Pediatric Practice & Research

Journal

ISSN: 2147-6470

Year: 2022 Volume: 10 Issue: 1

OPEN ACCESS

RÛMÎ PEDİATRİ DERNEĞİ

MHA MEDIHEALTH ACADEMY

Pediatric Practice & Research
Journal

ISSN: 2147-6470

VOLUME 10 ISSUE 1 YEAR 2022

Pediatric Practice and Research Journal is the official journal of the Rumi Pediatric Society. A three annually publication, it has been published continuously since 2013.

Prof. Dr. Resul YILMAZ
Address: Selçuk Üniversitesi, Tıp Fakültesi Çocuk Yoğun Bakım Bilim Dalı Alaeddin Keykubat Yerleşkesi Selçuklu/Konya 42075 Türkiye
Phone: +90 (332) 241 50 00-44513
Fax: +90 (332) 241 21 84
e-mail: pedpracres@yandex.com
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ISSN: 2147-6470

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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.

Pediatric Practice and Research Journal 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.

Pediatric Practice and Research Journal 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 Pediatric Practice and Research Journal 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. Pediatric Practice and Research Journal will immediately reject manuscripts leading to plagiarism.

TYPES OF MANUSCRIPT

Manuscripts should be submitted online via www.pprjournal.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

Prof. Dr. Resul YILMAZ
Selçuk Üniversitesi, Tıp Fakültesi
Çocuk Yoğun Bakım Bilim Dalı
Alaeddin Keykubat Yerleşkesi Selçuklu/Konya 42075 Türkiye
Phone: +90 (332) 241 50 00-44513
Faks: +90 (332) 241 21 84

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YAZARLARA BİLGİ

AMAÇ ve KAPSAM

Pediatric Practice and Research 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.

Pediatric Practice and Research 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. Pediatric Practice and Research 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.

Pediatric Practice and Research 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.

Pediatric Practice and Research 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.

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

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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. Pediatric Practice and Research Dergisi intihallere yol açan makaleleri derhal reddedecektir.

YAZI TÜRLERİ

Yazılar, elektronik ortamda www.pprjournal.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

Pediatric Practice and Research 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.

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.

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Ek sayı (Supplement)
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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
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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: *, †, ‡, §, ¶.

Şekiller
Şekil, resim, grafik ve fotoğrafların tümü "Şekil" olarak adlandırılmalı ve ayrı birer .jpg veya .gif dosyası olarak (yaklaşık 500x400 piksel, 8 cm eninde ve en az 300 dpi çözünürlükte) sisteme eklenmelidir. Şekiller metin içinde kullanım sıralarına göre Arabik rakamla numaralandırılmalı ve metinde parantez içinde gösterilmelidir.

Şekil Alt Yazıları
Şekil alt yazıları, her biri ayrı bir sayfadan başlayarak, şekillere karşılık gelen Arabik rakamlarla çift aralıklı olarak yazılmalıdır. Şeklin belirli bölümlerini işaret eden sembol, ok veya harfler kullanıldığında bunlar alt yazıda açıklanmalıdır. Başka yerde yayınlanmış olan şekiller kullanıldığında, yazarın bu konuda izin almış olması ve bunu belgelemesi gerekir.

Ölçümler ve Kısaltmalar
Tüm ölçümler metrik sisteme (Uluslararası Birimler Sistemi, SI) göre yazılmalıdır. Örnek: mg/kg, µg/kg, mL, mL/kg, mL/kg/h, mL/kg/min, L/min, mmHg, vb. Ölçümler ve istatistiksel veriler, cümle başında olmadıkları sürece rakamla belirtilmelidir. Herhangi bir birimi ifade etmeyen ve dokuzdan küçük sayılar yazı ile yazılmalıdır.

Metin içindeki kısaltmalar, ilk kullanıldıkları yerde parantez içinde açıklanmalıdır. Bazı sık kullanılan kısaltmalar; iv, im, po ve sc şeklinde yazılabilir.

İlaçların yazımında jenerik isimleri kullanılmalıdır.

İletişim
Prof. Dr. Resul YILMAZ
Selçuk Üniversitesi, Tıp Fakültesi Çocuk Yoğun Bakım Bilim Dalı
Alaeddin Keykubat Yerleşkesi Selçuklu/Konya 42075 Türkiye
Tel: +90 (332) 241 50 00-44513
Faks: +90 (332) 241 21 84

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Pediatric Practice & Research
Journal

ISSN: 2147-6470

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Pediatr Pract Res 2022; 10(1): 1-5
DOI: 10.21765/pprjournal.1053277

ORIGINAL ARTICLE
ORİJİNAL ARAŞTIRMA

Evaluation of Clinical and Laboratory Findings and Diagnostic Difficulties in Children with Vitamin B12 Deficiency

Vitamin B12 Eksikliği Olan Çocuklarda Klinik ve Laboratuvar Bulguların ve Tanısal Zorlukların Değerlendirilmesi

Cüneyt Karagöl[1], **Metin Yiğit**[1]

[1]University of Health Sciences, Ankara City Hospital, Department of Pediatrics, Ankara, Turkey

Abstract

Aim: In this study, we evaluated the clinical and laboratory data of healthy children with vitamin B12 deficiency. The benefits of methylmalonic acid (MMA) and homocysteine levels and the difficulties encountered in diagnosing vitamin B12 deficiency were pointed out.

Material and Method: A total of 70 healthy children whose serum cobalamin levels were below 126.5 pg/ml were included in the study. The age, gender, serum vitamin B12, urine MMA, plasma homocysteine, white blood cell, hemoglobin, thrombocyte, main corpuscular volume (MCV), main platelet volume (MPV), folic acid, and ferritin levels were obtained retrospectively from the hospital's medical records. The correlation analysis test compared vitamin B12 with MMA and homocysteine.

Results: The mean age was 8.21±6.15 years, and vitamin B12 deficiency was found in 6.29% of healthy children. Cobalamin levels ranged from 50-126 pg/ml, with a mean of 102.57±18.97 pg/ml. Urine MMA and serum homocysteine levels were 0.59±0.67 ng/ml and 13.50±0.67 g/dl, respectively. The correlation coefficient value (r) was found to be -0.342 and -0.437, moderately negative for MMA and homocysteine, respectively. MMA levels were normal in 36 patients, and homocysteine levels were normal in 48 patients.

Conclusion: Vitamin B12 deficiency is a common micronutrient deficiency in children. The diagnosis of vitamin B12 deficiency can be complex in healthy children who do not display typical laboratory findings, particularly elevated MMA and homocysteine.

Keywords: Vitamin B12 vitamini, kobalamin, metilmalonik asit, homosistein, çocuk

Öz

Giriş: Vitamin B12 eksikliği saptanan sağlıklı çocukların klinik ve laboratuvar verilerini değerlendirdiğimiz çalışmamızda Vitamin B12 eksikliği tanısında Metilmalonik asit (MMA) ile homosistein düzeylerinin yararlarına ve tanıda karşılaşılan güçlüklere ve dikkat çekildi.

Gereç ve Yöntem: Serum kobalamin düzeyleri 126.5 pg/ml'nin altında olan toplam 70 sağlıklı çocuk çalışmaya dahil edildi. Yaş, cinsiyet, serum B12 vitamini, idrar MMA, plazma homosistein düzeyleri, beyaz küre ve trombosit sayıları, hemoglobin, ortalama eritrosit hacmi (Mean Corpuscular Volume, MCV), ortalama trombosit hacmi (mean platelet volume, MPV), folik asit ve ferritin düzeyleri geriye dönük olarak incelendi. Vitamin B12 düzeylerini MMA ve homosistein düzeyleri ile karşılaştırmak için korelasyon analizi kullanıldı.

Bulgular: Sağlıklı çocuklarda ortalama yaş 8.21±6.15 yıl olup %6.29'unda B12 vitamini eksikliği saptandı. Kobalamin seviyeleri 50-126 pg/ml arasında değişmekteydi ve ortalama 102.57±18.97 pg/ml olarak saptandı. İdrar MMA ve serum homosistein düzeyleri ortalaması sırasıyla 0,59±0,67 ng/ml ve 13,50±0,67 g/dl idi. Korelasyon katsayısı (r), MMA için -0.342, homosistein için -0.437'ydi ve orta derecede negatif olarak değerlendirildi. 36 hastada MMA seviyeleri, 48 hastada homosistein seviyeleri normaldi.

Sonuç: Vitamin B12 eksikliği çocuklarda yaygın bir mikro besin eksikliğidir. Özellikle yüksek MMA ve homosistein düzeyleri gibi tipik laboratuvar bulguları göstermeyen sağlıklı çocuklarda vitamin B12 eksikliğinin teşhisi zor olabilir.

Anahtar Kelimeler: B12 vitamini, kobalamin, metilmalonik asit, homosistein, çocuk

Corresponding Author: Cüneyt Karagöl
Address: Department of Pediatrics, University of Health Sciences, Ankara City Hospital, 06800-Bilkent, Ankara, Turkey
E-mail: thecuneyt@yahoo.com

Başvuru Tarihi/Received: 04.01.2022
Kabul Tarihi/Accepted: 28.01.2022

INTRODUCTION

Cobalamin (vitamin B12) is a water-soluble vitamin whose primary source is animal products. A small amount is stored in the liver. Inadequate intake, intestinal malabsorption, and the use of some drugs can cause deficiency. This can lead to many disorders in various organ systems, especially megaloblastic anemia, as well as neurological and psychiatric disorders. It is essential to diagnose and treat vitamin B12 deficiency in childhood because delay in treatment may cause complications such as severe anemia and other lasting complications that cause irreversible neurological damage (1-3).

The diagnosis of vitamin B12 deficiency is typically made by measuring serum vitamin B12 levels to detect megaloblastic anemia. However, the clinical condition of most patients may not be very clear. Low vitamin B12 levels can be found without specific symptoms or anemia (false low), and normal vitamin B12 levels can be found despite strong clinical findings (false normal). Clinical findings for patients represent the most crucial factor in evaluating serum vitamin B12 levels because there is no "gold standard" diagnostic test to identify the deficiency (4). Urine MMA and plasma homocysteine levels, which are intermediate products of B12 and folate metabolism, may help in the diagnosis. However, these metabolic tests are not commonly used at present. In addition, the cut-off values of these tests indicating B12 deficiency are not clear and may differ between different laboratories (4,5).

In this study, we evaluated the clinical and laboratory data of previously healthy cases who applied to the pediatric outpatient clinic with various complaints and were found to have vitamin B12 deficiency. The difficulties encountered in the diagnosis have been pointed out.

MATERIAL AND METHOD

The study was carried out with the permission of Ankara City Hospital No. 2 Clinical Research Ethics Committee (Dated: 08/12/2021, Decision No: E2-21-943). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

Healthy children who applied to the pediatric outpatient clinic of Ankara City Hospital with various complaints and whose vitamin B12 levels were found to be low for screening purposes were evaluated over the period June 2018 - June 2019. The age and gender of these patients were recorded. In addition, serum vitamin B12, urine MMA, plasma homocysteine, white blood cell, hemoglobin, thrombocyte, MCV, MPV, folic acid, and ferritin levels were obtained retrospectively from the hospital's medical records. All of the laboratory data were obtained in the biochemistry and metabolism laboratory of our hospital. The chemiluminescence method (Beckman Coulter Dxl 800) was used in measuring serum vitamin B12 and folic acid levels, plasma homocysteine levels were measured with the chemiluminescence immunoassay method (Immulite 2000, Siemens Diagnostics), and urine MMA levels were measured with the gas chromatography-mass spectrometry method (GCMS QP 2010SE, Shimadzu). Serum B12 levels below the laboratory cut-off level of 126.5 pg/ml were defined as deficiency. A hemoglobin result of below 11 g/dl was defined as anemia, a leukocyte value of below 4500 /mm³ as leukopenia, and a platelet count of below $150x10^3$/mm³ as thrombocytopenia.

Laboratory-specific and assay-specific cut-offs were used for urine MMA and plasma homocysteine levels. An increased MMA level was accepted as 0.4 ng/ml, and an increased homocysteine level as above 15 g/dl. Patients with a chronic disease (e.g., malignancy, malabsorption syndromes like celiac disease, inflammatory bowel diseases) or those using drugs that could affect vitamin B12 levels, such as metformin, proton pump inhibitors, and patients whose data could not be obtained were not included in the study.

Statistical analyses were performed using the SPSS 20 package program. Pearson's correlation analysis test was used to compare vitamin B12 and other parameters. Results of descriptive analyses were reported in terms of minimum, maximum, and mean ± standard deviation (X±SD) for continuous variables, while non-continuous values were reported in numbers (n) and percentages (%). Differences were regarded as statistically significant at $p<0.05$.

RESULTS

During the course of the study, the vitamin B12 levels of 1874 pediatric cases were evaluated (male; 991, 52.8%, female; 883, 47.1%). Vitamin B12 deficiency was found in 118 (6.29%) of these cases. The study group consisted of 70 (37 male, 33 female) patients who were found to have Vitamin B12 deficiency and whose urinary MMA and plasma homocysteine levels were obtained. The ages of the subjects in the study group ranged from 3 months to 17.5 years, the mean age being 8.21±6.15 years. Vitamin B12 levels ranged from 50-126 pg/ml, with a mean of 102.57±18.97 pg/ml. There was no significant difference between the groups regarding age and gender ($p>0.05$). The most common complaints were constitutional complaints such as loss of appetite and fatigue. The complaints in the study group are summarized in **Table 1**.

Table 1: Complaints of study group

Complaints		n, (%)
Constitutional		
	Loss of appetite	21, (30)
	Fatigue	15, (21.4)
	Recurrent sickness	7, (10)
	Development growth	4, (5.7)
Neurological/psychiatric		
	Forgetfulness	10, (14.2)
	Developmental delay/regression	2, (2.8)
	Poor school performance	7, (10)
Hematological	Paleness	3, (4.2)
Other	Vomiting/Diarrhea	1, (1.4)
TOTAL		70, (100)

Urine MMA levels ranged from 0.14 to 4.63 ng/ml, at a mean of 0.59±0.67 ng/ml. Serum homocysteine levels were between 0.37-40.32 g/dl, at a mean of 13.50±0.67 g/dl. The correlation coefficient value (r) was found to be -0.342 and -0.437, moderately negative for MMA and homocysteine, respectively. MMA levels were normal in 36 patients, and homocysteine levels were normal in 48 patients. The results of ferritin levels in the entire study group, and folic acid levels in 31 patients were obtained. Iron deficiency was found in 42 patients (60%), and folate deficiency in 2 patients (6.4%). Other laboratory data are given in **Table 2**.

Table 2: Clinical and demographic findings of the study group.

Clinical and demographic findings		Correlation Coefficient Value (r)
Age Mean, Years	8.21±6.15	NA
Gender Male (n, %)	37, 52.9	NA
Vitamin B12 Mean pg/ml	102.57±18.97	NA
MMA Mean, ng/ml MMA Min-Max, ng/ml	0.59±0.67 0.14 - 4.63	-0.342
Homocysteine Mean, gr/dl Homocysteine Min-Max, gr/dl	13.50±6.71 0.37- 40.32	-0.437
Cytopenia (Anemia, Leucopenia and Trombocytopenia (n, %)	0, 0	NA
Megaloblastosis (n, %)	0, 0	NA
High MPV (n, %)	1, 1.4	NA

MMA, metilmalonic asit, MPV, main platelet volume NA, not available

DISCUSSION

In our study, 70 healthy children who applied to our pediatric outpatient clinic with various complaints and were found to have overt vitamin B12 deficiency were evaluated. No changes in hematological parameters such as cytopenia, macrocytosis, increased MCV and MPV, which are common and prominent in vitamin B12 deficiency, were detected in these patients. In addition, the fact that MMA and homocysteine levels were found to be within normal limits in most of the cases can be considered to contribute to the debate about the reliability of these tests and what the cut-off value of vitamin B12 in healthy children should be.

Vitamin B12 deficiency is common in healthy children, especially in developing countries, as a result of an insufficient intake of animal-sourced foods. Regional differences were found in studies on vitamin B12 deficiency in Turkey. In addition, different frequencies have been reported depending on the different threshold limits used to define vitamin B12 deficiency. In a study by Wetherilt et al., conducted with 960 healthy school-age children living in urban and rural areas, the frequency of vitamin B12 deficiency was 5.9% (6). Çolak et al. found the frequency of deficiency to be 16.9% in their study with 7310 children in Izmir. In this study, the lower limit of vitamin B12 was taken as 200 pg/ml (7). In another study conducted with a total of 889 participants aged 12-22 years in Diyarbakır, Turkey, the deficiency was found in 14.4% of the participants when the vitamin B12 cut-off level was taken to be 240 pg/ml (8). We used 126.5 pg/ml, which is the laboratory and assay-specific cut-off level, for the Vitamin B12 cut-off level in our study. We found the frequency of B12 deficiency in healthy children admitted to the hospital in Ankara to be 6.29%.

The cut-off level of Vitamin B12 may differ between laboratories depending on the measurement method used. Most laboratories use the competitive chemiluminescence test to measure serum vitamin B12 levels (9). This test has an approximate sensitivity of 95% and 80% specificity in symptomatic patients and is currently the standard initial diagnostic test for vitamin B12 deficiency. It measures both the "inactive" forms (bound to transcobalamin I-III) and the "active" form (bound to transcobalamin II-holotranscobalamin) of cobalamin in serum. This chemiluminescence-based method is a widely available, low-cost, automated method based on intrinsic factor binding. Sometimes, normal values may be found in patients clinically thought to have vitamin B12 deficiency, or levels may not be in parallel with the clinical condition of patients with significantly low vitamin B12 levels (subclinical deficiency), as stated in our study (10). In addition, there is an extensive gray range between normal and abnormal values of B12 measured by this method. More importantly, the measurement lacks the specificity and sensitivity required by a powerful diagnostic test (10,11). Because of this, although testing the serum vitamin B12 level remains the first-line test, supporting second-line tests are needed to clarify underlying biochemical/functional uncertainties. MMA and homocysteine are often used for this purpose. Especially in patients who are thought to have vitamin B12 deficiency but whose level is found to be normal, the high MMA level is considered quite significant for a diagnosis of deficiency. Patients with low vitamin B12 with normal MMA and homocysteine levels are considered to have no vitamin B12 deficiency, and no further action is required in these patients (11). In our

study, in which cases with overt vitamin B12 deficiency were evaluated, MMA was found to be increased in 34 (48.5%) patients, while homocysteine had increased in 22 (31.4%) patients. Increases in both were detected in only 12 (17.1%) patients. It is therefore evident that the reliability and cut-off values of these tests should be reviewed in healthy children. Also, if the metabolic values of uncertain/asymptomatic patients are also normal, it would be beneficial to re-study vitamin B12 levels.

Although the measurement of increased MMA and homocysteine levels in the early period of vitamin B12 deficiency is a more sensitive method of screening for vitamin B12 deficiency, the benefit of MMA and homocysteine measurement is controversial, especially in patients with borderline low B12 levels or those who have an absence of clinical findings. In this regard, the measurement of serum holotranscobalamin appears to have promise for first-line testing. Holotranscobalamin, an active vitamin B12 fraction, is more specific than serum vitamin B12 levels and outperforms serum vitamin B12 levels in assessing deficiency based on MMA levels in studies (11,12). Investigating the laboratory's sensitivity and specificity should be reviewed together with a ROC analysis using MMA or an appropriate alternative marker to define proof of the metabolic disorder originating from vitamin B12 deficiency (13). However, the determination of reference ranges by individual laboratories may be difficult because serum cobalamin levels can be affected by many variables such as the manufacturer, diet, and vitamin medications (11).

Since the biochemical pathways of vitamin B12 and folate are closely related, both deficiencies show similar clinical features. The evaluation of vitamin B12 and folate are usually performed together. In actual vitamin B12 deficiency, the serum folate level is usually normal or may be elevated. However, low serum vitamin B12 levels can be detected in the presence of folate deficiency (14,15). In our study, folate levels were obtained in only 31 children, and low levels were found in only two children. The general prevalence of iron deficiency, which is the most common nutritional deficiency in childhood, has been reported to be 15.2-62.5% in our country (16-18). In our study, this rate was 60%, and anemia was not detected in any of the patients. It is known that the cause of iron deficiency is poor animal nutrition, as is similarly true of vitamin B12 deficiency. It is no surprise then that the two conditions are often found together and associated with a common origin.

There are some limitations in our study. First of all, some data could not be obtained due to the retrospective nature of the research. For example, the response of patients to treatment or hypersegmentation of neutrophils in the peripheral smear could not be evaluated. In addition, the fact that holotranscobalamin is not routinely studied in our clinic, as well as our evaluation of the data of only a limited number of cases at a single site can be counted as other limitations. Nevertheless, our study sheds light on the difficulties that can be experienced in diagnosing vitamin B12 deficiency in children and provides guidance for clinicians.

CONCLUSION

Vitamin B12 deficiency is a common micronutrient deficiency in childhood. Neurological symptoms and signs may develop without hematological abnormalities such as megaloblastic anemia, and these findings may be permanent. Therefore, the recognition and early treatment of vitamin B12 deficiency is essential. This can be difficult in children who do not display typical laboratory findings particularly elevated MMA and homocysteine. In this regard, national quality assessments and standardization of laboratories will be beneficial.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was carried out with the permission of Ankara City Hospital No. 2 Clinical Research Ethics Committee (Dated: 08/12/2021, Decision No: E2-21-943).

