

ISSN 2536-4898  
Volume 27  
Issue 2  
June 2017



# Turkish Journal of **COLORECTAL DISEASE**

Official Journal of the Turkish Society of Colon and Rectal Surgery

# Turkish Journal of COLORECTAL DISEASE



## Editor-in-Chief/Baş Editör

Tahsin Çolak, M.D.

Mersin University Faculty of Medicine, Department of General Surgery, Mersin, Turkey

E-mail: colaktahsin@yahoo.com

## Associate Editors/Editör Yardımcıları

Fatma Ayça Gültekin, M.D.

Bülent Ecevit University Faculty of Medicine, Department of General Surgery,  
Zonguldak, Turkey

E-mail: faycagultekin@yahoo.com

İlker Sücüllü, M.D.

Haydarpaşa Sultan Abdülhamid Han Training and Research Hospital, İstanbul, Turkey

E-mail: ilkersucullu@gmail.com

Hüseyin Sinan, M.D.

Gülhane Training and Research Hospital, Clinic of General Surgery, Ankara, Turkey

E-mail: huseyinsinan@gmail.com

M. Özgür Türkmenoğlu, M.D.

Mersin University Faculty of Medicine, Department of General Surgery, Mersin, Turkey

E-mail: drturkmenoglu@gmail.com

## Past Editors/Geçmiş Editörler

Erman Aytaç, M.D.

Ersin Öztürk, M.D., PhD.

Rasim Gençosmanoğlu, M.D.

Sezai Demirbaş, M.D.

Uğur Sungurtekin, M.D.

B. Bülent Menteş, M.D.

Kemal Alemdaroğlu, M.D.

## Statistic Editor/İstatistik Danışmanı

Emine Arzu Okul, PhD.

## Language Editor/Dil Editörü

Jacqueline Renee Gutenkunst, Maryland, USA

## Translator/Çevirmen

Gözen Çevirmenlik Hizmetleri, İzmir, Turkey

## All inquiries should be addressed to

### TURKISH JOURNAL OF COLORECTAL DISEASE

Address: Latilokum Sk. Alphan İşhanı No: 3 Kat: 2

Mecidiyeköy Şişli, İstanbul, Turkey

Phone: +90 212 356 01 75-76-77

Gsm: +90 532 300 72 36

Fax: +90 212 356 01 78

Online Manuscript: [www.journalagent.com/krhd](http://www.journalagent.com/krhd)

Web page: [www.turkishjcrd.com](http://www.turkishjcrd.com)

E-mail: [info@turkishjcrd.com](mailto:info@turkishjcrd.com)

∞ All rights are reserved. Rights to the use and reproduction, including in the electronic media, of all communications, papers, photographs and illustrations appearing in this journal belong to the Turkish Journal of Colorectal Disease. Reproduction without prior written permission of part or all of any material is forbidden. The journal complies with the Professional Principles of the Press.

The paper used to print this journal conforms to ISO 9706: 1994 standard (Requirements for Permanence). The National Library of Medicine suggests that biomedical publications be printed on acid-free paper (alkaline paper).

Reviewing the articles' conformity to the publishing standards of the Journal, typesetting, reviewing and editing the manuscripts and abstracts in English and publishing process are realized by Galenos.



**Publisher**  
Erkan Mor

**Publication Director**  
Nesrin Çolak

**Web Coordinators**  
Eren Arsel  
Soner Yıldırım  
Turgay Akpınar

**Graphics Department**  
Ayda Alaca  
Çiğdem Birinci

**Publisher Contact**  
Address: Molla Gürani Mah. Kaçamak Sk. No: 21/1  
34093 İstanbul, Turkey  
Phone: +90 (212) 621 99 25 Fax: +90 (212) 621  
99 27  
E-mail: [info@galenos.com.tr](mailto:info@galenos.com.tr)/[yayin@galenos.com.tr](mailto:yayin@galenos.com.tr)  
Web: [www.galenos.com.tr](http://www.galenos.com.tr)

**Project Coordinators**  
Ebru Boz  
Eda Kolkısa  
Hatice Balta  
Lütfiye Ayhan İrtem  
Melis Kuru  
Zeynep Altındağ

**Research&Development**  
Büşrah Toparlan

**Finance Coordinator**  
Sevinç Çakmak

**Printing at:** Özgün Ofset Ticaret Ltd. Şti.  
Yeşilce Mah. Aytekin Sk. No: 21 34418 4. Levent,  
İstanbul, Turkey  
Phone: +90 (212) 280 00 09  
Printing Date: June 2017  
ISSN: 2536-4898 E-ISSN: 2536-4901  
International scientific journal published quarterly.

**Galenos Publishing House**

# Turkish Journal of COLORECTAL DISEASE



## National Review Board/Ülusal Değerlendirme Komitesi

Abdullah Zorluoğlu, M.D. (Acıbadem University Faculty of Medicine, Bursa)  
Acar Aren, M.D. (İstanbul Training and Research Hospital, İstanbul)  
Adil Baykan, M.D. (Medistate Hospital, Clinic of General Surgery, İstanbul)  
Ahmet Özbal, M.D. (İstanbul University Cerrahpaşa Faculty of Medicine, İstanbul)  
Ahmet Rencüzoğulları, M.D. (Çukurova University Faculty of Medicine, Adana)  
Ahmet Ziya Balta, M.D. (Haydarpaşa Sultan Abdülhamid Han Training and Research Hospital, İstanbul)  
Ali Uzunköy, M.D. (Harran University Faculty of Medicine, Şanlıurfa)  
Alper Sözütek, M.D. (Numune Training and Research Hospital, Adana)  
Ayhan Kuzu, M.D. (Ankara University Faculty of Medicine, Ankara)  
Bahadır Ege, M.D. (Liv Hospital, Ankara)  
Bilgi Baca, M.D. (Acıbadem University Faculty of Medicine, İstanbul)  
Biroldostancı, M.D. (Yüksek İhtisas Training and Research Hospital, Ankara)  
Bülent Erkek, M.D. (Ankara University Faculty of Medicine, Ankara)  
Bülent Menteş, M.D. (Liv Hospital, Ankara)  
Cem Kaan Parsak, M.D. (Çukurova University Faculty of Medicine, Adana)  
Cem Terzi, M.D. (Dokuz Eylül University Faculty of Medicine, İzmir)  
Cemalettin Ertekin, M.D. (İstanbul University Faculty of Medicine, İstanbul)  
Cemil Çalışkan, M.D. (Ege University Faculty of Medicine, İzmir)  
Cihangir Akyol, M.D. (Ankara University Faculty of Medicine, Ankara)  
Cüneyt Kayaalp, M.D. (İnönü University Faculty of Medicine, Malatya)  
Durkaya Ören, M.D. (Atatürk University Faculty of Medicine, Erzurum)  
Dursun Buğra, M.D. (Koç University Faculty of Medicine, İstanbul)  
Ediz Altınlı, M.D. (Florence Nightingale Hospital, İstanbul)  
Emel Canbay, M.D. (NPO HIPEC, İstanbul)  
Emre Balık, M.D. (Koç University Faculty of Medicine, İstanbul)  
Emre Canda, M.D. (Dokuz Eylül University Faculty of Medicine, İzmir)  
Enis Yüney, M.D. (Okmeydanı Training and Research Hospital, İstanbul)  
Eray Kara, M.D. (Celal Bayar University Faculty of Medicine, İstanbul)  
Erdoğan Sözüer, M.D. (Erciyes University Faculty of Medicine, Kayseri)  
Ergün Yücel, M.D. (Haydarpaşa Sultan Abdülhamid Han Training and Research Hospital, İstanbul)  
Erhun Eyüboğlu, M.D. (Kemerburgaz University Faculty of Medicine, İstanbul)  
Ersin Öztürk, M.D. (Uludağ University Faculty of Medicine, Bursa)  
Ethem Geçim, M.D. (Ankara University Faculty of Medicine, Ankara)  
Feza Karakayalı, M.D. (Başkent University Faculty of Medicine, İstanbul)  
Gökhan Yağcı, M.D. (Medicana Hospitals, Ankara)  
Haldun Gündoğdu, M.D. (Atatürk Training and Research Hospital, Ankara)  
Halis Dokgöz, M.D. (Mersin University Faculty of Medicine, Mersin)

Hovsep Hazar, M.D. (Marmara University Faculty of Medicine, İstanbul)  
İlyas Başkonuş, M.D. (Gaziantep University Faculty of Medicine, Gaziantep)  
İsmail Cem Eray, M.D. (Çukurova University Faculty of Medicine, Adana)  
İsmail Hamzaoğlu, M.D. (Acıbadem University Faculty of Medicine, İstanbul)  
Koray Topgül, M.D. (Liv Hospital, Ankara)  
Levhi Akın, M.D. (Liv Hospital, İstanbul)  
Mahir Özmen, M.D. (Hacettepe University Faculty of Medicine, Ankara)  
Mehmet Mihmanlı, M.D. (Etfal Training and Research Hospital, İstanbul)  
Melih Paksoy, M.D. (İstanbul University Cerrahpaşa Faculty of Medicine, İstanbul)  
Metin Ertem, M.D. (Acıbadem University Faculty of Medicine, İstanbul)  
Mustafa Ateş, M.D. (İnönü University Faculty of Medicine, Malatya)  
Mustafa Korkut, M.D. (Ege University Faculty of Medicine, İzmir)  
Mustafa Öncel, M.D. (Medipol University Faculty of Medicine, İstanbul)  
Neriman Şengül, M.D. (İzzet Baysal University Faculty of Medicine, Bolu)  
Neşet Köksal, M.D. (Ümraniye Training and Research Hospital, İstanbul)  
Nihat Yavuz, M.D. (Acıbadem University Faculty of Medicine, İstanbul)  
Nuri Okkabaz, M.D. (Lütfi Kırdar Training and Research Hospital, İstanbul)  
Oktar Asoğlu, M.D. (Liv Hospital, İstanbul)  
Ömer Alabaz, M.D. (Çukurova University Faculty of Medicine, Adana)  
Ömer Topçu, M.D. (Cumhuriyet University Faculty of Medicine, Sivas)  
Pars Tunçyürek, M.D. (Adnan Menderes University Faculty of Medicine, Aydın)  
Sabri Ergüney, M.D. (İstanbul University Cerrahpaşa Faculty of Medicine, İstanbul)  
Sadık Yıldırım, M.D. (Kolan Hastanesi, İstanbul)  
Sedar Yüceyar, M.D. (İstanbul University Cerrahpaşa Faculty of Medicine, İstanbul)  
Selçuk Atamanalp, M.D. (Atatürk University Faculty of Medicine, Erzurum)  
Selman Sökmen, M.D. (Dokuz Eylül University Faculty of Medicine, İzmir)  
Sezai Demirbaş, M.D. (Gülhane Training and Research Hospital, Ankara)  
Sezai Leventoğlu, M.D. (Gazi University Faculty of Medicine, Ankara)  
Sümer Yamaner, M.D. (Florence Nightingale Hospitals, İstanbul)  
Süphan Ertürk, M.D. (İstanbul University Cerrahpaşa Faculty of Medicine, İstanbul)  
Tayfun Karahasanoğlu, M.D. (Acıbadem University Faculty of Medicine, İstanbul)  
Tuncay Yılmazlar, M.D. (Uludağ University Faculty of Medicine, Bursa)  
Turgut İpek, M.D. (Medical Park Hospitals, İstanbul)  
Türker Bulut, M.D. (İstanbul University Faculty of Medicine, İstanbul)  
Uğur Sungurtekin, M.D. (Pamukkale University Faculty of Medicine, Denizli)  
Yavuz Özdemir, M.D. (Gülhane Training and Research Hospital, Ankara)  
Yılmaz Büyükcüncü, M.D. (İstanbul University Faculty of Medicine, İstanbul)  
Yunus Emre Altuntaş, M.D. (Lütfi Kırdar Training and Research Hospital, İstanbul)  
Yusuf Yağmur, M.D. (Gazi Yaşargil Training and Research Hospital, Diyarbakır)

## Editorial Advisory Board/Yayın Danışma Kurulu

Andre D'Hoore, M.D. (Leuven, Belgium)  
Andres Mellgren, M.D. (Chicago, USA)  
Angelita Habr - Gama, M.D. (Sao Paulo, Brazil)  
Ann C. Lowry, M.D. (Minneapolis, USA)  
Emre Gorgun, M.D. (Cleveland, USA)  
Faramarz Pakravan, M.D. (Dusseldorf, Germany)  
Feza Remzi, M.D. (Cleveland, USA)

Julio Garcia - Agliure, M.D. (NY, USA)  
Hiroki Ohge, M.D. (Hiroshima, Japan)  
Khaled Madbouly, M.D. (Alexandria, Egypt)  
Liliana G. Bordeianou, M.D. (Boston, USA)  
Maria Cristina Sartor, M.D. (Parana, Brazil)  
Mark Wong, M.D. (Singapore)  
Massarat Zutshi, M.D. (Cleveland, USA)

Seyed Vahid Hosseini, M.D. (Shiraz, Iran)  
Soren Laurberg, M.D. (Aarhus, Denmark)  
Mehrdad Bohlooli, M.D. (Tehran, Iran)  
Paul Antoine Lehur, M.D. (Nantes, France)  
Robert D. Madoff, M.D. (Minneapolis, USA)  
Tan Kok Yang, M.D. (Singapore)

# Turkish Journal of COLORECTAL DISEASE



## Aims and Scope

Turkish Journal of Colorectal Disease is an official journal of the Turkish Society of Colon and Rectal Surgery to provide epidemiologic, pathologic, diagnostic and therapeutic studies relevant to the management of small intestine, colon, rectum, anus and pelvic floor diseases. It was launched in 1991. Although there were temporary interruptions in the publication of the journal due to various challenges, the Turkish Journal of Colorectal Disease has been published continually from 2007 to the present. It is published quarterly (March, June, September and December) as hardcopy and an electronic journal at <http://www.turkishjcrd.com/>

The target audience of Turkish Journal of Colorectal Disease includes surgeons, pathologists, oncologists, gastroenterologists and health professionals caring for patients with a disease of the colon and rectum.

The Turkish name of the journal was formerly Kolon ve Rektum Hastalıkları Dergisi and the English name of the journal was formerly Journal of Diseases of the Colon and Rectum.

**Turkish Journal of Colorectal Disease is indexed in CINAHL Ultimate, British Library, Root Indexing, Idealonline, Turkish Citation Index and TurkMedline.**

The aim of Turkish Journal of Colorectal Disease is to publish original research papers of the highest scientific and clinical value at an international level. Furthermore, review articles, case reports, technical notes, letters to the editor, editorial comments, educational contributions and congress/meeting announcements are released.

Turkish Journal of Colorectal Disease is an independent open access peer-reviewed international journal printed in Turkish and English languages. Manuscripts are reviewed in accordance with "double-blind peer review" process for both referees and authors. The Editorial Board of the Turkish Journal of Colorectal Disease endorses the editorial policy statements approved by the WAME Board of Directors. The journal is in compliance with the uniform requirements for manuscripts submitted to biomedical journals published by the International Committee of Medical Journal Editors (NEJM 1997;336:309-315, updated 2001).

### Open Access Policy

This journal provides immediate open access to its content on the principle that making research freely available to the public supports a greater global exchange of knowledge. Open Access Policy is based on rules of Budapest Open Access Initiative (BOAI) <http://www.budapestopenaccessinitiative.org/>.

This journal is licensed under a Creative Commons 3.0 International License.

### Permission Requests

Permission required for use any published under CC-BY-NC license with commercial purposes (selling, etc.) to protect copyright owner and author rights). Reproduction and reproduction of images or tables in any published material should be done with proper citation of source providing authors names; article title; journal title; year (volume) and page of publication; copyright year of the article.

### Instructions for Authors

Instructions for authors are published in the journal and at [www.turkishjcrd.com](http://www.turkishjcrd.com)

### Material Disclaimer

Authors are responsible for the manuscripts they publish in Turkish Journal of Colorectal Disease. The editor, editorial board, and publisher do not accept any responsibility for published manuscripts.

If you use a table or figure (or some data in a table or figure) from another source, cite the source directly in the figure or table legend.

The journal is printed on acid-free paper.

Financial expenses of the journal are covered by Turkish Society of Colon and Rectal Surgery.

### Editorial Policy

Following receipt of each manuscript, a checklist is completed by the Editorial Assistant. The Editorial Assistant checks that each manuscript contains all required components and adheres to the author guidelines, after which time it will be forwarded to the Editor in Chief. Following the Editor in Chief's evaluation, each manuscript is forwarded to the Associate Editor, who in turn assigns reviewers. Generally, all manuscripts will be reviewed by at least three reviewers selected by the Associate Editor, based on their relevant expertise. Associate editor could be assigned as a reviewer along with the reviewers. After the reviewing process, all manuscripts are evaluated in the Editorial Board Meeting.

Turkish Journal of Colorectal Disease's editor and Editorial Board members are active researchers. It is possible that they would desire to submit their manuscript to the Turkish Journal of Colorectal Disease. This may be creating a conflict of interest. These manuscripts will not be evaluated by the submitting editor(s). The review process will be managed and decisions made by editor-in-chief who will act independently. In some situation, this process will be overseen by an outside independent expert in reviewing submissions from editors.

### Subscription Information

Turkish Journal of Colorectal Disease is sent free - of - charge to members of Turkish Society of Colon and Rectal Surgery and libraries in Turkey and abroad. All published volumes are available in full text free-of-charge online at [www.turkishjcrd.com](http://www.turkishjcrd.com)

Address: Latilokum Sok. Alphan İşhanı No: 3 Kat: 2, Şişli, İstanbul, Türkiye

Telephone: +90 (212) 356 01 75-76-77

Gsm: +90 (532) 300 72 36

Fax: +90 (212) 356 01 78

Online Manuscript Submission: [www.journalagent.com/krhd](http://www.journalagent.com/krhd)

Web page: [www.turkishjcrd.com](http://www.turkishjcrd.com)

E-mail: [info@turkishjcrd.com](mailto:info@turkishjcrd.com)

### Advertisement / Publisher Corresponding Address

For requests concerning advertising, please contact the Publisher:

Galenos Yayınevi Tic. Ltd. Şti.

Address: Molla Garani Cad. 22/2 34093 Fındıkzade-İstanbul-Türkiye

Telephone: +90 (212) 621 99 25

Fax: +90 (212) 621 99 27

Web page: [www.galenos.com.tr](http://www.galenos.com.tr)

E-mail: [info@galenos.com.tr](mailto:info@galenos.com.tr)

# Turkish Journal of COLORECTAL DISEASE



## Amaç ve Kapsam

Türk Kolon ve Rektum Hastalıkları Dergisi, Türk Kolon ve Rektum Cerrahi Derneği'nin resmi dergisidir. Bu dernek; ince barsak, kolon, rektum, anüs ve pelvik taban hastalıkları gibi hastalıkların yönetimi ile ilişkili epidemiyolojik patolojik, tanısal ve tedavi edici çalışmalar yapar. Derneğimiz 1991'de kurulmuştur. Çeşitli zorluklar nedeniyle geçici aksaklıklar olsa da Türk Kolon ve Rektum Hastalıkları Dergisi 2007'den bu yana aralıksız olarak basılmaktadır ve 3 ayda bir olmak üzere (Mart, Haziran, Eylül, Aralık) basılı dergi ve elektronik olarak (<http://www.turkishjcrd.com/>) yayımlanır.

Derginin hedef kitlesini; cerrahlar, patoloğlar, onkologlar, gastroenterologlar ve kolorektal hastalarına hizmet veren profesyoneller oluşturur. Derginin amacı; uluslararası düzeyde en yüksek bilimsel ve klinik değeri olan orijinal çalışmalarını yayımlamaktır. Bunlara ek olarak derleme (review) makaleleri, olgu sunumları, teknik notlar, editöre mektuplar, editöryal yorumlar, eğitim yazıları ve kongre/toplantı duyuruları yer almaktadır.

Derginin Türkçe eski adı; Kolon ve Rektum Hastalıkları Dergisi ve İngilizce eski adı; Journal of Diseases of the Colon and Rectum'dur.

**Kolon ve Rektum Hastalıkları Dergisi, CINAHL Ultimate, British Library, Root Indexing, Ideonline, Türk Atf Dizini ve TürkMedline'de indekslenmektedir.**

Türk Kolon ve Rektum Hastalıkları Dergisi, İngilizce ve Türkçe olarak yayımlanan; bağımsız, hakemli, uluslararası bir dergidir. Eserler, hem hakemler hem de otörler tarafından "çift kör hakem denetimi (peer review)" yöntemi ile değerlendirilir. Türk Kolon ve Rektum Hastalıkları Dergisi'nin Editör Kurulu, World Association of Medical Editors (WAME) politikalarına bağlı olarak yürütülmektedir. Bu dergi, Uluslararası Tıp Dergisi Editörler Komitesi (NEJM 1997;336:309-315, updated 2001) tarafından bildirilen, biyomedikal dergilere gönderilen makalelerin uyması gereken standartlara uygunluk göstermektedir.

### Açık Erişim Politikası

Bu dergi bilginin yer değiştirmesi ve toplum içinde bilgiye özgürce ulaşma olanağı sağlamak üzere açık erişime imkan vermektedir. Açık Erişim İlkesi "Budapeşte Açık Erişim Girişimi (BOAI)" <http://www.budapestopenaccessinitiative.org/> kurallarına dayanmaktadır.

Bu dergi Creative Commons 3.0 Uluslararası Lisansı ile lisanslanmıştır.

### İzinler

Ticari amaçlarla CC-BY-NC lisansı altında yayımlanan her hangi bir kullanım (satış vb.) telif hakkı sahibi ve yazar haklarının korunması için izin gereklidir. Yayımlanan herhangi bir materyalde figure veya tabloların yeniden yayımlanması ve çoğaltılması, kaynağın başlık ve makalelerin yazarları ile doğru alıntılanmasıyla yapılmalıdır.

Derginin mali giderleri Türk Kolon ve Rektum Cerrahi Derneği tarafından karşılanmaktadır.

### Yazarlar için Kılavuz

Yazarlar için kılavuz hem yayımlanan dergide hem de "<http://www.turkishjcrd.com/>" web sayfasında bulunmaktadır.

### Telif Hakkı Devri

Yazarlar Türk Kolon ve Rektum Hastalıkları Dergisi'nde yayınladıkları yazılardan

kendileri sorumludurlar. Editör, editör kurulu ve yayıncı hiçbir sorumluluk kabul etmemektedir. Başka bir kaynaktan tablo ya da figür (veya tablo/figürden bir veri) kullandıysanız, direkt olarak tablo ya da figürü kaynak gösteriniz.

Dergi asitsiz kağıda basılmaktadır.

Derginin mali giderleri Türk Kolon ve Rektum Cerrahi Derneği tarafından karşılanmaktadır.

### Editöryal Politika

Her yazının alınmasını takiben, bir kontrol listesi Editör Yardımcısı tarafından tamamlanır.

Editör yardımcısı, her yazıyı gerekli öğeleri sağladığı ve yazar kılavuzuna uyumu açısından kontrol eder, ardından editöre iletir. Editör değerlendirmesinin ardından her bir yazı için editör yardımcısı tarafından gözlemciler (reviewers) belirlenir. Genelde, her bir yazıyı ilgili uzmanlıkları göz önüne alınarak atanmış en az 3 gözlemci inceler. Yardımcı editör de diğer gözlemcilerle birlikte gözlemci olarak atanabilir. Gözlemci incelemesinin ardından yazılar editör kurul toplantısında değerlendirilir.

