibrotik band şeklini alır. Bu nedenle sekonder cinsiyet karakterleri pubertal dönemde gelişemez. Turner sendromunda pubertenin indüksiyonu ve devamlılığının sağlanabilmesi için östrojen tedavisi gereklidir. Nadiren spontan puberte başlangıcı ve menarş görülebilmektedir (9).

3) Kardiyovasküler Malformasyonlar:

Olguların yaklaşık yarısında kardiyovasküler malformasyonlar görülebilmektedir. biküspit aort kapağı, aort stenozu, aort koarktasyonu en sık görülen kusurlardır. Yele boynu olan hastalarda aort koarktasyonu ve biküspit aort kapak sıklığı daha fazla bildirilmiştir (10).

Kardiyak MR kardiyak malformasyonları, sistemik veya pulmoner venöz anomalileri ile transvers aorta ile özellikle kapak hastalıklarını saptamada ekokardiyografiden daha duyarlıdır (11).

Olgularda başlangıçta kardiyak patoloji saptanmasa da özellikle ergenlik dönemi, erişkine geçiş, hipertansiyon saptanması durumunda tekrar değerlendirmek gereklidir.

4) Renal Anomaliler

Çift toplayıcı sistem ve at nalı böbrek gibi anomalilerin sıklığı %30- 40 olarak bildirilmiştir (12). Ayrıca renovasküler anomaliler de TS'li olgularda sıktır(13).

5) Otoimmun tiroid hastalıkları:

En sık görülen otoimmün hastalık Hashimoto tiroiditidir. Tiroit otoantikor yüksekliği olguların yaklaşık %50'sinde mevcuttur ve bu oran yaşla

birlikte artmaktadır. Özellikle izoX kromozomlu olgularda otoimmnitede artış daha sıktır (14).

6) Gastrointestinal Sistem

Çölyak hastalığı ve inflamatuar barsak hastalığı riski önemli ölçüde artmıştır (15).

7) Metabolik Sendrom ve Diyabetes Mellitus

Olgular metabolik bozukluklar açısından risk altındadır. Obezite, insulin direnci, tip 2 diyabetes mellitus ve dislipidemi sıklığı normal populasyona göre artmıştır (16). Literatürde 46, X, del (X) Q 21 karyotipe sahip bir hastada ağır metabolik sendrom tanımlanmıştır (17).

8) Diğer

Doğumsal kraniyofasiyal anomaliler ve östaki kanalının küçük ve disfonksiyone olması sonucu olarak orta kulağın yetersiz ventilasyonu TS'li hastaların orta kulak iltihabına yatkınlığını artırır (18). %50-90 oranında iletim tipi ve sensorinöral tip işitme kaybı görülür (19).

Selim nevüs sıklığı TS'de artmıştır. Ancak melanoma insidansı düşük bulunmuştur. Psöriasis, alopesi areata, vitiligo normal populasyona göre iki kat daha fazla görülür (20).

Lenfödem; doğumda el ve ayaklarda görülür ve ilk yıl içinde kaybolmakla birlikte herhangi bir yaşta tekrar ortaya çıkabilir.

Olgularda düşük kemik mineral yoğunluğu saptanmış osteoporoz riski artmıştır (21). Olguların çoğunda uzun kemiklerde büyüme, vertebral büyümeye göre daha fazla etkilenir ve yaşla orantısız boy kısalığı ortaya çıkar. Vertebral epifizyel yapıdaki anomalilerin belirgin kifoza yol açabilir. Mikro ve retrognati, kalkan göğüs, kısa 4.metakarp (knuckle sign), Madelung deformitesi ,kubitus valgus, genu valgum, patellar dislokasyon, doğumsal kalça dislokasyonu (%5) ve skolyoz (%10), iskelet sistemine ait diğer patolojilerdir (22).

Zeka düzeyi TS'li hastalarda genellikle normal sınırlar içinde kabul edilmektedir (23).

TANI

Klinik özellikler TS'de yaşa göre farklılık gösterir. Bu nedenle değerlendirme yapılırken kronolojik yaş dikkate alınmalıdır. Yenidoğanlarda el ve ayaklarda doğumsal lenfödem, tırnak displazisi, yele boyun, yüksek arklı damak ve dördüncü metakarp kısalığı belirgin olabilir.