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.

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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Pediatr Pract Res 2022; 10(1): 6-10
DOI: 10.21765/pprjournal.1036818

ORIGINAL ARTICLE
ORİJİNAL ARAŞTIRMA

Approach to Labial Fusion in Children: 16 Years of Experience

Çocuklarda Labial Füzyona Yaklaşım: 16 Yıllık Deneyim

Can İhsan Öztorun[1], Elif Emel Erten[2], Süleyman Arif Bostancı[2], Şükrüye Demirkaya[2], Ahmet Ertürk[2], Sabri Demir[2], Doğuş Güney[1], Gülsen Keskin[3], Müjdem Nur Azılı[1], Emrah Şenel[1]

[1]Ankara Yıldırım Beyazıt University, Faculty of Medicine, Department of Pediatric Surgery, Ankara, Turkey
[2]Ankara City Hospital, Pediatric Surgery Clinic, Ankara, Turkey
[3]Health Sciences University, Dışkapı Yıldırım Beyazıt Training and Research Hospital, Department of Anesthesiology Ankara, Turkey

ABSTRACT

Aim: We aimed to retrospectively evaluate the patients with labial fusion who presented to or were referred to the pediatric surgery clinic in a tertiary pediatric hospital.

Material and Method: Between 01/01/2005 and 31/12/2020, 889 patients admitted or consulted to the pediatric surgery clinic due to labial fusion, age at the time of diagnosis, complaints on admission, which clinic referred the patient to the pediatric surgery clinic, treatments, recurrence, and complications were evaluated retrospectively.

Results: The mean age of the patients was 2,21±2,17 years. Most of the patients (82.5%) were asymptomatic. Parents noticed the condition and brought their child directly to the pediatric surgery clinic in 72.3% of the cases. Otherwise, patients were consulted to the pediatric surgery clinic from pediatric clinics, the pediatric endocrinology clinic, the pediatric nephrology clinic, or the pediatric emergency department. During the initial examination, manual separation was performed in 885 patients, and surgery was required for four patients. After the procedures, hydrotherapy with warm water and topical estrogen therapy were applied to all patients for 15 days. Recurrence was detected in 80 (9.0%) patients who were treated by manual separation. Manual separation was performed again in 78 of the patients, while surgical separation was performed in two (2.5%) patients who had severe fibrotic fusions.

Conclusion: In the treatment of labial fusion, we recommend the combination of manual separation and topical estrogen cream treatment because it can be applied safely in the clinic, and the recurrence rate is low. Surgical separation is preferred in severe, thick, and fibrotic labial fusions.

Keywords: Girl, labial fusion, topical estrogen, manual separation, surgical separation

ÖZ

Amaç: 3. basamak bir çocuk hastanesinde çocuk cerrahisi polikliniğine başvuran veya konsülte edilen labial füzyonlu hastaları retrospektif olarak değerlendirmeyi amaçladık.

Gereç ve Yöntem: 01/01/2005-31/12/2020 tarihleri arasında çocuk cerrahisi kliniğine labial füzyon nedeni ile başvuran veya konsülte edilen 889 hasta tanı anındaki yaşları, başvuru şikâyetleri, hangi kliniklerden çocuk cerrahisine konsülte edildiği, tedavileri, nüks ve komplikasyonlar açısından retrospektif olarak değerlendirildi.

Bulgular: Hastaların yaş ortalaması 2,21±2,17 yıl idi. Hastaların çoğu asemptomatik idi (%82,5). Hastaların %72,3'ü ebeveynlerin fark etmesi ile doğrudan çocuk cerrahisi polikliniğine getirildi. Bunun dışında pediatri poliklinikleri, pediatrik endokrinoloji polikliniği, pediatrik nefroloji polikliniği ve çocuk acilden hastalar kliniğimize konsülte edildi. İlk muayenede, 885 hastaya manuel seperasyon ve 4 hastaya cerrahi uygulandı. Tüm hastalara işlemden sonra 15 gün boyunca ılık suya oturma banyosu ve topikal östrojen tedavisi uygulandı. Manuel seperasyon yapılan 80 (%9) hastada nüks tespit edildi. Nüks olan hastaların 78'ine yeniden manuel seperasyon yapılırken, sert fibrotik füzyonu olan iki hastaya (%2,5) ise cerrahi seperasyon yapıldı.

Sonuç: Labial füzyon tedavisinde, manuel seperasyon ve topikal östrojenli krem tedavi kombinasyonunu, poliklinik ortamında güvenilir şekilde uygulanabilir olması ve nüks oranın düşük olmasından dolayı önermekteyiz. Sert, kalın ve fibrotik labial füzyonlarda ise cerrahi seperasyon tercih edilmelidir.

Anahtar Kelimeler: Kız çocuk, labial füzyon, topikal östrojen, manuel seperasyon, cerrahi seperasyon

Corresponding Author: Can İhsan Öztorun
Address: Ankara City Hospital, Deparment of Pediatric Surgery, Bilkent/Çankaya, Ankara, Turkey
E-mail: drcan-oz@hotmail.com

Başvuru Tarihi/Received: 15.12.2021
Kabul Tarihi/Accepted: 31.12.2021

INTRODUCTION

Labial fusion is a benign gynecological pathology that occurs as a result of partial or complete adhesion of the labia minora to the midline in girls; it is mostly seen between 0-2 years of age. The prevalence of labial fusion is 1.8%, with the highest incidence (3.3%) at 13 to 23 months (1,2). Although hypoestrogenism in the prepubertal periods considered to be the etiology, conditions such as urinary tract infections, diarrhea, diaper rash, fungal infections, allergic dermatitis, vaginal stream, poor hygiene, and low frequency of body washing and diaper changes can cause labial adhesions. Local trauma and irritation lead to fibrous exudate, causing tissue damage. Fibrous exudate is thought to cause midline adhesions (3). Although labial fusion is usually asymptomatic, it can cause problems such as bacteriuria, urinary tract infections, difficulty in urination, post-void dripping, and even hydronephrosis in total adhesions (4,5). Urinary tract infection is both a risk factor and a clinical outcome for labial fusion. It can be identified by families during home care or physicians with a careful physical examination. On physical examination, it is observed that the labia minora is partially or totally adhered as a thin membrane (**Figure 1**). Physical examination is sufficient for diagnosis. It is necessary to be careful in terms of labial adhesions in girls who present to the clinic with the complaint of frequent urinary tract infections. In treatment, the labial fusion should be separated. In most polyclinic conditions, it is sufficient to open the adhesion with manual separation. The separation process is performed with a sterile blunt-tipped clamp. If manual separation is insufficient in recurrent or total adhesions, the adhesion is separated surgically under sedation (3,6,7). After separation of adhesions, topical application with estrogen-containing cream two to three times a day for two weeks is recommended to reduce recurrence. In addition, the risk of recurrence is reduced by advising the family on warm baths, application of antibacterial cream, and ensuring good hygiene (8). In this study, we aimed to retrospectively evaluate the demographic data, complaints, consulting clinics, treatment, and results of patients with labial fusion who presented to or were consulted to the pediatric surgery clinic in a tertiary pediatric hospital.

MATERIAL AND METHOD

The study was carried out with the permission of Ankara City Hospital No. 2 Clinical Research Ethics Committee (Dated: 13/10/2021, decision no: E2-21-438). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

Between 01/01/2005 and 31/12/2020, female patients who presented to the pediatric surgery clinic or were referred to the clinic due to labial fusion were included in the study. The patients' files were evaluated retrospectively using the hospital data processing system. The age of the patients at the time of diagnosis, complaints, which clinic they were referred from, treatments applied, frequency of recurrence of the fusion, and complications were examined.

After the family was informed about the treatment method and consent was obtained, the labial fusion was treated with manual separation with the help of a blunt-tipped sterile clamp. The parents were educated about the use of estrogen topical cream, warm baths, and care recommendations for 15 days. They were called for follow-up in 15 days. In the patients who had thick, hard, fibrous adhesions which were detected in the physical examination, that were not amenable to manual separation, the fusion was separated surgically with electrocautery under sedation after obtaining the consent of the family. The patients were discharged on the same day as outpatients. During the follow-up period, topical estrogen cream and warm baths were advised for 15 days postoperatively.

Statistical Analysis

Data analysis was performed with the Statistical Package for the Social Sciences (SPSS) version 15.0 (SPSS Inc., Chicago, IL). The numerical variables, age, and number of clinic admissions were expressed as mean±standard deviation and categorical variables were expressed as percentages (%). The Kolmogorov-Smirnov or Shapiro-Wilk tests were used to determine whether the numerical variables were normally distributed. For the normally distributed variables, the mean values of the variables were analysed using the Student's t test and ANOVA testing. Cochrane Q test was used to compare categorical variables. $P<0.05$ was considered statistically significant for all variables.

RESULTS

This study included 889 girls who presented to or were referred to our clinic due to labial fusion. The mean age was 2.21±2.17 years. There were 347 patients (39.0%) under the age of one-year-old, 462 patients (52.0%) aged 1–5 years, and 80 patients (9.0%) over the age of five. The complaints of the children were dermatitis in 72 (8.1%) patients and urinary tract infection in 83 (9.3%) patients. Among the patients, 734 (82.6%) were asymptomatic. The parents noticed the problem and brought their child directly to the pediatric surgery clinic in 643 (72.3%) of the cases. Labial fusion was detected during the routine physical examination of 112 (12.6%) patients in pediatric clinics and 41 (4.6%) patients in pediatric endocrinology clinics. It was identified in 83 (9.3%) patients in pediatric

nephrology polyclinics who were being investigated for the cause of urinary tract infections. These patients were referred to our clinic after the detection of labial fusion. Ten (1.1%) patients were brought to the pediatric emergency department after their parents noticed the labial fusion and were referred to our clinic by pediatric emergency physicians. The number of clinic admissions is presented in **Table 1**. It was determined that direct presentation to the pediatric surgery clinic was the highest (p=0.02). The mean age of the patients was evaluated according to the referring clinic and is shown in **Table 2**. It was found that the mean age of the patients who were consulted to our pediatric surgery clinic from the pediatric emergency service was statistically lower (p=0.016).

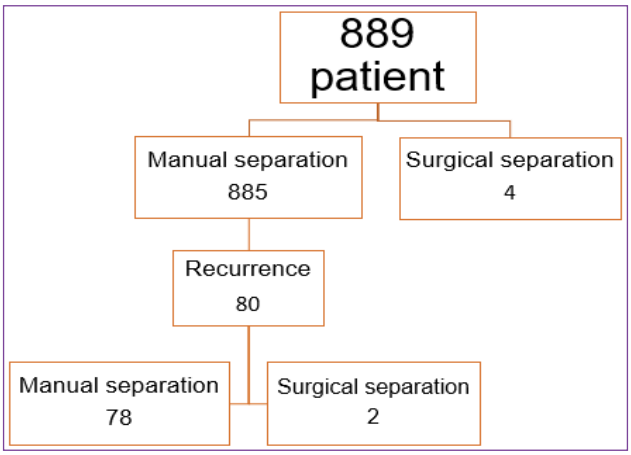

Figure 2. Treatment flow chart applied to the patients

Table 1. Numbers of patients according to the clinic admission

Clinic	Numbers of patients (n)	p
Admission to the Pediatric Surgery Clinic	643 (72.3%)	0.02*
Admission to the General Pediatric Clinic	112 (12.5%)	0.02*
Admission to the Pediatric Endocrinology Clinic	41 (4.61%)	0.02*
Admission to the Pediatric Nephrology Clinic	83 (9.33%)	0.02*
Admission to the Pediatric Emergency Department	10 (1.12%)	0.02*

*Cochrane Q test

Table 2. Mean age of the patient according to admission clinic

Clinic	Mean age (year)	p
Admission to the Pediatric Surgery Clinic	2.26±3.42	0.016*
Admission to the General Pediatric Clinic	2.66±3.22	0.016*
Admission to the Pediatric Endocrinology Clinic	2.89±3.52	0.016*
Admission to the Pediatric Nephrology Clinic	2.45±2.87	0.016*
Admission to the Pediatric Emergency Department	0.6±0.5	0.016*

*One –way ANOVA test

Escherichia coli (n=72, 86.7%) was the most frequently seen microorganism in the urine culture of patients presenting with urinary tract infection, followed by Klebsiella pneumoniae (n=7, 8.4%) and Proteus species (n=4, 4.8%). The patients were given antibiotic treatment by the pediatric nephrologist in accordance with the urine culture.

A detailed genital examination was performed, and the labial fusion was opened in 885 patients by manual separation. After the initial examination, four patients who were not suitable for manual separation of their labial fusion were treated by surgical separation with electrocautery under sedation in the operating room. All patients received warm bath and topical estrogen therapy for 15 days after the procedure.

One hundred and fourteen (12.8%) patients did not come to their follow-up examination. The patients were followed up for an average of 22±14 months. The mean number of admissions to the clinic was 2.4±1,8. During the follow-up, recurrence was detected in 80 (9.0%) patients who were treated by manual separation. No recurrence was observed in the patients who were treated with surgical separation. Recurrence was detected at a mean of eight 8±7 months. Manual separation was repeated in 78 (97.5%) of the patients with recurrences, while surgical separation was performed in two (2.5%) patients with severe fibrotic fusions (**Figure 2**).

The mean age of the patients was 2.6±2,4 years in the relapsed group and 1.8±1,6 years in the non-relapsed group. The age of the patients was found to be higher in the group in which the fusion recurred (p=0.03) (Student's t test). In 14 (17.5%) of the relapsed patients, E. coli was detected in the urine culture. Manual separation and appropriate antibiotic therapy were applied.

DISCUSSION

Labial fusion is defined as partial or complete adhesion of the labia minora to the midline. There is a fusion starting from the posterior fourchette and progressing to the clitoris. Although hypoestrogenism is responsible for the etiology, diaper-related skin irritation, infections, and poor hygiene are considered the main factors (9,10).

Labial fusion is common between three months and four years of age and peaks between 13 and 23 months (11). In this study, it was found that labial fusion was most common between the ages of one and five years, which is similar to the literature. It was seen in children younger than one year with the second highest frequency.

Most patients are asymptomatic and can be identified incidentally during care by parents or during a physical examination by a physician. They may present to

pediatric surgery and pediatric clinics with symptoms such as dermatitis, dysuria, urinary tract infections, and obstruction (10,11). Although 82.5% of the patients in this study were asymptomatic, there were patients who presented with dermatitis and urinary tract infections. In most of the patients (72.3%) in this study, labial fusion was detected by the family who brought the patient directly to the pediatric surgery clinic. Some of the patients were referred to the pediatric surgery clinic by pediatricians after they detected labial fusion during the physical examination performed while investigating the etiology of urinary tract infection or incidentally during routine examinations in pediatric clinics. It was determined that the mean age of the patients who were referred to our clinic from the pediatric emergency service was statistically lower (p=0.016). Although labial fusion is not a condition that requires emergency treatment, when families notice labial fusion during home care, they may want to have their baby treated immediately, thinking that the cause of the baby's trouble due to colic is labial fusion.

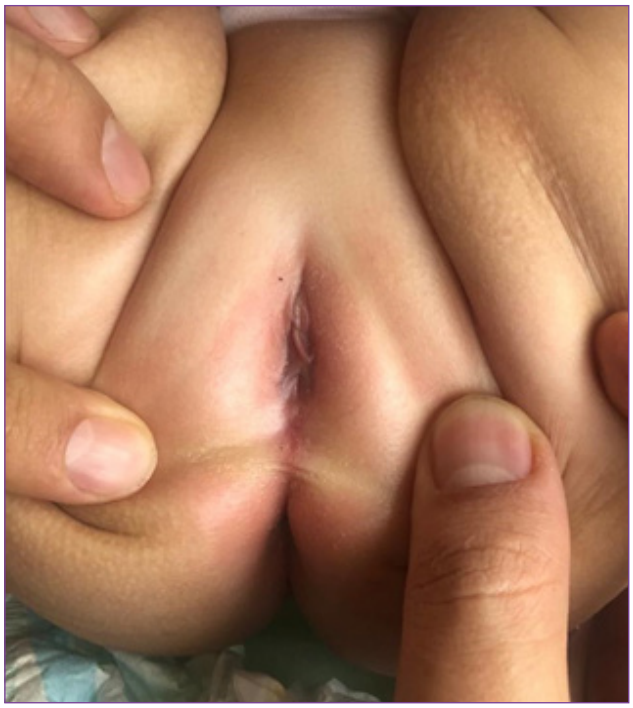

Figure 1. Total labial fusion in a girl infant.

There are different approaches in the literature regarding the treatment of labial fusion. It is thought that the increase in estrogen levels with puberty will cause spontaneous opening of the labial fusion. Some studies suggest waiting without intervention in asymptomatic cases (4). Other studies recommend treatment as labial fusion may cause asymptomatic bacteriuria and urinary tract infections (12). Our approach is to treat every labial fusion that comes to our clinic, even if it is asymptomatic, in order to prevent urinary system infections that may occur.

In addition to publications reporting failure of estrogen therapy in thick and nearly completely closed labial fusions, there are also reports of 50–88% success (4,8,13). Manual separation is recommended in cases where topical estrogen therapy fails (5,11,13). In the study by Soyer et al., manual separation and topical estrogen were applied together, and the success rate was reported as 100% (8). Saraç et al (12). compared estrogen therapy and manual separation therapy and found that manual separation was more successful.In some studies, surgery is recommended for patients with thick, hard, fibrous labial fusions (1,5,13,14). In the present study, manual separation was performed in 99.5% of the patients,and topical estrogen therapy was applied initially. Surgical separation was performed under sedation in four patients with severe, thick labial fusions that were not suitable for manual separation.

Long-term use of topical estrogen is considered harmless, but there are publications reporting complaints, such as the onset of breast development, vulva discoloration, and vaginal bleeding (1,4). Estrogen suppresses the local inflammatory response, accelerates epithelialization, and activates wound healing in the skin. Continuous application of cream to the fusion site creates a physical effect, causing the fusion to seperate.6 The application of topical estrogen cream is important to prevent recurrences, even if the fusion is separated manually (8). In this study, we prescribed estrogen-containing topical cream treatment for 15 days to patients who underwent both manual separation and surgery. We recommend using topical estrogen cream for 15 days after manual separation and surgical separation due to low recurrence rates.

In the literature, the recurrence rate was found to be 35–41% for topical estrogen treatment only, 14–25% for those who underwent manual separation only, and 11% for those who underwent surgical separation (3,6,15). In the present study, the recurrence rate was 9.0% in the combination of manual separation and topical estrogen cream treatment, and there were no recurrences in those who underwent surgical separation. The recurrence rate in this study is lower than the rates reported in the literature. We think that the low recurrence rate is due to the success of the applied combined treatment and our detailed care recommendations for families.

In this study, recurrence was more common in older children. We think that this is due to frequent diaper changes and appropriate care during infancy, while reduced parental care after infancy, poor hygiene conditions and urinary tract infections

CONCLUSION

Labial fusion is seen frequently in prepubertal girls and is among the reasons for referral to both pediatric surgery clinics and pediatric and pediatric nephrology clinics due

to urinary tract complaints in children. In the treatment of labial fusion, we recommend the combination of manual separation and topical estrogen cream treatment because it can be applied safely in the clinic, and the recurrence rate is low. Surgical separation should be preferred in severe, thick, fibrotic labial fusions.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was carried out with the permission of Ankara City Hospital No. 2 Clinical Research Ethics Committee (Dated: 13/10/2021, decision no: E2-21-438).

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.

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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Pediatr Pract Res 2022; 10(1): 11-15
DOI: 10.21765/pprjournal.1022679

ORIGINAL ARTICLE
ORİJİNAL ARAŞTIRMA

Çocuk Çağı Hemanjiyomları ve Sonuçları

Childhood Hemangiomas and Outcome

Mehmet Burak Duman[1], Buket Kara[2], Ahmet Sert[3], Yavuz Köksal[4]

[1]Anamur State Hospital, Department of Pediatria, Mersin, Turkey
[2]Recep Tayyip Erdoğan Training and Rsearch Hospital, Department of Pediatric Hematology and Oncology, Rize, Turkey.
[3]Selcuk University, Faculty of Medicine, Department of Pediatric Cardiology, Konya, Turkey
[4]Selcuk University, Faculty of Medicine, Department of Pediatric Hematology and Oncology, Konya, Turkey.

Öz

Amaç: Bu çalışmanın amacı hemanjiyom tanısı alan çocuklarda demografik ve klinik özellikleri ile tedavileri ve tedavi sonuçlarının incelenmesidir.

Gereç ve Yöntem: Ekim 2017- Eylül 2019 tarihleri arasında hemanjiyom tanısı alan 100 çocuk hastanın dosyası geriye dönük olarak incelendi. Hastaların demografik ve klinik özellikleri, tedavi yaklaşımları ve sonuçları not edildi.