Türk Kolon ve Rektum Hastalıkları Dergisi'nin editör ve editör kurulu üyeleri aktif araştırmacılar. Kendi araştırmalarının da Türk Kolon ve Rektum Hastalıkları Dergisi'nde yayımlanmasını pek ala arzu edebilirler. Bu durum çıkar sorunları doğurabilir. Bu yazılar, yazıyı yazan editör(ler) tarafından değerlendirilemez. Bu gibi durumlarda bu süreç, (editörlerin yazı başvurularında) yazıların uzman olan bağımsız kişiler tarafından incelenmesiyle aşılabılır.

### Abonelik Bilgileri

Türk Kolon ve Rektum Hastalıkları Dergisi, Türk Kolon ve Rektum Cerrahi Derneği üyelerine, Dünya'da ve Türkiye'deki kütüphanelere ücretsiz dağıtılmaktadır. Yayımlanmış tüm sayılar ücretsiz olarak şu linkte mevcuttur (<http://www.turkishjcrd.com/>).

Adres: Latilokum Sok. Alphan İşhanı No: 3 Kat: 2, Şişli, İstanbul, Türkiye

Telefon: +90 212 356 01 75-76- 77

GSM: +90 532 300 72 36

Faks: +90 212 356 01 78

Online Makale Gönderme: [www.journalagent.com/krhd](http://www.journalagent.com/krhd)

Web sayfası: [www.turkishjcrd.com](http://www.turkishjcrd.com)

E-posta: [info@turkishjcrd.com](mailto:info@turkishjcrd.com)

### Reklam-Duyuru / Yayınevi Yazışma Adresi

Talepleriniz için lütfen yayıncı ile iletişime geçiniz.

Galenos Yayınevi Tic. Ltd. Şti.

Molla Gürani Mah. Kaçamak Sk. No:21 34093 Fındıkzade-İstanbul-Türkiye

Telefon: +90 212 621 99 25 - Faks: +90 212 621 99 27

E-posta: [info@galenos.com.tr](mailto:info@galenos.com.tr)

Web sayfası: [www.galenos.com.tr](http://www.galenos.com.tr)

# Turkish Journal of COLORECTAL DISEASE



## Instruction for Authors

### GENERAL INFORMATION

Turkish Journal of Colorectal Disease (TJCD) is the journal of Turkish Society of Colon and Rectal Surgery. The mission of the Journal is to advance knowledge of disorders of the small intestine, colon, rectum, anus and pelvic floor. It publishes invited review articles, research articles, brief reports and letters to the editor, and case reports that are relevant to the scope of the journal, on the condition that they have not been previously published elsewhere. Basic science manuscripts, such as randomized, cohort, cross-sectional, and case control studies, are given preference. Invited reviews will be considered for peer review from known experts in the area.

Manuscripts should be prepared according to ICMJE guidelines ([www.icmje.org](http://www.icmje.org)). All manuscripts are subject to editorial revision to ensure they conform to the style adopted by the journal. There is a double blind kind of reviewing system.

Reviewed and accepted manuscripts are translated from Turkish to English by the Journal through a professional translation service. Prior to printing, the translations are submitted to the authors for approval or correction requests, to be returned within 7 days. If no response is received from the corresponding author within this period, the translation is checked and approved by the editorial board.

Accepted manuscripts are published in both Turkish and English languages.

All manuscripts submitted to the Turkish Journal of Colorectal Disease are screened for plagiarism using the 'iThenticate' software. Results indicating plagiarism may result in manuscripts being returned or rejected.

Turkish Journal of Colorectal Disease does not charge any article submission or processing charges.

The abbreviation of the Turkish Journal of Colorectal Disease is "TJCD", however, it should be denoted as "Turk J Colorectal Dis" when referenced.

### EDITORIAL POLICIES

All manuscripts will be evaluated by the scientific board for their scientific contribution, originality and content. Authors are responsible for the accuracy of the data. The journal retains the right to make appropriate changes on the grammar and language of the manuscript. When suitable the manuscript will be sent to the corresponding author for revision. The manuscript, when published, will become the property of the journal and copyright will be taken out in the name of the journal

"Turkish Journal of Colorectal Disease". Articles previously published in any language will not be considered for publication in the journal. Authors cannot submit the manuscript for publication in another journal. All changes in the manuscript will be made after obtaining written permission of the author and the publisher. Full text of all articles can be downloaded at the web site of the journal [www.journalagent.com/krhd](http://www.journalagent.com/krhd).

### AUTHOR GUIDELINES

#### Forms Required with Submission:

Copyright Transfer Statement  
Disclosure Statement  
Cover Letter

### Manuscript Submission Guidelines

Manuscript Preparation Guidelines  
Text Formatting  
Title Page  
Article Types  
Original Articles  
Invited Review Articles  
Case Reports  
Technical Notes  
Letters to Editor  
Editorial Comments  
Ethical Responsibilities of Authors  
Research Involving Human Participants and/or Animals  
Informed Consent  
Payment

### Forms Required with Submission

#### Copyright Transfer Statement

The scientific and ethical liability of the manuscripts belongs to the authors and the copyright of the manuscripts belongs to the Turkish Journal of Colorectal Disease. Authors are responsible for the contents of the manuscript and accuracy of the references. All manuscripts submitted for publication must be accompanied by the Copyright Transfer Form [copyright transfer]. Once this form, signed by all the authors, has been submitted, it is understood that neither the manuscript nor the data it contains have been submitted elsewhere or previously published and authors declare the statement of scientific contributions and responsibilities of all authors.

#### Disclosure Statement

Conflicts of interest: Authors must state all possible conflicts of interest in the manuscript, including financial, consultant, institutional and other relationships that might lead to bias or a conflict of interest. If there is no conflict of interest, this should also be explicitly stated as none declared. All sources of funding should be acknowledged in the manuscript. All relevant conflicts of interest and sources of funding should be included on the title page of the manuscript with the heading

"Conflicts of Interest and Source of Funding:"

#### Cover Letter

In the cover letter the authors should state if any of the material in the manuscript is submitted or planned for publication elsewhere in any form including electronic media. A written statement indicating whether or not "Institutional Review Board" (IRB) approval was obtained or equivalent guidelines followed in accordance with the Helsinki Declaration of 2013 update on human experimentation must be stated; if not, an explanation must be provided. The cover letter must contain address, telephone, fax and the e-mail address of the corresponding author.

### Manuscript Submission Guidelines

All manuscripts should be submitted via the online submission system. Authors are encouraged to submit their manuscripts via the internet after logging on to the web site [www.journalagent.com/krhd](http://www.journalagent.com/krhd).

### Online Submission

Only online submissions are accepted for rapid peer-review and to prevent delay in publication. Manuscripts should be prepared as word document (\*.doc) or rich text format (\*.rtf). After logging on to the web [www.journalagent.com/krhd](http://www.journalagent.com/krhd) double click the "submit an article" icon. All corresponding authors should be provided a password and an username after providing the information needed. After logging on the article submission system with your own password and username please read carefully the directions of the system to provide all needed information in order not to delay the processing of the manuscript. Attach the manuscript, all figures, tables and additional documents. Please also attach the cover letter with "Assignment of Copyright and Financial Disclosure" forms.

### Manuscript Preparation Guidelines

Turkish Journal of Colorectal Disease follows the "Uniform Requirements for Manuscripts Submitted to Biomedical Journals" (International Committee of Medical Journal Editors: Br Med J 1988;296:401-5).

Upon submission of the manuscript, authors are to indicate the type of trial/research and statistical applications following "Guidelines for statistical reporting in articles for medical journals: amplifications and explanations" (Bailar JC III, Mosteller F. Ann Intern Med 1988;108:266-73).

Preparation of research articles, systematic reviews and meta-analyses must comply with study design guidelines:

CONSORT statement for randomized controlled trials (Moher D, Schulz KF, Altman D, for the CONSORT Group. The CONSORT statement revised recommendations for improving the quality of reports of parallel group randomized trials. JAMA 2001; 285:1987-91) (<http://www.consort-statement.org/>);

PRISMA statement of preferred reporting items for systematic reviews and meta-analyses (Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group. Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 2009; 6(7): e1000097.) (<http://www.prisma-statement.org/>);

STARD checklist for the reporting of studies of diagnostic accuracy (Bossuyt PM, Reitsma JB, Bruns DE, Gatsonis CA, Glasziou PP, Irwig LM, et al., for the STARD Group. Towards complete and accurate reporting of studies of diagnostic accuracy: the STARD initiative. Ann Intern Med 2003;138:40-4.) (<http://www.stard-statement.org/>);

STROBE statement, a checklist of items that should be included in reports of observational studies (<http://www.strobe-statement.org/>);

MOOSE guidelines for meta-analysis and systemic reviews of observational studies (Stroup DF, Berlin JA, Morton SC, et al. Meta-analysis of observational studies in epidemiology: a proposal for reporting Meta-analysis of observational Studies in Epidemiology (MOOSE) group. JAMA 2000; 283: 2008-12).

### Text Formatting

Manuscripts should be submitted in Word.

Use a normal, plain font (e.g., 10-point Times Roman) for text.

Use the automatic page numbering function to number the pages.

Do not use field functions.

# Turkish Journal of COLORECTAL DISEASE



## Instruction for Authors

Use tab stops or other commands for indents, not the space bar.  
Use the table function, not spreadsheets, to make tables.  
Save your file in docx format (Word 2007 or higher) or doc format (older Word versions).

### Title Page

All manuscripts, regardless of article type, should start with a title page, containing:  
The title of the article;  
The short title of the article  
The initials, names and qualifications of each author;  
The main appointment of each author;  
The name(s) of the institution(s) of each author;  
The name and email address of the corresponding author;  
Full disclosures of potential conflicts of interest on the part of any named author, or a statement confirming that there are no conflicts of interest;  
The word count excluding abstract, references, tables, figures and legends;  
The place and date of scientific meeting in which the manuscript was presented and its abstract published in the abstract book, if applicable.

### Article Types

#### Original Articles

This category includes original research including both clinical and basic science submissions. The work must be original and neither published, accepted, or submitted for publication elsewhere. Any related work, either SUBMITTED, in press, or published from any of the authors should be clearly cited and referenced.

All clinical trials must be registered in a public trials registry that is acceptable to the International Committee of Medical Journals Editors (ICMJE). Go to (<http://www.icmje.org/faq.html>). Authors of randomized controlled trials must adhere to the CONSORT guidelines, available at: [www.consort-statement.org](http://www.consort-statement.org), and provide both a CONSORT checklist and flow diagram. We require that you choose the MS Word template at [www.consort-statement.org](http://www.consort-statement.org) for the flow chart and cite/upload it in the manuscript as a figure. In addition, submitted manuscripts must include the unique registration number in the Abstract as evidence of registration.

All authors are expected to abide by accepted ethical standards for human and animal investigation. In studies that involve human subjects or laboratory animals, authors must provide an explicit statement in Materials and Methods that the experimental protocol was approved by the appropriate institutional review committee and meets the guidelines of their responsible governmental agency. In the case of human subjects, informed consent, in addition to institutional review board approval, is required.

Original Articles should not exceed 3000 words (excluding abstract, references, tables, figures and legends) and four illustrations.

#### Original Articles should be organized as follows:

**Abstract:** The abstract must contain fewer than 250 words and should be structured as follows:

**Aim:** What was the purpose of the study?

**Method:** A brief description of the materials - patients or subjects (i.e. healthy volunteers) or materials (animals) - and methods used.

**Results:** What were the main findings?

**Conclusion:** What are the main conclusions or implications of the study?

**Keywords:** Below the abstract provide up to 6 key words or short phrases. Do not use abbreviations as keywords.

**Introduction:** State concisely the purpose and rationale for the study and cite only the most pertinent references as background.

**Materials and Methods:** Describe your selection of the observational or experimental subjects clearly (patients or experimental animals, including controls). Provide an explicit statement that the experimental protocols were approved by the appropriate institutional review committee and meet the guidelines of the responsible governmental agency. In the case of human subjects, state explicitly those subjects have provided informed consent. Identify the methods, apparatus/product\*\* (with manufacturer's name and address in parentheses), and procedures in sufficient detail to allow other workers to reproduce the results. Give references to established methods, including statistical methods; provide references and brief descriptions of methods that have been published but are not well known, describe substantially modified methods, including statistical methods, give reasons for using them, and evaluate their limitations;

**Results:** Present the detailed findings supported with statistical methods. Figures and tables should supplement, not duplicate the text; presentation of data in either one or the other will suffice. Emphasize only your important observations; do not compare your observations with those of others. Such comparisons and comments are reserved for the discussion section.

**Discussion:** State the importance and significance of your findings but do not repeat the details given in the Results section. Limit your opinions to those strictly indicated by the facts in your report. Compare your finding with those of others. No new data are to be presented in this section.

**Acknowledgments:** Only acknowledge persons who have made substantive contributions to the study. Authors are responsible for obtaining written permission from everyone acknowledged by name because readers may infer their endorsement of the data and conclusions. Begin your text of the acknowledgment with, "The authors thank...".

**Authorship Contributions:** The journal follows the recommendations of the ICMJE for manuscripts submitted to biomedical journals. According to these, authorship should be based on the following four criteria:

Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; and

Drafting the work or revising it critically for important intellectual content; and

Final approval of the version to be published; and

Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

All other contributors to the paper should be credited in the 'Acknowledgments' section.

**References:** The author should number the references in Arabic numerals according to the citation order in the text. Put reference numbers in parenthesis in superscript at the end of citation content or after the cited author's name. Use the form of "Uniform Requirements for manuscript abbreviations in Turk Bilim Terimleri" (<http://www.bilimterimleri.com>).

Journal titles should conform to the abbreviations used in "Cumulated Index Medicus".

**Journals;** Last name(s) of the author(s) and initials, article title, publication title and its original abbreviation, publication date, volume, the inclusive page numbers.

**Example:** 1. Dilaveris P, Batchvarov V, Gialafos J, Malik M. Comparison of different methods for manual P wave duration measurement in 12-lead electrocardiograms. *Pacing Clin Electrophysiol* 1999;22:1532-1538.

**Book chapter;** Last name(s) of the author(s) and initials, chapter title, book editors, book title, edition, place of publication, date of publication and inclusive page numbers of the extract cited.

**Example:** 1. Schwartz PJ, Priori SG, Napolitano C. The Long QT Syndrome. In: Zipes DP, Jalife J, eds. *Cardiac Electrophysiology. From Cell to Bedside*. Philadelphia; WB Saunders Co. 2000:597-615.

**Tables:** All tables are to be numbered using Arabic numerals. Tables should always be cited in text in consecutive numerical order. For each table, please supply a table caption (title) explaining the components of the table. Identify any previously published material by giving the original source in the form of a reference at the end of the table caption. Footnotes to tables should be indicated by superscript lower-case letters (or asterisks for significance values and other statistical data) and included beneath the table body.

**Figures:** Figures should work under "Windows". Color figures or grayscale images must be at least 300 dpi. Figures using \*.tiff, \*.jpg or \*.pdf should be saved separate from the text. All figures should be prepared on separate pages. They should be numbered in Arabic numerals. Each figure must have an accompanying legend defining abbreviations or symbols found in the figure. Figures could be submitted at no additional cost to the author.

**Units of Measurement and Abbreviations:** Units of measurement should be in Système International (SI) units. Abbreviations should be avoided in the title. Use only standard abbreviations. If abbreviations are used in the text, they should be defined in the text when first used.

**Permissions:** Authors wishing to include figures, tables, or text passages that have already been published elsewhere are required to obtain permission from the copyright owner(s) and to include evidence that such permission has been granted when submitting their papers. Any material received without such evidence will be assumed to originate from the authors.

#### Invited Review Articles

**Abstract length:** Not to exceed 250 words.

**Article length:** Not to exceed 4000 words.

**Reference Number:** Not to exceed 100 references.

Reviews should include a conclusion, in which a new hypothesis or study about the subject may be posited. Do not publish methods for literature search or level of evidence. Authors who will prepare

# Turkish Journal of COLORECTAL DISEASE



## Instruction for Authors

review articles should already have published research articles on the relevant subject. The study's new and important findings should be highlighted and interpreted in the Conclusion section. There should be a maximum of two authors for review articles.

### Case Reports

**Abstract length:** Not to exceed 100 words.

**Article length:** Not to exceed 1000 words.

**Reference Number:** Not to exceed 15 references.

### Case Reports should be structured as follows:

**Abstract:** An unstructured abstract that summarizes the case.

**Introduction:** A brief introduction (recommended length: 1-2 paragraphs).

**Case Report:** This section describes the case in detail, including the initial diagnosis and outcome.

**Discussion:** This section should include a brief review of the relevant literature and how the presented case furthers our understanding to the disease process.

**References:** See under 'References' above.

Acknowledgments.

Tables and figures.

Technical Notes

**Abstract length:** Not to exceed 250 words.

**Article length:** Not to exceed 1200 words.

**Reference Number:** Not to exceed 15 references.

Technical Notes include description of a new surgical technique and its application on a small number of cases. In case of a technique representing a major breakthrough one case will suffice. Follow-up and outcome need to be clearly stated.

### Technical Notes should be organized as follows:

**Abstract:** Structured "as above mentioned".

**Indications**

**Method**

**Comparison with other methods:** advantages and disadvantages, difficulties and complications.

References, in Vancouver style (see under 'References' above).

**Acknowledgments.**

**Tables and figures:** Including legends.

Letters to the Editor

**Article length:** Not to exceed 500 words.

**Reference Number:** Not to exceed 10 references

We welcome correspondence and comment on articles published in Turkish Journal of Colorectal Disease. No abstract is required, but please include a brief title. Letters can include 1 figure or table.

### Editorial Comments

**Article length:** Not to exceed 1000 words.

**Reference Number:** Not to exceed 10 references.

Editorials are exclusively solicited by the Editor. Editorials should express opinions and/or provide comments on papers published elsewhere in the same issue. A single author is preferred. No abstract is required, but please include a brief title. Editorial submissions are subject to review/request for revision, and editors retain the right to alter text style.

### Ethics

This journal is committed to upholding the integrity of the scientific record. As a member of the Committee on Publication

Ethics (COPE) the journal will follow the COPE guidelines on how to deal with potential acts of misconduct.

Authors should refrain from misrepresenting research results which could damage the trust in the journal, the professionalism of scientific authorship, and ultimately the entire scientific endeavor. Maintaining integrity of the research and its presentation can be achieved by following the rules of good scientific practice, which include:

The manuscript has not been submitted to more than one journal for simultaneous consideration.

The manuscript has not been published previously (partly or in full), unless the new work concerns an expansion of previous work (please provide transparency on the re-use of material to avoid the hint of text-recycling ("self-plagiarism").

A single study is not split up into several parts to increase the quantity of submissions and submitted to various journals or to one journal over time (e.g. "salami-publishing").

No data have been fabricated or manipulated (including images) to support your conclusions.

No data, text, or theories by others are presented as if they were the author's own ("plagiarism"). Proper acknowledgments to other works must be given (this includes material that is closely copied (near verbatim), summarized and/or paraphrased), quotation marks are used for verbatim copying of material, and permissions are secured for material that is copyrighted.

**Important note:** Turkish Journal of Colorectal Disease uses software (iThenticate) to screen for plagiarism.

Consent to submit has been received explicitly from all co-authors, as well as from the responsible authorities - tacitly or explicitly - at the institute/organization where the work has been carried out, before the work is submitted.

Authors whose names appear on the submission have contributed sufficiently to the scientific work and therefore share collective responsibility and accountability for the results.

**In addition:** Changes of authorship or in the order of authors are not accepted after acceptance of a manuscript.

Requesting to add or delete authors at revision stage, proof stage, or after publication is a serious matter and may be considered when justifiably warranted. Justification for changes in authorship must be compelling and may be considered only after receipt of written approval from all authors and a convincing, detailed explanation about the role/deletion of the new/deleted author. In case of changes at revision stage, a letter must accompany the revised manuscript. In case of changes after acceptance or publication, the request and documentation must be sent via the Publisher to the Editor-in-Chief. In all cases, further documentation may be required to support your request. The decision on accepting the change rests with the Editor-in-Chief of the journal and may be turned down. Therefore authors are strongly advised to ensure the correct author group, corresponding author, and order of authors at submission.

Upon request authors should be prepared to send relevant documentation or data in order to verify the validity of the results. This could be in the form of raw data, samples, records, etc.

If there is a suspicion of misconduct, the journal will carry out an

investigation following the COPE guidelines. If, after investigation, the allegation seems to raise valid concerns, the accused author will be contacted and given an opportunity to address the issue. If misconduct has been established beyond reasonable doubt, this may result in the Editor-in-Chief's implementation of the following measures, including, but not limited to:

If the article is still under consideration, it may be rejected and returned to the author.

If the article has already been published online, depending on the nature and severity of the infraction, either an erratum will be placed with the article or in severe cases complete retraction of the article will occur. The reason must be given in the published erratum or retraction note.

The author's institution may be informed.

### Research Involving Human Participants and/or Animals

**Statement of human rights:** When reporting studies that involve human participants, authors should include a statement that the studies have been approved by the appropriate institutional and/or national research ethics committee and have been performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

If doubt exists whether the research was conducted in accordance with the 1964 Helsinki Declaration or comparable standards, the authors must explain the reasons for their approach, and demonstrate that the independent ethics committee or institutional review board explicitly approved the doubtful aspects of the study.

**The following statements should be included in the text before the References section:** Ethical approval: "All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards."

**For retrospective studies, please add the following sentence:** "For this type of study formal consent is not required."

**Statement on the welfare of animals:** The welfare of animals used for research must be respected. When reporting experiments on animals, authors should indicate whether the international, national, and/or institutional guidelines for the care and use of animals have been followed, and that the studies have been approved by a research ethics committee at the institution or practice at which the studies were conducted (where such a committee exists).

**For studies with animals, the following statement should be included in the text before the References section:**

**Ethical approval:** "All applicable international, national, and/or institutional guidelines for the care and use of animals were followed."

**If applicable (where such a committee exists):** "All procedures performed in studies involving animals were in accordance with the ethical standards of the institution or practice at which the studies were conducted."

If articles do not contain studies with human participants or animals by any of the authors, please select one of the following statements:



# Turkish Journal of COLORECTAL DISEASE



## Instruction for Authors

"This article does not contain any studies with human participants performed by any of the authors."

"This article does not contain any studies with animals performed by any of the authors."

"This article does not contain any studies with human participants or animals performed by any of the authors."

### Informed Consent

All individuals have individual rights that are not to be infringed. Individual participants in studies have, for example, the right to decide what happens to the (identifiable) personal data gathered, to what they have said during a study or an interview, as well as to any photograph that was taken. Hence it is important that all participants gave their informed consent in writing prior to inclusion in the study. Identifying details (names, dates of birth, identity numbers and other information) of the participants that were studied should not be published in written descriptions, photographs, and genetic profiles unless the information is essential for scientific purposes and the participant (or parent or guardian if the participant is incapable) gave written informed consent for publication. Complete anonymity is difficult to achieve in some cases, and informed consent should be obtained if there is any doubt. For example, masking the eye region in photographs of participants is inadequate protection of anonymity. If identifying characteristics are altered to protect anonymity, such as in genetic profiles, authors should provide assurance that alterations do not distort scientific meaning.

**The following statement should be included:** Informed Consent: "Informed consent was obtained from all individual participants included in the study."

If identifying information about participants is available in the article, the following statement should be included:

"Additional informed consent was obtained from all individual participants for whom identifying information is included in this article."

### Payment

Turkish Journal of Colorectal Disease does not charge any article submission or processing charges.