Açıklanamayan boy kısalığı ve büyüme geriliği olan infant ve kız çocuklarda TS'den şüphelenilmelidir. Ayrıca, kardiyak defektler, yüksek damak, kısa dördüncü metakarpal, şaşılık, tekrarlayan orta kulak iltihabı, lenfödem, yele boyun, öğrenme güçlüğü dahil olmak üzere diğer karakteristik özellikleri olan hastalarda akla gelmelidir. Gecikmiş puberte, primer veya sekonder amenore, tam meme gelişimin olmaması ve boy kısalığı şikâyetleri ile başvurabilirler (24).

Klinik bulgular TS'yi saptamada çok etkili olmasına rağmen kesin tanı için sitogenetik tanı yöntemlerine başvurulmalıdır.

TEDAVİ

TS'li kızların yaşlarına uygun boy uzunluğunu ve kaybedilen büyüme hızını kazandırarak erişkin boyuna ulaşmalarını sağlamak için büyüme hormonu tedavisi kullanılır. BH'nin boya olan etkisinin yanında kemik dansitesi ve vücut kompozisyonuna da olumlu etkileri vardır. Olgularda puberte induksiyonu veya puberte devamlılığın sağlanabilmesi için sex steroidleri gereklidir

TS'li olgulara BH tedavisi ile birlikte fizyolojiye uygun replase edilen sex steroidleri ile puberte indüksiyonu sağlarak boyları erişkin boyuna yaklaşmaktadır (25).

SONUÇ

Sonuç olarak kız çocuklarında boy kısalığı ve gonodal yetmezlik durumunda TS akla gelmeli, eşlik edebilecek diğer hastalıklar açısından da dikkatli olmak gereklidir.

ETİK BEYANLAR

Hakem Değerlendirme Süreci: Harici çift kör hakem değerlendirmesi.

Çıkar Çatışması Durumu: Yazarlar bu çalışmada herhangi bir çıkara dayalı ilişki olmadığını beyan etmişlerdir.

Finansal Destek: Yazarlar bu çalışmada finansal destek almadıklarını beyan etmişlerdir.

Yazar Katkıları: Yazarların tümü; makalenin tasarımına, yürütülmesine, analizine katıldığını ve son sürümünü onayladıklarını beyan etmişlerdir.

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ORIGINAL ARTICLE
ORİJİNAL ARAŞTIRMA

The Effects of Acupuncture on Clinical and Electrophysiologic Parameters in Carpal Tunnel Syndrome, in Addition to Overnight Splint Treatment and Tendon Slinding

Karpal Tünel Sendromunda Gece Atel Tedavisine ve Tendon Kaydırmaya Ek Olarak Akupunkturun Klinik ve Elektrofizyolojik Parametreler Üzerine Etkileri

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ABSTRACT

Aim: To evaluate the effects of acupuncture on clinical and electrophysiologic parameters in Carpal Tunnel Syndrome, in addition to overnight splint treatment and tendon slinding exercises.

Material and Method: Mean age of the patients in group 1 is 48.0±12.37 and group 2 is 51.3±14.82 (26-83). 30 patients in group 1 received once a week for a total of 12 sessions in addition to night splint treatment and tendon slinding exercises. Meanwhile, patients in the second group received night splint treatment and tendon slinding exercises. All the patients in both groups used resting splint and received exercise for 12 weeks. 4 acupuncture points (PC-3, PC-6, PC-7, LU-9) are selected for treatment. 0.25x0.25 needle is placed for 20 minutes. Patients received for acupuncture treatment was applied once a week for a total of 12 sessions over 10 weeks. Patients are evaluated before and after treatment by using electroneurophysiologic parameters and Boston Scale which include Symptom Severity Scale and Functional Capacity Scale.

Results: When outcomes were compared between both groups, the Acu group showed more Symptom Severity Scale (SSS) and electroneurophysiological parameters DSL (distal sensory latency) reduction than the splint and exercise group (p=0.001), (p=0.025).The other parameters were not statistically significant for both groups.