Bulgular: Çalışmaya dâhil edilen 100 hastanın 66'sı (%66) kız, 34'ü (%34) erkekti. Hastaların yaş gruplarına göre, 0-3 ay, 3-6 ay, 6-12 ay, 12-24 ay ve >24 ay yaş gruplarında sırasıyla 35, 28, 23, 8 ve 6 hasta vardı. Atmış bir hastada (%61), hemanjiyom baş-boyun bölgesinde yerleşimli iken, baş-boyun dışı yerleşim 39 (%39) hastada saptandı. Tedavi yaklaşımları 71 hastada oral propranolol, 21 hastada topikal timolol damla ve 8 hastada oral propranolol + oral metilprednisolon idi. Oral propranolol ile tedavi edilen 37 hastada (%52), topikal timolol damla ile tedavi edilen 7 hastada (%33,3) ve oral propranolol + oral metilprednisolon ile tedavi edilen üç hastada (37,5) yanıt alındı. Stabil hastalık, oral propranolol alan hastaların 13'ünde (%45,1), topikal timolol damla uygulanan hastaların 13'ünde (%61,9) ve oral propranolol + oral kortikosteroid alan hastaların dördünde (%50) saptandı.

Sonuç: çocuklarda, hemanjiyom tedavisinde özellikle oral propranolol tedavisinin etkili ve güvenilir bir tedavi yöntemi olduğu gözlemlenmiştir.

Anahtar Sözcükler: Çocukluk çağı, hemanjiyom, propranolol

Abstract

Objective: The aim of this study is to examine the demographic and clinical characteristics, treatments and outcomes in children diagnosed with hemangioma.

Material and Method: Between October 2017 and September 2019, the files of 100 pediatric patients diagnosed with hemangioma were evaluated retrospectively. Demographic and clinical characteristics of the patients, treatment approaches and results were noted.

Results: Of the 100 patients included in the study, 66 (66%) were female and 34 (34%) were male. According the age of patients, there were 35, 28, 23, 8, and 6 patients in age groups 0-3 months, 3-6 months, 6-12 months, 12-24 months, and >24 months, respectively. Hemangioma was located in the head and neck region in 68 patients (61%), while extra-head and neck location was detected in 39 (39%) patients. Treatment approaches were oral proporanolol in 71 patients, topical timolol in 21 patients, and oral proporanolol + oral metilprednisolon in 8 patients. Response was obtained in 37 patients (52%) treated with oral propranolol, 7 patients (33%) treated with timolol drops, and three patients (37.5) treated with oral propranolol + oral metilprednisolon. Stable disease was found in 13 (45.1%) of patients receiving oral propranolol, 13 (61.9%) of patients performing topical timolol drop, and four (50%) patients receiving oral propranolol + oral corticosteroid.

Conclusion: Oral propranolol has been observed as an effective and safe treatment method for treatment hemangioma.

Keywords: Childhood, hemangioma, propranolol

Corresponding Author: Buket Kara
Address: Department of Pediatric Hematology and Oncology, Recep Tayyip Erdoğan Training and Rsearch Hospital, Rize, Turkey
E-mail: buketkara1001@gmail.com

Başvuru Tarihi/Received: 16.11.2021
Kabul Tarihi/Accepted: 15.03.2022

GİRİŞ

Hemanjiyomlar çocukluk çağının en sık görülen yumuşak doku tümörleridir. Gerçek insidansı bilinmemekle beraber, bir yaş altı çocuklarda % 4-10 sıklığında görüldüğü tahmin edilmektedir (1).

Yüzde 60 oranında baş ve boyun bölgesinde görülür. Kafkas ırkında, kızlarda, düşük doğum ağırlıklı ve prematüre bebeklerde görülme ihtimali daha fazladır. İleri anne yaşı, çoğul gebelik, plasenta anomalileri ve preeklampsi gibi durumlarda da infantil hemanjiyom görülme oranının arttığını gösteren çalışmalar mevcuttur (2).

İnfantil hemanjiyomların kendine özgü bir yaşam döngüsü vardır. Bu döngü proliferasyon ve involüsyon evresi olarak iki evreden meydana gelir. Proliferasyon erken infant döneminde başlar ve bir yıl sürebilir. İnvolüsyon evresi proliferasyona göre daha yavaştır ve hastaların %76'sında yedi yaşında tamamlanır (3).

Kendini sınırlayıcı özellikte olmasına rağmen bazen yaşamı tehdit eden komplikasyonlar gelişebilir. Medikal tedavi yaklaşık %10'unda gerekmektedir. Kozmetik deformiteye sebep olup bulunduğu yer ve özelliğine göre solunum zorluğu, görme bozukluğu, beslenme bozukluğu, kalp yetmezliği, lezyon üzerinde ülser, kanama ve enfeksiyon gibi komplikasyonlara neden olabilir.

Tedavide non-selektif bir beta bloker olarak kullanılan propranololün infantil hemanjiyom tedavisindeki etkisi gösterilmiştir ve ilk tercih olarak tedavide kullanılmaya başlanmıştır. Kortikosteroidler de günümüzde iyi bir tedavi seçeneği olsa da yan etkileri fazladır. Ayrıca kemoterapötikler ve antivasküler endotelyal büyüme faktörü (anti-VEGF) ikinci basamak tedaviler olarak kullanılmakta olup, gerektiği durumlarda cerrahi yöntem, lazer ve embolizasyon tedavileride uygulanmaktadır (4).

Bu çalışmanın amacı kliniğimizde hemanjiyom tanısı alan ve izlenen hastaların epidemiyolojik ve klinik özellikleri, uygulanan tedavi ve sonuçlarının retrospektif değerlendirilmesidir.

GEREÇ VE YÖNTEM

Bu çalışma için, Selçuk Üniversitesi, Tıp Fakültesi, Yerel Etik Kurulundan (Tarih: 30.10.2019, Karar No: 2019/320) izin alındıktan sonra Helsinki Bildirgesi ilkeleri çerçevesinde yapılmıştır. Retrospektif bir çalışma olduğu için hasta ya da hasta yakınlarından onam alınmadı.

Ekim 2017- Eylül 2019 tarihleri arasında daha önceden tedavi uygulanmamış, klinik olarak hemanjiom tanısı alan ve takibe alınan bir ay ile 18 yaş arasındaki 100 hastanın dosyalarının retrospektif olarak taranması yoluyla yapılmıştır. Hastaların tıbbi bilgilerine; pediatrik onkoloji takip ve arşiv dosyalarının yanı sıra bilgisayar sisteminden ulaşılmıştır. Çalışmaya alınan hastaların yaşı, cinsiyeti, hemanjiomun boyutu, lokalizayonu, verilen topikal ve oral tedaviler, tedavi süresi ve sonuçları geriye dönük olarak incelendi.

Çalışma kabul kriterleri; lezyonları hemanjiyom tanımına uymak, başvuru sırasında yaşın bir ay ile 18 yaş arasında olmak, hemanjiyom nedeni ile tedavi başlanmış hastalar arasında olmak ve tanı, izlem ve tedavisi Pediatrik Onkoloji Bilim Dalında yapılan ve tedavi kesiminden sonra en az üç ay süreyle izlenen hastalardan olmak olarak belirlenmiştir. Kriterlerin tamamını karşılayan hastalar çalışmaya alınmıştır. Çalışma dışlama kriterleri; hemanjiyom dışı tanı almış olmak, dosyasında tanı ve tedavi ile ilgili bilgileri eksik olmak, tedavi başlanan hastalarda tedavi kesiminden sonraki üç aylık periyodu tamamlamamış olmak olarak belirlenmiştir. Kriterlerin bir tanesini karşılayan hastalar çalışmaya alınmamıştır.

Hastaların tedavisinde topikal bir beta blokör olan timosol damla, non-selektif bir beta blokör olan propranolol ve sistemik kortikosteroid olan prednol kullanıldı. İnfantil hemanjiyom tedavisinde hangi ilacın kullanacağına lezyonun boyutuna, yerleşim yerine, tipine, gelişen yâda gelişme ihtimali olan komplikasyona göre karar verildi. Propranolol dozu ilk gün 1 mg/kg/gün (günde iki dozda) olacak şekilde başlandı, ikinci gün 2 mg/kg/gün e çıkıldı. Prematüre doğum öyküsü veya komorbiditesi olan hastalara propranolol dozu ilk gün 0,5 mg/kg/gün (günde iki dozda) olacak şekilde başlandı, ikinci gün 1 mg/kg/gün e çıkıldı. Hastaların tedavisinde kullanılan diğer iki ilaç timosol ve sistemik bir kortikosteroid olan prednoldü. Topikal bir beta blokör olan timosol damla günde iki kez, iki damla olarak lezyonun üzerine damlatılması şeklinde tedavide kullanıldı. Prednol dozu 2 mg/kg/gün (günde tek dozda, sabahları ve maksimum günlük 60 mg) olarak başlandı, hastanın kilosuna göre dozu ayarlandı. Depresif duygu durumu, ajitasyon, uykusuzluk, huzursuzluk, cushingoid yüz görünümü, femur başının aseptik nekrozu, hipertansiyon, osteoporoz ve katarakt gibi yan etkilerin gelişimi açısından hastalar yakından takip edildi. Prednol kullanımına bağlı yan etki gelişiminde ilaç azaltılarak kesildi.

İnfantil hemanjiyom tedavisinde lezyonlardaki iyileşme belirtileri hastaların pediatrik onkoloji poliklinik kontrolü sırasında yapılan ölçümler ve fotoğraf çekimleri ile değerlendirildi. Tedavi yanıtlarında %50-100 iyileşme varlığı iyileşen lezyon, %50 ve altında küçülme varlığı ve tedavi ile boyut ve renk değişikliği olmayan hastalar stabil lezyon ve tedavi kesildikten sonra tekrar büyüme görülen vakalar rekürren lezyon olarak kabul edildi. Tedaviye yanıtlar değerlendirilirken tedaviye başlama yaşı, tedavide kullanılan ilaç ve tedavi süreleri incelendi. Tedaviye başlama yaşı için 6 ay ve altı, 6 ay-2 yaş arası ve 2 yaş üstü grupları belirlenirken verilen tedavinin süresi ise 6 ay altı süre tedavi alanlar ve 6-12 ay arası tedavi alanlar olarak gruplandı.

İstatiksel Değerlendirme

İstatistiksel analiz için IBM Statistical Package for Social Sciences (SPSS) versiyon 21 yazılım programı kullanıldı. Kategorik veriler için frekans ve yüzdeleri kullanıldı. Sayısal değerler için dağılım normal ise ortalama ve standart sapma, dağılım normal değilse ortanca değeri ile minimum ve maksimum değerler verildi. Kolmogorov Smirnov testi ile verilerin normal dağılıma uygunluğu değerlendirildi. Kategorik verilerin karşılaştırılmasında χ2 testleri, numerik verilerin karşılaştırılmasında ise student T testi ya da Mann Whitney U testi kullanıldı. Alfa değeri (p) 0.05'ten küçük ise istatistiksel olarak anlamlı kabul edildi.

BULGULAR

Hemanjiyom tanısı ile takip ve tedavi edilen 100 olgunun 66'sı (%66) kız, 34'ü (%34) erkekti. Olguların 35'inde (%35) tanı alma yaşı 0-3 ay, 28'inde (%28) tanı alma yaşı 3-6 ay, 23'ünde (%23) tanı alma yaşı 6-12 ay, 8'inde (%8) tanı alma yaşı 12 ay-2 yaş ve 6'sında (%6) tanı alma yaşı 2 yaş ve üzeri olarak bulundu. Hastaların tanıda ortanca yaşı 7 ay olarak belirlendi. Olguların en çok tanı alma yaşı 0-3ay arasındaydı (%39). En sık izlenen lokalizasyon baş-boyun bölgesi olup, hastaların %55'inde lezyonun boyutu 2 cm'den büyüktü ve lezyon sayısına bakıldığında %68 hastada tek lezyon mevcuttu. Lezyon tipine göre değerlendirildiğinde 78 hastada (%78) yüzeyel lezyon, 4 hastada (%4) derin lezyon ve 18 hastada (%18) kombine lezyon (yüzeyel ve derin lezyon birlikte) olarak tespit edildi.

Hastalar doğum haftalarına göre değerlendirildiğinde 31 hastanın (%31) 38 gestasyon haftasından daha küçük doğduğu ve preterm kabul edildiği; 69 hastanın da (%69) 38 gestasyon haftası ve üzerinde doğmuş olup term kabul edildiği saptandı. Doğum kilosu 2500 gr'ın altında ölçülüp düşük doğum ağırlıklı olarak kabul edilen 20 hasta olup (%20) geriye kalan 80 hastada (%80) 2500 gram ve üzeri doğmuş ve normal doğum ağırlıklı olarak kabul edilmiştir. Hastaların klinik özellikleri **Tablo 1**'de görülmektedir.

Hastaların tedavi şekli ve sonuçları **Tablo 2**'de görülmektedir. Çalışmamızda, 71 hastada (%71) oral propranolol tedavisi (2 mg/kg/gün), 21 hastada (%21) topikal timolol damla uygulandığı (2x2 damla), ve 8 hastada ise (%8) oral propranolol (2 mg/kg/gün) ile birlikte metilprednisolon (2 mg/kg/gün) kullanıldığı saptandı. Oral propranolol tedavisi kullanılan 71 hastanın 37'sinde (%52) cevap alındığı, hastaların 32'sinde ise (%45) lezyonların stabil seyrettiği gözlendi. Bu grupta yer alan hastaların 2'sinde de (%3) tedavi kesildikten sonra rekkürrens saptandı. Topikal timolol uygulanan hastalarda ise, 21 hastanın 7'sinde (%33) tedaviye yanıt alındığı ve 13'ünde (%62) ise lezyonların stabil seyrettiği gözlendi. Bu grupta yer alan hastaların sadece birinde (%5) rekkürens saptandı. Tedavide oral propranolo ve metilprednisolon kullanılan 8 hastanın 3'ünde (%38) yanıt elde edilirken, 4'ünde (%50) lezyonlar stabil seyrettiği gözlendi. Hastaların sadece birinde (%12) rekkürrens saptandı.

Tedavi uygulanan hastalarda tedavi süreleri 3 kategoride; 0-6 ay tedavi alan hasta (%22, n=22), 6 ay-1 yıl tedavi alan hasta (%69, n=69), 1 yıldan uzun tedavi alan hasta (%9, n=9) olarak sınıflandırıldı. Hastaların çocuk onkoloji polikliniğimize başvuru sebepleri incelendiğinde infantil hemanjiyoma bağlı gelişen beş komplikasyonun bu sebepleri oluşturduğu tespit edildi. Bu komplikasyonlar ülserasyon, kanama, hızlı büyüme, kozmetik sebepler ve iç organ yerleşiminden oluşuyordu. Tedavi başlanan 60 hastada (%60) başvuru sebebi kozmetik sebepler, 31 hastada (%31) başvuru sebebi hızlı büyüme, 5 hastada (%5) başvuru sebebi kanama, 3 hastada (%3) başvuru

Tablo 1. Hastaların Demografik Özellikleri ve Lezyon Özellikleri

	n (%)
Tanı alma yaşı	
0-3 ay	35 (%35)
3-6 ay	28 (%28)
6-12 ay	23 (%23)
12 ay-2 yaş	8 (%8)
2 yaş ve üzeri	6 (%6)
Lokalizasyon	
Baş- boyun	61 (%61)
Baş- boyun dışı	39 (%39)
Boyut	
< 2 cm	45 (%45)
cm	42 (%42)
> 5 cm	13 (%13)
Lezyon tipi	
Yüzeyel	78 (%78)
Derin	4 (%4)
Kombine	18 (%18)
Lezyon sayısı	
Tek	68 (%68)
2-5 adet	32 (%32)
5'ten fazla	0 (%0)
Doğum haftalarına göre	
< 38 gestasyon haftasından	31 (%31)
≥ 38 gestasyon haftasından	69 (%69)
Doğum kilosu	
< 2500 gr	20 (%20)
≥ 2500 gr	80 (%80)

Tablo 2. Hastaların tedavileri ve sonuçları

	İyileşen lezyon (n:47, %47)	Stabil lezyon (n:49, %49)	Rekurren lezyon (n:4, %4)
Topikal timosol (n:21, %21)	7	13	1
Propranolol (n:71, %71)	37	32	2
Propranolol+Prednol (n:8, %8)	3	4	1

sebebi iç organ yerleşimi ve 1 hastada (%1) başvuru sebebi ülserasyon olarak saptandı. **Tablo 3'**de hastaların özellikleri ve tedavi yanıtları gösterilmiştir. Hastaların tedavi yanıtları değerlendirildiğinde cinsiyet, doğum ağırlığı, gestasyon yaşı, tanı alma yaşı, lezyon sayısı, lezyon tipi ve tedaviye başlama yaşının tedavi etkinliğine etki etmediği görüldü. Tedavi etkinliği ile lezyonun yerleşim yeri karşılaştırıldığında baş boyun bölgesinde olan ve baş boyun dışı bölgelerdeki lezyonların tedaviye yanıtları arasında anlamlı fark saptandı (p:0,015).

Tablo 3. Hastaların Özellikleri ve Tedavi Yanıtları

Özellik	İyileşen lezyon	Stabil lezyon	Rekürren lezyon	P değeri
Cinsiyet				0,107
Erkek	19	15	0	
Kız	28	34	4	
Doğum ağırlığı				0,295
< 2500 gr	11	9	0	
≥ 2500 gr	36	40	4	
Gestasyon yaşı				0,529
Preterm	16	14	1	
Term	31	35	3	
Tanı alma yaşı				0,211
0-3 ay	16	18	1	
3-6 ay	16	11	1	
6-12 ay	12	10	1	
12 ay- 2 yaş	2	5	1	
2 yaş ve üzeri	1	5	0	
Lezyon sayısı				0,510
Tek lezyon	34	31	3	
2-5 lezyon	13	18	1	
Yerleşim yeri				0,015
Baş boyun	34	26	1	
Baş boyun dışı	13	23	3	
Lezyon tipi				0,162
Yüzeyel	41	33	4	
Derin	1	3	0	
Kombine	5	13	0	
Tedaviye başlama yaşı				0,290
6 ay altı	31	28	2	
6 ay- 2 yaş	14	16	2	
2 yaş ve üzeri	2	5	0	

TARTIŞMA

Hemanjiyomlar bebeklik ve çocukluk çağında en sık görülen vasküler tümörlerdir. Gerçek insidansı bilinmemekle birlikte görülme sıklığının %4-10 arasında olduğu tahmin edilmektedir. İnfantil hemanjiom hayatın ilk beş ayında hızlı bir proliferasyon (büyüme) fazından sonra involusyon (küçülme) dönemine girer. Vücudun her hangi bir bölgesinde gelişebilmesine rağmen çoğunlukla baş-boyun bölgesinde görülmektedir. Özellikle kulak çevresi, burun ucu, dudak çevresi, subglottik ve trakeal lezyonlar obstrüksiyonlara neden olurken, periorbital bölgede olanlar optik sinir basısına, görme sorunlarına ve göz kapağı hareketlerinde kısıtlılığa yol açabilmektedirler. Ayrıca bazı lezyon tiplerinde masif kanama ve enfeksiyon gibi ciddi komplikasyonlar gelişebilmekte ve küçülme sonrası kalıcı skar dokusu kalabilmektedir. Bu sebeplerden dolayı tanı konması ve tedavi başlanması gerekli olan bir hastalıktır (5). Bizim çalışmamızda çocukluk çağında hemanjiyom tanısı konan vakaların dosyaları geriye dönük olarak incelenmiş olup hastaların başvuru yaşı ve sebepleri, lezyonların sayısı ve boyutu, lezyon tipleri, yerleşim yerleri, tedavileri, takip süreleri ve tedavi sonuçları değerlendirildi.

Hemanjiyomların çoğu tedavisiz kendiliğinden gerileyerek iyileşme eğilimindedir. Spontan rezolusyona uğrayacağı düşünülen küçük hemanjiyomlar aktif müdahale etmeme ile yakın takip altında izlenebilir. Kesin tedavi endikasyonları arasında; büyük, plak benzeri (segmental) veya kombine yüzeyel ve derin yerleşimli olmak, özellikle travmaya yatkın yerlerde yer almak, hayatı tehdit edici durumlara sebep olmak (tıkayıcı subglottik tümörler, nöral yapılara bası, kanamaya yol açan gastrointestinal tümörler, kalp yetmezliğine neden olan dev tümörler), fonksiyon kaybına yol açan lezyon olmak (ambliyopiye neden olan perioküler lezyonlar, burun ve dış kulak yolunun tıkayıcı lezyonları, ülsere lezyonlar) sayılabilir. Bu endikasyonlar varsa infantil hemanjiyomun tedavisi gerekmektedir (6). Çalışmamızda hemanjiyom tedavisinde oral propranolol, topikal timolol damla ve oral propranolol + metilprednisolon tedavileri kullanıldı.

Püttgen ve arkadaşları (7) tarafından yapılan çok merkezli 731 hastanın katıldığı retrospektif bir çalışmada tedavide topikal timolol damlanın, boyutuna bakılmaksızın ince ve yüzeysel hemanjiyomlar için oral propranolol'e iyi tolere edilebilen bir alternatif tedavi olduğu gösterilmiştir. Bizim çalışmamızda tedavide topikal ilaç olarak timolol damla kullanılan hastaların %33'ünde yanıt elde edilirken, %62'sinde stabil lezyon saptandı. Rekürens oranı ise %5'di.