### THE REVIEW PROCESS

Each manuscript submitted to The Turkish Journal of Colorectal Disease is subject to an initial review by the editorial office in order to determine if it is aligned with the journal's aims and scope,

and complies with essential requirements. Manuscripts sent for peer review will be assigned to one of the journal's associate editors that has expertise relevant to the manuscript's content. All accepted manuscripts are sent to a statistical and English language editor before publishing. Once papers have been reviewed, the reviewers' comments are sent to the Editor, who will then make a preliminary decision on the paper. At this stage, based on the feedback from reviewers, manuscripts can be accepted, rejected, or revisions can be recommended. Following initial peer-review, articles judged worthy of further consideration often require revision. Revised manuscripts generally must be received within 2 months of the date of the initial decision. Extensions must be requested from the Associate Editor at least 2 weeks before the 2-month revision deadline expires; The Turkish Journal of Colorectal Disease will reject manuscripts that are not received within the 3-month revision deadline. Manuscripts with extensive revision recommendations will be sent for further review (usually by the same reviewers) upon their re-submission. When a manuscript is finally accepted for publication, the Technical Editor undertakes a final edit and a marked-up copy will be e-mailed to the corresponding author for review and to make any final adjustments.

### REVISIONS

When submitting a revised version of a paper, the author must submit a detailed "Response to the reviewers" that states point by point how each issue raised by the reviewers has been covered and where it can be found (each reviewer's comment, followed by the author's reply and line numbers where the changes have been made) as well as an annotated copy of the main document. Revised manuscripts must be submitted within 30 days from the date of the decision letter. If the revised version of the manuscript is not submitted within the allocated time, the revision option may be canceled. If the submitting author(s) believe that additional time is required, they should request this extension before the initial 30-day period is over.

### ENGLISH LANGUAGE EDITING

All manuscripts are professionally edited by an English language editor prior to publication.

### AFTER ACCEPTANCE

All accepted articles are technically edited by one of the Editors. On completion of the technical editing, the article will be sent to the production department and published online as a fully citable Accepted Article within about one week.

### Copyright Transfer

Authors will be asked to transfer copyright of the article to the Publisher (or grant the Publisher exclusive publication and dissemination rights). This will ensure the widest possible protection and dissemination of information under copyright laws.

### Color Illustrations

Publication of color illustrations is free of charge.

### Proof Reading

The purpose of the proof is to check for typesetting or conversion errors and the completeness and accuracy of the text, tables and figures. Substantial changes in content, e.g., new results, corrected values, title and authorship, are not allowed without the approval of the Editor.

After online publication, further changes can only be made in the form of an Erratum, which will be hyperlinked to the article.

### ONLINE EARLY

The Turkish Journal of Colorectal Disease publishes abstracts of accepted manuscripts online in advance of their publication in print. Once an accepted manuscript has been edited, the authors have submitted any final corrections, and all changes have been incorporated, the manuscript will be published online. At that time the manuscript will receive a Digital Object Identifier (DOI) number. Both forms can be found at [www.journalagent.com/krhd](http://www.journalagent.com/krhd). Authors of accepted manuscripts will receive electronic page proofs directly from the printer, and are responsible for proofreading and checking the entire manuscript, including tables, figures, and references. Page proofs must be returned within 48 hours to avoid delays in publication.

### CORRESPONDENCE

All correspondences can be done to the following postal address or to the following e-mail address, where the journal editorial resides:

Address: Latilokum Sok. Alphan İşham No:3 Kat:2 Mecidiyeköy-Şişli-İstanbul- Turkey

Phone: +90 (212) 356 01 75-76-77

Gsm: +90 (532) 300 72 36

Fax: +90 (212) 356 01 78

Online Manuscript: [www.journalagent.com/krhd](http://www.journalagent.com/krhd)

Web page: [www.turkishjcrd.com](http://www.turkishjcrd.com)

E-mail: [info@turkishjcrd.com](mailto:info@turkishjcrd.com)

# Turkish Journal of COLORECTAL DISEASE



## Yazarlara Bilgi

### GENEL BİLGİ

Türk Kolon ve Rektum Hastalıkları Dergisi, Türk Kolon ve Rektum Cerrahisi Derneği'nin dergisidir. Derginin misyonu; ince bağırsak, kolon, rektum, anüs ve pelvik taban bozuklukları hakkındaki bilgiye katkı sağlamaktır. Dergi daha önce başka bir yerde yayınlanmamış olması koşuluyla, derginin kapsamı ile ilgili ve talep üzerine yazılan derleme makaleleri, araştırma makaleleri, kısa raporlar ve editöre mektuplar ve olgu sunumlarını yayınlamaktadır. Randomize, kohort, kesitsel ve vaka kontrol çalışmaları gibi temel bilim yazılarına öncelik verilir. Alanında bilinen uzmanlarca talep üzerine yazılan derlemeler dikkate alınacaktır.

Yazılar ICMJE yönergelerine göre (<http://www.icmje.org/>) hazırlanmalıdır. Tüm yazılar dergi tarafından benimsenen stile uygunluk sağlamak için editöryal kontrol ve düzeltmelere tabi tutulmaktadır. Derginin çift kör bir değerlendirme sistemi vardır. Değerlendirilen ve kabul edilen yayınlar Türkçeden İngilizceye veya İngilizceden Türkçeye derginin profesyonel çeviri hizmeti aracılığıyla tercüme edilir. Yayınlanmadan önce, çeviriler onay veya düzeltme istekleri için yazarlara gönderilir ve 7 gün içinde geri dönüş talep edilir. Bu süre içinde yanıt alınmazsa, çeviri kontrol ve yayın kurulu tarafından onaylanır.

Kabul edilen yayınlar hem Türkçe hem de İngilizce olarak yayınlanır.

Türk Kolon ve Rektum Hastalıkları Dergisi'ne gönderilen tüm yayınlar 'iThenticate' yazılımı kullanılarak intihal açısından taranır. İntihal saptanan durumlarda yayın iade veya reddedilir.

Türk Kolon ve Rektum Hastalıkları Dergisi, makale gönderme veya işlem ücreti adı altında herhangi bir ücret talep etmemektedir.

Türk Kolon ve Rektum Hastalıkları Dergisi'nin kısaltması "TJCD"dir, ancak, refere edildiğinde "Turk J Colorectal Dis" olarak kullanılmalıdır.

### YAYIN POLİTİKASI

Tüm makaleler bilimsel katkıları, özgünlük ve içerikleri açısından bilimsel komite tarafından değerlendirilecektir. Yazarlar verilerinin doğruluğundan sorumludurlar. Dergi gerekli gördüğü yerlerde dil ve uygun değişiklik yapma hakkını saklı tutar. Gereğinde makale revizyon için yazara gönderilir. Dergide basılan yayın derginin malı haline gelir ve telif hakkı "Türk Kolon ve Rektum Hastalıkları Dergisi" adına alınmıştır. Daha önce herhangi bir dilde yayınlanmış makaleler dergide yayınlanmak üzere kabul edilmeyecektir. Yazarlar bir başka dergide yayınlanmak üzere olan makaleyi teslim edemez. Tüm değişiklikler, yazar ve yayıncının yazılı izni alındıktan sonra yapılacaktır. Tüm makalelerin tam metinleri derginin [www.journalagent.com/krhd](http://www.journalagent.com/krhd) web sitesinden indirilebilir.

### YAZAR KILAVUZU

#### Makale gönderilirken sunulması gereken formlar:

Telif hakkı devir bildirimini

Açıklama bildirimini

Üst yazı

#### Makale Gönderme Kuralları

#### Makale Hazırlama Kuralları

Metin biçimlendirme

Giriş sayfası

Yayın tipleri

Orjinal Makaleler

Talepli derlemeler

Olgular sunumları

Teknik notlar

Editöre mektuplar

Editöryal Yorumlar

#### Yazarların Etik Sorumlulukları

#### İnsan katılımcılı araştırma ve/veya hayvan deneyleri

#### Bilgilendirilmiş Onam

#### Makale Gönderilirken Sunulması Gereken Formlar:

#### Telif Hakkı Devir Bildirimi

Yayınlara bilimsel ve etik sorumluluğu yazarlarına aittir. Yazıların telif hakkı ise Türk Kolon ve Rektum Hastalıkları Dergisi'ne aittir. Yazarlar yayınların doğruluk ve içeriğinden ve kaynakların doğruluğundan sorumludur. Yayınlanmak üzere gönderilen tüm yayınlara Telif Hakkı Devir Formu (telif hakkı transferi) eşlik etmelidir. Tüm yazarlar tarafından imzalanarak gönderilen bu form ile yazarlar, ilgili yayının ve içerdiği datanın başka bir yayın organına gönderilmediğini veya başka bir dergide yayınlanmadığını beyan ederler. Ayrıca bu belge yazarların bilimsel katkı ve tüm sorumluluklarının ifadesidir.

#### Açıklama Bildirimi

Çıkar çatışmaları: Yazarlar, finansal, kurumsal, danışmanlık şeklinde ya da herhangi bir çıkar çatışmasına yol açabilecek başka ilişkiler de dahil olmak üzere yayındaki ilgili tüm olası çıkar çatışmalarını belirtmelidir. Herhangi bir çıkar çatışması yoksa da bu da açıkça belirtilmelidir. Tüm finansman kaynakları yazının içinde belirtilmelidir. Finansman kaynakları ve ilgili tüm çıkar çatışmaları yazının başlık sayfasında "Finansman ve Kaynak Çatışmaları:" başlığı ile yer almalıdır.

#### Üst Yazı

Yazarlar, yazının içinde malzemenin elektronik ortam da dahil olmak üzere herhangi bir başka bir yerde yayımlanmak üzere gönderilmediğini veya planlanmadığını üst yazıda belirtmelidir. Yine "Kurumsal Değerlendirme Kurulu" (KDK) onayı alınıp alınmadığı ve 2013 yılı Helsinki Bildirgesi'ne eşdeğer kılavuzların izlenip izlenmediği belirtilmelidir. Aksi takdirde, bir açıklama temin edilmelidir. Üst yazı; adres, telefon, faks ve ilgili yazının e-posta adresini içermelidir.

#### Makale Yazım Kuralları

Tüm makaleler online başvuru sistemi üzerinden teslim edilmelidir. Yazarlar web sitesi [www.journalagent.com/krhd](http://www.journalagent.com/krhd) adresinde oturum açtıktan sonra internet üzerinden yazıyı sunmalıdır.

#### Online Başvuru

Gecikmeyi önlemek ve hızlı hakemlik için sadece çevrim içi gönderimler kabul edilir. Yazılar word belgesi (\*.doc) veya zengin metin biçimini (\*.rtf) olarak hazırlanmalıdır. [www.journalagent.com/krhd](http://www.journalagent.com/krhd) adresinde web oturumu açtıktan sonra "Makale gönder" ikonuna tıklayın. Tüm yazarlar, gerekli bilgileri sisteme girdikten sonra bir şifre ve bir kullanıcı adı alır. Kendi şifre ve kullanıcı adınız ile makale gönderme sistemine kayıt olduktan sonra

yazının işleme alınmasında bir gecikme olmaması için gerekli tüm bilgileri sağlamak için sistemin yönergelerini dikkatlice okuyunuz. Makaleyi ve tüm şekil, tablo ve ek dokümanları ekleyiniz. Ayrıca üst yazı ve "Telif Hakkı ve Finansal Durum" formunu ve yazının tipine göre aşağıda belirtilen kılavuzların kontrol listesini ekleyiniz.

#### Makale Hazırlama Kuralları

Türk Kolon ve Rektum Hastalıkları Dergisi "Biyomedikal Dergilere Gönderilen Makaleler için Gerekli Standartları" izler. (International Committee of Medical Journal Editors: Br Med J 1988; 296: 401-5).

Yazarlar yayınlarını gönderirken, çalışmalarının türünü ve uygulanan istatistik yöntemlerini "Tıbbi Dergilere Gönderilen Makaleler için İstatistiksel Raporlama Rehberi"ne uygun olarak belirtmelidir. (Bailar JC III, Mosteller F. Ann Intern Med 1988;108:266-73).

Araştırma makalesi, sistematik değerlendirme ve meta-analizin hazırlanması aşağıdaki çalışma tasarımı kurallarına uymak zorundadır; (CONSORT statement for randomized controlled trials (Moher D, Schultz KF, Altman D, for the CONSORT Group).

The CONSORT statement revised recommendations for improving the quality of reports of parallel group randomized trials. JAMA 2001; 285:1987-91 (<http://www.consort-statement.org/>);

PRISMA statement of preferred reporting items for systematic reviews and meta-analyses (Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group. Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 2009; 6(7): e1000097.) (<http://www.prisma-statement.org/>);

STARD checklist for the reporting of studies of diagnostic accuracy (Bossuyt PM, Reitsma JB, Bruns DE, Gatsonis CA, Glasziou PP, Irwig LM, et al., for the STARD Group. Towards complete and accurate reporting of studies of diagnostic accuracy: the STARD initiative. Ann Intern Med 2003;138:40-4) (<http://www.stard-statement.org/>);

STROBE statement, a checklist of items that should be included in reports of observational studies (<http://www.strobe-statement.org/>);

MOOSE guidelines for meta-analysis and systemic reviews of observational studies (Stroup DF, Berlin JA, Morton SC, et al. Meta-analysis of observational studies in epidemiology: a proposal for reporting Meta-analysis of observational Studies in Epidemiology (MOOSE) group. JAMA 2000; 283: 2008-12).

#### Metin Biçimlendirme

Yazılar Word programı ile hazırlanarak teslim edilmelidir.

- Metin için normal, düz yazı tipi kullanın (örneğin, 10 punto Times Roman).

- Sayfa numarası için otomatik sayfa numaralandırma işlevini kullanın.

- Alan fonksiyonları kullanmayın.

- Girintiler için sekme durakları (Tab) kullanın, ara çubuğu ve diğer komutlar kullanmayın.

- Tablo yapmak için diğer işlevleri değil, elektronik tablo fonksiyonunu kullanın.

- Dosyanızı .docx formatında (Word 2007 veya üstü) ya da .doc formatında (eski Word sürümü) kaydedin.

# Turkish Journal of COLORECTAL DISEASE



## Yazarlara Bilgi

Giriş sayfası

Tüm yazılar, makale türü ne olursa olsun, aşağıdakileri içeren bir başlık sayfası ile başlamalıdır:

- Makalenin başlığı;
- Makalenin kısa başlığı;
- Yazarların isimleri, isimlerinin baş harfleri ve her yazarn akademik ünvanı;
- Her yazarn görevi;
- Her yazarn kurumu;
- Yazarn adı ve e-posta adresi;
- Herhangi bir yazarn olası bir çıkar çatışması olduğunu teyit eden bir ifade, aksi takdirde çatışma olmadığını belirtir bir açıklama;
- Özet, kaynaklar, tablo ve şekiller hariç kelime sayısı;
- Varsa yayının yayınlanmış olduğu bilimsel toplantının tarihi, yeri ve varsa kongre özet kitabındaki özeti.

### Makale Tipleri

#### Orjinal Makaleler

Bu kategori, klinik ve temel bilimde orijinal araştırmaları içerir. Yayın orijinal olmalı ve başka bir dergide yayınlanmış/gönderilmiş ya da kabul edilmiş olmamalıdır. Yazarlar, herhangi biri tarafından bir dergiyeye gönderilmiş, baskıda veya basılmış ilgili herhangi bir çalışmaya atıfta bulunmak istiyorsa açıkça atıfta bulunulmalı ve kaynak gösterilmelidir.

Tüm klinik çalışmalar, Uluslararası Tıp Dergisi Editörler Komitesince (ICMJE) kabul gören bir kayıt sistemine kayıtlı olmalıdır. Bunun için <http://www.icmje.org/faq.html> adresine mütacaat edin. Randomize kontrollü çalışmaların yazarları da, [www.consort-statement.org](http://www.consort-statement.org) adresinden başvurulabilen CONSORT kılavuzuna uymalıdır ve yayınlanya birlikte CONSORT kontrol listesi ve akış diyagramı tebliğ edilmelidir. Akış şeması olarak [www.consort-statement.org](http://www.consort-statement.org) adresinde bulunan MS Word şablonunun kullanılması ve bunun yayının içinde bir alıntı veya bir figür olarak yerleştirilmesi gereklidir. Buna ek olarak, sunulan yayınlar her yayına spesifik verilen özel kayıt numarasını içermelidir.

Tüm yazarların, insan üzerindeki çalışmalar ve hayvan deneylerinde etik standartlara uymaları beklenmektedir. İnsan üzerindeki veya laboratuvar hayvanları içeren çalışmalarda, yazarların yayının Gereç ve Yöntem kısmında deney protokolünün ilgili kurumsal inceleme komitesi tarafından onaylandığını ve sorumlu devlet kurumu kurallarına uyduğunu açık bir dille açıklamaları gereklidir. İnsan üzerindeki çalışmalarda kurumsal inceleme kurulu onayına ek olarak, aydınlatılmış onam da bulunmalıdır.

Orjinal Makaleler (özet, kaynaklar, tablolar, rakamlar hariç) 3000 kelime ve dört figürü aşmamalıdır.

Orjinal Makaleler aşağıdaki gibi organize edilmelidir:

**Özet:** Özet 250 kelimeyi geçmemeli ve şunları içermelidir;

**Amaç:** Çalışmanın amacı nedir?

**Yöntem:** Kullanılan yöntem ve materyaller (örneğin hayvanlar) veya hastalar ya da konu (sağlıklı gönüllüler gibi) hakkında kısa bir açıklama içermelidir.

**Bulgular:** Ana bulgular nelerdir?

**Sonuç:** Çalışmanın ana sonuçları ve etkileri nelerdir?

**Anahtar kelimeler:** Özetin altında en az 3 anahtar kelime veriniz. Kısaltmaları anahtar kelime olarak kullanmayınız.

**Giriş:** Açık bir dille çalışmanın amaç ve gereğini belirtin ve çalışmanın arka planını açıklarken sadece en önemli kaynaklardan alıntı yapın.

**Gereç ve Yöntem:** Gözlemsel veya deneysel deneklerin (hastalar, deney hayvanları veya kontrol grupları dahil) seçim şeklini açıklayın. Deney protokolünün ilgili kurumsal inceleme komitesi tarafından onaylandığını ve ilgili devlet kurumu kurallarına uyduğunu açık bir dille açıklayın. İnsan çalışması durumunda, tüm şahısların aydınlatılmış onamlarının alındığını açık bir dille belirtin. Yöntem, cihaz ve ürünleri tanımlayın (Parantez içinde üretici firma adı ve adresi)\*\* Uygulanmış olan tüm prosedürler, diğer çalışmacıların aynı deneyi tekrar edebilecekleri detay ve netlikte anlatılmalıdır. İstatistiksel yöntemler de dahil olmak üzere yerleşik ve yaygın olarak bilinen çalışma yöntemleri için kaynaklar belirtilmelidir. Yayınlanmış ancak yaygın olarak bilinmeyen yöntemler için ise kaynaklar ve kısa tanımlamalar verilmelidir. Kullanma sebepleri ve limitasyonları belirtilmelidir.

**Bulgular:** İstatistiksel yöntemlerle desteklenmiş bulgularınızı ayrıntılı olarak sunun. Şekil ve tablolar metni tekrar değil, takviye etmelidir. Verilerin hem metinde hem figür olarak verilmemesi gerekir. Metin veya figürden birisi olarak verilmesi yeterlidir. Sadece kendi önemli izlenimlerinizi belirtin. Kendi izlenimlerinizi diğerlerinininkiyle karşılaştırmayın. Bu tür karşılaştırma ve yorumlar tartışma bölümünde yapılmalıdır.

**Tartışma:** Bulgularınızın önem ve anlamını vurgulayın ancak bulgular kısmında verilenleri tekrarlamayın. Fikirlerinizi yalnızca bulgularınızla kanıtlayabildiklerinizle sınırlı tutun. Bulgularınızı diğerlerinininkiyle karşılaştırdın. Bu bölümde yeni veriler bulunmamalıdır.

**Teşekkür:** Sadece çalışmaya ciddi katkılarda bulunmuş kişilere teşekkür edin. Yazarlar ismen teşekkür ettikleri herkesten yazılı izin almak zorundadır. Teşekkür kısmına "Yazarlar ...teşekkür eder" şeklinde başlayın.

**Yazarlık ve Katkı Sağlayanlar:** Dergi, biyomedikal dergilere gönderilen yayınlara yönelik ICMJE tavsiyelerini izler. Buna göre "yazarlık" aşağıdaki dört kritere dayalı olmalıdır:

Yazar;

- Yayının konsept veya dizaynına, çalışmanın verilerinin elde edilmesine, analizine ve yorumlanmasına önemli katkılar veren; ve

- İşi hazırlayan veya entellektüel içerik açısından eleştirel biçimde gözden geçiren; ve

- Yayınlanacak son şekli onaylayan; ve

- Çalışmanın her bir bölümünün doğruluğu ve bütünlüğü ile ilgili sorunları uygun bir şekilde inceleyen ve çözüm sağlayan sorumlu kişidir.

Bu şartların hepsini sağlamayan diğer tüm katılımcılar yazar değil, "Teşekkür" bölümünde anılması gereken katkı sağlamış kişilerdir.

Kaynaklar: Kaynakları l'den başlayarak Arap rakamları ve alfabetik sıra ile verin. Kaynak numaraları cümle sonunda noktadan sonra üstte küçük rakamlar şeklinde (superscript) yazılmalıdır. Kısaltmalar için gerekli standartları <http://www.bilimterimleri.com> adresinde bulunan Türk Bilim Terimleri Kılavuzu'ndan edinin.

Dergi başlıkları "Cumulated Index Medicus" kısaltmalarına uygun olmalıdır.

**Dergiden:** Yazar/yazarların soyadı ve adının ilk harfi, makale başlığı, dergi başlığı ve derginin özgün kısaltması, yayın tarihi, baskı, kapsayıcı sayfa numaralarını içermelidir.

**Örneğin:** 1. Dilaveris P, Batchvarov V, Gialafos J, Malik M. Comparison of different methods for manual P wave duration measurement in 12-lead electrocardiograms. Pacing Clin Electrophysiol 1999;22:1532-1538.

**Kitap Bölümü:** Yazar/yazarların soyadı ve adının ilk harfi, bölüm başlığı, kitap editörleri, kitap başlığı, basım, yayın yeri, yayın tarihi, kapsadığı sayfa numaralarını içermelidir

**Örneğin:** 1. Schwartz PJ, Priori SG, Napolitano C. The Long QT Syndrome. In: Zipes DP, Jalife J, eds. Cardiac Electrophysiology. From Cell to Bedside. Philadelphia; WB Saunders Co. 2000:597-615.

**Tablolar:** Tüm tablolar Arapça sayılarla numaralandırılmalıdır. Tüm tablolardan metin içerisinde numara sırası ile bahsedilmelidir. Her tablo için tablonun içeriği hakkında bilgi veren bir başlık verin. Başka yayından alıntı olan tüm tabloları tablonun alt kısmında kaynak olarak belirtin. Tabloda dipnotlar tablonun altında, üst karakter olarak küçük harflerle verilmelidir. İstatistiksel anlamlı değerler ve diğer önemli istatistiksel değerler yıldız ile işaretlenmelidir.

**Şekiller:** Şekillerin "Windows" ile açılması gerekir. Renkli şekiller veya gri tonlu görüntüler en az 300 dpi olmalıdır. Şekiller ana metinden ayrı olarak "\*.tiff", "\*.jpg" veya "\*.pdf" formatında kaydedilmelidir. Tüm şekil ayrı bir sayfada hazırlanmalı ve Arap rakamları ile numaralandırılmalıdır. Her şekilde kendisindeki işaret ve sembollerini açıklayan bir alt yazı olmalıdır. Şekil gönderme için yazardan hiçbir ek ücret alınmaz.

**Ölçü Birimleri ve Kısaltmalar:** Ölçü birimleri System International (SI) birimleri cinsinden olmalıdır. Kısaltmalarında başlıkta kaçınılmalıdır. Sadece standart kısaltmalar kullanın. Metinde kısaltma kullanılırsa ilk kullanıldığı yerde tanımlanmalıdır.