Conclusions: We observed an improvement in patients who received acupuncture in addition to resting splint and exercise, Symtom Severity Scale, Functional Capacity Scale and median nerve distal sensory latency.

Keywords: Carpal tunnel syndrome, acupuncture, overnight splint, exercises.

ÖZ

Amaç: Karpal Tünel Sendromunda gece atel tedavisi ve tendon kaydırma egzersizlerine ek olarak akupunkturun klinik ve elektrofizyolojik parametreler üzerindeki etkilerini değerlendirmek.

Gereç ve Yöntem: Grup 1'deki hastaların yaş ortalaması 48,0±12,37, grup 2'de ise 51,3±14,82 (26-83)'dir. Grup 1'deki 30 hastaya gece atel tedavisi ve tendon kaydırma egzersizlerine ek olarak haftada 1 seans olmak üzere 3 ay boyunca 12 seans akupunktur uygulandı. Bu arada ikinci gruptaki hastalara gece ateli tedavisi ve tendon kaydırma egzersizleri yapıldı. Her iki gruptaki tüm hastalar istirahat ateli kullandı ve 12 hafta boyunca egzersiz yaptı. Tedavi için 4 akupunktur noktası (PC-3, PC-6, PC-7, LU9) seçildi ve 0.25x0.25 iğne 20 dakika yerleştirildi. Hastalar 12 hafta boyunca 12 seans akupunktur aldı. Hastalar tedavi öncesi ve sonrası elektronörofizyolojik parametreler ve Boston Skalası kullanılarak değerlendirildi.

Bulgular: Her iki grup karşılaştırıldığında, akupunktur grubu, splint ve egzersiz grubuna göre daha fazla semptom şiddet ölçeği ve elektronörofizyolojik parametrelerde distal duyu gecikmesi azalma gösterdi (p sırasıyla= 0,001, 0,025). Diğer parametreler her iki grup için istatistiksel olarak anlamlı değildi.

Sonuç: Boston Skalası, fonksiyonel kapasite skalası ve median sinir distal duyu latansına göre istirahat ateli ve egzersize ek olarak akupunktur uygulanan hastalarda iyileşme gözlemledik.

Anahtar Kelimeler: Karpal tünel sendromu, akupunktur, gece ateli, egzersizler.

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INTRODUCTION

Carpal tunnel syndrome is one of the most common peripheral neuropathies. It affects mainly middleaged women. In the majority of patients, the exact cause and pathogenesis of CTS are unclear (1). The classic symptoms of CTS include nocturnal pain associated with tingling and numbness in the distribution of the median nerve in the hand. CTS diagnosis is often based on clinical symptoms, physical signs, electrophysiological measurements, or image study (2). The patient with mild symptoms of CTS can be managed with conservative treatment, particularly local injection of steroids. However, in moderate to severe cases, surgery is the only treatment that provides a cure (1). Most studies in the literature focus on surgical treatments of CTS. Recently, the application of non-surgical treatments that combine acupuncture has become one of the popular complementary alternative treatments in clinical rehabilitation to facilitate nerve function recovery (3). Before surgical approaches for severe CTS, conservative therapies are commonly recommended and acupuncture has been proposed as a viable option (4,5). CTS is a kind of median nerve damage due to inappropriate posture or mechanical overuse, resulting in a decrease in blood supply of the median nerve; hence, acupuncture is believed to be complementary method to treat CTS.

Acupuncture has healing effects through different mechanisms, these are; analgesic effect, homeostatic effect, immune-enhancing effect, sedative effect, psychological effect and engine healing effect. Two theories have been proposed for its use in pain control. First, acupuncture can stimulate large sensory afferent fibers and can be used in gate control theory.

It suppresses the perception of pain as it is understood. A painful needle prick pain by inducing the release of opiate-like endogenous substances by acting as a stimulus control effect (6). To endogenous opioids with the application of acupuncture. In addition, an increase in serotonin level was observed in the CNS (7).