Oral propranololün 2008 yılında, infantil hemanjiyomlu hastalarda kalp yetmezliğini tedavi etmek için kullanımında tesadüfi olarak IH'da gerileme yaptığının gözlenmesi bu ilacın infantil hemanjiyom tedavisinde kullanıma başlanmasına sebep olmuştur. Sonrasında birçok geniş vaka raporları ve randomize kontrollü çalışmalar yayınlanmış ve infantil heemanjiyom tedavisinde etkinliği sebebiyle birinci basamak tedavi olarak tercih edilmiştir. Oral propranolol için etki mekanizması tamamen netlik kazanmamış olsa da potansiyel etki mekanizmaları vazokonstriksiyon, vasküler endotelyal büyüme faktörünün (VEGF) ve bazik fibroblast büyüme faktörünün (bFGF) ekspresyonunun azalması ve apoptozun uyarılması olarak kabul edilmektedir (8-11). Çalışmamızda tedavide oral propranolol kullanılan hastaların %52'sinde yanıt elde edilirken, hastaların %45'inde lezyonun stabil seyrettiği gözlendi. Hastaların %3'ünde rekürrens saptandı.

Oral propranolol tedavisi kullanıma girmeden önce hemanjiyom tedavisinde öncelikli olarak kortikosteroidler kullanılıyordu. Kortikosteroide yanıtsız vakalarda veya bazı durumlarda vinkristin gibi kemoterapötikler, embolizasyon, lazer ve cerrahi tedaviler de uygulanmaktaydı. Yapılan çalışmalarda propranololün kortikosteroid tedavisine göre daha az yan etkiye sebep olduğu ve kortikosteroide göre daha efektif olduğu gösterildi. Bu nedenle çoğu merkezde birinci basamak tedavi olarak tercih edilmektedir. Tek başına kortikosteroidin başlangıç tedavisi olarak kullanımı nadir durumlarda görülürken, kortikosteroid ve propranololün birlikte kullanımı bazı merkezlerde tercih edilmektedir (12-14). Bizim çalışmamızda tedavide oral propranolol ile birlikte oral kortikosteroid kullanılan hastaların %38'inde lezyonlarda iyileşme saptanırlen, hastaların %50'sinde lezyonların stabil seyrettiği gözlendi. Bu grupta rekürens oranı %12'ydi.

Literatür incelendiğinde infantil hemanjiyom tedavisi sonrası rekürrens oranı %5-10 arasında değişmektedir (15,16). Derin ve kombine (yüzeyel ve derin) lezyonlar rekürrens için yüksek risk oluşturmakla birlikte en önemli risk faktörü tedavinin erken kesilmesidir. Bizim çalışmamızda tüm hastalarda rekürrens oranı %7 olup literatür ile uyumlu olarak saptandı.

SONUÇ

Çalışmamızda özellikle infantil hemanjiyom tedavisinde kullanılan topikal β-bloker timosol, non-selektif β-bloker propranolol ve sistemik steroid prednol etkinlik açısından karşılaştırılmış, non-selektif β-bloker propranololün diğerlerine göre tedavide daha iyi sonuç verdiği görülmüştür. Tedavi verilen hastaların hiçbirinde yan etki görülmemiştir. İnfantil hemanjiyom tedavisinde özellikle propranolol tedavisinin etkili ve güvenilir bir tedavi yöntemi olduğu gözlemlenmiştir.

ETİK BEYANLAR

Etik Kurul Onayı: Bu çalışma için, Selçuk Üniversitesi, Tıp Fakültesi, Yerel Etik Kurulundan karar alınmıştır (Tarih: 30.10.2019, Karar No: 2019/320).

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

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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Pediatr Pract Res 2022; 10(1): 16-21
DOI: 10.21765/pprjournal.1027715

ORIGINAL ARTICLE
ORİJİNAL ARAŞTIRMA

Investigating the Toxoplasmosis Seroprevalence in Pregnant Women from Turkey by Pool Analyses Method

Türkiye'deki Gebelerde Toxoplasmosis Seroprevalansının Havuz Analiz Yöntemiyle Araştırılması

Emine Kübra Dindar Demiray[1], Sevil Alkan[2], Adnan Barutcu[3], Alper Tahmaz[4]

[1]Bitlis State Hospital, Department of Infection Diseases and Clinical Microbiology ,Turkey
[2]Çanakkale Onsekiz Mart University, School of Medicine, Department of Infection Diseases and Clinical Microbiology, Turkey
[3]Çukurova University Faculty of Medicine, Department of Pediatrics, Department of Social Pediatrics, Adana, Turkey
[4]University of Health Sciences, Antalya Training and Research Hospital, Turkey

Abstract

Aim: Toxoplasmosis in pregnancy may cause ophthalmologic and neurological sequelae in the fetus. However, this screening is not clearly included in routine screening protocols in our country. Therefore, there is no general information about the exact prevalence of the disease. In this study, it was aimed to evaluate the toxoplasmosis seroprevalence studies conducted in Turkey during pregnancy using the pool analysis method and to highlight the difference in disease seroprevalence between regions.

Material and Method: Published literature in English and Turkish language on toxoplasmosis seroprevalence in pregnancy from Turkey in last 30 years were elavuated. Four international databaseses were scanned by using the keywords "Toxoplasmosis" OR "*Toxoplasma gondii*" OR "TORCH" and "seroprevalence" OR "IG G" and"pregnant women" OR "pregnancy" OR "pregnant" and "Turkey" or 'Turkish'. The publications were evaluated in terms of the general frequency, city, region, year, sample size, diagnostic method. Conference papers were not included in the study. Studies involving refugee women in the sample group were excluded.

Results: A total number of 58 studies and 256612 test results were included. ELISA (n=22) was the most preferred laboratory diagnostic method. The average Anti-Toxo IgG seroprevalence rate in the pregnant population in Turkey was found to be 36.76%. And the average of Anti-Toxo IgM rate was found to be 2.91%. As a result of our study, the highest Anti-Toxo IgG test results were; It was found in studies conducted in Southeastern Anatolia (59.43%), Mediterranean (43.95%) and Eastern Anatolia (40.89%). The regions with the lowest Anti-Toxo IgG test results are respectively; Aegean Region (30.25%), Marmara Region (31.21%) and Black Sea Region (31.80%). Anti-Toxo IgM ratios are highest respectively; It was detected in Aegean Region (5.65%), Mediterranean Region (2.77%) and Southeastern Anatolia (2.21%).

Conclusion: It has been determined that western Turkey (Aegean Region) is riskier in terms of congenital toxoplasmosis due to its high susceptibility to Toxoplasma infection associated with low toxoplasma seroprevalence compared to the east, and it is considered important to perform at least region-based prenatal toxoplasma screening to prevent this.

Keywords: *Toxoplasma gondii*, Toxoplasmosis, Turkey, seroprevalence

Öz

Amaç: Gebelikteki toxoplasmozis fetüste nörolojik sekellere neden olabilir. Ancak ülkemizde bu tarama rutin olarak yapılmamaktadır. Bu nedenle hastalığın net prevelansına dair bir genel bilgi mevcut değildir. Bu çalışmada ülkemizden yapılan gebelikte toxoplasmozis seroprevelans çalışmalarını havuz analiz yöntemi ile değerlendirmeyi ve bölgeler arasındaki hastalık seroprevelans farkını gözler gönüne koymak amaçlandı.

Gereç ve Yöntem: Türkiye'de son 30 yılda gebelikte toksoplazmoz seroprevalansı ile ilgili İngilizce ve Türkçe yayınlanmış literatür değerlendirildi. "Toxoplasmosis" veya "*Toxoplasma gondii*" veya "TORCH" ve "seroprevalans" VEYA "IG G" ve "hamile kadınlar" veya "gebelik" veya "hamile" ve "Türkiye" anahtar kelimeleri kullanılarak dört uluslararası veritabanı tarandı. Yayınlar genel prevelans, şehir, bölge, yıl, örneklem büyüklüğü, tanı yöntemi açısından değerlendirildi. Konferans bildirileri çalışmaya dahil edilmemiştir. Mülteci kadınların örneklem olduğu çalışmalar hariç tutuldu.

Bulgular: Toplam 58 çalışma ve 256612 test sonucu dahil edildi. ELISA (n=22) en çok tercih edilen laboratuvar tanı yöntemiydi. Türkiye'deki gebe popülasyonda ortalama Anti-Toxo IgG seroprevalans oranı %36,76 olarak bulundu. Anti-Toxo IgM oranı ise ortalama %2,91 olarak bulundu. Çalışmamız, en yüksek Anti-Toxo IgG testi sonucu; Güneydoğu Anadolu (%59,43), Akdeniz (%43,95) ve Doğu Anadolu (%40,89) bölgelerinde saptandı. Anti-Toxo IgG test sonuçları en yüksek olan bölgeler; Ege Bölgesi (%30,25), Marmara Bölgesi (%31,21) ve Karadeniz Bölgesi (%31,80) idi. Anti-Toxo IgM test sonuçları en yüksek olan bölgeler ise; Ege Bölgesi (%5,65), Akdeniz Bölgesi (%2,77) ve Güneydoğu (%2,21) Anadolu Bölgesi olarak saptandı.

Sonuç: Türkiye'nin batısında (Ege Bölgesi), doğuya kıyasla düşük toksoplazma seroprevalansı ile ilişkili yüksek toksoplazma enfeksiyonu duyarlılığı nedeniyle, konjenital toksoplazmoz riskini önleme amaçlı, en azından bölge tabanlı prenatal toksoplazma taraması yapılmalıdır.

Anahtar kelimeler: *Toxoplasma gondii*, Toxoplasmosis, Türkiye, seroprevelans

Corresponding Author: Emine Kübra DİNDAR DEMİRAY
Address: Bitlis State Hospital, Department of Infection Diseases and Clinical Microbiology ,Turkey
E-mail: e.kubradindar@hotmail.com

Başvuru Tarihi/Received: 23.11.2021
Kabul Tarihi/Accepted: 5.01.2022

INTRODUCTION

Toxoplasma gondii infection is a common zoonosis globally. Toxoplasmosis, which has a latent course in individuals with a healthy immune system, is an indirectly life-threatening disease in patients with pregnancy and immunodeficiency (1). It is more common in hot and humid places than in dry places. Infection in humans is most commonly seen congenitally by consuming raw or undercooked meat containing tissue cysts, consuming water and foods contaminated with oocysts, or by transplacental route from mothers infected during pregnancy (1,2). The risk of mother-to-child transmission of T. gondii during pregnancy is much higher in women exposed to primary T. gondii infection (toxoplasmosis) after conception, compared to those exposed to infection before conception (1,2-7).

In the United States, approximately 1 in 10,000 live births will develop congenital toxoplasmosis. Although multifactorial in etiology, maternal infection is primarily attributed to the consumption of contaminated meat or water. Infection and transmission to the fetus can cause devastating neurological disorders. Screening methods should be applied to all pregnant women in routine antenatal care (3-7). However, this screening is not routinely performed in our country. Therefore, there is no general information on the net prevalence of the disease.

The published studies are local studies. In this study, it was aimed to evaluate the studies on toxoplasmosis seroprevalence in pregnancy with the pool analysis method and to highlight the difference in disease seroprevalence between regions.

MATERIAL AND METHOD

Published literature in English and Turkish language (full text articles or detailed abstracts) on toxoplasmosis seroprevalence in pregnancy from Turkey in last 30 years were elavuated.

Pubmed, Google Scholar, The Web of Science, The Scopus databaseses were scanned by using the keywords "Toxoplasmosis" OR "*Toxoplasma gondii*" OR "TORCH" and "seroprevalence" OR "IG G" and "pregnant women" OR "pregnancy" OR "pregnant" and "Turkey" OR "Turkish". The publications were evaluated in terms of the general frequency, city, region, year, sample size, diagnostic method. Conference papers were not included in the study. Studies in which refugee women were samples were excluded.

The data obtained were analyzed using Statistical Package for the Social Sciences (SPSS) for Windows Version 23.0 software (SPSS Inc., Chicago, IL, USA). Data were reported as mean ± standard deviation values, number and percentage. Descriptive statistics were used in the statistical evaluation.

Ethics approval: Since the literature research study was used in the research, ethics committee approval is not required.

RESULTS

A total number of 58 studies and 256612 test results were included according to search criteria (6-85). The avarage number of tests were 4501.96.

In two of the studies the number of testes were less than 100, in 7 of the studies was between 100-500, in 6 of the was between 501-1000, 15 of them between 1001-2000, 15 of them 2001-5000, four of them 5001-10000, 8 of them above 10001.

Enzyme-linked immunosorbent assay (ELISA) (n=22) was the most preferred laboratory diagnostic method. Immunofluorescence (IFA) (n=2), Chemiluminescent immünoassay (CLIA) (n=9), Enzim Immun Assay (EIA) (n=5), Micro ELISA (n=6), Microparticle enzyme immunoassay (MEIA) (n=1), Automated Vitros ECiQ system (n=1), competitive enzyme linked fluorescence assay (ELFA) (n=4), chemiluminescent microparticle immunoassay (CMIA) (n=5), Electrochemiluminescence Immunoassay (ECLIA) (n=2), otomated analyser (n=2) also macro ELISA (n=2) were used for diagnosis.

Most of the publications (70.68%) were published between the years 2011-2021. Most of the studies (18.96%) were from the Aegean region. Number of publications according to geographical regions were summarized in **Table 1**.

Table 1. Studies according to geographical regions in Turkey (n=58)

Geographical region	n	%
Aegean	11	18.96
Marmara	10	17.24
Eastern Anatolia	10	17.24
Central Anatolia	9	15.52
Mediterranean	9	15.52
Black Sea	6	10.34
Southeast Anatolia Region	3	5.18

The average Anti-Toxo IgG seroprevalence rate in the pregnant population in Turkey was found to be 36,76%. The details of the studies have been summarized in **Table 2**.

The average of Anti-Toxo IgM rate in the pregnant population in Turkey was found to be 2.91%. The details of the studies have been summarized in **Table 3**.

Table 2. The Anti-Toxo IgG Seroprevalence Rates Performed in the Pregnant Population in Turkey (8-65)

Year	City	Anti-Toxo IgG Frequency (%)
1991-2000	Diyarbakır	61.3
	Eskişehir	2.6
2001-2010	Malatya	37.1
	İzmir	26.9
	İstanbul	26.1
	Van	36
	Aydın	30.1
	Şanlıurfa	60.4
	Kayseri	33.42
	Kayseri	33.9
	Adıyaman	48.4
	Hatay	52.1
	Kocaeli	48.3
	Ankara	94.6
	Şanlıurfa	69.5
	Afyon	30.7
	İstanbul	26.1
2011-2021	Isparta	28.4
	Adapazarı	25.9
	Zonguldak	43.9
	Kahraman Maraş	64.6
	Adana	46.3
	Antalya	31
	Tokat	32
	Hatay	48.7
	Ordu	27.6
	Erzurum	31
	İzmir	34.3
	Kars	44.8
	Malatya	37.5
	Uşak	18.3
	Bursa	49.8
	Mersin	44.2
	Malatya	25.7
	Canakkale	28.8
	Rize	33.46
	Artvin	30.3
	Denizli	37
	İstanbul	23.1
	Mugla	18.8
	Amasya	23.39
	Ankara	26.9
	Bingöl	63
	İstanbul	31
	Diyarbakır	34.9
	Hatay	57
	Van	37.6
	Yozgat	36.9
	İstanbul	24.2
	Uşak	41.1
	Ankara	25.5
	Afyonkarahisar	23.4
	İzmir	32.3
	İzmir	39.9
	Erzurum	31
	Edirne	31.95
	Kars	44.48
	Mersin	23.3

Table 3. The Anti-Toxo IgM Seroprevalence Rates Performed in the Pregnant Population in Turkey (8-65)

Year	City	Anti-Toxo IgM Frequency (%)
1991-2000	Diyarbakır	0.9
	Eskişehir	0.6
2001-2010	Malatya	1.3
	İzmir	26.9
	İstanbul	0.6
	Van	0.3
	Aydın	not tested
	Şanlıurfa	3
	Kayseri	2.95
	Kayseri	2.5
	Adıyaman	0.65
	Hatay	0.54
	Kocaeli	0.4
	Ankara	5.4
	Şanlıurfa	3
	Afyon	not tested
	İstanbul	2.8
2011-2021	Isparta	1.8
	Adapazarı	0.6
	Zonguldak	0
	Kahraman Maraş	2.5
	Adana	4.8
	Antalya	1.8
	Tokat	0.5
	Hatay	1.1
	Ordu	3.9
	Erzurum	1.6
	İzmir	0.6
	Kars	not tested
	Malatya	0
	Uşak	33.3
	Bursa	3
	Mersin	10.8
	Malatya	7.66
	Canakkale	1.7
	Rize	2.7
	Artvin	0.83
	Denizli	1.3
	İstanbul	1.4
	Mugla	0.4
	Amasya	3.7
	Ankara	1.02
	Bingöl	1
	İstanbul	0.2
	Diyarbakır	2
	Hatay	0
	Van	1.1
	Yozgat	3.6
	İstanbul	1.1
	Uşak	0.1
	Ankara	0.7
	Afyonkarahisar	4.3
	İzmir	0.3
	İzmir	1.5
	Erzurum	1.9
	Edirne	2.5
	Kars	0.97
	Mersin	0.4

The regional seroprevalence of the Anti-Toxo IgG was as follows: 31.21% in the Marmara region, 31.80% in the Black Sea region, 40.89% in Eastern Anatolia region, 59.43% in Southeastern Anatolia region, 30.25% in the Aegean region, 34.85% in Central Anatolia region, and 43.95% in the Mediterranean region (**Figure 1**).

Figure 1. The Anti-Toxo IgG Frequency rates by geographical regions in Turkey.

The regional seroprevalence of the Anti-Toxo IgM was as follows: 1.71 % in the Marmara region, 1.39% in the Black Sea region, 4.23 % in Eastern Anatolia region, 2.21% in Southeastern Anatolia region, 5.65% in the Aegean region, 1.76 % in Central Anatolia region, and 2.77 % in the Mediterranean region (**Figure 2**).

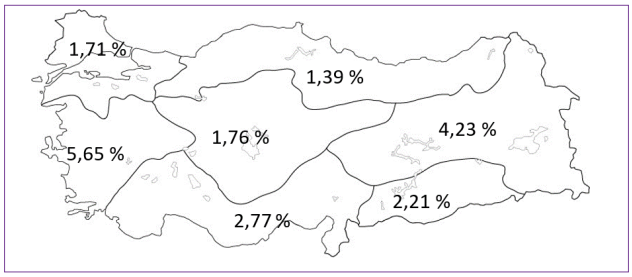

Figure 2. The Anti-Toxo IgM Frequency rates by geographical regions in Turkey.

DISCUSSION

Toxoplasma gondii infection is one of the more prominent zoonotic disease in recent years especially in pregnancy and immunosuppressives. The importance of infant deaths and malformations is being investigated more due to decreasing maternality, globally. Although a few causes of malformations have been identified, most of them have not been explained (6). However, it is known that T. gondii infection causes fetal ophthalmologic and neurological malformations in randomized studies. The transmission of maternal infection to the fetus occurs vertically. With congenital infection that develops in the early weeks of pregnancy. The clinical course of toxoplasmosis is severe and the probability of sequelae is high (1-6).

Several environmental, behavioral, socio-demographic and obstetric factors have been suggested as important risk factors for T. gondii infections such as geographical location, average age of the population, diet, consuming food or drinking water contaminated with cat faeces containing T.gondii oocysts, consumption of undercooked meat, presence of cats in the home, exposure to contaminated soil (through barehand farming or gardening), history of spontaneous abortion, and later conception (1,4). Again in recent years, the trend of consuming chickens that move freely in nature increases the rate of transmission of T.gondii oocysts from infected chickens to humans (7). The fact that this disease differs in terms of seropositivity by regions should be examined with a wide range of socio-demographic factors. There is no study conducted in this context across Turkey. In this study, it was aimed to evaluate the toxoplasmosis seroprevalence studies conducted in Turkey during pregnancy using the pool analysis method and to show the differences between seroprevalence rates by regions.

The seroprevalence of toxoplasmosis in the world varies between 12-90% (14). In pregnant women in Yemen, Anti-T.gondii IgG seroprevalence 12.9%, anti-T.gondii IgM seroprevalence was reported as 1.2% (4). Identification, early diagnosis and treatment of toxoplasmosis, which is one of the infections that can cause fetal damage in pregnant women, is very important. However, the necessity of routine screening for toxoplasma infection during pregnancy is controversial. The Republic of Turkey Ministry of Health, General Directorate of Public Health, Department of Women and Reproduction 2018 Antenatal Care Management Guidelines (ACMG) recommends only hepatitis B virus antigen screening in pregnant women (15). While ACMG does not recommend routine screening in countries such as North America, Austria, France and Slovenia implement a national screening program for toxoplasma in pregnant women (8). However, it is important to know the seropositivity rates of that region, especially in order to determine the necessity of routine screening (3,4).