**İzinler:** Yazarlar yayınlarına önceden başka bir yerde yayınlanmış şekil, tablo, ya da metin bölümleri dahil etmek isterlerse telif hakkı sahiplerinden izin alınması ve bu izin belgelerinin yayımla beraber değerlendirilmeye gönderilmesi gerekmektedir. Böyle bir belgenin eşlik etmediği her materyalin yazara ait olduğu kabul edilecektir.

Davetli (Talep üzerine yazılan) Derlemeler

**Özet uzunluğu:** 250 kelimeyi aşmamalıdır.

**Makale uzunluğu:** 4000 kelimeyi aşmamalıdır.

**Kaynak sayısı:** 100 kaynağı aşmamalıdır.

Derlemeler, üzerine konuyla ilgili yeni bir hipotez ya da çalışma oturtulabilecek bir sonuç içermelidir. Literatür taraması metodlarını veya kanıt düzeyi yöntemlerini yayımlamayın. Derleme makaleleri hazırlayacak yazarların ilgili konuda önceden araştırma makaleleri yayımlamış olması gerekir. Çalışmanın yeni ve önemli bulguları sonuç bölümünde vurgulanır ve yorumlanmalıdır. Derlemelerde maksimum iki yazar olmalıdır.

**Olgu Sunumları**

**Özet uzunluğu:** 100 kelimeyi aşmamalıdır.

**Makale uzunluğu:** 1000 kelimeyi aşmamalıdır.

**Kaynak sayısı:** 15 kaynağı aşmamalıdır.

# Turkish Journal of COLORECTAL DISEASE



## Yazarlara Bilgi

Olgu Sunumları aşağıdaki gibi yapılandırılmalıdır:

**Özet:** Olguyu özetleyen bir yapılandırılmamış özet (gereç ve yöntem, bulgular, tartışma gibi bölümlerin olmadığı).

**Giriş:** Kısa bir giriş (tavsiye edilen uzunluk: 1-2 paragraf).

**Olgu Sunumu:** Bu bölümde ilk tanı ve sonuç da dahil olmak üzere olgu ayrıntılı olarak anlatılır.

**Tartışma:** Bu bölümde ilgili literatür kısaca gözden geçirilir ve sunulan olgunun, hastalığa bakımını ve yaklaşımımızı nasıl değiştirebileceği vurgulanır.

**Kaynaklar:** Vancouver tarzı, (yukarıda 'Kaynaklar' bölümüne bakınız).

**Teşekkür**

**Tablolar ve şekiller**

**Teknik Notlar**

**Özet uzunluğu:** 250 kelimeyi aşmamalıdır.

**Makale uzunluğu:** 1200 kelimeyi aşmamalıdır.

**Kaynak Sayısı:** 15 kaynağı aşmamalıdır.

Teknik Notlar, yeni bir cerrahi tekniğin açıklanmasını ve az sayıda olguda uygulanmasını içermektedir. Büyük bir atılım/değişikliği temsil eden bir tekniğin sunulması durumunda tek bir olgu yeterli olacaktır. Hastanın takip ve sonucu açıkça belirtilmelidir.

Teknik Notlar aşağıdaki gibi organize edilmelidir:

**Özet:** Aşağıdaki gibi yapılandırılmalıdır:

**Amaç:** Bu çalışmanın amacı nedir?

**Yöntem:** Kullanılan yöntemlerin, hastalar ya da sağlıklı gönüllülerin veya hayvanların tanımı, malzemeler hakkında kısa bir açıklama.

**Bulgular:** Ana bulgular nelerdir?

**Sonuç:** Bu çalışmanın ana sonuçları ve etkileri nelerdir?

**Endikasyonları**

**Yöntem**

Diğer yöntemlerle karşılaştırılması: Avantaj ve dezavantajları, zorluklar ve komplikasyonlar.

**Kaynaklar:** Vancouver tarzı (yukarıda 'Kaynaklar' bölümüne bakınız)

**Teşekkür**

**Tablolar ve şekiller; alt yazıları dahil**

**Editöre Mektuplar**

**Makale uzunluğu:** 500 kelimeyi aşmamalıdır.

**Kaynak Sayısı:** 10 kaynağı aşmamalıdır.

Türk Kolon ve Rektum Hastalıkları Dergisi'nde yayınlanan makaleler hakkında yorumlar memnuniyetle kabul edilir. Özet gerekli değildir, ancak lütfen kısa bir başlık ekleyiniz. Mektuplar bir şekil veya tablo içerebilir.

**Editöryal Yorumlar**

**Makale uzunluğu:** 1000 kelimeyi aşmamalıdır.

**Kaynak Sayısı:** 10 kaynağı aşmamalıdır.

Editöryal yorumlar sadece editör tarafından kaleme alınır. Editöryal yorumlarda aynı konu hakkında başka yerlerde

yayınlanmış yazılar hakkında fikir veya yorumlar belirtilir. Tek bir yazar tercih edilir. Özet gerekli değildir, ancak lütfen kısa bir başlık ekleyiniz. Editöryal gönderimler revizyon/gözden geçirme talebine tabi tutulabilir. Editörler, metin stilini değiştirme hakkını saklı tutar.

**Etik**

Bu dergi, bilimsel kayıtların bütünlüğünü korumayı taahhüt etmektedir. Yayın Etik Komitesi (COPE) üyesi olarak, dergi olası olumsuz davranışlarla nasıl başa çıkılacağı konusunda Yayın Etik Komitesi (COPE) kılavuzlarını takip edecektir.

Yazarlar araştırma sonuçlarını yanlış sunmaktan; derginin güvenilirliğine, bilimsel yazırlık profesyonelliğine ve en sonunda tüm bilimsel çabalara zarar verebileceğinden dolayı, sakınlmalıdır. Araştırma bütünlüğünün sürdürülmesi ve bunun sunumu, iyi bilimsel uygulama kurallarını takip ederek başarılıdır. Bu da şunları içerir:

- Yazılı eser değerlendirilmek üzere eş zamanlı birden fazla dergiye gönderilmemelidir.

- Yazılı eser daha önceki bir eserin geliştirilmesi olmadıkça, daha önce (kısmen ya da tamamen) yayınlanmamış olmalıdır. [Metnin yeniden kullanıldığı imasından kaçınmak için tekrar kullanılabilir materyallerde şeffaflık sağlayın ("self-plagiarism" kişinin kendinden intihali)].

- Tek bir çalışma; sunum miktarını arttırmak için birçok parçaya bölünmemeli ve zaman içinde aynı ya da çeşitli dergilere gönderilmemelidir. (örneğin "salam-yayıncılık" "salamizasyon").

- Veriler, sonuçlarınızı desteklemek için fabrikasyon (uydurma) ya da manipüle edilmiş olmamalıdır.

- Yazarın kendine ait olmayan hiçbir veri, metin veya teori kendinmiş gibi sunulmamalıdır (intihal). Diğer eserlerin kullanımı, (eserin birebir kopyalanması, özetlenmesi ve/veya başka kelimeler kullanılarak açıklanmasını da içeren) ya telif hakkı korunacak şekilde izin alınarak ya da tırnak işareti içinde birebir kopyalanarak uygun onay ile kullanılmalıdır.

Önemli not; Türk Kolon ve Rektum Hastalıkları Dergisi intihal taramak için bir program (iThenticate) kullanmaktadır.

- Eser sunulmadan önce sorumlu makamlardan ve çalışmanın yapıldığı enstitü/kuruluşlardan-zimnen veya açıkça-onay alınmasının yanı sıra tüm yazarlardan açıkça onay alınmış olmalıdır.

- Sunulan eserde yazar olarak ismi olanların, bilimsel çalışmaya yeterince katkısı olmuş olmalıdır ve ortak mesuliyet ve sorumluluğu olmalıdır.

Bununla beraber:

- Yazarlık veya yazarların sıra değişiklikleri eserin kabulünden sonra yapılabilir

- Yazının revizyon aşamasında, yayın öncesi veya yayınladıktan sonra yazar isim eklenmesi veya çıkarılması istemi; ciddi bir konudur ve geçerli sebepler olduğunda değerlendirilebilir. Yazar değişikliği gerekeceği; haklı gerekçeli, inandırıcı ve sadece tüm yazarların yazılı onayı alındıktan sonra; ve yeni/silinmiş yazarın rolü silme hakkında ikna edici ayrıntılı bir açıklama ile kabul edilebilir. Revizyon aşamasında değişiklik olması halinde, bir mektup revise edilmiş yayına eşlik etmelidir. Yayına kabul edildikten veya yayınladıktan sonra değişiklik olması

halinde, bu istek ve gerekli dökümantasyon yayıncı yoluyla editöre gönderilmesi gerekmektedir. Gerek görüldüğünde bu isteğin gerçekleşmesi için daha fazla doküman talep edilebilir. Değişikliğin kabul veya red karar dergi editörü insiyatifindedir. Bu nedenle, yayının gönderilmesi aşamasında yazar/yazarlar; gönderecekleri ilgili yazar grubunun isim doğruluğundan sorumludur.

- Yazarlardan sonuçların geçerliliğini doğrulamak amacıyla verilerin ilgili belgelerinin istenmesi halinde bu verileri göndermek için hazır bulundurulmalıdır. Bunlar, ham veri, örnekler, kayıt vb. şekilde olabilir.

Görevi kötüye kullanma ya da suistimal şüphesi halinde dergi COPE yönergeleri izleyerek bir soruşturma yürütecektir. Soruşturmanın ardından, iddia geçerli görünüyorsa, yazara sorunu gidermek için bir fırsat verilecektir.

Usulsüzlük, şüphe seviyesinde kaldığında; dergi editörü aşağıdaki yollardan birine başvurabilir;

- Makale halen şüpheli ise, reddedilip yazara iade edilebilir.

- Makele online yayınlanmış ise; hatanın mahiyetine bağlı olarak ya yazım hatası olarak kabul edilecek ya da daha ciddi durumlarda makale geri çekilecektir.

- Hatalı yayın ve geri çekme durumlarında açıklayıcı not yayınlanır ve yazarın kurumu bilgilendirilir.

**İnsan ve Hayvan Araştırmaları**

**İnsan Hakları Beyannamesi**

**İnsan katılımlı araştırmalar;** 1964 Helsinki Deklarasyonu'na ve sonrasında yayımlanan iyileştirici ilkelere uygun olmalıdır ve yazarlar tarafından kurumsal ve/veya ulusal etik kurul komitelerine başvurulup onay alınmış olduğu beyan edilmelidir.

Araştırmanın 1964 Helsinki Deklarasyonu veya kıyaslanabilir standartlara göre yürütülmesi ile ilgili şüphe durumunda, yazarlar bu durumun nedenlerini açıklamak zorundadır ve bağımsız etik kurulları veya diğer değerlendirme kurulları aracılığıyla şüphelerin giderilmesi gerekmektedir.

Aşağıda belirtilen durumlar yazı içerisinde "Kaynaklar" bölümünden önce yer almalıdır:

**Etik Kurul Onayı:** "Çalışmada insanlara uygulanan tüm prosedürler kurumsal ve ulusal araştırma kurullarının etik standartlarına, 1964 Helsinki Deklarasyonu'na ve sonrasında yayımlanan iyileştirici ilkelere uygun olmalıdır."

Retrospektif çalışmalarda, aşağıda belirtilen cümle yer almalıdır.

"Bu tür çalışmalarda yazılı onam gerekmemektedir."

**Hayvan Hakları Beyannamesi**

Araştırmalarda kullanılan hayvanların refahına saygı gösterilmelidir. Hayvan deneylerinde, yazarlar hayvanların bakımında ve kullanımında uluslararası, ulusal ve/veya kurumsal olarak oluşturulmuş kılavuzlara uymalıdır ve çalışmalar için kurumdaki veya çalışmanın yapıldığı veya yürütüldüğü merkezdeki (eğer böyle bir merkez varsa) Klinik Araştırmalar Etik Kurulundan onay alınmalıdır.

Hayvanlar ile yürütülen çalışmalarda, aşağıda belirtilen durumlar yazı içerisinde "Kaynaklar" bölümünden önce yer almalıdır:

**Etik Kurul Onayı:** "Hayvanların bakımı ve kullanımı ile ilgili olarak uluslararası, ulusal ve/veya kurumsal olarak oluşturulmuş tüm kılavuzlara uyulmuştur."

# Turkish Journal of COLORECTAL DISEASE



## Yazarlara Bilgi

Eğer uygun bulduysa (komitenin bulunduğu merkezde): "Hayvan çalışmalarında yapılan tüm uygulamalar kurumsal veya çalışmanın yürütüldüğü merkez tarafından belirlenmiş etik kurallara uyumludur."

Eğer makale insan ya da hayvan katımlı bir çalışma değilse, lütfen aşağıda yer alan uygun durumlardan birini seçiniz:

"Bu makalenin yazarları insan katımlı bir çalışma olmadığını bildirmektedir."

"Bu makalenin yazarları çalışmada hayvan kullanılmadığını bildirmektedir."

"Bu makalenin yazarları insan katımlı veya hayvan kullanılan bir çalışma olmadığını bildirmektedir."

### Bilgilendirilmiş Onam

Bütün bireyler ihlal edilemeyecek kişisel haklara sahiptir. Çalışmada yer alan bireyler, elde edilen kişisel bilgilere, çalışmada geçen görüşmelere ve elde edilen fotoğraflara ne olacağı konusunda karar verebilmeye hakkına sahiptir. Bundan dolayı, çalışmaya dahil etmeden önce yazılı bilgilendirilmiş onam alınması önemlidir. Bilimsel olarak gerekli değilse ve katılımcılardan (veya katılımcı yetkin değilse ebeveynlerinden veya velilerinden) basılması için yazılı onam alınmadysa, katılımcılara ait detaylar (isimleri, doğum günleri, kimlik numaraları ve diğer bilgileri) tanımlayıcı bilgilerini, fotoğraflarını ve genetik profillerini içerecek şekilde yazılı formda basılmamalıdır. Tam gizlilik sağlanmasının zor olduğu durumlarda, bilgilendirilmiş onam formu şüpheyi içerecek şekilde düzenlenmelidir. Örneğin fotoğrafta katılımcıların göz kısmının maskelenmesi gizlilik açısından yeterli olmayabilir. Eğer karakteristik özellikler gizlilik açısından değiştirilirse, örneğin genetik profile, yazar yapılan değişikliğin bilimsel olarak sorun oluşturmadığından emin olmalıdır.

Aşağıdaki ifade belirtilmelidir:

**Bilgilendirilmiş Onam:** "Çalışmadaki tüm katılımcılardan bilgilendirilmiş onam alınmıştır."

Eğer makalede katılımcıların tanımlayıcı bilgileri yer alacaksa, aşağıdaki ifade belirtilmelidir:

"Makalede kişisel bilgileri kullanılan tüm katılımcılardan ayrıca bilgilendirilmiş onam alınmıştır."

### DEĞERLENDİRME SÜRECİ

Türk Kolon ve Rektum Hastalıkları Dergisi'ne gönderilen tüm yazılar, sisteme yüklendikten sonra ilk önce editöryal kurul tarafından derginin amaç ve hedeflerine uygunluk ve temel şartları

sağlama yönünden değerlendirilecektir. Yazılar, konusunda uzman dergi hakemlerine değerlendirilmek üzere gönderilecektir. Tüm kabul edilen yazılar yayımlanmadan önce, istatistik ve İngiliz dili konusunda uzman editörler tarafından değerlendirilecektir. Sayfaların ilk gözden geçirilmesinden sonra, hakem yorumları ön karar vermek için Editör'e gönderilecektir. Bu aşamada, ilk değerlendirmede bulunanların düşüncesi doğrultusunda, yazı kabul edilebilir, reddedilebilir veya yazıda düzeltme yapılması istenebilir. İlk değerlendirme sonrasında değerli bulunan makaleler için genellikle düzeltme istenir. Düzeltülen makaleler ilk karardan sonraki 2 ay içerisinde tekrar dergiye gönderilmelidir. Süre uzatmaları yardımcı editörden 2 aylık süre bitmeden en az 2 hafta önce talep edilmelidir. Türk Kolon ve Rektum Hastalıkları Dergisi tarafından, 2 aylık düzeltme süresi sona erdikten sonra, yazı kabul edilmeyecektir. Düzeltme yapılan yazılar sisteme tekrar yüklendikten sonra değerlendirilmek üzere (genellikle ilk değerlendirmeyi yapan hakeme) gönderilecektir. Sonuç olarak yayımlanma kararı verildikten sonra, baskı öncesi Teknik Editör tarafından son kez değerlendirilecektir ve iletişim kurulacak olan yazara gözden geçirme ve son düzenlemeleri yapmak üzere işaretlenmiş bir nüshası elektronik ortamda gönderilecektir.

### DÜZELTME SONRASI GÖNDERİLMESİ

Revize edilmiş bir versiyonu gönderirken yazar, yorumcular tarafından ele alınan her konuyu ayrıntılı olarak açıklamalı ve nokta nokta ayrıntılı olarak "yorumlara yanıt" sunmalıdır ve ardından belgenin açıklanmalı kopyası bulunmalıdır (her yorumcunun yorumu nerede bulunabilir, yazının cevap ve satır numaraları gibi yapılan değişiklikler).

Bunun yanı sıra ana revize yazı, kabul mektubu tarihinden itibaren 30 gün içinde teslim edilmelidir. Yazının revize edilmiş versiyonunun tanınan süre içinde verilmemesi durumunda, revizyon seçeneği iptal edilebilir. Yazar(lar) ek sürenin gerekli olduğunu düşünüyorsa, ilk 30 günlük süre bitmeden, uzatmayı talep etmelidir.

### İNGİLİZCE YAZIM

Tüm yazılar yayımlanmadan önce profesyonel olarak "English Language Editor" tarafından değerlendirilmektedir.

### KABUL SONRASI

Tüm kabul edilen makaleler editörlerden biri tarafından teknik açıdan değerlendirilecektir. Teknik inceleme tamamlandıktan sonra, makale ilgili birime gönderilerek yaklaşık bir hafta içerisinde tamamen atfı yapılabilir "Kabul Edilmiş Makale" şeklinde online olarak yayımlanacaktır.

### Telif Hakkının Devri

Yayımlayan dergiye (veya basım ve yayma haklarının ayrı olduğu yapılarda ayrı olarak) makalenin telif hakkının devri gerekmektedir. Telif yasaları gereği bilginin yayılması ve korunması daha güvenli olarak sağlanacaktır.

### Resimler

Renkli çizimlerin yayımlanması ücretsizdir.

Basım Öncesi Son Kontrol (Proof Reading)

Amaç, dizgi kontrolünü sağlamak veya dönüştürme hatalarını fark etmek, bütünlük ve netlik açısından yazıyı, tabloları ve şekilleri kontrol etmektir. Yeni bulgu ekleme, değerlerde düzeltme, başlıkta ve yazarlarda önemli değişikliklere editör izni olmadan müsaade edilmemektedir.

Online olarak yayımlandıktan sonra yapılacak değişikliklerde, Erratum üzerinden form oluşturulup makaleye erişim sağlayacak bağlantı oluşturulması gerekmektedir.

### ERKEN YAYIN

Kabul edilmiş yazının baskı için tümü hazırlanırken online olarak özet hali yayımlanır. Kabul edilen yazı kontrolden geçtikten sonra, yazarlar son düzeltmeleri yaptıktan sonra ve tüm değişiklikler yapıldıktan sonra yazı online olarak yayımlanacaktır. Bu aşamada yazıya DOI (Digital Object Identifier) numarası verilecektir. Her iki forma da [www.journalagent.com/krhd](http://www.journalagent.com/krhd) adresinden ulaşılabilecektir. Kabul edilen yazının yazarları elektronik ortamdaki sayfaları çıktı olarak aldıktan sonra proofreading yapmak, tüm yazıyı, tabloları, şekilleri ve kaynakları kontrol etmekle sorumludur. Baskıda gecikme olmaması için 48 saat içinde sayfa kontrolleri yapılmış olmalıdır.

### YAZIŞMA

Tüm yazışmalar dergi editöryal kuruluna ait aşağıdaki posta adresi veya e-mail adresi ile yapılacaktır.

Adres: Latilokum Sok. Alphan İşhanı No:3 Kat:2 Mecidiyeköy-Şişli, İstanbul, Türkiye

Telefon: +90 212 356 01 75-76-77

GSM: +90 (532) 300 72 36

Faks: +90 212 356 01 78

Online makale göndermek için: [www.journalagent.com/krhd](http://www.journalagent.com/krhd)

Web sayfası: [www.turkishjcrd.com](http://www.turkishjcrd.com)

E-posta: [info@turkishjcrd.com](mailto:info@turkishjcrd.com)

# Turkish Journal of COLORECTAL DISEASE



## Contents/İçindekiler

### Research Articles/Özgün Makaleler

- 38 Clinical Value of the Monocyte-to-Lymphocyte Ratio for Determining Number of Debridements in Treatment of Fournier's Gangrene  
*Monosit-Lenfosit Oranının Fournier Gangreni Tedavisinde Debridman Sayısına Karar Vermede Klinik Etkisi*  
Turgut Anuk, Ali Cihat Yıldırım, Hakan Güzel, Gülşen Çığsar, Elnare Günal; Kars, Ankara, Turkey
- 44 Grade II-III Hemorrhoidal Disease Treatment: Rubber Band Ligation versus Hemorrhoidal Artery Ligation  
*Grade II-III Hemoroidal Hastalık Tedavisi: Lastik Bant Ligasyonu ve Hemoroidal Arter Ligasyonu Karşılaştırılması*  
İbrahim Yılmaz, Dursun Özgür Karakaş, İlker Sücüllü, Mehmet Saydam; Ankara, İstanbul, Turkey
- 50 Clinical Value of Platelet-to-Lymphocyte Ratio in Predicting Liver Metastasis and Lymph Node Positivity of Colorectal Cancer Patients  
*Platelet-Lenfosit Oranının Kolon Kanseri Hastalarda Karaciğer Metastazını ve Lenf Nodu Pozitifliğini Öngörebilmedeki Klinik Etkisi*  
Turgut Anuk, Ali Cihat Yıldırım; Kars, Turkey

### Case Reports/Olgu Sunumları

- 56 Small Bowel Intussusception After Rectal Surgery: Case Report  
*Rektum Cerrahisi Sonrası İnce Barsak İnvajinasyonu: Olgu Sunumu*  
Barış Sevinç, Semiha Canverenler; Uşak, Turkey
- 59 A Case of Tuberculosis Mimicking Colon Cancer  
*Kolon Kanseri Taklit Eden Tüberküloz Olgusu*  
Hüseyin Çiyiltepe, Durmuş Ali Çetin, Ulaş Aday, Ebubekir Gündes, Emre Bozdağ, Mustafa Duman; İstanbul, Turkey
- 62 Foreign Body in Sacral Region: Remaining Part of Knife After Stabbing  
*Sakrumda Yabancı Cisim: Bıçaklanma Sonrası Geride Kalan Bıçak Parçası*  
Dursun Özgür Karakaş, Batuhan Hazer, İbrahim Yılmaz, Özgür Dandin, Ali Kemal Sivrioğlu, İlker Sücüllü; İstanbul, Çanakkale, Turkey

### Letters to the Editor/Editöre Mektuplar

- 65 A New Approach to Classification of Pilonidal Disease  
*Pilonidal Sinüs Sınıflandırmasında Yeni Bir Yaklaşım*  
Dursun Özgür Karakaş, İbrahim Yılmaz, Batuhan Hazer, Özgür Dandin, İlker Sücüllü; İstanbul, Çanakkale, Turkey
- 67 Necessity of Rational Use of Social Media in Colorectal Surgery  
*Kolorektal Cerrahide Sosyal Medyanın Akılcı Kullanımının Gerekliği*  
Bahar Büşra Özkan, Mustafa Berkeşoğlu, Gökhan Selçuk Özbacı; Samsun, Mersin, Turkey

### Technical Note/Teknik Not

- 69 Is the Ischioanal Fossa the Most Appropriate Surgical Area for Fecal Incontinence Surgery  
*İskioanal Fossa, Fekal İnkontinans Cerrahisi için En Uygun Alan mıdır?*  
Ali Naki Yücesoy; İstanbul, Turkey

# Turkish Journal of COLORECTAL DISEASE



## Editorial/Editöryal

Esteemed colleagues,

This issue of the Turkish Journal of Colorectal Disease features three original research articles, one technical note, two letters to the editor, and three case reports. We are pleased to see that the quality of our publication is steadily increasing.