The improvement in these parameters is caused by the anti-inflammation effects of acupuncture. Reducing inflammation, acupuncture can facilitate the healing of the median nerve through vasodilation and can increase ATP production via the photo-biomodulation effect. By activating the mitochondria and facilitating ATP production, acupuncture produces nitric oxide, which have a vasodilatory effect and calcitonin gene-related peptide (8). This process improves the nutrition and oxygenation of the median nerve, thus ameliorating nerve healing. Stimulating the acupuncture points in localized areas of the wrist can increase separation in the D2/D3 area of the S1 somatosensory cortex, thereby improving neuroplasticity via the GABA neurotransmitter (9,10). It is possible that there is a form of central autonomic control of the arteriolar blood vessels that supply the nerve vasa of the median nerve so that vasodilation occurs as a result of parasympathetic impulses from the S1 cortex (9). The reason we chose these points in our study was to benefit from this effect of acupuncture. In addition, this point was chosen as the far point due to the effect of these points close the nerve.

Acupuncture is an alternative medicine technique used for the treatment of different types of painful disorders. The Acupuncture and carpal tunnel syndrome efficacy of acupuncture in management of mild to moderate CTS has been investigated in limited studies (11,12). Yang et al. showed that short-term acupuncture treatment is as effective as oral prednisolone in mild to moderate CTS (5). A recent randomized controlled trial study compared the efficacy of acupuncture with night splinting for CTS and found that electro-acupuncture was as effective as night splinting in management of symptoms in mild to moderate CTS (13). Hand splinting is frequently prescribed in mild-to-moderate cases of CTS because its safety and efficacy have been demonstrated and generally accepted (15,16).

It is recommended to use Boston Scale for evaluation of CTS treatment since it is functional and useful (12). Thus, we used Boston Symptom and Severity Scale to evaluate the effect of acupuncture in CTS. In a study where they showed the effect of acupuncture and night splint on CTS, they showed a significant improvement on Boston Scale for the electro-acupuncture group. They observed a better efficiency with acupuncture compared to night splint for pain reduction and similar efficiency for general symptoms and functional progression (13).

The aim of this study was to evaluate the effectiveness of acupuncture in addition to night splinting and exercise program in mild-moderate CTS.

METHODS

Patients

60 patients who applied to Beyhekim training and research hospital between 2021-2022 were included in the study and informed consent forms were obtained from the participants.

60 patients participating in the study were divided into two groups by simple random methods according to the closed-envelope method. All patients completed the study. Diagnosis of patients was made based on at least one of the following clinical criteria which were confirmed by Tinel's and Phalen's tests: Numbness and tingling in the thumb, index finger, middle finger, and ring finger (the region innervated by median nerve). Provocation of symptoms by repetitive actions of the hand o wrist. Nocturnal symptoms, mitigation of symptoms by changing hand posture or shaking the wrist, definitive diagnosis was made with emg.

Study appraisal

In addition to night splinting and tendon sliding exercises, 12 sessions of acupuncture treatment were applied to 60 extremities of 30 patients in the first group for 3 months. In the second group, 30 patients were given night splint and tendon slinding exercises. All patients used wrist rest splint at night for 12 weeks (keeping the wrist at 0-5 degrees extension) and a tendon slinding exercise program was given.

Acupuncture was applied to all patients by the same experienced physician. 4 acupuncture points PC3 (Quze), PC-6 (Neiugan), PC-7 (Dailing), LU-9 (Taiyuan) were selected for treatment. A 0.25x0.25 mm needle was placed vertically and held at these points for 20 minutes. Acupuncture treatment was applied once a week for a total of 12 sessions for 12 weeks.

Patients were evaluated with electroneurophysiological parameters and Boston Scale (symptom severity and functional capacity) before and after treatment.

Inclusion criteria

Inclusion criteria in the study; (1) It was determined as being diagnosed with carpal tunnel, continuing pain in the wrist for three months. (2) Patients who can adapt to treatment practices.

Exclusion criteria

Patients were not admitted to the present study if any of the following criteria were present: (1) Pregnancy.(2) Severe degree CTS. (3) Thenar muscle atrophy. (4) History of carpal tunnel surgery. (5) Tendinitis or arthralgia in wrist or hand. (6) Obvious space-occupying lesion at the wrist. (7) Peripheral neuropathy. (8) History of local steroid injection. (9) İnability to discontinue analgesics. (10) Unwillingness to participate in the present study.