In a meta-analysis study evaluating the seroprevalence of toxoplasmosis in pregnant women in Benin, the overall prevalence of toxoplasma-specific IgG was 47% (CI 95: 40-53) and that of specific IgM was 2% (CI 95: 1-3) (5). In our study, the average of toxoplasma-specific IGM was found to be 2.91 and the mean of toxoplasma-specific IgG was found to be 36.76% across Turkey. In the results of our study, while the rate of having this disease beforehand was lower, IgM results found to be close. However, in our country with a wide geography, these rates vary between regions.

As a result of the study, the highest Anti-Toxo IgG test results were; in the studies conducted in Southeastern Anatolia (59.43%), Mediterranean (43.95%) and Eastern Anatolia (40.89%). The regions with the lowest Anti-Toxo IgG test results were respectively; in the Aegean Region (30.25%), Marmara Region (31.21%) and Black Sea Region (31.80%). Anti-Toxo IgM ratios were highest respectively in Aegean Region (5.65%), Mediterranean Region (2.77%) and Southeastern Anatolia (2.21%). The study shows that pregnant women lives in Aegean Region are more susceptible to toxoplasmosis.

CONCLUSION

It has been determined that western Turkey (Aegean Region) is at a higher risk for congenital toxoplasmosis due to its high susceptibility to toxoplasma infection associated with low toxoplasma seroprevalence compared to the east, and it is considered important to perform at least region-based prenatal toxoplasmosis screening to prevent this. In this regard, it is thought that it is necessary to make a decision to screen for the detection of toxoplasma seroprevalence and to increase the awareness of pregnant women in terms of this zoonotic disease.

ETHICAL DECLARATIONS

Ethics Committee Approval: No ethics approval is needed as it is not human or animal study.

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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Pediatr Pract Res 2022; 10(1): 22-25
DOI: 10.21765/pprjournal.1067688

ORIGINAL ARTICLE
ORİJİNAL ARAŞTIRMA

Yenidoğan Brakiyal Pleksus Yaralanmaları; Obstetrik Brakiyal Pleksus Yaralanması Olan Yenidoğanların Doğum Özelliklerinin Retrospektif Değerlendirilmesi

Neonatal Brachial Plexus Injuries; Retrospective Evaluation of Birth Characteristics of Newborns with Obstetric Brachial Plexus Injuries

Tuğrul Ergün[1], Sevcan Sarıkaya[2]

[1]İstinye Üniversitesi Liv Hastanesi, Ortopedi ve Travmatoloji Kliniği İstanbul, Türkiye
[2]Mardin Devlet Hastanesi, Kadın Hastalıkları ve Doğum Kliniği, Mardin, Türkiye

Öz

Amaç: Perinatal brakial pleksus yaralanması(BPY) görülen yenidoğan hastalarının doğum özelliklerini ve eşlik eden ek patolojilerini incelemektir.

Gereç ve Yöntem: 2016-2021 yılları arasında perinatal BPY nedeniyle ortopedi ve travmatoloji kliniğine konsulte edilen hastalar retrospektif olarak tarandı. Hastaların doğum özellikleri ve eşlik eden perinatal patolojileri kayıt altına alınarak istatistiksel analizleri gerçekleştirildi.

Bulgular: 4687 canlı doğum arasında 75 hastada BPY görüldü. Hastaların %78.7(n=59)'sinin spontan vajinal yol ile , % 21.3(n=16)'ünün sezaryen doğum ile doğurtulduğu gözlemlendi. Hastaların % 53.3(n=40)'ü erkeklerden oluşmaktayken, %73.3 (n=55)'ünde pleksus hasarı sağ ekstremitede idi. %57.3(n=43)'ünde eşlik eden omuz distosisi, %20(n=15)'sinde klavikula kırığı bulunmaktaydı. Omuz distosili hastaların doğum ağırlığı, boy uzunlukları ve baş çevresi uzunluklarının omuz distosisi olmayan hastalara göre istatistiksel olarak anlamlı derecede yüksek olduğu gözlemlendi.(p=0.001,p=0.037,p=0.023) Klavikula kırığı gözlenen hastaların doğum ağırlığı, boy uzunlukları ve baş çevresi ve göğüs çevresi uzunluklarının klavikula kırığı olmayan hastalara göre istatistiksel olarak anlamlı derecede yüksek olduğu gözlemlendi.(p=0,000, p=0.012, p=0.044, p=0.035).

Sonuç: Yenidoğan bebeklerde artmış doğum ağırlığı, kafa çapı uzunluğu, boy uzunluğu ve göğüs çevresi uzunluğu artmış perinatal komplikasyonlarla ilişkili olduğu gözlemlendi. Bu yenidoğan bebeklerin; BPY, omuz distosisi ve klavikula kırığı oluşması açısından değerlendirilmeleri önerilir.

Anahtar Kelimeler; Brakial Pleksus Yaralanması, Yenidoğan, Omuz Distosisi, Makrozomi.

Abstract

Aim: To examine the birth characteristics and accompanying additional pathologies of newborn patients with perinatal brachial plexus injury (BPI).

Material and Method: Patients who were consulted to the orthopedics and traumatology clinic due to perinatal BPI between 2016-2021 were retrospectively screened. The birth characteristics and accompanying perinatal pathologies of the patients were recorded and statistical analyzes were performed.

Results: BPI was seen in 75 patients among 4687 live births. It was observed that 78.7% (n=59) of the patients were delivered by spontaneous vaginal delivery and 21.3% (n=16) by cesarean section. While 53.3% (n=40) of the patients were men, 73.3% (n=55) had plexus damage in the right extremity. There was accompanying shoulder dystocia in 57.3% (n=43) and clavicle fracture in 20% (n=15). It was observed that the birth weight, height and head circumference of patients with shoulder dystocia were statistically significantly higher than those without shoulder dystocia. (p=0.001, p=0.037, p=0.023) Birth weight, height and head circumference of patients with clavicle fracture and chest circumference lengths were statistically significantly higher than patients without clavicle fracture (p=0.000,p=0.012, p=0.044, p=0.035).

Conclusion: It was observed that increased birth weight, head diameter length, height and chest circumference were associated with increased perinatal complications in newborn babies. These newborn babies; It is recommended that they be evaluated for BPI, shoulder dystocia, and clavicle fracture.

Keywords: Brachial Plexus Injury, Newborn, Shoulder Dystosis, Macrosomy.

Corresponding Author: Tuğrul Ergün
Address: İstinye Üniversitesi Liv Hastanesi Ortopedi ve Travmatoloji Kliniği Esenyurt/Istanbul/ Türkiye
E-mail: drergun14@gmail.com

Başvuru Tarihi/Received: 03.02.2022
Kabul Tarihi/Accepted: 14.03.2022

GİRİŞ

Brakial pleksus üst ekstremite ve göğüs üst kısmının innervasyonunu sağlayan karmaşık bir nöral yapıdır.(1) Brakial pleksus yaralanması (BPY) perinatal dönemde 1000 canlı doğumda 0.4-2.6 oranında görülmektedir (2). Omuz distosisi, maternal diyabet mellitus, makrozomi bebek olması, makat doğum ve doğumda enstrüman kullanılması doğumda brakial pleksus hasarı oluşmasını arttıran risk faktörleridir (3). Genellikle fizik tedavi ile takip sonrası iyileşme olmakla birlikte nöral rekonstrüksiyon, kas transferleri ve kemik osteotomileri vb. cerrahilerine ihtiyaç olabilmektedir (4,5). Çoğunluğu spontan iyileşmekle birlikte, bir kısmında da sekel kalabilmektedir (6).

Bu çalışmada amacımız perinatal BPY görülen yenidoğan hastalarının doğum özelliklerini (baş çevresi, boy uzunluğu, doğum ağırlığı, göğüs çevresi, omuz distosisi) ve eşlik eden ek yaralanmalarını incelemektir.

GEREÇ VE YÖNTEM

2016-2021 yılları arasında Mardin Devlet Hastanesi'nde perinatal brakial pleksus hasarı tanısı ile ortopedi ve travmatoloji konsültasyonu istenen tüm hastalar retrospektif olarak tarandı. Klinik takibi yapılamayan hastalar, hipoksik ensefalopati ve fetal ölümle sonuçlanan hastalar çalışma dışı bırakıldı. Hastaların doğum özellikleri (doğum şekli, doğum kilosu, cinsiyet, boy uzunluğu, baş çevresi, göğüs çapı, omuz distosi varlığı) ve eşlik eden kemik patolojileri hastane bilgi işlem sisteminden kayıt edildi. Elde edilen verilerin istatistiksel analizi yapıldı. Çalışmanın yapılabilmesi için yerel etik kurulundan onay alındı.(Tarih:23/06/2021 Sayı No:8087)

İstatistiksel Analiz

İstatistiksel analiz için SPSS versiyon 22.0 (IBM Corporation, New York, USA) istatistik paket programı kullanılmıştır Sürekli değişkenler için tanımlayıcı istatistikler; parametrik test kullanılırken ortalama ± standart sapma, parametrik olmayan test kullanılırken median (min-maks) olarak ve kategorik değişkenler için sayı ve yüzde olarak ifade edildi. Sürekli değişkenler için normallik testi Shapiro-Wilk Testi kullanılarak yapıldı. Parametrik olmayan iki bağımsız hasta grubunun değişkenlerini karşılaştırmak için Mann-Whitney U testi kullanıldı. Ancak kategorik (sıralı ve nominal) değişkenleri karşılaştırmak için ki-kare testi ve Fisher-Freeman-Halton testi kullanıldı. İstatistiksel anlamlılık düzeyi olarak P<0.050 seçilmiştir.

BULGULAR

Çalışmaya 4687 doğum arasından perinatal brakial pleksus yaralanması olan 75 yenidoğan bebek hasta dahil edildi. Görülme sıklığı 1000 canlı doğumda %1.6 olarak gözlemlendi. Hastaların %78.7(n=59)'sinin spontan vajinal yol ile , % 21.3(n=16)'ünün sezaryen doğum ile doğurtulduğu gözlemlendi. Hastaların cinsiyet dağılımları arasında anlamlı bir fark gözlenmedi (% 53.3 (n=40) erkek, % 46,7 (n=35) kız). Hastaların %73.3 (n=55)'ünde BPY sağ tarafta idi. %57.3 (n=43)'ünde eşlik eden omuz distosisi mevcuttu. Hastaların %20 (n=15)'sinde klavikula kırığı eşlik etmekte idi (**Tablo 1**).

Tablo 1: Hastaların Demografik ve Doğum Özellikleri(n: sayı, Ortanca (Minumum-Maksimum)

	Omuz Distosi (n=43)	Klavikula Kırığı (n=15)	Total Patient (n=75)
Cinsiyet(%)			
Erkek	32 (n=24)	12 (n=9)	53.3 (n=40)
Kadın	25.3 (n=19)	8 (n=6)	46.7 (n=19)
P değer	0.618	0.751	
Doğum Şekli(%)			
NVD	48 (n=36)	18.7 (n=14)	78.7 (n=59)
S/C	9.3 (n=7)	1.3 (n=1)	21.3 (n=16)
P değer	0.216	0.151	
Taraf			
Sağ	38.7 (n=29)	14.7 (n=11)	73.3 (n=55)
Sol	18.7 (n=14)	5.3 (n=4)	26.7 (n=20)
P değer	0.181	0.747	

NVD: Normal vajinal doğum, S/C(Sezeryan/Sectio)
*p değeri< 0.05 :istatistiksel anlamlılık.

Omuz distosisi görülen hastaların ortanca doğum ağırlığı 3700 (2950-4250) kg iken, olmayanlarda ortanca doğum ağırlığı 3290 (2400-4000) kg olduğu görüldü. İki grup arasında istatistiksel olarak fark olduğu gözlemlendi. (p=0.001) Ayrıca omuz distosili hastaların boy uzunlukları ve baş çevresi uzunluklarının omuz distosisi olmayan hastalara göre istatistiksel olarak farklılık gösterdiği gözlemlendi.(p=0.037,p=0.023) Klavikula kırığı görülen hastaların ortanca doğum ağırlığı 4000(3500-4155 kg iken, olmayanlarda ortanca doğum ağırlığı 3350(2400-4250) kg olduğu görüldü. İki grup arasında istatistiksel olarak fark olduğu gözlemlendi.(p=0.000). Ayrıca klavikula kırığı gözlenen hastaların boy uzunlukları ve baş çevresi ve göğüs çevresi uzunluklarının klavikula kırığı olmayan hastalara göre istatistiksel olarak farklılık gösterdiği gözlemlendi.(p=0.012, p=0.044, p=0.035) (**Tablo 2**).

Tablo 2: Klavikula kırıklı ve omuz distosili hastaların doğum özellikleri (n: sayı, ortanca (minumum-maksimum)

	Doğum Ağırlığı (kğ)	Baş Çevresi (cm)	Boy Uzunluğu (cm)	Göğüs Çevresi (cm)	Total (n)
Klavikula Kırığı (%)					
Var	4000 (3500-4155)	36 (33-36)	51 (48-54)	36 (33-37)	20 (n=15)
Yok	3350 (2400-4250)	35 (32-37)	50 (48-54)	35 (31-38)	75 (n=60)
P değeri	0,000*	0.044*	0.012*	0.035*	
Omuz Distosisi (%)					
Var	3700 (2950-4250)	35 (32-36)	50 (42-54)	35 (32-37)	57.3 (n=43)
Yok	3290 (2400-4000)	34 (32-37)	50 (42-52)	35 (31-38)	42.7 (n=32)
p değeri	0,001*	0.023*	0.037*	0.231	

*p değeri< 0.05 :istatistiksel anlamlılık,

TARTIŞMA

BPY doğum esnasında brakial pleksusun gerilmesine bağlı gelişen ve üst ekstremitede güçsüzlük ve paraliz ile sonuçlanabilen ciddi perinatal doğum komplikasyonudur (7). Bu nedenle BPY'nin risk faktörleri, klinik özellikleri ve prognozu klinisyenlerin ilgisini çekmektedir. Çalışmamızda BPY'si olan pediatrik yenidoğan hastaların risk faktörleri ve eşlik eden doğum özellikleri incelenmiştir.

BPY yenidoğan döneminde 1000 canlı doğumda %0.4-2,6 sıklıkla görülmektedir. Çalışmamızda literatürle uyumlu olarak 1000 canlı doğumda % 1,6 olarak gözlemlenmiştir. Dünya Sağlık Örgütü (WHO) raporuna göre doğumlar %15 oranında sezaryen endikasyonu ile gerçekleşmektedir (8). Yapılan çalışmalarda normal spontan vajinal doğumun (NSVD) indüksiyonu için oksitosin hormonu kullanımı, doğum sürecinin uzaması, bebeğin doğum ağırlığının yüksek olması gibi faktörlerin brakial pleksus yaralanması ile ilişkili olabiliceği rapor edilmiştir (9). Çalışmamızda NSVD ile doğan yenidoğanlarda BPY'nin daha sık geliştiğini gözlemledik.

Omuz distosisi, NSVD'de karşılaşılan ve sıklıkla BPY ile ilişkili doğum komplikasyonudur (10). Omuz distosisi sonrası %4-40 oranında BPY ile birliktelik göstermektedir (11). Çalışmamızda BPY'li hastalar %57.3 oranında omuz distosi ile birliktelik göstermekte idi. Bu hastaların literatürle uyumlu olarak uzun boylu ve kilolu bebekler olduğu gözlemlendi. Yapılan çalışmalarda omuz distosili hastalarda doğum sürecinin dikkatli yönetilmesinin doğum komplikasyonlarını azaltabileceği rapor edilmiştir (12). Çalışmamızda omuz distosisi ve BPY birlikteliğinin yüksek olduğu gözlemlendi. Bu nedenle omuz distosili doğumlarda BPY açısından dikkatli olunmalıdır.

Artmış doğum kilosunun altında yatan birden fazla maternal ve fetal neden bulunmaktadır (13). Perinatal makrozomi varlığı sıklıkla doğum komplikasyonları ile birliktedir (14). Çeşitli çalışmalarda yüksek doğum ağırlığının BPY, omuz distosisi, klavikula kırıkları, perinatal asfiksi ve fetal ölüm gibi ciddi komplikasyonlarla birliktelik gösterdiği rapor edilmiştir (15-17). Bizim çalışmamızda da artmış doğum kilosunun omuz distosisi ve eşlik eden klavikula kırığı ile ilişkili olduğu gözlemlendi. Çalışmamızda artmış doğum kilosunun literatürle uyumlu olarak perinatal komplikasyonları arttırdığını gözlemlendi.

Artmış fetal ve maternal risk faktörleri sebebiyle klavikula kırıkları ve BPY sıklıkla birliktelik göstermektedir (18,19). Çalışmamızda %20 oranında klavikula kırığının BPY' ye eşlik ettiği gözlemlendi. Doğum kilosunun, baş çevresi. boy uzunluğunun ve gögüs çapının daha yüksek olduğu BPY´li hastalarda klavikula kırığının daha yüksek oranda ortaya çıktığı gözlemlendi.

Limitasyonlar: Maternal risk faktörlerinin bilinmemesi çalışmamızın kısıtlayıcı faktörleri arasındadır

SONUÇ

Yenidoğan bebeklerde yüksek doğum ağırlığının artmış perinatal komplikasyonlarla ilişkili olduğu gözlendi. Bu hastaların brakial pleksus yaralanması ve klavikula kırığı oluşması açısından değerlendirilmeleri önerilir.

ETİK BEYANLAR

Etik Kurul Onayı: Çalışmanın yapılabilmesi için yerel etik kurulundan onay alındı (Tarih:23/06/2021 Sayı No:8087).

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

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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Pediatr Pract Res 2022; 10(1): 26-31
DOI: 10.21765/pprjournal.1064688

ORIGINAL ARTICLE
ORİJİNAL ARAŞTIRMA

Clinical Characteristics and Treatment of COVID-19 Patients Admitted to the Pediatric Intensive Care Unit in Our Center

Hastanemiz Çocuk Yoğun Bakım Ünitesine Kabul Edilen COVID-19 Hastalarının Klinik Özellikleri ve Tedavileri

Oktay Perk[1], Serhan Ozcan[1], Serhat Emeksiz[1], Emel Uyar[1], Belgin Gulhan[2], Ahmet Yasin Güney[2], Saliha Kanik Yüksek[2], Ayşe Yilmaz Candar[3]

[1]Ankara City Hospital, Department of Pediatric Intensive Care, Turkey
[2]Ankara City Hospital, Department of Pediatric Infectious Diseases, Turkey
[3]Ankara City Hospital, Department of Pediatric, Turkey

ABSTRACT

Aim: The aim of this study was to evaluate the clinical and laboratory features and to determine the treatment options of COVID-19 patients hospitalized in the Pediatric Intensive Care Unit.

Material and Method: We retrospectively reviewed the patients who were diagnosed with COVID-19 and admitted to the pediatric intensive care unit (PICU) with 32 beds in Ankara City Hospital between March 16, 2020 and December 16, 2021. Patient characteristics included age, gender, contact history, and co-morbidities. Laboratory investigations included complete blood count, biochemical evaluations, chest X-ray, and computed tomographic imaging of the thorax. Respiratory support therapy, extracorporeal therapy, and other medical treatments were recorded.

Results: A total of 82 patients were admitted to the PICU after being diagnosed with COVID-19. Of all patients 64.6% (n=53) were male. The median age of the patients was 126.5 (37-185) months. Nearly half of the patients had a SpO_2 below 92%. About half of the patients had lymphopenia, anemia, and elevated CRP and D-Dimer levels. Of the patients, 60% (n=47) were supported with non-invasive ventilation (NIV) or high-flow nasal cannula (HFNC) oxygen therapy, whereas 35% (n=28) were followed on invasive mechanical ventilation. The length of stay in the PICU was 11 days, whereas the total length of stay in the hospital was 19 days. Twelve patients (15.2%) died.

Conclusion: In line with previous studies, our study planned to contribute to the literature in order to fill the diagnostic gap through clinical findings, laboratory values and chest radiographic examinations in COVID-19.

Keywords: COVID-19, pediatrics, pediatric intensive care unit, respiratory support methods, critical patient.

ÖZ

Amaç: Bu çalışmanın amacı Çocuk Yoğun Bakım Ünitesine yatan COVID-19 hastaların klinik ve laboratuvar bulgularını değerlendirmek ve tedavi seçeneklerini saptamaktı.

Gereç ve Yöntem: Otuz iki yataklı Ankara şehir Hastanesi çocuk yoğun bakım ünitesine (ÇYBÜ) kabul edilen hastalardan 16 Mart 2020 ile 16 Aralık 2021 tarihleri arasında COVID-19 tanısı almış hastalar retrospektif olarak tarandı. Vakalar yaş, cisiyet, temas hikayesi, eşlik eden hastalıklar ve karakteristik bulgular olarak tarandı. Laboratuvar parametreleri olarak tam kan sayımı, rütin biyokimya, akciğer grafisi, toraks bigisayarlı tomografi ile değerlendirildi. Solunum destek tedavisi ve ekstrakorporyal tedavi, medikal tedaviler kaydedildi.