In this issue, there is an excellent study investigating the predictive value of platelet-to-lymphocyte ratio in metastatic colon cancer, as well as a study presenting new parameters in the treatment of Fournier gangrene, which is common in our country and can sometimes be challenging to manage. The other original research article evaluates two minimally invasive techniques frequently used in daily practice to treat hemorrhoidal disease. I believe you will read them with great interest.

This issue also includes a technical note presenting a unique point of view concerning the surgical therapy for fecal incontinence. I highly recommend you read it. In addition, there are three interesting case reports which are particularly relevant for Turkey. Furthermore, we feature a letter to the editor recommending a new classification system for pilonidal sinus disease, which is very common in our country and has been published about rather extensively by Turkish surgeons. Finally, we include a very current letter to the editor encouraging more widespread use of social media in colorectal surgery in parallel to the general public's increasing use of social media.

As is evident by the content of the journal, in addition to the increase in the quality of our publications, we have also increased the variety of articles in our journal.

The Turkish Colon and Rectal Surgery Congress, the most important event held by the Turkish Society of Colon and Rectal Surgery, took place last month with the support of our valuable nurses and was very well attended. Although it was a national congress, many experts from abroad also participated. The European Society of Coloproctology also contributed. The studies presented at the congress have been printed as a supplementary issue of the Turkish Journal of Colorectal Disease, and we will be honored to publish these worthy studies when they are prepared as articles.

I wish you a lovely summer and look forward to receiving more of your diverse and valuable articles for our September issue.

Best wishes until September...

**Tahsin Çolak, MD**  
Editor-in-Chief

Sevgili meslektaşlarım,

*Türk Kolon ve Rektum Hastaları Dergisi bu sayısında üç özgün makale, bir teknik not, iki editöre mektup ve üç olgu sunumuyla çıktı. Gittikçe yayın kalitemizin arttığını görmenin mutluluğu içindeyiz.*

*Bu sayıda platelet-lenfosit oranının metastatik kolon kanserini öngörmedeki etkinliğini irdeleyen çok güzel bir çalışmanın yanında ülkemizde sık rastlanan ve tedavisinde zaman zaman zorlanılan Fournier gangreninin tedavisinde yeni parametreler sunan diğer bir çalışma yer aldı. Diğer özgün araştırma makalesinde ise günlük pratikte sık uyguladığımız hemoroidal hastalığın tedavisinde minimal invazif iki yöntem değerlendirilmektedir. İlgili okuyacağımızı tahmin ederim.*

*Bu sayıda ayrıca fekal inkontinans cerrahi tedavisinde değişik bir bakış açısı sunan bir teknik not da yer aldı. Mutlaka okumanızı tavsiye ederim. Bunun yanında, ülkemizde özellikle ilgi gören üç birbirinden ilginç olgu sunumuna yer verildi. Öte yandan ülkemizde çok yaygın olan ve ülkemiz cerrahları tarafından literatüre oldukça fazla katkı sağlanan pilonidal sinüs hastalığı için yeni bir sınıflama öneren editöre mektubumuzun yanında, günümüzde sosyal medyanın kullanımına paralel olarak kolorektal cerrahide de sosyal medyanın daha yaygın kullanılmasını öneren çok güncel bir editöre mektuba daha yer verildi.*

*Derginin içeriğinde de görüldüğü gibi yayınlarımızın kalitesinin artmasının yanı sıra yayın tipi çeşitliğimiz de arttı.*

*Değerli meslektaşlarım, geçen ay Türk Kolon ve Rektum Cerrahi Derneği'nin en önemli aktivitesi olan Türk Kolon ve Rektum Cerrahisi Kongresi, kolorektal cerrahiye gönül veren değerli hemşirelerimizin de desteğiyle ve çok yüksek bir katılımı gerçeğe dönüştürdü. Kongre ulusal nitelikli olmasıyla birlikte yurtdışından birçok üstad kongreye katkı sağladı. Ayrıca Avrupa Koloproktoloji Cemiyeti'nin de katkısı oldu. Kongrede sunulan değerli çalışmalar Türk Kolon ve Rektum Hastalıkları Dergisi'nin ek sayısı (supplement) olarak basıldı. Bu çalışmalar çok değerli yayınlara döndüğünde bu yayınlara yer vermektense onur duyacağımızı bilhassa bildirmek isterim.*

*Eylül sayısında da bu sayıda olduğu gibi çeşitli ve değerli yayınlarımızı beklediğimizi hatırlatarak iyi bir yaz geçirmenizi dilerim.*

Eylülde buluşmak dileğiyle...

**Dr. Tahsin Çolak**  
Baş Editör



# Clinical Value of the Monocyte-to-Lymphocyte Ratio for Determining Number of Debridements in Treatment of Fournier's Gangrene

## Monosit-Lenfosit Oranının Fournier Gangreni Tedavisinde Debridman Sayısına Karar Vermede Klinik Etkisi

Turgut Anuk<sup>1</sup>, Ali Cihat Yıldırım<sup>2</sup>, Hakan Güzel<sup>3</sup>, Gülşen Çığsar<sup>4</sup>, Elnare Günel<sup>4</sup>

<sup>1</sup>Kafkas University Faculty of Medicine, Department of General Surgery, Kars, Turkey

<sup>2</sup>Kars Harakani State Hospital, Clinic of General Surgery, Kars, Turkey

<sup>3</sup>Dışkapı Yıldırım Beyazıt Training and Research Hospital, Clinic of General Surgery, Ankara, Turkey

<sup>4</sup>Kafkas University Faculty of Medicine, Department of Emergency Medicine, Kars, Turkey

### ABSTRACT

**Aim:** Fournier's gangrene (FG) is a rapidly progressive, fulminant necrotizing fasciitis of the anogenital region. Treatment of FG consists of aggressive surgical debridements. The current scoring systems in FG focus on mortality. However, simple biomarkers could be useful. Here we aim to investigate the clinical usefulness of monocyte-to-lymphocyte ratio (MLR) in determining the number of debridements in FG patients.

**Method:** Fifty-nine patients were diagnosed with FG and operated in the emergency unit between 2010 and 2016. The patients were separated into a single-debridement group and a multiple-debridement group. The groups were compared in terms of mean age, gender, duration of symptoms, predisposing factors, wound culture positivity, MLR values at admission, treatment protocols, and mortality rates.

**Results:** The two groups differed significantly in wound culture results and colostomy status ( $p=0.001$  and  $p=0.008$ ). There was no significant difference in mortality rate ( $p=0.749$ ). Furthermore, there were no significant differences between the groups in terms of predisposing factors or duration of symptoms ( $p=0.069$  and  $p=0.091$ ). The multiple-debridement group had a significantly higher MLR value ( $p<0.001$ ). MLR under the cut-off value of 0.549 had 79.4% sensitivity and 76% specificity in the prediction of number of debridements. Furthermore, MLR value could predict the number of debridements independently from other factors ( $p<0.001$ ).

**Conclusion:** MLR value was significantly higher in patients who underwent multiple debridements. Thus, MLR shows promise as a single-parameter biomarker for FG severity. Future studies should focus on this parameter using a larger number of FG patients.

**Keywords:** Fournier's gangrene, debridement, monocyte, lymphocyte

### ÖZ

**Amaç:** Fournier gangreni (FG) anorektal bölgenin klinik olarak çok hızlı kötüleşen, ölümcül nekrotizan fasiitidir. FG tedavisinin temelini agresif cerrahi debridman oluşturur. Güncel skorlama sistemleri FG'de mortalite üzerine yoğunlaşmıştır. Bununla birlikte serum belirteçleri yararlı olabilir. Bu çalışmada FG hastalarındaki debridman sayısını belirlemede monosit-lenfosit oranının (MLO) klinik etkisini ortaya koymayı amaçladık.

**Yöntem:** 2010-2016 yılları arasında hastanelerimiz acil servisinde FG tanısıyla tanı konup opere edilen 59 hasta çalışmaya dahil edildi. Tek debridman uygulanan grup 1 ve birden çok debridman uygulanan hastalar grup 2 olarak iki gruba ayrıldılar. Grupların ortalama yaş, cinsiyet, semptom süresi, predispozan faktör, yara kültür pozitifliği, kolostomi durumu, yatış anındaki MLO'lar, tedavi protokolleri, mortalite oranları karşılaştırıldı.

**Bulgular:** İki grup arasında yara kültür sonuçları ve kolostomi durumları arasında istatistiksel anlamlı fark bulundu ( $p=0,001$  ve  $p=0,008$ ). Mortalite oranları arasında anlamlı fark bulunamadı ( $p=0,749$ ). Predispozan faktörler ve semptomların süresi arasında gruplar arası anlamlı fark bulunamadı ( $p=0,069$ ,  $p=0,091$ ). Grup 2'de MLO anlamlı oranda yüksekti ( $p<0,001$ ). 0,549 cut-off değerinde MLO debridman sayısını öngörmede %79,4 sensitivite ve %76 oranında spesifiteye sahipti. Ayrıca MLO debridman sayısını diğer faktörlerden bağımsız olarak öngörebilmekteydi ( $p<0,001$ ).

**Sonuç:** MLO değeri birden çok debridman yapılan hastalarda anlamlı oranda yüksek bulundu. Bu sonuç, MLO'nun tek bir parametre olarak FG ciddiyetini göstermesi bakımından önemlidir. Gelecekte düzenlenebilecek daha yüksek hasta popülasyonlu çalışmalar parametrenin gücünü gösterebileceği açısından önem kazanmıştır.

**Anahtar Kelimeler:** Fournier gangreni, debridman, monosit, lenfosit



Address for Correspondence/Yazışma Adresi: Turgut Anuk MD

Kafkas University Faculty of Medicine, Department of General Surgery, Kars, Turkey

Phone: +90 532 697 44 98 E-mail: turgutanuk@gmail.com

Received/Geliş Tarihi: 06.03.2017 Accepted/Kabul Tarihi: 09.04.2017



## Introduction

Fournier's gangrene (FG) is a rare, rapidly progressive, fulminant form of necrotizing fasciitis of the perineum, genitalia and perianal region. It is a polymicrobial infection of aerobic and anaerobic bacteria and characterized by obliterative endarteritis of subcutaneous tissue leading to gangrene.<sup>1,2</sup> Although first described by French physician H. Baurienne in 1764, the disease was named after French venereologist Jean Alfred Fournier, who presented in 1883 the case of a young male with perineal gangrene of sudden onset.<sup>3</sup> FG affects mainly males (the male/female rate is 10:1) and patients over 50 years of age.<sup>1</sup> The principal therapeutic approaches for FG are aggressive surgical debridements, with the administration of wide-spectrum antibiotics and supportive drugs.<sup>3</sup> Nevertheless, FG continues to have a high mortality rate. Despite being a well-described entity, the disease has a mortality rate ranging from 20% to 50%.<sup>2</sup> Many of the underlying etiologic factors have been described in the literature. These include diabetes mellitus, malignant conditions, chronic alcoholism and other immunosuppressive conditions.<sup>4</sup>

There are several scoring systems for mortality prediction in FG. Acute Physiology and Chronic Health Evaluation (APACHE) II is a commonly used scoring system predicting the mortality of critical patients. Another is Fournier's Gangrene Severity Index (FGSI), which is specific for FG. Uludağ Fournier's Gangrene Severity Index (UFGSI) is a new scoring system that was established in Uludağ University in Turkey.<sup>5</sup> However, all systems focus on mortality and are too complicated to be easily calculated under urgent conditions.

To our knowledge, the monocyte-lymphocyte ratio (MLR) has not as yet been used for the prediction of FG's debridements. Here we investigated the factors affecting the number of debridements and the ability of MLR to predict debridements number in FG patients.

## Materials and Methods

After the approval of the local institution's ethics committee, 59 patients admitted to the emergency care units of Kafkas University, Kars State Hospital and Dışkapı Yıldırım Beyazıt Training and Research Hospitals for perineal pain, swelling and purulent flow were investigated between years 2010 to 2016 (Approval number: 27.04.2016/51). The patients were operated on after being diagnosed with FG by the general surgery unit. For the 59 patients included in the study, full medical information was obtained from a computer database. Age, gender, duration from beginning of the symptoms to admission, predisposing factors, laboratory results, and MLRs were encoded. The patients were then sorted into two

groups: those who had undergone one debridement (single debridement group) and those who had undergone two or more debridements (multiple debridement group). The groups' age, gender, time of complaint, predisposing factors, MLR values at admission, wound culture results which were obtained by wound swabs during first debridement, treatment protocols and mortality rates during this early period after admission were compared. Patients who had active infection, had used antibiotherapy in the last week, who had hematological or immunological disorders, who had recently had a blood transfusion or whose data were missing, were excluded from the study. The leukocyte count and monocyte count percentages were measured by an automated hematology analyzer (Coulter Counter Model S-Plus Jr, Coulter Electronics, Hialeah, FL). The reference interval of monocyte and of lymphocyte were 300-900 per mm<sup>3</sup> and 900-3.700 per mm<sup>3</sup> respectively.

## Statistical Analysis

The data analysis was performed using the Statistical Package for the Social Sciences for Windows, version 22 (SPSS Inc, Chicago, IL, USA). Whether the distributions of continuous variables were normal was determined using the Kolmogorov-Smirnov test. Data are shown as mean  $\pm$  standard deviation or median (minimum-maximum), where applicable. The differences between the groups were compared using the student's t-test or Mann-Whitney U test, where appropriate. Categorical data were analyzed by the Pearson's chi-square test where appropriate. The cut-off values of parameters for discrimination of the groups were determined using receiver operating characteristic (ROC) analysis. At each value, the sensitivity and specificity for each outcome under study were plotted, thus generating an ROC curve. A p-value less than 0.05 was considered statistically significant.

Logistic regression analysis was used to assess the differences between groups. The coefficient of regression and the 95% confidence interval for each independent variable were also calculated.

## Results

The median age of the patients was 53 years (ranging from 23 to 87) and the male/female ratio was 2.1. The median duration of symptoms was 5.0 (0-21) days. Only 14 patients had predisposing factors. Patients demographic characteristics were given on Table 1. In the single debridement group, three patients had predisposing factors. In the multiple debridement group, five patients had perianal abscesses and perianal fistulas. One patient also had rectal traumatic laceration, and three patients had previously reported FG operations. One patient in

this group had undergone total abdominal hysterectomy and bilateral salpingo-oophorectomy and one patient had urogenital infection. These results did not show statistical significance in terms of predisposing factors between groups ( $p=0.069$ ).

Groups were compared with wound culture results and there was statistical significance between groups ( $p=0.001$ ). In the single debridement group, only one patient had a documented *Escherichia coli* positive wound culture. However, in the multiple debridement group, 10 patients had *Escherichia coli*, three patients had an *Acinetobacter* infection, one patient had a *Candida albicans* positive culture result, and one had an *Methicillin-resistant Staphylococcus aureus* infection.

Thirty patients had undergone simple debridement, 12 patients had undergone debridement and colostomy, 13 patients had undergone major debridement, one patient had undergone penilectomy, one patient had been discharged before treatment without permission and two had undergone debridement and vacuum-assisted closure (VAC) application. Twenty-five patients had one debridement and 34 patients had had two or more debridements. One patient had undergone colostomy in the single debridement group and 11 patients had undergone colostomy in the multiple debridement group, these two groups were significantly for this trait ( $p=0.008$ ). Age, gender, and duration of symptoms were compared between the two groups and the three parameters showed a homogenous distribution ( $p=0.286$ ,  $0.248$  and  $0.091$ ). The mortality rate was 6.8% (four patients). Two of these patients were in the single debridement group and two were in the multiple debridement group. There was no statistically significant difference in the mortality rates between the groups ( $p=0.749$ ). Comparisons between groups were given on Table 2.

The median MLR values of the single and multiple debridement groups were 0.33 (0.09-0.91) and 0.81 (0.25-2.30) respectively, which was significantly higher in the multiple debridement group ( $p<0.001$ ) (Figure 1). ROC curve analysis returned a below cut-off value for MLR (0.549)

Table 1. Patients' demographic characteristics

Parameters	Number
Male/female ratio	40/19
Age	53 (23-87)
Patients with predisposing factors	14/59 (23.7%)
Exitus patients	4/59 (6.8%)
Patients had one debridement/patients had $\geq 2$ debridements	25/34
Total number of patients	59 (100%)

in an area of 0.881 [95% confidence interval (CI): 0.794-0.968], with a 79.4% sensitivity, 76% specificity, 81.8% positive predictive value and 73.1% negative predictive value for predicting number of debridements (Figure 2).

When age, gender, culture positivity, duration of symptoms, predisposing factors and MLR value were analyzed together for predicting number of debridements, the MLR value could predict the number of debridements independently from the other factors ( $p<0.001$ ).

Table 2. Comparisons between groups

Parameters	Group 1	Group 2	p
Number of patients	25	34	0.241
Male/female ratio	19/6	21/13	0.248
Age (median-minimum-maximum)	47 (23-84)	56 (23-87)	0.286
Patients with predisposing factors	3/25	11/34	0.069
Duration of complaints (days)	7 (0-15)	4 (0-21)	0.091
MLR value	0.33 (0.09-0.91)	0.81 (0.25-2.30)	<0.001
Colostomy	1/25	11/34	0.008
Exitus	2/25	2/34	0.749
Culture positivity	1/25	15/34	0.001

MLR: Monocyte-lymphocyte ratio

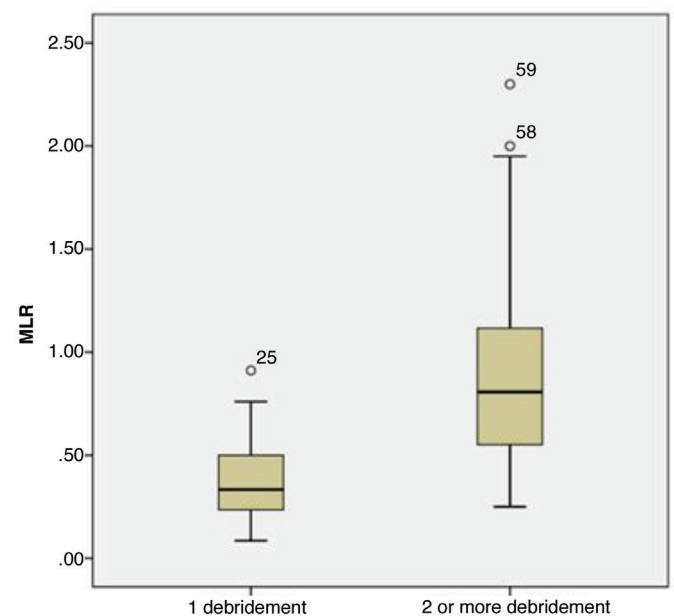
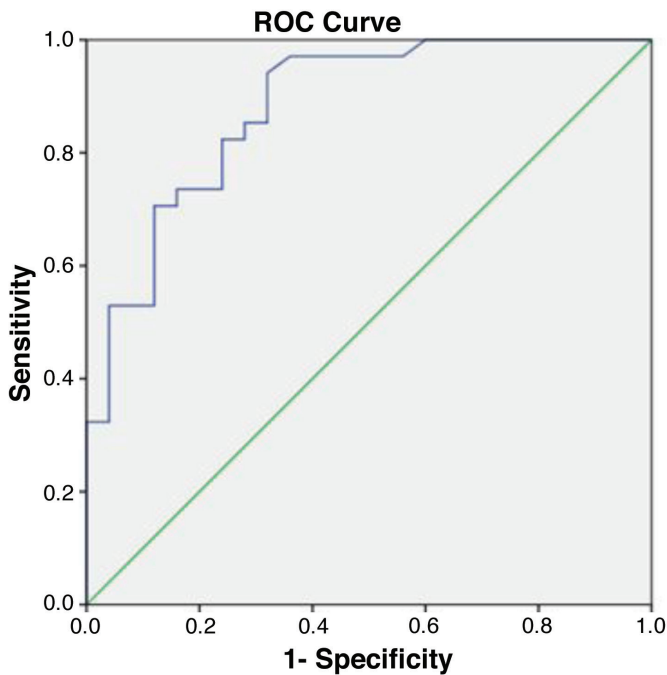


Figure 1. Monocyte-lymphocyte ratio distribution between groups  
MLR: Monocyte-lymphocyte ratio



**Figure 2.** Monocyte-lymphocyte ratio value assessed by receiver operating characteristic curve analysis  
ROC: Receiver operating characteristic

## Discussion

FG is a surgical emergency for which the main therapy is aggressive debridement. However, adequate treatment does not reduce the high mortality rates. Although recent technological improvements in antimicrobial agents has increased the spectrum and efficacy of these drugs, early surgical intervention remains the principal therapy for FG because tissue necrosis can rapidly progress (up to 2 cm/h) and sepsis leading to death quickly can develop.<sup>6,7</sup>

Many underlying conditions contribute to the formation of FG, such as diabetes mellitus, immunosuppression, local trauma, genitourinary infections, acquired immunodeficiency and malignancy. All of these conditions lead to a decline in the host immunity and contribute to polymicrobial infection.<sup>1</sup> When FG was first discussed in the literature, the disease was described as an idiopathic condition. However, most cases were related to an identifiable cause, like perianal and urinary tract infections, with the most common initial port of entry being local trauma.<sup>1,2</sup> In our study, predisposing factors and wound culture results were compared between the single and multiple debridement groups, wound culture result positivity showed statistical significance. However, in our study wound culture result showed aerobic culture positivity than anaerobic colonies than expected.

We first assessed the ability of MLR to predict of the number of surgical debridements in FG patients. The MLR has been

were used to predict the progress of patients with different inflammatory events, such as malignancy and chronic diseases.<sup>8,9,10,11</sup> It is relatively straight forward to use and calculate the MLR under urgent conditions.

Our study has some limitations, such as its retrospective nature and limited patient number. Thus, these results should need to be compared with studies analyzing a larger number of patients. Nevertheless, as a single parameter, MLR, was able to predict the number of debridements. Based on this finding, we propose that future studies with larger patient numbers should investigate this trait further in FG patients.

Many scoring systems have been proposed for predicting the mortality rate of FG patients, including important indexes such as APACHE II, FGSI, the Laboratory Risk Indicator for Necrotizing Fasciitis and UFGSI.<sup>1,3,5</sup> However, under urgent conditions, it is not always easy to calculate multiple parameters. Therefore, several studies have focused on reducing the number of parameters in order to facilitate mortality prediction in FG.<sup>12,13</sup> One such parameter for predicting mortality in FG was assessed by Kahramanca et al.<sup>3</sup>, who found that the neutrophil-lymphocyte ratio and platelet-to-lymphocyte ratio were useful for determining FG prognosis.<sup>3</sup>

As early and aggressive surgical therapy remains the most effective treatment, we focused on the number of surgical debridements. Our data show that MLR value was significantly higher in the multiple debridements group. By ROC curve analysis, we found that MLR returned a below cut-off value of 0.549 in an area of 0.881 (95% CI: 0.794-0.968), with 79.4% sensitivity and 76% specificity for predicting the number of debridements in FG patients. However, the mortality rate was not statistically different between groups, which may be because of the low mortality rate of the study.