Electrodiagnostic Studies

The diagnosis of all patients with clinically diagnosed CTS was confirmed by the presence of 1 or more of the following standard electrophysiological criteria (16). 1) Prolonged distal motor latency (DML ≥ 4.2ms). 2) Prolonged antidromic distal sensory latency (DSL) to the second digit (≥ 3.6 ms). 3) Reducedwrist-palm sensory nerve conduction velocity (W-P SNCV < 40 ms).

Electrophysiological parameters were assessed as the secondary outcome at baseline and four weeks after the intervention. These parameters included DML (distal motor latency), sensory NCV (nerve conduction velocity) and DSL (distal sensory latency). All tests were done using an Advantage EMG machine (Medelec synergy, UK). Nerve conduction studies were performed by an experienced electro-myographer who was blinded to random assignment. Surface stimulation in sensory and motor nerve conduction studies was done using standard methodology (17).

The Boston Carpal Tunnel Questionnaire

Hand symptoms were assessed at baseline and immediately at the end of treatments using the Boston Carpal Tunnel Outcome Scales (BCTS). This self-administrated instrument was developed specifically to measure clinical changes in CTS (18).

CTS evaluation and diagnosis BCTS is a quantitative instrument that consists of two parts. The Functional capasity (FSS) and the Symptom Severity Scale (SSS), which needs considerable time to fulfill all the questions. 2.7.Ethics approval

The study was approved by Karatay University Clinical Research Ethics Committee on 11.03.2021 with the decision number 2021/047. Each patient gave written informed consent before entering the treatment and understood that they were free to withdraw from the treatment at any time. Our work was carried out in accordance with the principles of the Helsinki Declaration.

Statistical analysis

IBM SPSS 22 statistics program was used for Windows. Kolmogorov-Smirnov normality test was used to evaluate whether continuous variables were normally distributed. Normally distributed student t-test was used for paired comparisons and paired t-test was used for pre-treatment evaluation. If at least one of the groups did not distribute normally, the nonparametric Mann Whitney U test was used in paired comparisons and the Wilcoxon Signed Ranks test was used to compare each group before and after treatment. A value of $p \leq 0.05$ was considered significant.

RESULTS

The mean age of patients in the acupuncture group was 48.0±12.37 years with a range of 24 to 77 years, of whom 24 patients were female. The control group consisted of 23 females. The mean age of these patients was 51.30±14.82 years with a range of 26 to 83 years. There was no statistically significant difference in demographic data between the two groups at the start of the trial (p> 0.05). The results are presented in **Table 1**.

Table 1. Age and gender of all participants

	Acupuncture group (n=30)	Control Grup (n=30)	p
Age	48.0±12.37 (24-77)	51.3±14.82 (26-83)	0.348
Gender (Female/Male)	24\6	23\7	0.055

We observed in acu group improvement in sss and electrophysiological parameter dsl (p:0.001, 0.025). There was no significant difference between the groups in other parameters. Results are also demonstrated in **Table 2**. No serious complication occurred in the present study.