Bulgular: COVID-19 tanısı alıp ÇYBÜ' ye kabul edilen hasta sayısı 82'ydi. Hastaların %64,6'sı (n=53) erkekti. Hastaların median yaşı 126,5 (37-185) aydı. Hastaların yaklaşık yarısının SpO_2 değeri %92'nin altında idi. Hastaların yaklaşık %50'sinde lenfopeni, anemi, CRP ve D-Dimer yüksekliği görüldü. Hastaların %60'ının (n:47) noninvaziv mekanik ventilasyon (NIV) veya yüksek akımlı nazal oksijen tedavisi (HFNC), desteğine ihtiyacı varken, %35'si (n:28) invaziv mekanik ventilatörde izlendi. ÇYBÜ'de kalış süresi 11 gün, hastanede kalış süresi ise 19 gündü. On iki hasta (%15.2) kaybedildi.

Sonuç: Literatür verilerinin ışığında, Çocuk yoğun bakım ihtiyacı gösteren ağır COVD-19 olgularının klinik semptomları labotavuar verileri ve toraks görüntülemelerinde sıkça karşılaşılan tanısal eksiklikleri gidermek ve literatüra dikkati çekmektir.

Anahtar Kelimeler: COVID-19, pediatrik, çocuk yoğun bakım ünitesi, solunum destek uygulama yöntemleri, kritik hasta.

Corresponding Author: Oktay Perk
Address: Division of Pediatric Intensive Care, Department of Pediatrics, Ankara City Hospital, Ankara, Turkey
E-mail: droktayperk@hotmail.com

Başvuru Tarihi/Received: 29.01.2022
Kabul Tarihi/Accepted: 06.03.2022

INTRODUCTION

COVID-19 is a disease caused by severe acute respiratory syndrome Coronavirus type-2, which emerged in Wuhan, China at the end of 2019 and continues to spread all over the world (1). The World Health Organization (WHO) reported that, as of 03 December 2021, COVID-19 has been detected in more than 260 million people worldwide, resulting in the death of approximately 5 million people, and a total of 7.8 million doses of COVID-19 vaccines administered. According to the World Health Organization, the average worldwide mortality rate is 2.2% (2). Although COVID-19 usually has an asymptomatic course in infected individuals, 10-15% of them receive oxygen therapy in intensive care units and 5% need mechanical ventilatory support (3). SARS-CoV-2 was initially thought to involve only the respiratory system and cause death due to ARDS. However, as a result of the pandemic in Europe and America, it has been understood that COVID-19 causes involvement in the gastrointestinal, cutaneous and neurological systems, and finally, multisystemic inflammatory syndrome (MIS) (4). It has been reported that all these involvements lead to critical diseases and eventually cause death. Mortality rates differ between countries. Most COVID-19 patients have a mild or asymptomatic disease course. Serious (2.1%) or critical (1.2%) disease was reported in only a small portion of the patients (5). The direct identification of viral RNA in nasopharyngeal swab samples by real-time polymerase chain reaction is the most commonly used diagnostic method for COVID-19. It has been described that this method can detect viral RNA in nasopharyngeal, bronchoalveolar and stool samples (6).

In our single-center study, we investigated the diagnostic methods, course and management of the disease and the need for medical and respiratory support in patients hospitalized in pediatric intensive care units due to SARS-CoV-2 during the COVID-19 pandemic in our country.

MATERIAL AND METHOD

Our study had a single-center retrospective study design. This study included patients aged 1 month to 18 years diagnosed with COVID-19 based on PCR testing for SARS-CoV-2 and admitted to the pediatric intensive care unit (PICU) with 32 beds in Ankara City Hospital between March 16, 2020 and December 16, 2021. All patients with suspicious or negative PCR results for SARS-CoV-2 were excluded from the study.

All children with a confirmed SARS-CoV-2 infection in nasopharyngeal swab samples by quantitative RT-PCR were included in the study. SARS-CoV-2 was identified by the method targeting the RNA-dependent RNA polymerase (RdRp) gene using the Bio-Speedy COVID-19 RT-qPCR Detection Kit (Bioeksen, Istanbul, Turkey). Using this method, at least one positive test result was considered significant.

Demographic data, comorbidities, symptoms at admission, indications for PICU admission, and physical examination findings (whole body and neurological, respiratory and circulatory system findings) were recorded on a joint study form. Laboratory examinations at admission, including complete blood count (total lymphocyte count, absolute lymphocyte count, hemoglobin level, platelet count), coagulation parameters (PT, aPTT, INR, fibrinogen, D-dimer), C-reactive protein (CRP), procalcitonin, troponin I/T, brain natriuretic peptide (BNP), and ferritin levels were recorded. Laboratory values outside the normal reference ranges were determined.

Antibiotic and antiviral drugs given to the patients were recorded. The respiratory support methods [high flow nasal oxygen therapy (HFNC), non-invasive and invasive mechanical ventilation] applied were determined. The Complications at baseline and during the follow-up were recorded.

Organ dysfunctions were classified into respiratory, circulatory, neurological, renal, hepatic, and hematological types, where 2 or more acute organ failures were defined as multiple organ dysfunction syndrome (MODS) (7). Types of extracorporeal therapies [renal replacement therapies (RRT), total plasma exchange (TPE) and extracorporeal membrane oxygenation (ECMO)] were recorded.

The Length of stay in the intensive care unit and respiratory and/or neurological sequelae at discharge from the ICU were recorded. The mortality rates in the groups and the main factors affecting the mortality rates were determined.

This study was carried out with the permission of the Ministry of Health dated 14 May 2020 (Ethics committee 20-567) and the approval of the local ethics committee (Ethics committee number: 567).

Statistical analysis

Data were analyzed using (Statistical) Package for the Social Sciences (IBM SPSS Statistics, IBM Corporation). Normality distribution of numerical data was evaluated using visual (histograms, probability plots) and analytical methods (Kolmogorov-Smirnov test). Descriptive statistics included median, range [interquartile range (IQR)], mean, standard deviation, number, and percentage. Comparisons of categorical variables were performed using the Chi-square test. Comparisons of laboratory values between the two groups were made using the independent samples t-test or the Mann-Whitney U test depending on the normality of the distribution. The significance level was set as $p < 0.05$.

RESULTS

The result of the COVID-19 test was positive in 3.4% (n=82) of 2445 patients admitted to the PICU with different diagnosis. In our study, patients hospitalized in the PICU due to COVID-19 were examined. The median age of COVID-19 positive patients was 126.5 (37-185) months, and the 64.6% (n=53) were male. Nine (11%) of the patients were refugee and 30 (36.6%) had a history of contact with COVID-19.

The most common symptoms at the time of admission to the PICU were respiratory distress (64.2%), fever (53.7%) and cough (52.4%). On physical examination, the most common pathological findings in respiratory system examination were rales (56.8%) and rhonchi (53.1%), respectively. The most common comorbidities were neurological diseases [epileptic diseases (36.3%) and cerebral palsy (31.7%)]. In addition, metabolic and respiratory diseases were other common comorbidities. There were 40 (49.4%) patients with an SpO_2 below 92% and 23 (28.7%) patients with an FiO_2 above 60, which were considered criteria for having hypoxia. Demographic and clinical findings of the patients are shown in **Table 1**.

Table 1. Demographic and clinical characteristics of patients infected with COVID-19

Parameter	Number (%)
Demographic characteristics	N: 82
Age (month), median (IQR)	126.5 (37-185)
Refugee	9 (11)
Male (%)	53 (64.6)
Severity of the disease	
PRISMIII score (median)	30 (25-35)
PELOD2 score (median)	25 (21-31)
OSI (median)	11 (0-15.5)
FiO_2(median)	23 (28.7)
Clinical characteristics	
Contact history	30 (36.6)
Comorbidity	39 (54.1)
Cough	43 (52.4)
Fever	44 (53.7)
Shortness of breath	52 (64.2)
SaO_2 <92%	40 (49.4)
Crackles	46 (56.8)
Rhonchi	43 (53.1)
Respiratory Failure	62 (78.5)
Circulatory Failure	33 (41.8)
Other Failure (Neurological, Renal, Hematological, Hepatic)	29 (36.7)

IQR: Inter quartile range, Pediatric Risk of Mortality Score (PRISMIII), Pediatric Logistic Organ Dysfunction (PELOD2), Oxygen saturation in arterial blood (SaO_2), OSI: Oxygen Saturation Index, FiO_2: Fraction of Inspired Oxygen

Patients admitted to the PICU had low lymphocyte counts, hemoglobin and thrombocyte levels (65.4%, 48.1%, 27.2%, respectively). There were high levels of C-reactive protein, pro-brain natriuretic peptide and D-Dimer (68.4%, 40%, 51.5%, respectively). The laboratory values of the patients are shown in **Table 2**.

Table 2. Laboratory Values and radiological findings of patients with COVID-19

Parameter and Tests	
Laboratory Values	**N (%)**
Mean WBC/mm3	7200
Neutropenia (<1500/mm3)	25 (30.5)
Mean Lymphocyte count /mm3	1185
Lymphopenia (<1500/mm3)	53 (65.4)
Anemia	39 (48.1)
Thrombocytopenia (<150000/mm3)	22 (27.2)
Elevated CRP	54 (68.4)
Mean procalcitonin level ±SD	55.10 ±35.1
Elevated Procalcitonin	21(40)
Mean ferritin levels ±SD	1802.14 ±12120
Elevated Ferritin	16(35)
Mean D-Dimer levels	1005.52 ±1291.06
Elevated D- dimer	35 (51.5)
Elevated PT	8 (11.4)
Elevated aPTT	18 (25.4)
BNP	33 (40)
Radiological findings	
Chest-X-Ray	
Bilateral peribronchial thickening and/or peripheral opacities	7 (9)
Multifocal or diffuse GGOs and/or consolidation without specific distribution	12 (14.6)
No findings	42 (51.4)
CT	
Multifocal or diffuse GGOs and/or consolidation without specific distribution	17 (34.2)
Bilateral peripheral and/or subpleural GGOs and/or consolidation lower lobe predominant pattern	8 (18.6)
No findings	12 (25.1)

WBC: White blood cell, CRP: C-reactive protein, SD: standart deviation, PT: prothrombin time, Aptt: activated partial thromboplastin time, CT: computed tomography, GGOs: Ground-Glass Opacities

The radiological findings of the patients were as follows. Half of the radiographic examinations (51.4%, n=42) revealed normal results. Multifocal or diffuse ground-glass infiltration and/or consolidations were the most common (14.6%, n=12) pathological findings on chest X-Ray. Multifocal or diffuse ground glass opacities (GGOs) and/or consolidation without specific distribution was seen in 17 (34%) and bilateral peripheral and/or subpleural GGOs and/or consolidation lower lobe predominant pattern was seen in 8 (18,6%) patients on thoracic CT imaging. The radiological findings are shown in **Table 2**.

Our patients had almost equal rates of need for HFNC and NIV support (59.5%). There were 28 (35.4%) patients who did not benefit from these supportive treatments or who were intubated and received invasive mechanical ventilatory support. Of these patients, 4 (5.1%) had to undergo tracheostomy tube placement.

Antibiotic treatment was commenced for almost all of the patients (97.5%) admitted to the PICU. The more frequent (58.2%) use of favipiravir initially was preferred

to the more frequent (73.4%) use of methyl prednisolone later on. Two patients underwent plasmapheresis due to multiple organ dysfunction syndrome. Renal replacement therapy was performed in five patients with fluid overload that did not improve with volume resuscitation. Veno-venous ECMO (VV-ECMO) as performed in one patient due to high inotrope score and multiple organ dysfunction syndrome. This patient died 1 month later. 'The therapy modalities and patient outcome are presented at Table 3.

Table 3. Therapy modalities and patient outcome

Therapy modalities and patient outcome	N (%)
Oxygen therapy	61 (77.2)
HFNC	47 (59.5)
NIV/CPAP/BIPAP	47 (59.5)
Conventional MV	28 (35.4)
HFO	1 (1.3)
Need for tracheostomy	4 (5.1)
Antiviral therapy	50 (63.3)
Antibacterial therapy	77 (97.5)
Antifungal therapy	10 (12.8)
IVIG	14 (17.7)
Steroid	58 (73.4)
Inotrope	28 (35.4)
Hydroxychloroquine	7 (8.9)
Azithromycin	4 (5.1)
Favipiravir	46 (58.2)
Lopinavir/ritonavir	3 (3.8)
Immunoplasma	6 (7.6)
LMWH	48 (60.8)
RRT	5 (6.3)
Plasmapheresis	2 (2.5)
ECMO	1 (1.3)
Stay of length in PICU, day, median (IQR)	6.5 (3-12)
Stay of length in hospital, day, median (IQR)	14.5 (7.5-23)
Discharge	53 (67.1)
Mortality Rate	12 (15.2)

HFNC:High Flow Nasal Cannula, NIV/CPAP/BIPAP: Non-Invasive Ventilation/Continuous Positive Airway Pressure/Bilevel Positive Airway Pressure, MV: Mechanical Ventilation, HFO: High-Frequency Oscillation, IVIG: Intravenous Immuno Globulin, LMWH:Low-Molecular-Weight Heparin, RRT: Renal Replacement Therapy, ECMO:Extra Corporeal Membrane Oxygenation, PICU: Pediatric Intensive Care Unit, Antiviral Therapy*: Oseltamivir, Immunoplasma*: Convalescent Plasma Therapy.

The length of stay in the PICU was 6,5 (3-12) whereas the total length of stay in the hospital was 19 days 14,5 (7,5-23). Twelve patients (15.2%) died, but 5 patients recovered with sequelae.

DISCUSSION

The COVID-19, which has become a worldwide pandemic since December 2019, shows a mild course in childhood compared to adults (8). The majority of pediatric patients with a positive PCR test for COVID-19 had an asymptomatic course, yet only 2% required hospitalization in the intensive care unit (9). This disease is spreading rapidly worldwide and new mutations in viral RNA are emerging, which changes the severity of the disease in pediatric patients and increases the need for intensive care unit admissions. In order to determine an investigative, therapeutic and follow-up strategy for patients hospitalized in the PICU, we identified the COVID-19 patients who were followed up in our intensive care unit to date. The factors affecting the prognosis of the patients, the changes in the course of the disease and supportive treatments were determined. Children of all age groups are susceptible to SARS-CoV-2 infection, but have milder clinical manifestations than adults. In pediatric patients, Covid-19 is most often observed under the age of 3 years, with a slight predominance of the male gender (10). In this study, the mean age of patients with COVID-19 admitted to the PICU was 126,5 (37-185) month, with no gender difference between patients. It was detected more frequently in young children, which was consistent with other literature studies (11). The lower frequency, especially in younger ages, can be attributed to the role of the immune system in improving the clinical picture. Comorbidities are the most important risk factors for critical illness in pediatric COVID-19 patients (11). In our study, the most common comorbidity was neurological disorders, followed by metabolic, cardiac and respiratory disorders.

The initiation of quarantine and active surveillance of suspected patients, and the use of rapid detection tools to confirm the etiology of the disease are strongly recommended. COVID-19 is a highly contagious disease. However, 75-80% of patients have a mild disease course. Patients with two or more comorbidities such as diabetes or malignancy tend to have higher morbidity or mortality rates (12,13). Our study, in particular, showed a higher frequency of comorbidities. Less than half of our patients had lower rates of contact history compared to previous studies. This is attributed to the lack of testing for COVID-19 in all children and to a mild course of the disease.

Children are reported to have a milder course of SARS-CoV-2, however, patients admitted to the PICU appear to have a severe course of the disease. Consistent with the literature, the most common symptoms in our study were dispnea (64.2%), fever (53.7%) and cough (52.4%), respectively (12). In some cases, patients are admitted to the PICU with severe respiratory distress, cyanosis, fever and cough, and may even develop respiratory and circulatory failure during hospitalization. In our study, approximately 50% of our patients developed hypoxia and were supported by oxygen therapy. The high frequency of respiratory and circulatory failure in COVID-19 positive patients is especially associated with the high incidence of comorbid conditions, which is one of the most important reasons for admission to the PICU. About half of the COVID-19 positive patients had a concurrent congenital or acquired disease. This causes different disease presentations, especially ARDS. However, in our study, comorbidities and organ

dysfunctions such as respiratory or circulatory failure, with a higher frequency in young children, caused a more severe clinical course.

As in other publications, COVID-19 positive patients in our study had leukopenia, lymphopenia and elevated CRP levels. Our study showed comparable rates of coagulation disorders and troponin elevations with literature studies (13,14). Although many studies have reported lymphopenia, leukopenia, thrombocytopenia, and elevated CRP levels, these have not been proven to be disease-specific criteria (15). Chest X-rays are the first preferred radiological diagnosis method in suspected pulmonary involvement. Peribronchial thickening and multifocal ground-glass infiltrates are the most common chest X-ray examination findings of COVID-19 pneumonia in children. (16). In this study, half of the chest X-rays revealed normal, but the most common radiographic findings included multifocal or diffuse ground glass infiltrations and/or consolidations and unilateral peripheral or peripheral-central ground glass infiltrations and/or consolidations. Chest X-rays are the first-line imaging study in patients with suspected COVID-19 infection. Despite this fact, studies in the literature have reported a relatively low rate of chest X-ray findings in patients with COVID-19.

Computed tomographic examination has a limited role in COVID-19 pneumonia in children. In our study, CT imaging yielded normal results in most pediatric patients, with the highest frequency of peripheral ground-glass infiltrates, cobblestone appearance, halo, and reversed halo findings (17,18). The most common findings in the patients in our study were multifocal or diffuse ground glass infiltration and/or consolidation and prominent peripheral ground glass infiltration and/or consolidation in the lower lobes.

There is no intensive therapy for pediatric patients, which is more often preferable to supportive symptomatic therapy, which included free oxygen support in approximately 77% of patients, antiviral therapy in 63% of severe cases, and prophylactic antibiotic therapy in 97%. Antiviral therapy and supportive therapy were started immediately in patients admitted to the PICU. The early initiation of treatment is due to the high complication and mortality rates in adults with COVID-19 and the lack of sufficient number of studies in pediatric patients. However, at the beginning of the pandemic in our country, drug combinations such as hydroxychloroquine, azithromycin, favipravir, lopinavir/ritonavir were used in patients who applied with the suspicion of COVID-19 and had evidence on thoracic CT imaging and complications (such as PARDS, septic shock, MODS, TAMOF). No specific antiviral efficacy of these agents has been demonstrated based on currently available data. Hydroxychloroquine and chloroquine have been shown to have anti-SARS-CoV-2 activities in in vitro studies (19,20). It is an appropriate approach to start treatment before the development of multiple organ dysfunction syndrome. Our goal in initiating an early treatment with these drugs was to prevent disease progression and the need for mechanical ventilatory support. Indications for antiviral therapy (Hydroxychloroquine, or Lopinavir / Ritonavir) in patients with suspected or confirmed COVID-19 infection included severe pneumonia (PARDS) or critical illness (SHOCK, TAMOF, DIC, Hemophagocytic syndrome). These patients were also given IVIG, steroids, plasmapheresis and RRT. Of the patients with severe PARDS, 6 received immune plasma therapy and 12 died. One patient with Steven Johnson syndrome who developed severe ARDS was supported by V-V ECMO and died 3 weeks later. None of the treatments have shown a clear benefit for COVID-19 infection, and the World Health Organization does not recommend any specific treatment for pediatric patients (21). Respiratory support therapies such as HFNC and NIV were preferred in 60% of COVID-19 positive patients to prevent the development of respiratory failure. These respiratory support therapies were used more cautiously in COVID-19 positive patients due to the generation of aerosols and the risk of transmission. In our study, mechanical ventilatory support was provided to patients with low SaO_2 and elevated OSI levels and the need to obtain high FiO_2 levels. We provided invasive and non-invasive respiratory support to 59.5% of the patients. Of the patients, 35.4% (n=28) worsened or were intubated while on HFNC or NIV supports. Studies in the literature have reported an intubation rate of 15-47% in COVID-19 positive patients admitted to the PICU, which is comparable to our study (22,23,24,25), but still lower than in adults (26,27)

High PRISM and PELOD scores due to respiratory and circulatory failure, and the need for invasive and aggressive treatments such as immune plasma therapy, RRT, plasmapheresis, and ECMO support were associated with poor prognosis and high mortality rates in patients with COVID-19.

CONCLUSION

The majority of COVID-19 patients admitted to the PICU had respiratory failure. A multidisciplinary approach is needed in COVID-19 patients. In line with previous studies, our study aimed to contribute to the literature in order to fill the diagnostic gap through clinical findings, laboratory values and chest radiographic examinations in COVID-19.

ETHICAL DECLARATIONS

Ethics Committee Approval: This study was carried out with the permission of the Ministry of Health dated 14 May 2020 (Ethics committee 20-567) and the approval of the local ethics committee (Ethics committee number: 567).

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.

Financial Disclosure: This study was supported by Division of Pediatric Intensive Care, Department of Pediatric Infectious Diseases, Department of Pediatrics, Ankara City Hospital.

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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Pediatr Pract Res 2022; 10(1): 32-37
DOI: 10.21765/pprjournal.1030271

REVIEW
DERLEME

Baby Massage and Massage Oils: Are They Safe?

Bebek Masajı ve Kullanılan Masaj Yağları: Güvenli mi?