Previous studies have suggested that improved survival of patients with FG is dependent on early diagnosis and adequate surgical treatment,<sup>14,15</sup> although early diagnosis is not dependent only on a physician's early diagnosis and intervention. Many patients seek treatment in advanced phases of the infection, usually after formation of necrotizing fasciitis. Sugihara et al.<sup>16</sup> reported in a study of 379 patients that surgical treatment within 2 days after admission reduced the mortality rates of FG. In our study, the mean duration of symptoms was 5 days (0-21) days, which is longer than the periods described in other studies.<sup>6</sup> However, we did not find any statistically significant difference between our two groups.

Determining whether surgical debridement is necessary in FG is mostly based on the surgical team's opinion after wound examination. Reappearance of the necrosis shows

that the initial debridement was insufficient, so repeated interventions may be necessary. Most studies describe an initial debridement followed by repeated procedures.<sup>17</sup> In our study, 57.6% of our patients had undergone two or more debridements (n=34). Earlier studies have described many factors contributing to the clinical progress of FG. These include diabetes mellitus, local trauma, alcoholism, malignancy and chronic liver disease.<sup>18,19</sup> Patients with multiple debridements usually have underlying conditions, leading to positive wound culture results.

In our study, the mean age of patients was 53 and the male/female ratio was 2.1, which are compatible with the existing literature.<sup>1,3</sup> The mortality rate in our study was 6.8% (four patients), which is low compared with other studies;<sup>1,3</sup> this could be due to the patient numbers or early intervention by the experienced surgical team. Thirty patients underwent simple debridement; 12 patients underwent debridement and colostomy; and 13 patients underwent major debridement. Fecal or urinary diversion procedures should be undertaken to diminish additional bacterial overload of affected areas. In another study, 19 of 37 patients had undergone diverting colostomy.<sup>20</sup> Another study found that the fatality rate was lower in the enterostomy group than in the control group.<sup>21</sup> VAC devices and hyperbaric oxygen therapy are commonly used in FG treatment in modern surgical practice, thereby supporting the wound healing process.<sup>1,4</sup> In our study, two patients underwent debridement and VAC application. However, we could not use hyperbaric oxygen due to lack of technical device in our center.

Laor et al.<sup>22</sup>, who presented the FGSi score, reported that the number of debridements was not associated with patient outcomes. However, Chawla et al.<sup>23</sup> reported a higher number of debridements in the mortality groups. Although Göktaş et al.<sup>17</sup> reported a 20% higher mortality rate in a group that had required multiple debridements than patients that had required a single debridement, this did not reach statistical significance. Our mortality data were similar to those of Göktaş et al.<sup>17</sup>.

FG is a special genital form of idiopathic necrotizing fasciitis with a mortality rate of around 50%. Here we showed that the MLR is significantly higher in patients requiring multiple debridements compared to those requiring single debridements. In our analyses, MLR had a 79.4% sensitivity and 76% specificity for predicting the number of debridements. When compared with commonly used FG indexes, this single parameter appears to be a good indicator of the disease severity. Future studies with a greater number of patients and focused on MLR in FG patients should now be performed.

## Ethics

**Ethics Committee Approval:** The study was approved by the Kafkas University Local Ethics Committee (Approval number: 27.04.2016/51).

**Informed Consent:** Due to retrospective nature of the study informed consent form was not filled by the participants however surgical consent form was filled out by all participants.

**Peer-review:** Internally peer-reviewed.

## Authorship Contributions

Surgical and Medical Practices: T.A., A.C.Y., Concept: T.A., A.C.Y., Design: T.A., A.C.Y., Data Collection or Processing: H.G., G.Ç., E.G., Analysis or Interpretation: T.A., A.C.Y., Literature Search: H.G., G.Ç., E.G., Writing: T.A.

**Conflict of Interest:** No conflict of interest was declared by the authors.

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

## References

1. Shyam DC, Rapsang AG. Fournier's gangrene. *Surgeon* 2013;11:222-232.
2. Benjelloun el B, Souiki T, Yakla N, Ousadden A, Mazaz K, Louchi A, Kanjaa N, Taleb KA. Fournier's gangrene: our experience with 50 patients and analysis of factors affecting mortality. *World J Emerg Surg* 2013;8:13.
3. Kahramanca S, Kaya O, Özgehan G, Irem B, Dural I, Küçükpınar T, Kargici H. Are neutrophil-lymphocyte ratio and platelet-lymphocyte ratio as effective as Fournier's gangrene severity index for predicting the number of debridements in Fournier's gangrene? *Ulus Travma Acil Cerrahi Derg* 2014;20:107-112.
4. Mallikarjuna MN, Vijayakumar A, Patil VS, Shivswamy BS. Fournier's Gangrene: Current Practices. *ISRN Surg* 2012;2012:942437.
5. Yılmazlar T, Işık Ö, Öztürk E, Özer A, Gülcü B, Ercan İ. Fournier's gangrene: review of 120 patients and predictors of mortality. *Ulus Travma Acil Cerrahi Derg* 2014;20:333-337.
6. Ruiz-Tovar J, Cordoba L, Devesa JM. Prognostic factors in Fournier gangrene. *Asian J Surg* 2012;35:37-41.
7. Altarac S, Katusin D, Crnica S, Papes D, Rajkovic Z, Arslani N. Fournier's gangrene: etiology and outcome analysis of 41 patients. *Urol Int* 2012;88:289-293.
8. Lin B, Chen C, Qian Y, Feng J. Prognostic role of peripheral blood lymphocyte/monocyte ratio at diagnosis in diffuse large B-cell lymphoma: a meta-analysis. *Leuk Lymphoma* 2015;56:2563-2568.
9. Huang Y, Feng JF. Low preoperative lymphocyte to monocyte ratio predicts poor cancer-specific survival in patients with esophageal squamous cell carcinoma. *Onco Targets Ther* 2015;8:137-145.
10. Wang J, Yin Y, Wang X, Pei H, Kuai S, Gu L, Xing H, Zhang Y, Huang Q, Guan B. Ratio of monocytes to lymphocytes in peripheral blood in patients diagnosed with active tuberculosis. *Braz J Infect Dis* 2015;19:125-131.
11. Naranbhai V, Hill AV, Abdool Karim SS, Naidoo K, Abdool Karim Q, Warimwe GM, McShane H, Fletcher H. Ratio of monocytes to lymphocytes in peripheral blood identifies adults at risk of incident tuberculosis among HIV-infected adults initiating antiretroviral therapy. *J Infect Dis* 2014;209:500-509.
12. Roghmann FI, von Bodman C, Løppenber B, Hinkel A, Palisaar J, Noldus J. Is there a need for the Fournier's gangrene severity index? Comparison of scoring systems for outcome prediction in patients with Fournier's gangrene. *BJU Int* 2012;110:1359-1365.

13. Lin TY, Ou CH, Tzai TS, Tong YC, Chang CC, Cheng HL, Yang WH, Lin YM. Validation and simplification of Fournier's gangrene severity index. *Int J Urol* 2014;21:696-701.
14. Medina Polo J, Tejido Sánchez A, de la Rosa Kehrmann F, Felip Santamaria N, Blanco Alvarez M, Leiva Galvis O. Fournier gangrene: evaluation of prognostic factors in 90 patients. *Actas Urol Esp* 2008;32:1024-1030.
15. Tuncel A, Aydin O, Tekdogan U, Nalcacioglu V, Capar Y, Atan A. Fournier's gangrene: Three years of experience with 20 patients and validity of the Fournier's Gangrene Severity Index Score. *Eur Urol* 2006;50:838-843.
16. Sugihara T, Yasunaga H, Horiguchi H, Fujimura T, Ohe K, Matsuda S, Fushimi K, Homma Y. Impact of surgical intervention timing on the case fatality rate for Fournier's gangrene: an analysis of 379 cases. *BJU Int* 2012;110:E1096-1100.
17. Göktaş C, Yıldırım M, Horuz R, Faydacı G, Akça O, Cetinel CA. Factors affecting the number of debridements in Fournier's gangrene: our results in 36 cases. *Ulus Travma Acil Cerrahi Derg* 2012;18:43-48.
18. Paty R, Smith AD. Gangrene and Fournier's gangrene. *Urol Clin North Am* 1992;19:149-162.
19. Morpurgo E, Galandiuk S. Fournier's gangrene. *Surg Clin North Am* 2002;82:1213-1224.
20. Akcan A, Sözüer E, Akyıldız H, Yılmaz N, Küçük C, Ok E. Necessity of preventive colostomy for Fournier's gangrene of the anorectal region. *Ulus Travma Acil Cerrahi Derg* 2009;15:342-346.
21. Li YD, Zhu WF, Qiao JJ, Lin JJ. Enterostomy can decrease the mortality of patients with Fournier gangrene. *World J Gastroenterol* 2014;20:7950-7954.
22. Laor E, Palmer LS, Tolia BM, Reid RE, Winter HI. Outcome prediction in patients with Fournier's gangrene. *J Urol* 1995;154:89-92.
23. Chawla SN, Gallop C, Mydlo JH. Fournier's gangrene: an analysis of repeated surgical debridement. *Eur Urol* 2003;43:572-575.



# Grade II-III Hemorrhoidal Disease Treatment: Rubber Band Ligation versus Hemorrhoidal Artery Ligation

## Grade II-III Hemoroidal Hastalık Tedavisi: Lastik Bant Ligasyonu ve Hemoroidal Arter Ligasyonu Karşılaştırılması

İbrahim Yılmaz<sup>1</sup>, Dursun Özgür Karakaş<sup>2</sup>, İlker Sücüllü<sup>3</sup>, Mehmet Saydam<sup>1</sup>

<sup>1</sup>Dışkapı Yıldırım Beyazıt Training and Research Hospital, Clinic of General Surgery, Ankara, Turkey

<sup>2</sup>Okmeydanı Training and Research Hospital, Clinic of General Surgery, İstanbul, Turkey

<sup>3</sup>Haydarpaşa Sultan Abdülhamid Han Training and Research Hospital, Clinic of General Surgery, İstanbul, Turkey

### ABSTRACT

**Aim:** Comparison the application and effectiveness of hemorrhoidal artery ligation (HAL) and rubber band ligation (RBL) techniques in the treatment of grade II and III hemorrhoidal disease.

**Method:** HAL was performed in 50 patients between December 2006 and May 2007 and RBL was performed in 96 patients between August 2011 and October 2014. A total of 146 patients with grade II-III hemorrhoidal disease were included in this retrospective study. Surgery duration, performed ligations, pain on postoperative day 7 visual analog scale, complications, and ratio of symptom-free patients at 6 months were statistically analyzed for both procedures.

**Results:** Patients who underwent HAL returned to work earlier and had less pain on postoperative day 7 than those who underwent RBL; in addition, the RBL procedure was statistically more cost-effective and had shorter surgery times. There was no statistical difference between the HAL and RBL groups in proportion of patients who were symptom-free at postoperative 6 months (94% and 96.6%, respectively).

**Conclusion:** The RBL and HAL procedures are both effective and have low complication, and can be used safely together or separately in the treatment of grade II-III hemorrhoidal disease.

**Keywords:** Hemorrhoidal disease, rubber band ligation, hemorrhoidal artery ligation

### ÖZ

**Amaç:** Grade II ve III hemoroidal hastalık tedavisinde; lastik bant ligasyonu (LBL) ve hemoroidal arter ligasyonu (HAL) yöntemlerinin uygulama şekli ve etkinliğini karşılaştırmaktır.

**Yöntem:** HAL işlemi Aralık 2006-Mayıs 2007 tarihleri arasında 50 hastaya ve LBL işlemi Ağustos 2011-Eylül 2014 tarihleri arasında 96 hastaya uygulandı. Grade II-III hemoroidal hastalığı olan toplam 146 hasta retrospektif çalışmamıza dahil edildi. Operasyon süresi, uygulanan ligasyon sayısı, postoperatif 7. gün vizüel analog skala değerleri, komplikasyonlar ve 6. ay sonunda semptomsuz hasta sayıları her iki işlem için istatistiksel olarak karşılaştırıldı.

**Bulgular:** HAL yöntemi uygulanan hastaların LBL uygulanan hastalara göre daha erken işe döndüğü ve postoperatif 7. gün daha az ağrılarının olduğu ve LBL yönteminin ise daha düşük maliyete ve kısa operasyon süresine sahip olduğu istatistiksel olarak saptandı. Semptomsuz hasta oranları 6. ay sonunda her iki yöntem için de benzer olarak (%94 ve %91,66) saptanmış olup istatistiksel olarak fark yoktu.

**Sonuç:** HAL ve LBL yöntemleri yüksek etkinlik ve düşük komplikasyon oranlarıyla grade II-III hemoroidal hastalık tedavisinde ayrı ayrı veya birlikte güvenle uygulanabilir.

**Anahtar Kelimeler:** Hemoroidal hastalık, lastik bant ligasyonu, hemoroidal arter ligasyonu



Address for Correspondence/Yazışma Adresi: İbrahim Yılmaz MD

Dışkapı Yıldırım Beyazıt Training and Research Hospital, Clinic of General Surgery, Ankara, Turkey

Phone: +90 505 812 75 55 E-mail: dibrabimiyilmaz@yahoo.com

Received/Geliş Tarihi: 28.02.2017 Accepted/Kabul Tarihi: 03.05.2017

## Introduction

Hemorrhoidal disease has been one of the most distressing diseases since the dawn of human, and many procedures have been described for treatment until today.<sup>1</sup> Hemoroidectomy which includes hemorrhoidal cushions' removal from anal canal, is the choice of treatment, though its high complication rates; such as fecal incontinence, anal stricture and high postoperative pain.<sup>2</sup> Hemorrhoidal cushions are the part of normal anatomy and physiology of anal canal and also have an important role in anal continence,<sup>3</sup> so keeping in mind this hemoroidectomy shouldn't be gold standard for hemorrhoidal disease treatment. The ideal surgical procedure has to target minimal tissue damage with low complication rates and minimal postoperative pain and be proper for physiological anatomy of anal region.<sup>4</sup>

Rubber band ligation (RBL) is defined by Barron for the first time in 1963, includes placing a rubber band at the base of the hemorrhoid cushion with a special instrument above dentate line and following with ischemic necrosis ulceration and tissue fixation with the formation of scar tissue.<sup>5</sup> Procedure is reported as; an effective, outpatient, safe, easy to use and non-surgical procedure with high patients' satisfaction and low postoperative complication rates for hemorrhoidal disease<sup>6</sup> which seems to fulfil the ideal surgery technique description above. RBL can be performed under any type of anesthesia; topical, local, regional or general anesthesia after a rectal cleansing before surgery. In one session of treatment maximum 3 band ligations replacement at least 2 cm away from dentate line is recommended to prevent postoperative pain.<sup>7</sup> Recurrence rates vary from 11% to over 50% and especially for grade IV prolapsing hemorrhoidal disease cases RBL procedure seems to be ineffective but rebanding could be done at any time.<sup>6</sup>

Hemorrhoidal artery ligation (HAL) technique has been described as the ligation of submucosal superior hemorrhoidal artery terminal branches with the help of a Doppler probe. HAL was first discribed in 1995 by Morinaga et al.<sup>8</sup> as the selective ligation of submucosal superior hemorrhoidal artery distal branches which leads decreasing blood flow to hemorrhoidal cushions, results in shrink and following scar tissue formation lifts cushions back into anal canal. It is a non-excisiniol and outpatient procedure for hemorrhoidal disease. Reccurence rates at 6<sup>th</sup> month were reported as high as 80-90%. The procedure can be done any type of anesthesia; with rectal cleansing, there is no limitation for number of ligations or treatment session numbers. None major complications were reported and seems to fulfil the ideal surgery technique description above as RBL.<sup>9</sup>

Both RBL and HAL are reported effective, safe and outpatient procedures with low complication rates for grade II-III hemorrhoidal disease treatment.<sup>10,11</sup>

The aim of this study is to compare the application and effectiveness of HAL and RBL techniques in grade II-III hemorrhoidal disease treatment.

## Materials and Methods

HAL procedure performed 50 patients through December 2006 to May 2007 and RBL performed to 96 patients through August 2011 to October 2014. Total 146 patients with grade II or III hemorrhoidal disease were included in this retrospective study. Patients medical records were examined retrospectively after obtaining institutional ethical permission and informed written consent was waived because of the retrospective nature of study. The study was approved by the Haydarpaşa Sultan Abdülhamid Han Training and Research Hospital Local Ethics Committee (Approval number: 065).

Length of operation time, performed ligations, postoperative 7<sup>th</sup> day visual analog scale (VAS), complications and rate of symptom free patients at 6<sup>th</sup> month were retrospectively analyzed with SPSS 16 software (SPSS Inc. Chicago, Illinois) for both procedures. The chi-square or Fisher's exact tests were used to analyze multiple variables. Values of p less than 0.05 were considered statistically significant. Postoperative pain was measured by VAS which 0 corresponds to "no pain" and 10 to "maximum pain" postoperative first and 7<sup>th</sup> days.

RBL procedure was performed under topical anesthesia. Topical 5% lidocaine applied to anoderm and into anal canal. After 5 minutes anoscope inserted into anal canal and ligations were made. Maximum 3 ligations were made in one session, and always watched out to be away at least 2 cm away from dentate line (Figure 1). Bands were removed in three cases because of severe intraoperative pain and then the patients were rebanded.

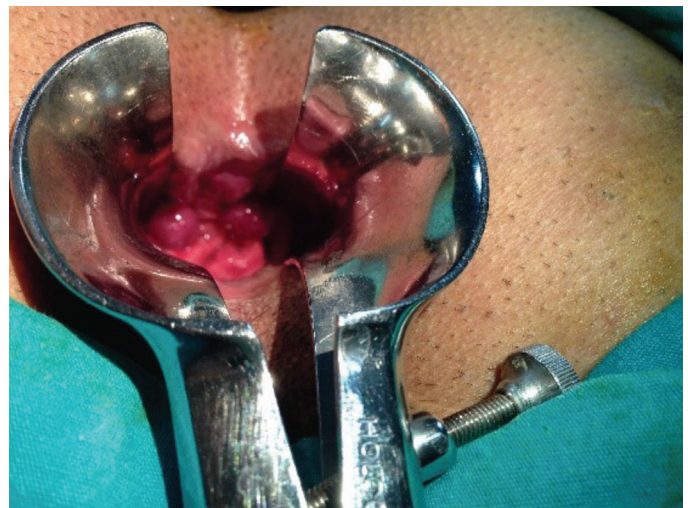


Figure 1. Rubber band ligation procedure

HAL procedures were done by Transanal Haemorrhoidal Dearterialiser (THD®-G.F. Medical Division, Correggio, Italy), device and special equipments. Local anesthesia was achieved by injection of mixture of 5 mL 2% prilocaine and 5 mL 0.9% NaCl equally to cutaneous and subcutaneous regions of 3-6-9-12 o'clock perianal areas around the anus. THD device was placed into the anal canal and anoscope rotated clockwise to search for an arterial flow Doppler sound. An eight-shaped suture was applied to the area of arterial sound using absorbable suture. Loss of the arterial sound was regarded as the sign of successful ligation (Figure 2). The procedure was completed when the arterial flow sounds disappeared.

Grade I and IV hemorrhoidal disease cases were excluded from study.

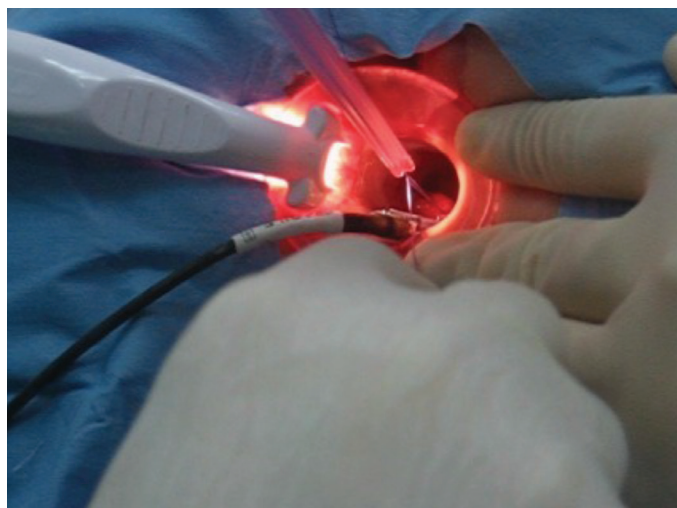


Figure 2. Hemorrhoidal artery ligation procedure

## Results

HAL procedure was applied to 50 patients (29 female and 21 male). The average age was 26.4 (20-54) years and 22 (44%) patients had grade II hemorrhoidal disease whose most presenting symptom was bleeding (76%). RBL procedure was applied to 96 patients (24 female and 72 male). The average age was 24.8 (20-46) years and 69 (71.8%) patients had grade II hemorrhoidal disease whose most presenting symptom was also bleeding (71.8%). There wasn't statistically significant difference between two groups except higher number of male patients in RBL group (Table 1).

Rectal cleansing was performed at the night of a day before and morning of the operation for both techniques and was enough for performing procedures. Local anesthesia for HAL cases and topical anesthesia for RBL cases were performed. Intraoperative no additional anesthesia was required and all patients tolerated.

To avoid postoperative pain and decrease VAS; maximum attention was shown for ligations and bandings were far away at least 2 cm from dentate line for both procedures. Maximum 3 with a mean 2.2 bandings in one session was applied for RBL cases but if needed additional bandings performed with additional sessions. Ligation replacement continued until arterial sounds disappear in proximal anal canal which meant effective ligation was done and mean 5.8 ligations were performed for Doppler-guided HAL (DGHAL) group. Comparing two groups; although number of ligations were statically significant ( $p < 0.05$ ), it was clinically insignificant. Time off work mean was 2.8 days for HAL group and 7.4 days for RBL group which was significant ( $p < 0.05$ ). The difference was due to the patients' beginning work after bands' dropping from anal canal.

Table 1. Preoperative patients' characteristics comparison of rubber band ligation and hemorrhoidal artery ligation

	HAL	RBL	p*
Number of patients	50 (29 F, 21 M)	96 (24 F, 72 M)	p=0.14
Age (years)	26.4 (mean)	24.8 (mean)	NS
Grade II patients (n)	22 (44%)	41 (42.7%)	NS
Grade III patients (n)	28 (56%)	55 (53.1%)	NS
Duration of complaints (months)	6.4	7.1	NS
Main complaints			
Bleeding	38 (76%)	69 (71.8%)	NS
Prolapsus	24 (48%)	42 (43.7%)	NS
Pain	27 (54%)	51 (53.1%)	NS
Itching	20 (40%)	35 (36.4%)	NS

\*P values calculated with the Pearson chi-square test (significant:  $p < 0.05$ )

HAL: Hemorrhoidal artery ligation, RBL: Rubber band ligation, NS: Not significant, F: Female, M: Male



Postoperative mean VAS was 1.7 for HAL patients and 2.4 for RBL cases which was statically significant ( $p < 0.05$ ).

Mean operation time for RBL group was 16.2 minutes and shorter than DGHAL cases which was 20 minutes ( $p < 0.05$ ). The cost ratio of RBL was lower than HAL because of special instruments and Doppler probe necessity.

Patients were examined at 6<sup>th</sup> month by physical examination and anoscopy for success rates of both procedures. Symptom free patients were recorded as successful procedure. HAL and RBL had similar success rates respectively: 94% and 91.6% at 6<sup>th</sup> month for grade II-III hemorrhoidal disease treatment.