Table 2: Comparison between acupuncture and control groups

	Acupuncture group(n=30)			Control group(n=30)		
	Pre-tx	Post-tx	p	Pre-tx	Post-tx	p
	Mean±SD (Min-Max)	Mean±SD (Min-Max)		Mean±SD (Min-Max)	Mean±SD (Min-Max)	
EMG L LATEN	4.19±1.46 (2.7-8.7)	4.033± 1.16 (2-6.6)	0.866	4.08±0.63 (3.4-5.3)	4.14±0.67 (3.3-5.4)	0.328
EMG R LATEN	4.37±1.63 (3-8.8)	4.22± 1.52 (2-9)	0.141	4.49±0.494 (3.6-6.3)	4.53±0.74 (3.3-7.4)	0.951
EMG L AMP	11.23±4.96 (1.4-23)	12.82± 4.15 (2.6-19)	0.098	12.59± 4.02 (4.7-18.0)	11.89±2.38 (7.8-15.8)	0.089
EMG R AMP	10.82±4.71 (2-19)	12.11±5.28 (1.2-22)	0.308	10.30±3.68 (5.1-18.0)	10.83±3.29 (2.6-16.7)	0.135
SensoriaL L LATEN	2.98±0.61 (2-4)	3.06±1.05 (1-7.1)	0.807	3.35±0.46 (2.4-3.9)	3.43±0.58 (2.7-4.3)	0.082
Sensorial R LATEN	3.14±0.782 (2-4.30)	3.15±0.84 (2-5.7)	0.939	3.88±0.66 (2.6-5.0)	3.89±2.71 (2.7-17.9)	0.089
Sensorial L AM	11.81± 5.77 (3.30-27.6)	9.14± 5.57 (1.9-26)	0.025	10.12±5.68 (2.4-21.4)	13.72±8.12 (6.7-31.0)	0.015
Sensorial R AM	12.91±4.32 (4-25)	9.47± 6.12 (1.5-30)	0.006	8.24±4.79 (0.7-17.3)	10.83±7.64 (3.8-27.7)	0.105
Symptom severity scale (1-5 points)	3.278±0.738 (2.1-4.63)	1.32± 0.414 (0.81-2.09)	0.001	3.16±0.62 (1.6-4.0)	2.87±0.67 (1.3-4.0)	0.179
Functional status scale (1-5 points)	2.67±0.544 (1-3.1)	1.35±0.472 (1-2)	0.001	2.63±0.49 (2.0-3.0)	2.43±0.50 (2.0-3.0)	0.014

DISCUSSION

In this study, we aim to investigate the efficiency of acupuncture in addition to night splint and exercise. We observed an improvement in SSS and electrophysiologic parameters when acupuncture is applied with night splint and exercise compared to the group that didn't receive acupuncture.

There is limited evidence of conservative treatment of CTS providing long-term relief from symptoms, and therefore no adequate data to allow accurate quantification of relapse rates (19,20). Because the standard treatments for CTS are not fully satisfactory, other conservative methods, including those from complementary and alternative medicine (CAM), need to be further evaluated (21).

When compared night splint with acupuncture for CTS, it has been shown that electro-acupuncture is as equally effective as night splint (13). In another study, where they compare acupuncture with night splint on CTS, they showed a significant improvement in Boston Scale. Whereas in night splint group, they observed significant improvement only in severity of the symptom. In the mid-level CTS, they showed acupuncture was able to reduce the pain better than night splint and acupuncture showed similar efficiency compared to night splint for general symptoms and functional progression (22).

Weinstein et al. evaluated the effect of manual acupuncture in comparison with sham acupuncture and found no statistical difference between the real and sham groups (23).

A Cochrane meta-analysis reviewed twenty one trials of different conservative managements of CTS including one laser acupuncture trial study, concluded that acupuncture does not produce significant benefit (24). Another randomized controlled trial study found no significant differences between laser acupuncture and placebo on night pain at 3 weeks of follow-up (25).

Wolny et al. also obtained similar results in their RCT, which showed that sensory conduction velocity improved before there were any changes in motor conduction velocity (26). Iwan et al. evaluated a case series showed a decrease in NCS grades for 3 wrists, all wrists have BCTQ score improvements, a decrease in VAS, but no significant improvement in Tinel and Phalen signs. It is concluded that laser acupuncture can be used as a treatment option for the management of carpal tunnel syndrome (27). In summary, patients who received acupuncture showed better improvement in functional capacities. In addition, they also showed significant improvement in clinical symptoms. Acupuncture is a good treatment for patients with CTS who don't want surgery or other treatments.

Limitations

Having a small sample size and a short follow-up period in both groups are limitation in this study. In addition, patients were not grouped based on CTS severity. In order to group them based on CTS severity, bigger sample size is required.

CONCLUSION

Acupuncture treatment has more significant efficiency on clinical findings when compared to electrophysiological findings. Findings in this study indicate that acupuncture treatment is alternative for patients who have intolerance or contraindication to medication or who don't prefer surgery.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was approved by Karatay University Clinical Research Ethics Committee on 11.03.2021 with the decision number 2021/047.

Informed Consent: All patients signed the free and informed consent form.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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