Özgür Alparslan

Tokat Gaziosmanpaşa University, Faculty of Health Sciences, Tokat, Turkey

ABSTRACT

Massage has been practiced in infant care for many years since it creates a good mother-infant bond, contributes to the prevention of morbidity, and provides better physical development. Baby oil massage has been shown to have several benefits in neonates. However, recent studies have reported that not all oils are appropriate for baby massage. This study was conducted to discuss the results of studies on the benefits of oil massage, which can affect skin properties and functions during the maturation process of the neonate whose skin has still not fully developed, and the possible effects of oils. In the study, it was also aimed to briefly review the safety of oils used in neonate skincare or massage, the importance of knowing the properties of herbal oils before choosing or using a particular one for a massage, and the role of professionals and parents. Moreover, up-to-date information on the use and effects of different herbal oils for massage of preterm and term babies was provided. Studies show that more research is needed to clearly answer which herbal oil is more effective and safer for infant massage.

Keywords: Massage, massage oils, safety, neonate massage

ÖZ

Masaj uygulaması iyi bir anne-bebek bağı oluşturması, morbiditeyi önlemeye katkısı ve bebeğin daha iyi gelişimini sağlaması nedeni ile bebek bakımında yıllardır kullanılmaktadır. Yenidoğanlarda bebek yağı ile yapılan masajının birden fazla faydası olduğu gösterilmiştir. Ancak son yapılan araştırmalar, tüm yağların bebek masajı için her zaman uygun olmadığından da söz etmektedir. Bu makale de amaç, hala cildi tam olarak gelişmemiş yenidoğanın cilt özelliklerini ve işlevlerini etkileyebilen, yağ masajının faydalarını, yağların olabilecek etkilerini tartışmaktır. Ancak yenidoğan cilt bakımında veya masajda doğal olarak kullanılan her şeyin çocukları için iyi veya güvenli olmadığını, masaj için belirli bir bitkisel yağ kullanılmadan önce bitkisel yağların özelliklerinin bilinmesinin önemini, profesyoneller ve ebeveynlerin rolünü kısaca gözden geçirilmiştir. Makale, farklı bitkisel yağların preterm ve term bebeklere masajda kullanımları, etkileri hakkında güncel bilgiler sunmaktadır. Yapılan çalışmalar, yenidoğanlarda masaj sırasında hangi bitkisel yağın daha etkin ve güvenli olduğunu açıklamak için daha fazla çalışmaya ihtiyaç olduğunu göstermektedir.

Anahtar kelimeler: Masaj, masaj yağları, güvenlik, yenidoğan masajı

INTRODUCTION

The sense of touch is one of the three senses that enables the child to perceive the environment and the outside world in the neonatal and infancy period and is a prominent sense compared to the senses of sight and hearing. During neonate and infancy period, the child perceives its environment with the help of this sense, establishes communication through it when it is picked up, caressed, and touched, and gets to know its environment. Appropriate stimulation of the baby's senses by touching affects its psychosocial development positively (1). To stimulate the sense of touch, people use massage, which is a practice that is as old as human history, and it is one of the most effective methods. It has played an important role in maintaining health and treating diseases in different cultures for centuries (2–5).

The massage was first used as an intervention in China in 2760 BC. It was used in various cultures for both treating

Corresponding Author: Özgür Alparslan
Address: Tokat Gaziosmanpaşa University, Faculty of Health Sciences, Tokat, Turkey
E-mail: ozgur.alparslan@gop.edu.tr

Başvuru Tarihi/Received: 29.11.2021
Kabul Tarihi/Accepted: 07.03.2022

medical conditions and its beneficial effects on beauty. With the modernization of massage and techniques in the early 21st century, it began to gain popularity in North America. Massage for the term and premature babies have attracted the attention of many researchers and clinicians since the 1980s. Yet, research evidence on its benefits is limited (6).

The word massage is defined as the manipulation of body tissues to maintain health and reduce pain and stress. It includes many techniques, such as patting, kneading, and applying pressure to certain points. Infant massage, on the other hand, is defined as the application of "tactile stimulation by human hands" or "medium pressure to the whole body of the neonate". In addition to these, some different interventions can usually be combined with baby massage. For example, kinesthetic stimuli such as a gentle touch on the baby's body, opening and closing of arms and legs can be counted among them (3,7,8).

Massage is also used as an effective communication tool that strengthens the emotional bond between baby and mother and supports psychosocial development (9,10). When massage is applied regularly to babies, it strengthens the circulatory, digestive, and excretory systems, which do not develop adequately at birth, and contributes positively to the strengthening of muscle coordination and the physical and spiritual development of the baby (7,11–13).

While massage increases weight gain, accelerates growth, improves sleep quality, and reduces bilirubin that causes jaundice in term infants (14,15), in preterm infants, it provides benefits, such as better weight gain, less response to pain, and increased interaction with parents. Existing studies in the literature have not shown any adverse effects of massage (4,16–18). Some studies have shown that babies gain weight and even develop better interactions with their mothers, no matter who applies the massage (4,11,12), and that using oil in massage has some positive effects (18–20). However, research about infant massage and the oils used is limited (21–26), and more evidence-based, randomized studies are needed.

Today, some companies claim that the oils they produce are useful, without many studies and clinical data, while the studies that have been conducted so far have limited subjects and the study design or randomization of some of them seems inadequate. In addition, the oils used in many studies have not been specified whether they are processed or refined products. The aim of this review is to present the importance of using healthy and safe oils while neonates are being given a massage and supply research evidence from studies conducted in this field. Thus, it will be possible to increase the benefits of massage application, which we think is beneficial, and to protect babies from unwanted harm.

Can baby massage be applied safely?

Aromatherapeutic benefits can be achieved by combining manual massage techniques with the beneficial effects of essential and carrier oils (27). In addition to providing the desired aromatherapeutic effect in the massage, the safe application of the massage is one of the important application goals. The key element to ensure this safety is the selection of appropriate oil (28). The use of oils, such as sunflower oil, evening primrose oil, borage seed oil, linseed oil, and olive oil, is generally recommended for infants and children. Due to its high permeability, neonate skin has unique absorption properties against locally applied agents. Due to the incomplete development of the stratum corneum in the early neonatal period, the absorption of the applied drugs and the loss of water from the skin can be high, and it is quite sensitive (29,30). When all these conditions are considered, the good selection and safety of the oils used in baby massage gain importance in baby health.

During massaging, it is not only necessary to choose appropriate oil but also to take all safety precautions for the baby. For this reason, it is necessary to check whether there are signs of fever or illness before starting to give a massage to babies. If the baby has been vaccinated in the last 72 hours, it is not recommended massage the baby during this period to avoid disrupting the action of the vaccine. If there is any doubt about the baby's health, it should be investigated, and the massage should not be applied without the approval of doctor. It is appropriate to perform body massage in a warm room, when the baby is calm, awake, and active, one to two hours after feeding and for a continuous period of fifteen to thirty minutes. Before starting the massage, parents or the people who will give the massage should always have clean hands and short nails and take off their jewelry. Oil massage should be avoided in summer if the baby has Miliaria rubra. Oil massage should be done before bathing in summer and after bathing in winter (31).

To prevent possible falls or accidents, babies should be massaged on the floor, especially when they grow up and can move more easily. Babies should not be left alone in high places.

For a parent/ practitioner to make the baby happy to have a massage, it is necessary to ask permission from the baby before starting the massage and to prepare and encourage the baby by talking and touching it.

What is the best option for baby massage oils?

There have been a lot of controversy and conflicting opinions on what is the safest oil for baby massage lately. It is observed in the media and literature that baby massage is practiced in many different cultures around the world and that oils used in the past have been traditionally preferred in most cases (29). Traditions can also play a role in determining the choice of oil used. In

India, mustard seed oil has been used largely for massage but has been subsequently shown to potentially harm the skin (29–31).

Recent research has shown that not all oils are suitable for baby massage. Before recommending or using a particular herbal oil for baby massage, the composition of herbal oils should be well known, professionals and parents should be warned that even if the oils are natural, they may not be good or safe for children (29–31).

There is little information on when to apply a massage in preterm babies. Moderate pressure applications are often used in preterm infants to avoid unnecessary and uncomfortable tactile stimuli. Some studies suggest the use of oil during massage to further increase the benefit of massage (7,31–33). There is even a suggestion that the use of the same type of oil constantly may be beneficial (34). In a study evaluating the effects of different oil types, "sesame, mustard, mineral, and vegetable oils" were used, and it was determined that "sesame oil" showed more significant changes. Mustard oil is not recommended, and it is evaluated that more studies on these oils are needed (33,35).

Although the effect of massage with or without using oil on the baby's weight gain is not clear, recent studies have shown that massage with essential oils provides oil (lipid) absorption through the skin, and the weight gain in massage with oil (olive oil) is higher than that without oil (32,33,35). It is seen that massage contributes increasing blood circulation and oxygen transport, protection of the body against infections, and regulating body temperature (32).

Essential oils - Are they beneficial or harmful?

Essential oils are volatile substances that are usually colorless or light yellow, with an intense smell and oily consistency, soluble in oils, alcohol, ether, or chloroform (36). The use of essential oils on neonate skin should be avoided during the massage as they are very strong. Only an aromatherapist with specific knowledge in the field can use essential oils on the skin of babies and children. This practice can usually be done when the baby is three months old. It is also very important for the practitioner to understand the differences between the skin of a full-term baby and the skin of a premature baby (37).

Compared to simple massage, oil massage provides a decrease in motor activity, a decrease in stress behaviors, an increase in vagal activity, and an increase in salivary cortisol levels (7,31). In the early attachment process in the mother-infant relationship, the baby needs to smell its mother. Heavy-smelling oil can prevent the baby from smelling its parents and can be harmful to the early attachment process. The use of any heavily scented oil is therefore not recommended. An unscented product should be used to avoid confusion in the baby.

In addition, although the use of sage oil (apple oil) is recommended for babies' stomachache/gas pain (colic), it has been observed that negative respiratory system or central nervous system symptoms or intoxication may develop as a result of accidental oral intake of these products by children or their misuse (38–42).

Apart from the issues mentioned above, the production of oils to be used in massage and oil processing and refining methods is another important component of choosing oil for skincare. The cold pressing method has been the preferred extraction method as it uses no heat or chemicals, preserves beneficial lipids, and limits irritating by-products (33). Although the topical application of cold-pressed oils seems safe, side effects, such as burning on the skin, erythema, or allergic reaction can be seen in some cases. It has been reported that herbal oils support allergic contact dermatitis in some individuals, and essential oils have a higher incidence of creating these problems than cold-pressed fixed oils (32,33).

Many studies have examined the effects of natural oils in neonatal skincare applications to help maintain and improve the integrity of the immature skin barrier and have obtained valuable results. Delicately-selected natural, cold-pressed oils can be used in addition to or in place of other conventional moisturizers to provide subcutaneous hydration and improve skin barrier function. Generally, small doses of oil (2-4 mL per application) massage methods have been used two to four times a day for specific skin areas or whole-body for neonate skincare (32,33)

When using massage oils, the oil should be tested for sensitivity to avoid allergic reactions. A certain minimum amount of oil mixture should be applied to an area where possible reactions can be observed for 24-48 hours for high sensitivity. If redness, itching or swelling is observed after application, the tested oil/oils should not be used (43,44).

An oil that is considered to have ideal natural emollient properties should be anti-inflammatory, antimicrobial, barrier-repairing, low irritant, or non-allergic, readily available, and economical (33). Now, let's examine the oils that can be beneficial in case of use and can be used without harm during a massage, and some oils that are thought to be harmful.

Mineral oils

Mineral oil is a petroleum-based product that is not absorbed by the skin and forms a barrier on the surface. Some studies show that it may provide some benefits, especially in maintaining hydration and reducing infection, but it does not allow the skin to "breathe" and is not nutritionally valuable to the skin as it does not contain vitamins (45). Besides, mineral oils can have a strong artificial odor that can mask the natural scent

of the mother/baby. Although there are some studies on mineral oils, they do not recommend using mineral oil for baby massage. In a comparative study, coconut oil massage resulted in a significantly greater rate of weight gain and increase in height than mineral oil and placebo in the preterm infant group. There was no neuro-behavioral differences between the groups in term babies (46).

Olive oil

Olive oil has been used for care purposes since ancient times as its external application affects skin elasticity and protects against UV rays. In ancient Greece, massage with olive oil was used as an analgesic for therapeutic purposes and to prevent sports injuries.

Olive oil is shown as the best choice, especially for baby skin. Considering the positive effect of olive oil massage on weight gain in premature babies, it is recommended that nurses should use oil in infant massage in neonatal units (24,44). However, recent studies have shown that oleic acid in olive oil delays the healing of the skin's protective layer (skin barrier) in damaged skin (37), and there is limited evidence for the use of olive oil (47).On the other hand, oils with higher oleic acid content, such as olive oil, are now widely avoided for use in neonates, as they can be irritating and damaging to the integrity of the skin barrier when used as a moisturizer. More studies are needed on this topic (33).

In a randomized massage study with olive oil, sunflower oil, and no-oil groups, both oil groups were found to significantly exhibit improved skin hydration compared to the no-oil group, but the study was not found to be of clinical importance, and it was stated that more evidence was needed to recommend this type of massage. It was shown that regular external application of olive oil significantly improved the stratum corneum (48).

Sunflower oil

Organic sunflower oil has been the choice of baby massage instructors and many studies for the last 5-8 years as it has many features that make it ideal. It has almost no odor, is full of vitamins, is easily absorbed through the skin, and has no harmful effects if swallowed by the baby. Sunflower oil is rich in linoleic acid content (about 60,9%) and acts as an aromatherapy tool during the massage, nourishes the skin, is an oil with healing, moisturizing, antibacterial, regenerating, and restructuring properties, and strengthens the stratum corneum (37,44).

Fallah et al. (2013) concluded that sunflower oil massage could be used as an effective and safe intervention for weight gain in preterm newborns with very low birth weight. Some studies even suggest that sunflower seed oil is very important for preterm infant health and improves skin barrier function. Both oils should be used with more caution in preterm babies. In another study, it was determined that even a short body massage with sunflower oil increased the weight gain of preterm infants and significantly reduced the length of stay in the Neonatal Intensive Care Unit (NICU) (25). Aziznejadroshan et al. (2020) concluded in a comparative study that coconut oil and sunflower oil massage improved weight gain in premature babies. Another study showed that therapeutic massage with sunflower oil would give better results than coconut oil (26).

Coconut oil

Coconut oil is a good choice instead of sunflower oil. It contains oleic acid, which is the same fatty acid found in olive oil, which means it can make the skin more permeable, but in a relatively low level. However, no comprehensive studies of the use of coconut oil on baby skin have been conducted, so it is difficult to strongly recommend it without a complete trial. What is clear, however, is that it is safer to use an organic, natural-based product on baby skin rather than a highly perfumed or processed product.

The findings of the study by Evangelin Sally (2017) revealed that there was a significant weight gain in low-birth-weight neonates who received a coconut oil massage. A systematic review found that topical application of coconut oil to the skin was beneficial in preterm infants, but the quality of evidence was low to moderate. There is need for randomized controlled studies with enough power, especially in very preterm and extremely preterm babies.

In a study evaluating the effectiveness of coconut oil versus olive oil massage on certain physical and physiological parameters in neonates, it was revealed that both coconut oil and olive oil massage were significantly effective in increasing weight gain, improving sleep patterns, and reducing crying in low-birth-weight (LBA) neonates compared to a control group. It is said that oil massage is safe and beneficial for very low birth weight neonates, and a significant difference in weight gain was found compared to the olive oil and the control group (50). Coconut oil massage caused weight gain in low birth weight neonates (51), as well as an increase in both weight and height compared to mineral oil and placebo (46).

Grapeseed Oil

Nayak et al. (2011) showed that grapeseed oil accelerated the wound healing process, which is related to the antibacterial, anti-inflammatory and antioxidant activity of biologically active compounds in the seed, including fatty acids and polyphenols. This oil can be used in the treatment of psoriasis, decubitus and skin itching (44,52,53).

Grapeseed oil is absolutely safe for the skin of neonates, and it can also be used for diaper dermatitis (44,52).

It does not irritate the baby if it gets into the eyes or mouth. It is easily digestible. When grapeseed oil is applied, it leaves a shiny film-like appearance on the skin. According to many experts, this special oil also contains linoleic oil and oleic oil, which are essential oils and contain some resveratrol. Grapeseed oil does not leave any residue on the skin of the baby. Therefore, the baby does not feel restless after the massage. This special oil can also be used on a baby's scalp. No allergies or side effects originating from the use of grapeseed oil have been reported. It also reduces the redness that occurs due to the constant use of diapers. Grapeseed oil and coconut oil should never be mixed for massage.

Safflower Seed Oil

Safflower seed oil is colorless, tasteless, and rich in linoleic acid. It has previously been important to see that the topical application of oils for neonatal massage affects blood lipid levels and can penetrate the skin. Although its high linoleic acid content supports the idea that its use on the skin will be beneficial for the skin barrier, there is limited clinical research into using safflower seed oil (33).

Sesame oil

It has been shown that massages containing sesame oil may have beneficial effects on neonate health, improved sleep patterns, and growth (27). It has been reported that massage with sesame oil increases sleep after massage and contributes to development (21). There is limited research into the use of this oil, thus more research evidence is needed.

CONCLUSION

It is best to avoid using any oil on the skin until the baby is at least one month old. According to our current recommendations, olive oil and sunflower oil should be avoided on the skin of a neonate. Coconut oil appears to be suitable for massage depending on its chemical structure but within the guidelines outlined above. Essential oils should be avoided for massaging infants younger than three months of age. These oils can only be used under the supervision of an aromatherapist. When applying oils for the first time, they should always be tested on the skin of the baby. Traditionally, natural plant-based oils have been used for infant massage for hundreds of years. However, more research is needed to determine when and which oil is suitable for a baby's skin, and more evidence is needed on this issue.

ETHICAL DECLARATIONS

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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Pediatr Pract Res 2022; 10(1): 38-43
DOI: 10.21765/pprjournal.1031224

REVIEW
DERLEME

Çocuklarda Özofagus Yabancı Cisimlerine Genel Yaklaşım

General Approach to Foreign Objects in the Esophagus in Children

Tamer Sekmenli[1], İlhan Çifci[1]

[1]Selcuk University School of Medicine Department of Pediatric Surgery, Konya, Turkey

ÖZ

Bebekler ve yeni yürümeye başlayan çocuklar hemen her şeyi ağızlarına koymak ve yemek isterler. Amerika Birleşik Devletleri'nde her yıl yeni 100.000'den fazla yabancı cisim yutma vakalarının yüzde 80'i çocuklar oluşturur. Nesne, keskin uzun, ya da mıknatıs oluştuğunda, özofagusda disk pil olduğunda, özofagus tıkanıklığı varsa(hasta sekresyonlarını yutamıyorsa), değerlendirme 24 veya daha fazla saat önce meydana gelmişse yabancı cismin çıkarılması için acele edilmelidir

Anahtar Kelimeler: Özofagus, yabancı cisim, acil, çocuk

ABSTRACT

Infants put almost everything into their mouths, and toddlers eat just about anything. Of more than 100,000 cases of foreign body ingestion reported each year in the United States, 80 percent occur in children. Foreign object has to be removed immediately if the patient has difficulties in swallowing, can not swallow his/her secretions, disphagia diagnosed 24 hours ago or earlier, presence of esophegal obstruction, sharp, long, magnetic foreign body presence, or in the presence of battery or button batery in the esophagus.

Keywords: Esophagus, foreign body, child

GİRİŞ

Bebekler ve yeni yürümeye başlayan çocuklar hemen her şeyi ağızlarına koymak ve yemek isterler. Amerika Birleşik Devletleri'nde her yıl yeni 100.000'den fazla yabancı cisim yutma vakalarının yüzde 80'nini çocuklar oluşturur (1-4). Çocuklardaki Özofagus yabancı cisimleri (ÖYC)'nin çoğunluğu, altı ayla üç yaş arasındaki çocuklarda görülür (1,5,6). Neyse ki, gastrointestinal sistemdeki yabancı cisimlerin çoğu pasajı kendiliğinden geçer. Sadece olguların %10 ila 20 oranında endoskopik çıkarma gerektirir ve yine yüzde 1'den daha azına cerrahi müdahale gerekir (1,5,7). Yabancı cisim yutma ile gelen ölüm son derece düşük olmasına rağmen, ölüm bildirilmiştir (5,8,9). Amerika Birleşik Devletleri'nde, paralar çocuklar tarafından yutulması en sık görülen ÖYC'dir. Oyuncak, oyuncak parçaları, mıknatıslar, piller, emniyet pimleri, vidalar, mermer, kemikler ve gıda parçaları dahil olmak üzere diğer nesneler, bildirilmiştir (3,7,10-12).

Birden fazla yabancı nesneleri yutma yada tekrarlayan yabancı cisim yutma nadirdir ve genellikle gelişme geriliği olan çocuklarda görülür (10,13).