No major complications were recorded. Bleeding and postoperative pain were the minor complications of both procedures which were treated easily (Table 2).

## Discussion

Hemorrhoidal disease is one of the most prevalent benign anorectal disease described as symptomatic enlargement, prolapse or bleeding of hemorrhoidal cushions which are the anal canal's normal functional and anatomical structures.<sup>1</sup> Also taking into account their roles in continence, minimal tissue damage should be targeted during surgery.<sup>3</sup> Despite Milligan-Morgan hemorrhoidectomy and modified versions accepted as the gold standard treatment of hemorrhoidal disease; surgeons intend to prefer minimally invasive outpatient techniques because of hemorrhoidectomy

complications such as postoperative pain and sphincter damage.<sup>2</sup> Having thought that treatment of choice procedure should not have major complications, we aimed to discuss and compare RBL and HAL for grade II-III hemorrhoidal disease treatment which were both reported as an outpatient procedures with minimal postoperative pain and complication rates and high patient satisfaction rates in literature.<sup>11</sup>

Grade II-III hemorrhoidal disease cases included in this study. Because we considered that grade I cases should be treated by conservative methods without surgery and grade IV cases with mucosal prolapses should be treated more effectively by other surgical procedures such as; HAL + Mucopexy, stapler hemorrhoidopexy or classic hemorrhoidectomy due to our clinical experience as reported in the literature.<sup>12</sup>

RBL and HAL could be performed to all hemorrhoidal disease patients. RBL is contraindicated in immune deficiency patients because of perianal sepsis risk and anticoagulant medicated patients because of late severe hemorrhage,<sup>13</sup> but any significant contraindication is not defined for HAL technique.<sup>14</sup> Both procedures can be done any type of anesthesia with only rectal cleansing. The type of anesthesia is important for elderly patients with comorbidities. We performed two procedures under topical and local anesthesia and didn't encounter with locoregional or general anesthesia complications. Two procedures can be performed to patients who couldn't get general or locoregional anesthesia safely and easily.

Table 2. Comparison results of rubber band ligation and hemorrhoidal artery ligation

	DGHAL	RBL	p
Cleansing	Rectal cleansing	Rectal cleansing	
Type of anesthesia	Local	Topical	
Hospital stay	Outpatient	Outpatient	
Mean operation time (minutes)	20 minute	16.2 minute	<0.05
Mean number of ligations	5.8	2.2	<0.05
Time off work (days)	2.8 days	7.4 days	<0.05
Postoperative VAS (1 <sup>st</sup> week)	1.7	2.4	<0.05
Major complications	None	None	
Success rate (6 <sup>th</sup> month)	94%	91.66%	NS
Major complication	None	None	
Complications	8	13	
Bleeding	3	7	
Pain	5	6	
Infection	None	None	
Cost	300€	100€	<0.05

DGHAL: Doppler-guided hemorrhoidal artery ligation, RBL: Rubber band ligation, VAS: Visual analog scale, NS: Not significant

No major postoperative complications were reported after HAL technique, but postoperative lethal complications such as acute perianal sepsis, tetanus-related deaths and pyogenic liver abscess have been reported for RBL.<sup>15</sup> HAL procedure is a new technique and doesn't have long-term results and high number of cases, so we concluded that being new could decrease the major complication rates. It seems that over years we could face HAL's rare but deadly complications. There were no major complications for both two techniques except postoperative minor bleeding and pain which were easily treated in our study.

Sohn et al.<sup>16</sup> reported that they applied HAL and Shanmugam et al.<sup>17</sup> reported RBL as a daily surgery and discharged all of the patients at the same day as similar to this study. In Dal Monte et al.'s<sup>18</sup> study, 330 patients evaluated one week after HAL with VAS and postoperative pain score was 1.7. In our study, VAS score on the postoperative first week was 1.7. Post-banding pain is the most popular complication of RBL in the literature and Lam and Felt-Bersma<sup>19</sup> reported postoperative VAS 5.5 on the day of RBL procedure and suggested anal cooler for post-banding pain. It is obvious that pain is related to banding area's relation to dentate line. In our experience banding at least 2 cm away from dentate line will decrease postoperative pain like in our study; postoperative first week mean VAS was 2.4 compare to HAL group it was statistically significant ( $p < 0.05$ ). The advantage of performing RBL under topical anesthesia was; after banding near to dentate line the patient had pain during banding. In three cases we had to remove bands and rebanded for RBL cases. If the procedures performed correctly; there would be less postoperative pain for either RBL or HAL.

Cantero et al.<sup>20</sup> reported that return to work time as 2-3 days for HAL procedure and our study yielded a mean of 2.8 days. Murie et al.<sup>21</sup> reported work off time 3 days which was 7.4 days in our study which was statistically significant compared with HAL cases. RBL cases returned their work after bands' removal from anal canal which led 5-11 days which created difference.

Doppler probe and special proctoscope requirements increased markedly the cost ratio of HAL when compared to cost ratio of RBL. RBL concluded cheaper procedure than HAL for hemorrhoidal disease treatment.

Comparison of five years follow up results both RBL and HAL have similar results 75-90% and 73-90% respectively.<sup>6,9</sup> The success rate decreases with the increase of the follow-up period in both procedures. The direct proportion of follow-up period and recurrence rate is considered to be related with the continuation of etiologic factors and revascularization due to wound healing process. The success rates at 6<sup>th</sup> month follow-up period for both

techniques were similar rates as 90-95% in our study which was statistically insignificant.

In summary; HAL performed patients return to work earlier and had less pain at postoperative 7<sup>th</sup> day than RBL performed patients; in addition, RBL group had shorter operation time and more cost-effective than HAL group statistically in grade II-III hemorrhoidal diseases treatment. Symptom free patient rates at 6<sup>th</sup> month were similar and both procedures were highly effective with minimal postoperative complications.

RBL and HAL techniques have satisfactory short-term results for grade II-III hemorrhoidal disease treatment and both techniques were assessed as easy to perform, repeatable, minimal postoperative complications and can be used safely together or separately.

### Ethics

**Ethics Committee Approval:** The study was approved by the Haydarpaşa Sultan Abdülhamid Han Training and Research Hospital Local Ethics Committee (Approval number: 065).

**Informed Consent:** Consent form was waived because of retrospective nature of study.

**Peer-review:** Internally peer-reviewed.

### Authorship Contributions

Surgical and Medical Practices: İ.Y., Concept: İ.Y., İ.S., Design: D.Ö.K., Data Collection or Processing: M.S., İ.Y., Analysis or Interpretation: İ.Y., M.S., D.Ö.K., Literature Search: D.Ö.K., Writing: İ.Y., M.S.

**Conflict of Interest:** No conflict of interest was declared by the authors.

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

### References

- Bruch HP, Roblick UJ. Pathophysiology of hemorrhoids. *Chirurg* 2001;72:656-659.
- Bleday R, Pena JP, Rothenberger DA, Goldberg SM, Buls JG. Symptomatic hemorrhoids: Current incidence and complications of operative therapy. *Dis Colon Rectum* 1992;35:477-481.
- Lohsiriwat V. Hemorrhoids: from basic pathophysiology to clinical management. *World J Gastroenterol* 2012;18:2009-2017.
- Altomare DF, Roveran A, Pecorella G, Gaj F, Stortini E. The treatment of hemorrhoids: guidelines of the Italian Society of Colorectal Surgery. *Tech Coloproctol* 2006;10:181-186.
- İskender Sayek. *Basic Surgery*. 3th ed. 2004:1256-1262.
- Iyer VS, Shrier I, Gordon PH. Long-term outcome of rubber band ligation for symptomatic primary and recurrent internal hemorrhoids. *Dis Colon Rectum* 2004;47:1364-1370.
- Sneider EB, Maykel JA. Diagnosis and management of symptomatic hemorrhoids. *Surg Clin North Am* 2010;90:17-32.
- Morinaga K, Hasuda K, Ikeda T. A novel therapy for internal hemorrhoids: ligation of the hemorrhoidal artery with a newly devised instrument (Moricorn) in conjunction with a Doppler flowmeter. *Am J Gastroenterol* 1995;90:610-613.

9. Giordano P, Overton J, Madeddu F, Zaman S, Gravante G. Transanal hemorrhoidal dearterialization: a systematic review. *Dis Colon Rectum* 2009;52:1665-1671.
10. Ramirez JM, Aguilera V, Elia M, Gracia JA, Martínez M. Doppler-guided hemorrhoidal artery ligation in the management of symptomatic hemorrhoids. *Rev Esp Enferm Dig* 2005;97:97-103.
11. Shehata A, Saleh AF, Elheny A. Clinical outcome after Doppler-guided hemorrhoidal artery ligation and rubber-band ligation for the treatment of primary symptomatic hemorrhoids. *Egyptian J Surgery* 2016;35:5-10.
12. Sun Z, Migaly J. Review of Hemorrhoid Disease: Presentation and Management. *Clin Colon Rectal Surg* 2016;29:22-29.
13. KU JJ, Marfan M, Wall D. Pyogenic liver abscess after haemorrhoidal banding. *ANZ J Surg* 2005;75:828-830.
14. Yılmaz İ, Sücüllü İ, Karakaş DÖ, Özdemir Y, Yücel E, Akin ML. Doppler-guided hemorrhoidal artery ligation: experience with 2 years follow-up. *Am Surg* 2012;78:344-348.
15. Bat L, Melzer E, Koler M, Dreznick Z, Shemesh E. Complications of rubber band ligation of symptomatic internal hemorrhoids. *Dis Colon Rectum* 1993;36:287-290.
16. Sohn N, Aronoff JS, Cohen FS, Weinstein MA. Transanal hemorrhoidal dearterialization is an alternative to operative hemorrhoidectomy. *Am J Surg* 2001;182:515-519.
17. Shanmugam V, Thaha MA, Rabindranath KS, Campbell KL, Steele RJ, Loudon MA. Systematic review of randomized trials comparing rubber band ligation with excisional haemorrhoidectomy. *Br J Surg* 2005;92:1481-1487.
18. Dal Monte PP, Tagariello C, Sarago M, Giordano P, Shafi A, Cudazzo E, Franzini M. Transanal haemorrhoidal dearterialisation: nonexcisional surgery for the treatment of haemorrhoidal disease. *Tech Coloproctol* 2007;11:333-339.
19. Lam TJ, Felt-Bersma RJ. A novel device reduces anal pain after rubber band ligation: a randomized controlled trial. *Tech Coloproctol* 2012;16:221-226.
20. Cantero R, Balibrea JM, Ferrigni C, Sanz M, García Pérez JC, Pérez R, Luffiego A, Forero RG, Balibrea JL. Doppler-guided transanal haemorrhoidal dearterialisation. An alternative treatment for haemorrhoids. *Cir Esp* 2008;83:252-255.
21. Murie JA, Mackenzie I, Sim AJ. Comparison of rubber band ligation and haemorrhoidectomy for second- and third-degree haemorrhoids: a prospective clinical trial. *Br J Surg* 1980;67:786-788.



# Clinical Value of Platelet-to-Lymphocyte Ratio in Predicting Liver Metastasis and Lymph Node Positivity of Colorectal Cancer Patients

## Platelet-Lenfosit Oranının Kolon Kanserli Hastalarda Karaciğer Metastazını ve Lenf Nodu Pozitifliğini Öngörebilmedeki Klinik Etkisi

Turgut Anuk<sup>1</sup>, Ali Cihat Yıldırım<sup>2</sup>

<sup>1</sup>Kafkas University Faculty of Medicine, Department of General Surgery, Kars, Turkey

<sup>2</sup>Kars Harakani State Hospital, Clinic of General Surgery, Kars, Turkey

### ABSTRACT

**Aim:** Colorectal cancer related mortality is still high. The widespread use of colonoscopy, surgical advancements, and standardized use of chemotherapeutic agents has increased survival rates in metastatic cases. Inflammation is the main etiological factor in a variety of cancers. Platelet-to-lymphocyte ratio (PLR), one the most studied biochemical parameters, has been shown as a poor prognostic factor. In this study, our aim was to determine the predictive value of PLR on liver metastasis and lymph node positivity in colorectal patients.

**Method:** The data of patients who were diagnosed with colorectal cancer and underwent surgery between March 2010 and September 2016 were analyzed retrospectively. Demographic characteristics, preoperative PLR, intraoperative findings, and tumor-node-metastasis stages were recorded. Patients with liver metastasis comprised group 1a and those without liver metastasis were group 1b; patients were also sorted into groups 2a and 2b based on lymph node positivity or negativity, respectively.

**Results:** A total of 152 patients were included in the study and the male/female ratio was 1.53. Most of patients had rectosigmoid junction tumors. Eight patients had familial history of colorectal cancer and 66 patients had comorbid conditions. Eight patients had early 30-day mortality. Thirty-one patients had liver metastasis. Patients with liver metastasis (group 1a) had significantly higher PLR values when compared to group 1b ( $p<0.001$ ). When age, gender and comorbid diseases were analyzed together, group 1a had significantly higher PLR values ( $p<0.001$ ). The cut-off value of the PLR for liver metastasis was 194.7, giving a sensitivity of 74.2% and specificity of 72.7%. Patients with lymph node positivity (group 2a) had significantly higher PLR ( $p<0.001$ ) than patients in group 2b. The cut-off value of the PLR for lymph node positivity was 163.95, giving a sensitivity of 56.8% and specificity of 56.3%.

**Conclusion:** As an inexpensive and feasible parameter, PLR could be useful for predicting liver metastasis and even lymph node positivity of colorectal cancers.

**Keywords:** Platelet, lymphocyte, colon carcinoma, liver metastasis

### ÖZ

**Amaç:** Kolon kanserine bağlı mortalite azalsa da hala yüksektir. Kolonoskopinin artan kullanımı, cerrahi teknolojide ilerlemeler, kemoradyoterapi protokollerinin standardizasyonu metastatik olgularda sağkalımı arttırmıştır. Enflamasyon, birçok kanserin gelişiminde önemli rol oynar. Platelet-lenfosit oranı (PLO) gibi birçok belirteç kanserde kötü prognoz ile ilişkilendirilmiştir. Çalışmamızda preoperatif bakılan PLO'nun kolon kanserli hastalarda karaciğer metastazını ve lenf nodu pozitifliğini öngörebilirliğini saptamayı amaçladık.

**Yöntem:** Mart 2010 ve Eylül 2016 tarihleri arasında kolorektal kanser tanısı konularak operasyona alınan hastaların dosyaları retrospektif olarak incelendi. Hastaların demografik verileri, preoperatif PLO, intraoperatif bulgular ve postoperatif tümör-nod-metastaz evrelemesine göre histopatoloji raporları kaydedildi. Hastalar karaciğer metastazı saptananlar grup 1a ve saptanmayanlar grup 1b olarak 2 gruba ayrıldı. Aynı şekilde lenf nodu pozitifliği saptananlar grup 2a ve saptanmayanlar grup 2b olarak alt gruba ayrıldı. Sonuçlar SPSS programı ile analiz edildi.

**Bulgular:** Yüz elli iki hastada erkek/kadın oranı 1,53 idi. En sık rektosigmoid bölgede kanser tespit edildi. Sekiz hastada ailesel kolorektal kanser, 66 hastada komorbid hastalık tespit edildi. Postoperatif 30 günlük dönemde sekiz hastada erken mortalite gözlemlendi. Otuz bir hastada karaciğer metastazı mevcuttu. PLO'nun gruplar arası karşılaştırmasında, metastaz saptanan grupta PLO değeri, anlamlı şekilde yüksekti ( $p<0,001$ ). Yaş, cinsiyet



Address for Correspondence/Yazışma Adresi: Turgut Anuk MD

Kafkas University Faculty of Medicine, Department of General Surgery, Kars, Turkey

Phone: +90 532 697 44 98 E-mail: turgutanuk@gmail.com

Received/Geliş Tarihi: 01.03.2017 Accepted/Kabul Tarihi: 03.05.2017

## ÖZ

ve komorbid hastalıkların ortak etkisi incelendiğinde, bu üç parametreden bağımsız olarak PLO'nun karaciğer metastazlı hastalarda anlamlı şekilde yüksek olduğu saptandı ( $p<0,001$ ). PLO'nun karaciğer metastazını öngörmeye ROC curve eğrisi ile tespit edilen 194,7 cut-off değeri baz alındığında, %74,2 sensitivite, %72,7 spesifite, %91,7 negatif prediktif değer ve %41,1 pozitif prediktif değerinin olduğu tespit edildi. PLO'nun gruplar arası karşılaştırmasında, lenf nodu pozitifliği saptanan grupta PLO değeri, anlamlı şekilde yüksekti ( $p<0,001$ ). PLO'nun lenf nodu pozitifliğini öngörmeye ROC curve eğrisi ile tespit edilen 163,95 cut-off değeri baz alındığında, %56,8 sensitivite, %56,3 spesifite, %53,3 negatif prediktif değer ve %59,7 pozitif prediktif değerinin olduğu tespit edildi.

**Sonuç:** Ucuz, kolay uygulanabilir bir belirteç olarak PLO'nun kolorektal bölge kanserlerindeki karaciğer metastazını ve lenf nodu pozitifliğini öngörmeye kullanılabileceği kanaatindeyiz.

**Anahtar Kelimeler:** Platelet, lenfosit, kolon kanserleri, karaciğer metastazı

## Introduction

Colorectal cancer is the third most common cancer worldwide. Although mortality rates due to colon cancer have decreased after 1990, it is still the third most common cause of mortality.<sup>1,2</sup> The widespread use of screening tests, primarily colonoscopy, removal of detected premalignant polyps, and the effective and widespread use of neoadjuvant chemoradiotherapy protocols for local advanced-stage tumors have played important roles in the reduction of mortality rates.<sup>3</sup> Distant metastasis is detected at the time of diagnosis in 20% of colorectal cancers, and average life expectancy in stage 4 colorectal cancers ranges from 6 to 8 months even under the best palliative treatment.<sup>4</sup>

Studies conducted since Rudolph Virchow defined the relationship between inflammation and cancer in the 19th century have demonstrated the extensive and significant impact of inflammation on tumor development, progression, and response to treatment.<sup>5</sup> Moreover, many cancers develop from a background of infection, chronic irritation, and inflammation.<sup>6</sup> Although many biochemical parameters have been investigated in terms of their clinical effect on colorectal cancer, the routine clinical use of these tests has been limited by their high cost, a lack of standardization, and unsuitability for widespread use.<sup>7</sup>

Platelet and lymphocyte values, which are among the most commonly analyzed parameters in peripheral blood, are inexpensive to measure and are suitable for routine use, and are therefore the most commonly investigated inflammation markers. The platelet-to-lymphocyte ratio (PLR) has been associated with poor prognosis in many cancers, including colorectal cancer.<sup>6,8,9</sup> Previous studies have focused on changes in PLR at different stages of colon cancer and its effect on prognosis, response to chemotherapy, and recurrence time.<sup>4,5,6,7,8,9,10</sup>

In this study, we aimed to determine the utility of PLR at time of admission in predicting hepatic metastasis and lymph node positivity in patients who have undergone colorectal surgery.

## Materials and Methods

After receiving approval from the Kafkas University Faculty of Medicine, Local Ethics Committee (Approval number: 80576354-050-99/87, date: 11.01.2017), we retrospectively reviewed the medical records of patients who were diagnosed with colorectal cancer and operated after being admitted to the general surgery and emergency departments of our hospitals between March 2010 and September 2016 with complaints of abdominal pain, gas, inability to defecate, and blood in stool. The patients' age, sex, medical history, preoperative PRL determined at time of admission, intraoperative findings, and data from postoperative histopathological reports regarding tumor, lymph node involvement, and metastasis [tumor-node-metastasis (TNM) staging] were recorded from their records. The PLR was measured from the complete blood count. The Beckman Coulter R Gen-S System® (Beckman Coulter Diagnostic System Laboratories, Inc., Texas, USA) device was used for hematological analysis. Patients were grouped based on those with hepatic metastasis (group 1a) and those without (group 1b) and as those with lymph node positivity (group 2a) and those without (group 2b).

Thirty-five patients were excluded from the study because they had a hematologic disease or active infection within the past week, their records were not accessible, or they had a history of blood transfusion within the last 10 days.

## Statistical Analysis

SPSS version 22 for Windows (Chicago, Illinois, USA) software package was used for statistical analyses. Distribution normality of continuous variables was determined using the Kolmogorov-Smirnov test. Descriptive statistics were reported as continuous variables, mean  $\pm$  standard deviation, or median or range, depending on the context and relevance. Categorical variables were expressed as case numbers and ratios. Differences between groups were compared using student's t-test for mean values and the Mann-Whitney U test for median values. Pearson's chi-square test was used for categorical variables. Sensitivity, specificity, positive

predictive value (PPV), and negative predictive value (NPV) were compared using ROC curve analysis. P values <0.05 were accepted as statistically significant.

## Results

The male/female ratio among the 152 patients included in the study was 1.53. Tumors were most commonly located in the rectosigmoid region of the colon (73.7%). Eight patients had a family history of colorectal cancer and 66 patients had a history of comorbid disease. Pulmonary embolism, anastomotic leakage, and early mortality due to comorbid diseases were observed in 8 patients (5.3%) in the postoperative 30-day period. In 31 patients, a mass lesion consistent with liver metastasis was detected intraoperatively, metastasectomy was performed, and the mass was confirmed as adenocarcinoma in histopathologic examination. The demographic characteristics of the patients are given in Tables 1 and 2.

The groups were homogenous in terms of both sex and age distribution ( $p=0.357$  and  $p=0.240$ , respectively) (Table 3).

Table 1. Demographic characteristics of the patients

Sex	Number	Percentage (%)
Female	60	39.5
Male	92	60.5
Family history	Number	Percentage (%)
No	144	94.7
Yes	8	5.3
Mortality	Number	Percentage (%)
No	144	94.7
Yes	8	5.3
Comorbid disease	Number	Percentage (%)
No	85	55.9
Yes	66	43.4

Table 3. Age and sex distribution of the patient groups

	Sex	M0	M1	Total		
	Female	50	10	60		
	Male	71	21	92		
	Total	121	31	152		
Age (years)	Mean	Standard deviation	Minimum	Maximum	Median	
M0	61.21	12.934	24	85	63.00	
M1	64.23	12.412	32	88	65.00	
Total	61.82	12.847	24	88	63.00	

M0: No liver metastasis; M1: Liver metastasis

Tumor location was not associated with liver metastasis ( $p=0.596$ ).

Mean PLR value was significantly higher in the group with metastasis (232.4; range, 79.4-837.5) than in the nonmetastatic group (159.7; range, 57.4-289.3) ( $p<0.001$ ). The PLR distribution graph for the two groups is shown in Figure 1.

When the common effect of age, sex, and comorbid diseases was examined, it was found that the PLR value was significantly higher in patients with liver metastasis independent of these three parameters ( $p<0.001$ ).

Based on the 194.7 cut-off value determined using the ROC curve, PLR was found to have 74.2% sensitivity, 72.7% specificity, 91.7% NPV, and 41.1% PPV in predicting liver metastasis (Figure 2).

Mean PLR value was significantly higher in the group exhibiting lymph node positivity ( $p<0.001$ ) (Figure 3).

Based on the 163.95 cut-off value determined using the ROC curve, PLR had 56.8% sensitivity, 56.3% specificity, 53.3% NPV, and 59.7% PPV in predicting lymph node positivity (Figure 4).