ÖYC'nin Klinik Bulguları: ÖYC çocukların çoğunda bu cisimlerin yutulmasına tanıklık eden ebeveynleri tarafından fark edilir ya da acillerde diğer semptomlar nedeniyle sağlıkçılar tarafından tesbit edilir (1,5,15,16). Genellikle ÖYC asemptomatiktir, bulgu vermeyebilir. Örneğin, 325 çocuk hasta bir olgu serisinde, ÖYC olan çocukların sadece yarısında geçici retrosternal ağrı, siyanoz, ya da yutma güçlüğü gibi belirtiler tesbit edilmiştir (17). Bu belirtiler genellikle ÖYC lokalizasyonuyla da ilişkilidir. Daha büyük çocuklarda ise, üst veya alt yemek borusu tahrişini düşündüren, boyun ya da alt göğüsde lokalize "sıkışmış" bir şey hissi olabilir. Substernal göğüs ağrısı şikayetleri olan çocuklarda, ya yabancı cisim 72 saatten fazla bulunuyordur göğüs filminde beklenmedik imaj vardır, ya da endoskopi ile değerlendirildiğinde özofagusda mukozal ülserasyon gözlenebilir (18).

ÖYC üst özofagus sfinkter, aort kavsi düzeyi, ve alt özofagus sfinkter gibi fizyolojik daralma, alanlarında takılma eğilimindedir (5,15). Özofagus orta kısmında görünen yabancı cisimlerin darlık gibi patolojilerin sonucu olabil-

Corresponding Author: Tamer Sekmenli
Address: Selcuk University School of Medicine Department of Pediatric Surgery, Konya, Turkey
E-mail: dr_sekmenli@hotmail.com

Başvuru Tarihi/Received: 01.12.2021
Kabul Tarihi/Accepted: 05.01.2022

ir (2,19). Geçirilmiş cerrahi opere özofagus atrezisi veya trakeoözofageal fistül gibi konjenital malformasyonlar nedeniyle özofagusun darlık bölgesinde tıkanma riski oluşturmaktadır (20,21). Uzun süredir devam eden özofagus yabancı cisimleri sırasıyla, kilo kaybı ya da tekrarlayan aspirasyon pnömonisi neden olabilir. ÖYC trakea veya diğer yakın yapılarla bir fistül oluşturarak, özofagus mukozasında hasar ve darlıklara yol açabilir. Keskin nesneler, yemek borusu delip, boyunda şişme ortaya çıkararak krepitus veya pnömomediastinum oluşturabilir (5). Aort içine erozyonla yaşamı tehdit eden gastrointestinal kanama nedeni bildirilmiştir (22,23). Bazen, yabancı cisimler de alt sindirim sisteminde gecikmiş komplikasyonlara neden olabilir.

ÖYC'ne Yaklaşım: Dikkatli bir anamnez ve fizik muayene ÖYC'yi teşhis etmek ve komplikasyonlarını önlemede önemlidir (24). Görüntüleme yabancı cisim bulgularını onaylamak ve lokalize etmek için kullanılır. Tanı ve tedavi basamaklarında, ÖYC'nin radyo-opak olup olmadığını, hastanın semptomları, yabancı cismin şekli ve konumuna bağlı olarak değişir (25,26). Havayolu ve solunum her zaman ilk muayene edilmelidir. Boyun fizik muayenesinde özofagus perforasyonu düşündüren şişlik, kızarıklık veya krepitasyon gösterebilir ve cerrahi konsültasyon bu durumda zorunludur. Göğüs muayenesinde trakea sıkıştırma ile özofagus yabancı cisim düşündüren inspiratuar stridor veya ekspiratuar wheezing ortaya çıkabilir. İnce bağırsak tıkanıklığı veya perforasyon şüphesini içeren karın muayenesinde, abdominal görüntüleme alınmalıdır, acil cerrahi konsültasyon istenmelidir.

Görüntüleme: Şüpheli yabancı cisim yutma tüm hastalar için, ilk tanı testi boyun, göğüs, karın ve ön-arka-yan grafileri olmalıdır (5,17,27). Birden fazla yabancı cisim gibi yığılmış cisimler varsa, yan grafisi nesneyi tanımlamak için yardımcı olabilir. Plastik veya tahtadan yapılmış oyuncaklar, bazı ince metal nesneler ve kemiklerin birçok türde yapılmış oyuncaklar kolaylıkla düz filmlerde görülemeyebilirler (17,28,29). ÖYC'li 325 çocuğun dahil olduğu bir çalışmada, alınan nesnelerin sadece % 64'ü, radyo-opaktır (17). Yabancı cisim radyolusen olduğunda bile düz grafi çekilmelidir. Bu diğer yutulan nesnelerin, radyolusen yabancı cisimden dolayı örneğin yemek borusunda bir hava-sıvı seviyesi gibi olasılığı değerlendirmeyi sağlayabilir. Düz radyografide herhangi bir yabancı cisim veya anormallik olup olmadığını araştırılmalı, takip ve tedavi sürecinde hasta ve şüpheli yabancı cismin özellikleri önemlidir. Hasta semptomatik ise veya şüphelenilen yabancı cisim herhangi bir tehlikeli özelliklere sahipse 2cm'den büyük, uzun ya da keskinse, ya da eğer yabancı cisim tipi kesin çocuğa bakanlarca bilinen bir nesne değilse, bilgisayarlı tomografi kullanması öneririlir (5,30). Alternatif olarak, manyetik rezonans görüntüleme (MRG) radyolusen yabancı cisimlerin değerlendirilmesi için kullanılabilir, ancak herhangi bir metalik yabancı cisim varsa bu kontrendikedir. Eğer hasta tamamen asemptomatikse, çocuğa bakan yakını yutulan cismin uzun ya da keskin olmadığından eminse, yutulan cismin türü hakkında pil ya da mıknatıs gibi eminseniz BT veya MR ile görüntüleme gerekli değildir. Hasta gözlem sırasında tamamen asemptomatik kalır, yemek ve içmeyi tolere ederse taburcu edilebilir. Mümkün olduğunca gastrointestinal kontrast çalışmalarından kaçınılmalıdır. Kontrastlı çalışma yabancı cismi tespitte yardımcı olsa da, baryum kontrast sonraki endoskopik incelemeyi zorlaştırabilir. ÖYC nedeniyle özofagus tıkalıysa, kontrast aspire edilebilir. Radyografi tetkikleri negatif olsa bile endoskopi kontrastlı çalışmalara tercih edilmelidir (5,29). Bir el metal dedektörüyle alüminyum gibi radyoopak olmayan metaller algılanabilir (31,32). Bu gibi cihazların kullanımını metal paralar dışında sınırlı olup, metal nesneleri tespitte daha az güvenilirdir (33).

Eğer yutulan nesne, 5 cm'den fazla uzunluktaysa, keskinse, özofagusdaysa midedeyse, büyük mıknatıs ya da mıknatıslarsa, disk şeklinde saat pilleri Özofagustaysa, tama yakın özofagus takınıksa(tükürüğünü yutamıyorsa), İnflamasyonu ya da bağırsak tıkanıklığını düşündüren ateş karın ağrısı kusma belirtileri varsa yaklaşım acil olmalıdır (5,29). Yukarıdaki özellikleri olmayan künt yabancı cisimlerde 12-24 satlik gözlem makuldür (34-38). Bir çalışmada metal para içerikli ÖYC'lerin üçte biri gözlem sırasında 24 saatten az sürede, herhangi bir şikayet olmaksızın mideye geçtiği görülmüştür (37). 24 saatten daha uzun ya da bilinmeyen bir süre içinde yutulan yabancı cisim bir an önce çıkarılmalıdır (5). Bu süreden sonra, özofagusda transmural erozyon, perforasyon, fistül gibi komplikasyonların ortaya çıkması olasıdır. Örneğin, 167 ÖYC olan çocuk olgu serisinde, 24 saatten fazla süre özofagus mukozasında hasar, kanama, darlık, tıkanıklık gibi komplikasyonların oluşmasında güçlü bir belirleyici oldu(22). Eğer yutulan yabancı cisim keskin ya da sivri bir nesne, radyo-opak olmayan nesne, bir disk pil ya da yemek borusu üst üçte bir lokalizasyonun altında olması durumunda komplikasyonların daha fazla olması muhtemeldir.

ÖYC Çıkarılması için Teknikler:

ÖYC çıkarmak için çeşitli yöntemler kullanılmıştır. Onlar rijit ve fleksbl endoskopi, buji, özofagus Foley kateterizasyonu ve "penny pincher" tekniğidir.

Fleksibl endoskopi: Yabancı cisim doğrudan görüntülenir, çevredeki gastrointestinal sistem olası potansiyel komplikasyonları için manuple ve muayene edilebilirler (1,5,10,39-41). Bu uygulamada, hastanın yaşı, kooperasyonu ve yabancı cismin tipi ve sayısına bağlı olarak sedasyon veya genel anestezi altında yapılır.

Endoskopiyi yapan hekim, böyle bir yabancı nesneyi kavramak için ilgili ekipmanı tam olmalıdır. Bu prosedüre başlamadan önce, yabancı cisim forcepsi araçlarını, işlem öncesi yabancı cismin bir kopyasını tutarak uygulama provası yararlı olacaktır. Nesne keskin ya da deliciyse, bir yabancı cisim koruyucu bir başlıkla özofagusu işlem sırasında korumayı tercih etmek önemlidir (42).

Rijit endoskopi: Genel anestezi altında, yemek borusu içine esnek olmayan kanallı aygıt kullanılmaktadır. Bu hipofarenks ve proksimal özofagusta bulunan keskin nesneler için çok yararlıdır (43). Uygulama önemli beceri gerektirir ve özofagusda aşınma ve perforasyon gibi komplikasyonlara neden olabilir (10,41).

Magill forseps: Orofarenks veya üst özofagusda yabancı cisimleri çıkarmada kullanılır. Bazı durumlarda, üst özofagusda doğrudan entübasyon gerek kalmadan Magill forseps ile yabancı cisim çıkarılabilinir. Bununla birlikte, çoğu durumda, bir endotrakeal tüp hava girişini korumak için yerleştirilir ve bir larengoskopla yavaşça yemek borusu açmak ve yabancı cisim göstermek için kullanılır (17). Bir olgu serisinde, özofagusdaki paralar Magill forseps kullanarak 36 hastadan 23'de çıkarılmıştır. Cisimler laringoskop ile görünür olmamasına rağmen bu vakaların çoğunda, ekstraksiyon kolayca gerçekleştirildiği ve hiçbir komplikasyon gözlenmediği bildirilmiştir (44).

Buji: Mideye nesneleri itmek için kullanılır olmuştur. Prosedür endoskopiye göre daha az masraflı olmasına rağmen, bu yemek borusu güvenlik kontrolüne izin vermez ve yabancı cismi almak için yapılan uygulama değildir. Bu nedenle, özofagus yaralanma riski düşük olduğu durumlarda, komplikasyon olmadan yabancı cisimlerin mide ötesine geçmesinin çok büyük olasılıkla uygun olduğu durumlarda tercih edilebilir. Bu teknik sadece seçilmiş hasta grubunda, 24 saatten az süreli ÖYC'nde kullanıla bilinir. Endoskopi imkanı olması durumunda tavsiye edilmez (5,17,40,45).

Foley kateter: Bu teknik için, bir sönük Foley kateter yabancı cisim ötesine geçirilir. Daha sonra balon bir radyoopak kontrast boya kullanılarak şişirilir ve kateter yavaşça ağız yoluyla yabancı cismin çıkarılması için, geri floroskopi altında geri çekilir. Deneyimli bir cerrah tarafından yapıldığında, proksimal ÖYC'nde başarılı olunabilinir. Bu özofagusun görüntülemesine izin vermediğinden ve balon bir darlık altında şişirildiğinde ise özofagus perforasyonu riski taşıyabilir. Yanlışlıkla trakeaya doğru sürüklenen yabancı cisim bu yaklaşımla, yabancı cisim aspirasyonu neden olabilir (5). Endoskopi varsa bu nedenlerden dolayı, bu tekniği tavsiye etmiyoruz.

Penny pincher tekniği: Floroskopi altında, bir nazogastrik tüp aracılığıyla bir kavrama forseps yerleştirilmesini içerir ve genellikle anestezi veya entübasyon olmadan uygulanır. Bu yöntemle yabancı cismin hava yolu içine düşme riskini azaltarak, nesnenin doğrudan kontrolü için bu yaklaşım, Foley kateter yöntemi üzerinde bir gelişmedir. Bununla birlikte, yemek borusu denetlenmesine izin vermez, sadece sağlam forseps tarafından tutulan ve kontrol edilebilinen nesneler için kullanılmalıdır (46).

Yabancı Cisimlerin Özel Türleri İçin Yaklaşımlar

Paralar: Çocuklar tarafından en fazla yutulan yabancı cisimlerdir (1,17,40,47-49). Yutulan paraların küçük bir yüzdesi özofagusda yerleşirler ve çıkarılmazlarsa, aspirasyon gibi ciddi komplikasyonlara neden olabilir (47). Yaklaşık yutulan paraların üçte ikisi ilk radyografik değerlendirme sırasında midede bulunmaktadır (12,47). Eğer para görülüyor, hasta asemptomatikse 24 saate kadar gözlem yapılabilinir. Gözlem sırasında ilk sekiz saatte olguların üçte ikisinde spontan mideye geçişi gözlenebilir. Bu kendiliğinden geçiş daha büyük çocuklarda ve distal özofagusda lokalize paralarda yaygındır. Paranın yutulduğu zaman bilinmiyorsa hasta semptomatikse cisim çıkarılmasında acele edilmelidir. Çocuk asemptomatik ve 24 satten fazla olduysa cisim çıkarılmalıdır. Rijit endoskopi veya Magill forseps deneyimli cerrahlar ve proksimaldeki paralar için kabul edilebilir yaklaşımdır. Penny pincher veya Foley kateter teknikleri seçilmiş hastalar için maliyet-etkin alternatiflerdir, ancak floroskopi gerektiren ve yemek borusunu doğrudan görmeye izin vermeyen yöntemlerdir. Paralar keskin kenarları olmaması nedeniyle ve mideye ulaştıktan sonra, çoğu 1-2 hafta içinde olaysız kendiliğinden dışarı çıkacaktır, toksik değildir. Bu hastalar için, kontrolde haftada bir kez yaklaşık bir düz radyografi ile paranın yer değişimi kontrol edilebilinir. Para, dört hafta mide ötesine geçmedi ise, endoskopik çıkarma tavsiye edilir. Çocuk herhangi bir belirti veya tıkanma, karın ağrısı, kusma, ateş ya da belirtileri oluşursa, o zaman hasta derhal radyografi ile değerlendirilir ve para endoskopik olarak çıkarılır.

Piller: Pillerin yutulması ve olgu sayısı önemli ölçüde artmaktadır (50). Yemek borusunda açıldığında önemli morbidite nedenidir, bu yüzden tıbbi acil durum olarak kabul edilir.

Doğrudan basınç nekrozuna ek olarak, pilin iki kutuplu yassı özofagus duvarının temasıyla sıvılaşma, nekroz ve yemek borusu delinmesine neden olabilir. Atık piller de kostik maddenin sızıntı yoluyla genellikle de pillerdeki cıva, gümüş, lityum gibi ağır metal içermesive sodyum veya potasyumun güçlü hidroksit özelliğiyle doku hasarına neden olabilir (5,6,29). Hayvanlar üzerinde yapılan çalışmalarda piller alındıktan bir saat içinde mukozal nekroz gösterilmiş ve iki saat sonrasında ülserasyon (51), sekiz saat sonra perforasyon gözlenmiştir (52).

Keskin uçlu cisimler: Çocuklar tarafından yutulması en sık görülen sivri nesneler düz iğne, iğneler ve kağıt zımbalarıdır. Bunlar yutulan nesnelerin %5-30'unu oluşturur (1,22). Yemek borusuna açılmış sivri nesneler nedeniyle perforasyon olguların % 15 ila 35'de görülmesi riski yüksek bir tıbbi acil durumu temsil eder (1,22). Cisim hipofarenkste lokalize ise, retrofarengeal abse oluşturabilir (17). Cisim yemek borusunda ise, derhal çıkarılmalıdır.

Keskin nesnelerin endoskopik olarak geri alınması forseps kullanımı ile gerçekleştirilir (26). Keskin bir nesnenin alımı sırasında mukozal yaralanma riskini azlatmak için sivri cismi çıkarma sırasında endoskopun ucunda bir koruyucu örtüsü ile nesneyi yönlendirilmek faydalı olacaktır (25,53).

Nesne mide veya duodenum proksimalindeyse, aynı zamanda esnek bir endoskop kullanılarak derhal çıkarılması gerekir. Bazı olgu serlerinde keskin nesnelerin %4 gibi daha düşük komplikasyon oranları tarif edilmesine rağmen (54), diğer bir çalışmada gastrointestinal sistemden geçen sivri uçlu bir nesnenin neden olduğu komplikasyon riski yüzde 35 gibi bir hayli yüksektir (19).

Hasta asemptomatik ve cisim ince barsağa geçmiş ise, bu geçişi seri grafilerle takip etmek gerekir. Eğer cisim üç gün geçmesine rağmen, lokalizasyonunda ilerleme yoksa, cerrahi müdahale planlanmalıdır (2). Hasta yakınını olası karın ağrısı, kusma, ateş, hematemez, melena gibi semptomlar için uyarmak gerekir.

Gıda sıkışması: Çocuklarda altta yatan patoloji özofagus darlıkları, akalazya, yada özofagus motilite bozuklukları gibi durumlarda daha yüksek risk vardır (2,55,56). Reflü özofajit ve eozinofilik özofajit de gıda birikimine yatkındır(56-58). Papain gibi proteolitik enzimler, kullanımı hipernatremiye, erozyon ve özofagus perforasyonuna neden olduğu için tavsiye edilmezler (2,59,60). Bazı araştırmacılar intravenöz bolus glukagon verilmesiyle özofagusun gevşemesini sağlayarak spontan pasajı geçişine izin verdiğine inanır (61,62). Ancak, iki küçük randomize çalışma ve büyük bir vaka serisinde glukagon belki katı gıda yutma güçlüğü öyküsü olan hastalar hariç, plasebodan daha fazla etkili olduğunu düşündürmemektedir (63-65). Çocuklarda glukagonun etkin olmaması, bulantı ve kusma gibi sık görülen yan etkileri nedeniyle, çocuklarda gıda birikiminin veya diğer özofagus yabancı cisimlerin yönetiminde kullanılmasını tavsiye etmiyoruz (64-67).

Mıknatıslar: Oyuncak ve ev eşyalarındaki küçük mıknatıslar artan kullanımı ile, mıknatıs yenmesi çocuklarda ciddi bir sağlık tehlikesi haline gelmiştir (67-69). Gelişime geriliği veya otizmde birden fazla mıknatıs yenmesi ve buna bağlı komplikasyonların görülme ihtimali artmıştır (67-68). Özellikle farklı zamanlarda yutulduğunda barsaklar arasında basınç nekroz, fistül, volvulus, perforasyon, enfeksiyon ya da tıkanıklığa yol açabilir. İki ya da daha fazla güçlü mıknatıslar, bağırsak rezeksiyonu dahil olmak üzere ciddi sonuçlara yol açabilir (69,73). Şüpheli mıknatıs yutulması acil değerlendirmeyi gerektirir. Boyun ve karın grafileri lateral görünüm de dahil olmak üzere, yapılmalıdır. Takipte önemli olan noktalar yutulan mıknatıslar sayısı, yeri ve tipine, birden fazlaysa yutulma zamanlarına bağlıdır (71,73).

Uzun nesneler: Diş fırçası, piller ve kaşık gibi uzun ve künt olan yabancı cisimler, en sık büyük çocuklar, ergenler, yetişkinler tarafından yutulur. Genellikle 6-10 cm daha uzun nesneleri mide ötesine geçemez ve çıkarılmalıdır (29,54,72). 5 cm'den daha uzun, ara uzunlukta cisimler mideyi geçebilir, fakat ileoçekal bölgede %50'si takılabilir (54).

SONUÇ

Birçok ÖYC'nde hastaların çoğunda asemptomatiktir veya retrosternal ağrı, siyanoz, ya da yutma gibi sindirim sırasında geçici belirtiler vardır. Belirtiler ortaya çıktığında, beslenememe ya da yutamama, salya akması, ya da hırıltı, stridor, ya da boğulma dahil solunum semptomları hissini içerebilir. Uzun süredir ÖYC olan hastalar, kilo kaybı, aspirasyon pnömonisi, ateş, krepitisyonun dahil olduğu özofagus perforasyonu belirtileri ile ortaya çıkabilirler. Şüpheli yabancı cisim yutma ihtimali olan bir hastada, ilk değerlendirme boyun-göğüs (ön-arka ve yan) radyografiler ve karın grafilerini içermelidir. Diğer görüntüleme yöntemleri veya üst endoskopiyle doğrudan müdehale radyoopak olmayan yabancı cisimleri tanımlamada ve teadvide yardımcı olabilir. Nesne, keskin uzun, ya da mıknatısdan oluşuyorsa, özofagusda disk pil olduğunda, özofagus tıkanıklığı varsa(hasta sekresyonlarını yutamıyorsa), değerlendirme 24 veya daha fazla saat önce meydana gelmişse yabancı cismin çıkarılması için acele edilmelidir.

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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