## Discussion

Liver metastases of colon cancer pose a major clinical problem.<sup>11</sup> Because lymphatic drainage of the colon occurs primarily through the portal vein, the first locations of metastasis are the regional lymph nodes, liver, lung, and

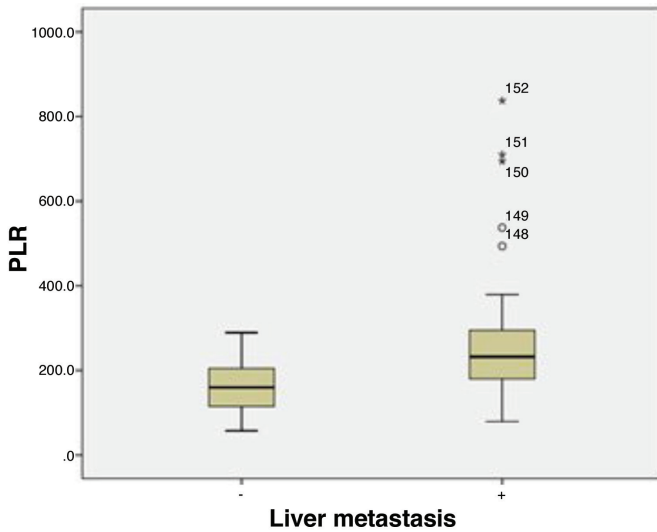
Table 2. Distribution of patients by affected colon segment

Colon segment	Number	Percentage (%)
Ascending colon	32	21.1
Transverse colon	4	2.6
Descending/sigmoid colon	31	20.4
Rectum	81	53.3
Anal canal	1	0.7
Total colon	3	2.0

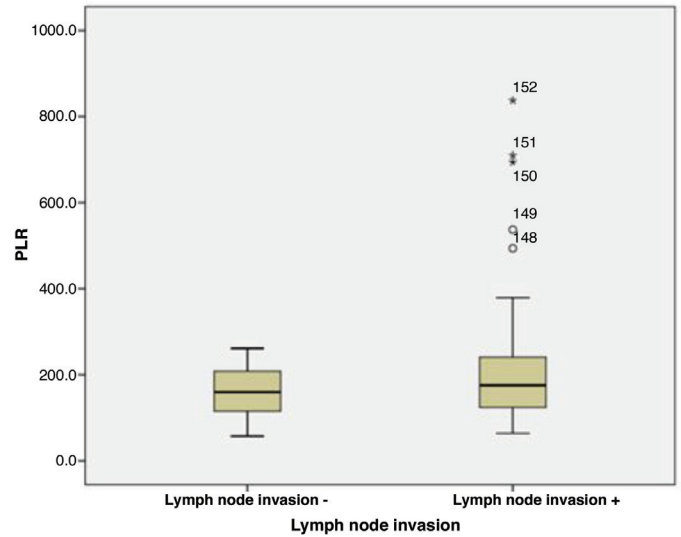
peritoneum, in that respective order.<sup>12</sup> Treatment options for cases of colon cancer with liver metastasis include adjuvant chemotherapy protocols as well as surgical resection, local tumor ablation, radiofrequency ablation, regional intraarterial chemotherapy, chemoembolization, and radiotherapy. Of these methods, only surgery has been reported to prolong survival. For this reason, with recent advances in surgical techniques and technology, the criteria

for operability have been expanded in cases with liver metastasis.<sup>11,13</sup>

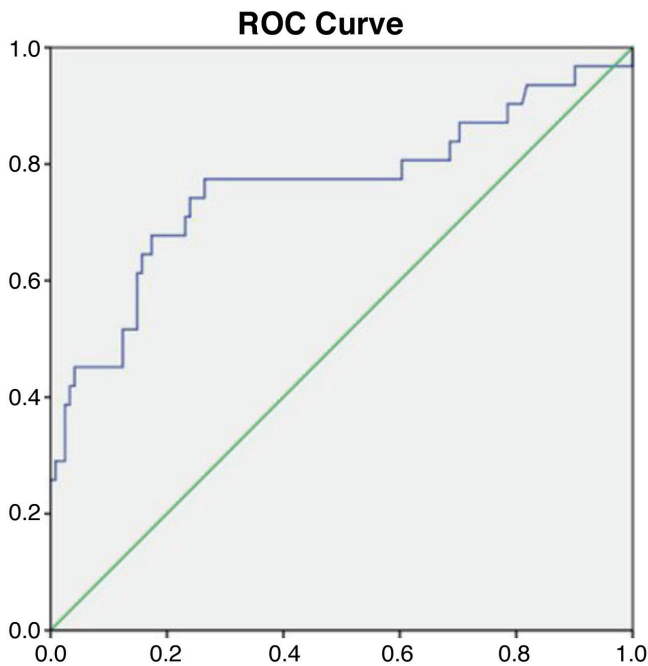
In contrast to previous studies investigating the prognostic value of PLR in cancer, in the present study we also aimed to determine the utility of earliest preoperative PLR in predicting lymph node positivity and hepatic metastases confirmed by postoperative pathology reports in patients with colon cancer. The retrospective nature of our study



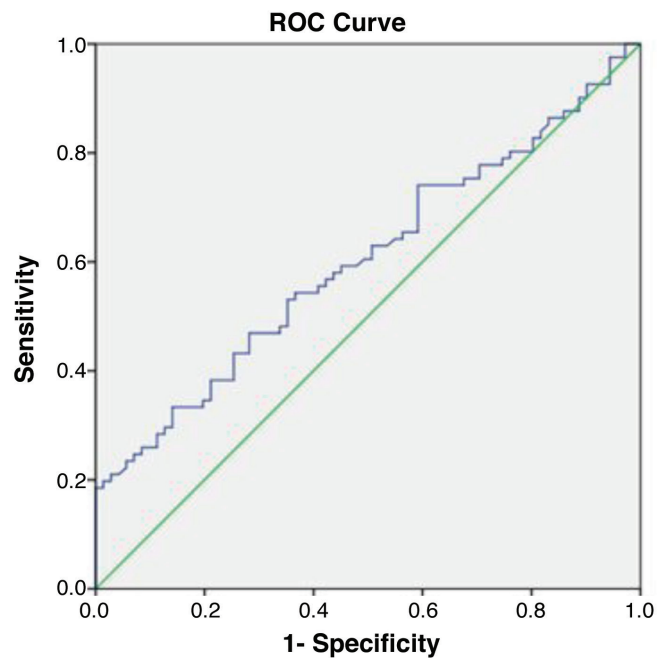
**Figure 1.** Platelet-to-lymphocyte ratio distribution graph for patients with and without liver metastasis (group 1a and 1b, respectively)  
 PLR: Platelet-to-lymphocyte ratio



**Figure 3.** Platelet-to-lymphocyte ratio distribution graph for patients with and without lymph node involvement (group 2a and 2b, respectively)  
 PLR: Platelet-to-lymphocyte ratio



**Figure 2.** ROC curve analysis for patients with and without liver metastasis (group 1a and 1b, respectively)



**Figure 4.** ROC curve analysis for patients with and without lymph node involvement (group 2a and 2b, respectively)

and the relatively low number of patients are among the fundamental limitations of our study.

Platelets play an important role in hemostasis and thrombosis, and they also positively affect the growth, spread, and neovascularization processes of tumor cells. Platelets aggregated by the tumor lead to cancer-related thrombosis. Tumor growth is also induced by platelet-derived growth factor and tissue growth factor, which are mainly secreted from the platelets.<sup>5,14</sup> In many studies, significant PLR elevation has been associated with poor prognosis in many types of cancer.<sup>14,15,16,17</sup>

The male/female ratio in our study showed a predominance of males, in accordance with the literature. Similarly, consistent with the literature, the rectosigmoid region was the colon segment most commonly affected.<sup>1</sup> Eight patients had a family history of colorectal cancer and 66 patients had comorbid diseases. Pulmonary embolism, anastomotic leakage, and early mortality due to comorbid diseases were observed in 8 patients (5.3%) in the postoperative 30-day period. Liver metastasis was detected intraoperatively in 20.3% of the patients, in accordance with the literature.<sup>4</sup>

When sex and age distributions between groups were examined, both were observed to be homogeneous ( $p=0.357$  and  $p=0.240$ ). Reports in the literature indicate that mortality is 25% higher among males than females and that colorectal cancers are located more proximally in females.<sup>18</sup>

Our analysis of colon segment involvement showed that tumor location was not associated with liver metastasis ( $p=0.596$ ). We did not encounter any findings on this subject in the literature.

Mean PLR value was significantly higher in the group with metastasis (232.4; range, 79.4-837.5) than in the nonmetastatic group (159.7; range, 57.4-289.3) ( $p<0.001$ ). This finding is important because it shows that tumor load is related to PLR. In many studies in the literature, higher PLR values have been shown to be a marker of poor prognosis, especially in colorectal cancer. Hypercoagulability induced by cytokines secreted by malign solid tumors produces reactive thrombocytosis. Interleukin-6 in particular leads the transformation of megakaryocytes into platelets in the bone marrow. Other important factors include the increase of platelet-associated inflammatory reactions, decreased antitumor response due to relative scarcity of lymphocytes, and tumoral growth and spread induced by various epithelial and endothelial growth factors secreted by circulating active platelets.<sup>4,5,6,7,8,9,10</sup>

When the common effect of age, sex, and comorbid diseases was examined, it was found that PLR was significantly higher in patients with liver metastasis independent of these three parameters ( $p<0.001$ ). The most important prognostic

marker in colon cancer is cancer stage, and liver metastasis detected preoperatively corresponds to a more advanced stage. The average 5-year survival rate is 35-58%, even in resectable cases. In addition to prognostic studies, the increase in PLR was also found to be significantly higher in more advanced stages of colorectal cancer, significantly affecting the T aspect of TNM staging.<sup>9</sup> In another study, it was reported that an increased PLR value after surgical therapy could be a statistically significant indicator of disease recurrence in stage 2 and 3 patients.<sup>7</sup> Another use of PLR in colorectal cancers is to evaluate response to chemotherapy. In a study conducted with metastatic colorectal cancer patients, Wu et al.<sup>10</sup> reported that normalization of PLR value is a marker of good prognosis in the assessment of response to chemotherapy.

There is only one study in the literature evaluating liver metastases of colorectal cancers and PLR. In that study, PLR was found to be a significant and independent factor indicating overall survival and disease-free survival in patients with colorectal cancer who underwent curative liver resection after neoadjuvant chemotherapy and only had liver metastasis. In addition, preoperative PLR value was found to be superior to neutrophil-to-lymphocyte ratio (NLR) as a negative indicator in these cases.<sup>19</sup>

In the present study, we also evaluated lymph node positivity and found that this parameter was able to predict involvement in patients with statistically high PLR values. However, the sensitivity and specificity levels were not as high as those for PLR in predicting liver metastasis. In our review of the literature, we did not find any studies in which PLR predicted lymph node involvement in colon cancer. However, Özgehan et al.<sup>20</sup> examined the effect of NLR on tumor staging in colon cancer and reported that NLR was significantly high in patients with lymph node positivity. This is important in that it demonstrates the importance of PLR, which is another inflammatory marker like NLR.

In their study conducted in the northeastern Anatolia region of Turkey in 2015, Çakmur et al.<sup>21</sup> reported that colorectal cancer patients were diagnosed late in Turkey, which is not consistent with the literature. They emphasized the importance of screening tests, especially in the context of preventive health services.<sup>21</sup> Considering these data in light of our results, we believe that PLR can be used as an inexpensive, convenient, universal, and non-invasive marker to predict liver metastases in newly diagnosed cases of colorectal cancer.

### Ethics

**Ethics Committee Approval:** The study was approved by the Kafkas University Local Ethics Committee (Approval number: 80576354-050-99/87, Date: 11.01.2017).



**Informed Consent:** The study was designed retrospectively, and consent form was obtained from all patients.

**Peer-review:** Internally peer-reviewed.

### Authorship Contributions

Surgical and Medical Practices: T.A., A.C.Y., Concept: T.A., Design: T.A., Data Collection or Processing: T.A., A.C.Y., Analysis or Interpretation: T.A., A.C.Y., Literature Search: T.A., A.C.Y., Writing: T.A.

**Conflict of Interest:** No conflict of interest was declared by the authors.

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

### References

1. Siegel RL, Miller KD, Jemal A. Cancer statistics, 2016. *CA Cancer J Clin* 2016;66:7-30.
2. Ryerson AB, Ehemann CR, Altekruse SF, Ward JW, Jemal A, Sherman RL, Henley SJ, Holtzman D, Lake A, Noone AM, Anderson RN, Ma J, Ly KN, Cronin KA, Penberthy L, Kohler BA. Annual Report to the Nation on the Status of Cancer, 1975-2012, featuring the increasing incidence of liver cancer. *Cancer* 2016;122:1312-1337.
3. Lee BY, Sonnenberg A. Time trends of mortality from colorectal cancer in the United States: a birth-cohort analysis. *JAMA Intern Med* 2013;173:1148-1150.
4. Maeda K, Shibutani M, Otani H, Nagahara H, Ikeya T, Iseki Y, Tanaka H, Mugeruma K, Hirakawa K. Inflammation-based factors and prognosis in patients with colorectal cancer. *World J Gastrointest Oncol* 2015;7:111-117.
5. Zou ZY, Liu HL, Ning N, Li SY, DU XH, Li R. Clinical significance of pre-operative neutrophil lymphocyte ratio and platelet lymphocyte ratio as prognostic factors for patients with colorectal cancer. *Oncol Lett* 2016;11:2241-2248.
6. Mahsuni Sevinc M, Riza Gunduz U, Kinaci E, Armagan Aydin A, Bayrak S, Umar Gursu R, Gunduz S. Preoperative neutrophil-to-lymphocyte ratio and platelet- to-lymphocyte ratio as new prognostic factors for patients with colorectal cancer. *J BUON* 2016;21:1153-1157.
7. Szkandera J, Pichler M, Absenger G, Stotz M, Arminger F, Weissmueller M, Schaberl-Moser R, Samonigg H, Kornprat P, Stojakovic T, Avian A, Gerger A. The elevated preoperative platelet to lymphocyte ratio predicts decreased time to recurrence in colon cancer patients. *Am J Surg* 2014;208:210-214.
8. Min GT, Wang YH, Yao N, Zhao JM, Wang J, Wang HP, Chen W, Deng SJ, Li YM. The prognostic role of pretreatment platelet-to-lymphocyte ratio as predictors in patients with colorectal cancer: a meta-analysis. *Biomark Med* 2017;11:87-97.
9. Jia J, Zheng X, Chen Y, Wang L, Lin L, Ye X, Chen Y, Chen D, Dettke M. Stage-dependent changes of preoperative neutrophil to lymphocyte ratio and platelet to lymphocyte ratio in colorectal cancer. *Tumour Biol* 2015;36:9319-9325.
10. Wu Y, Li C, Zhao J, Yang L, Liu F, Zheng H, Wang Z, Xu Y. Neutrophil-to-lymphocyte and platelet-to-lymphocyte ratios predict chemotherapy outcomes and prognosis in patients with colorectal cancer and synchronous liver metastasis. *World J Surg Oncol* 2016;14:289.
11. Khatri VP, Petrelli NJ, Belghiti J. Extending the frontiers of surgical therapy for hepatic colorectal metastases: is there a limit? *J Clin Oncol* 2005;23:8490-8499.
12. Siegel RL, Miller KD, Jemal A. Cancer statistics, 2016. *CA Cancer J Clin* 2016;66:7-30.
13. Kopetz S, Chang GJ, Overman MJ, Eng C, Sargent DJ, Larson DW, Grothey A, Vauthey JN, Nagorney DM, McWilliams RR. Improved survival in metastatic colorectal cancer is associated with adoption of hepatic resection and improved chemotherapy. *J Clin Oncol* 2009;27:3677-3683.
14. Yodying H, Matsuda A, Miyashita M, Matsumoto S, Sakurazawa N, Yamada M, Uchida E. Prognostic Significance of Neutrophil-to-Lymphocyte Ratio and Platelet-to-Lymphocyte Ratio in Oncologic Outcomes of Esophageal Cancer: A Systematic Review and Meta-analysis. *Ann Surg Oncol* 2016;23:646-654.
15. Song W, Wang K, Zhong FP, Fan YW, Peng L, Zou SB. Clinicopathological and prognostic significance of platelet-to-lymphocyte ratio in patients with hepatocellular carcinoma. *Oncotarget* 2016;7:81830-81838.
16. Xu Z, Xu W, Cheng H, Shen W, Ying J, Cheng F, Xu W. The Prognostic Role of the Platelet-Lymphocytes Ratio in Gastric Cancer: A Meta-Analysis. *PLoS One* 2016;11:e0163719.
17. Chen L, Zhang F, Sheng XG, Zhang SQ, Chen YT, Liu BW. Peripheral platelet/lymphocyte ratio predicts lymph node metastasis and acts as a superior prognostic factor for cervical cancer when combined with neutrophil: Lymphocyte. *Medicine (Baltimore)* 2016;95:e4381.
18. Schoenfeld P, Cash B, Flood A, Dobhan R, Eastone J, Coyle W, Kikendall JW, Kim HM, Weiss DG, Emory T, Schatzkin A, Lieberman D; CONCERN Study Investigators. Colonoscopic screening of average-risk women for colorectal neoplasia. *N Engl J Med* 2005;352:2061-2068.
19. Neofytou K, Smyth EC, Giakoustidis A, Khan AZ, Cunningham D, Mudan S. Elevated platelet to lymphocyte ratio predicts poor prognosis after hepatectomy for liver-only colorectal metastases, and it is superior to neutrophil to lymphocyte ratio as an adverse prognostic factor. *Med Oncol* 2014;31:239.
20. Özgehan G, Kahramanca Ş, Kaya İO, Bilgen K, Bostancı H, Güzel H, Kütükpınar T, Kargıcı H. Neutrophil-lymphocyte ratio as a predictive factor for tumor staging in colorectal cancer. *Turk J Med Sci* 2014;44:365-368.
21. Çakmur H, Anuk T, Önder T, Güven H, Neşet K. Kuzey-Doğu Anadolu Bölgesinde Görülen Kolorektal Kanserlerin Özellikleri. *Turk J Colorectal Dis* 2015;25:21-27.

# Platelet-Lenfosit Oranının Kolon Kanseri Hastalarda Karaciğer Metastazını ve Lenf Nodu Pozitifliğini Öngörebilmedeki Klinik Etkisi

## Clinical Value of Platelet-to-Lymphocyte Ratio in Predicting Liver Metastasis and Lymph Node Positivity of Colorectal Cancer Patients

Turgut Anuk<sup>1</sup>, Ali Cihat Yıldırım<sup>2</sup>

<sup>1</sup>Kafkas Üniversitesi Tıp Fakültesi, Genel Cerrahi Anabilim Dalı, Kars, Türkiye

<sup>2</sup>Kars Harakani Devlet Hastanesi, Genel Cerrahi Kliniği, Kars, Türkiye

### ÖZ

**Amaç:** Kolon kanserine bağlı mortalite azalsa da hala yüksektir. Kolonoskopinin artan kullanımı, cerrahi teknolojide ilerlemeler, kemoradyoterapi protokollerinin standardizasyonu metastatik olgularda sağkalımı arttırmıştır. Enflamasyon, birçok kanserin gelişiminde önemli rol oynar. Platelet-lenfosit oranı (PLO) gibi birçok belirteç kanserde kötü prognoz ile ilişkilendirilmiştir. Çalışmamızda preoperatif bakılan PLO'nun kolon kanserli hastalarda karaciğer metastazını ve lenf nodu pozitifliğini öngörebilirliğini saptamayı amaçladık.

**Yöntem:** Mart 2010 ve Eylül 2016 tarihleri arasında kolorektal kanser tanısı konularak operasyona alınan hastaların dosyaları retrospektif olarak incelendi. Hastaların demografik verileri, preoperatif PLO, intraoperatif bulgular ve postoperatif tümör-nod-metastaz evrelemesine göre histopatoloji raporları kaydedildi. Hastalar karaciğer metastazı saptananlar grup 1a ve saptanmayanlar grup 1b olarak 2 gruba ayrıldı. Aynı şekilde lenf nodu pozitifliği saptananlar grup 2a ve saptanmayanlar grup 2b olarak alt gruba ayrıldı. Sonuçlar SPSS programı ile analiz edildi.

**Bulgular:** Yüz elli iki hastada erkek/kadın oranı 1,53 idi. En sık rektosigmoid bölgede kanser tespit edildi. Sekiz hastada ailesel kolorektal kanser, 66 hastada komorbid hastalık tespit edildi. Postoperatif 30 günlük dönemde sekiz hastada erken mortalite gözlemlendi. Otuz bir hastada karaciğer metastazı mevcuttu. PLO'nun gruplar arası karşılaştırmasında, metastaz saptanan grupta PLO değeri, anlamlı şekilde yüksekti ( $p<0,001$ ). Yaş, cinsiyet ve komorbid hastalıkların ortak etkisi incelendiğinde, bu üç parametreden bağımsız olarak PLO'nun karaciğer metastazlı hastalarda anlamlı şekilde yüksek olduğu saptandı ( $p<0,001$ ). PLO'nun karaciğer metastazını öngörmeye ROC curve eğrisi ile tespit edilen 194,7 cut-off değeri baz alındığında, %74,2 sensitivite, %72,7 spesifite, %91,7 negatif prediktif değer ve %41,1 pozitif prediktif değerinin olduğu tespit edildi. PLO'nun gruplar arası karşılaştırmasında, lenf nodu pozitifliği saptanan grupta PLO değeri, anlamlı şekilde yüksekti ( $p<0,001$ ). PLO'nun lenf nodu pozitifliğini öngörmeye ROC curve eğrisi ile tespit edilen 163,95 cut-off değeri baz alındığında, %56,8 sensitivite, %56,3 spesifite, %53,3 negatif prediktif değer ve %59,7 pozitif prediktif değerinin olduğu tespit edildi.

**Sonuç:** Ucuz, kolay uygulanabilir bir belirteç olarak PLO'nun kolorektal bölge kanserlerindeki karaciğer metastazını ve lenf nodu pozitifliğini öngörmeye kullanılabileceği kanaatindeyiz.

**Anahtar Kelimeler:** Platelet, lenfosit, kolon karsinomu, karaciğer metastazı

### ABSTRACT

**Aim:** Colorectal cancer related mortality is still high. The widespread use of colonoscopy, surgical advancements, and standardized use of chemotherapeutic agents has increased survival rates in metastatic cases. Inflammation is the main etiological factor in a variety of cancers. Platelet-to-lymphocyte ratio (PLR), one of the most studied biochemical parameters, has been shown as a poor prognostic factor. In this study, our aim was to determine the predictive value of PLR on liver metastasis and lymph node positivity in colorectal patients.

**Method:** The data of patients who were diagnosed with colorectal cancer and underwent surgery between March 2010 and September 2016 were analyzed retrospectively. Demographic characteristics, preoperative PLR, intraoperative findings, and tumor-node-metastasis stages were recorded. Patients with liver metastasis comprised group 1a and those without liver metastasis were group 1b; patients were also sorted into groups 2a and 2b based on lymph node positivity or negativity, respectively.

**Results:** A total of 152 patients were included in the study and the male/female ratio was 1.53. Most of patients had rectosigmoid junction tumors.



Yazışma Adresi/Address for Correspondence: Dr. Turgut Anuk  
Kafkas Üniversitesi Tıp Fakültesi, Genel Cerrahi Anabilim Dalı, Kars, Türkiye  
Tel.: +90 532 697 44 98 E-posta: turgutanuk@gmail.com  
Geliş Tarihi/Received: 01.03.2017 Kabul Tarihi/Accepted: 03.05.2017

## ABSTRACT

Eight patients had familial history of colorectal cancer and 66 patients had comorbid conditions. Eight patients had early 30-day mortality. Thirty-one patients had liver metastasis. Patients with liver metastasis (group 1a) had significantly higher PLR values when compared to group 1b ( $p<0.001$ ). When age, gender and comorbid diseases were analyzed together, group 1a had significantly higher PLR values ( $p<0.001$ ). The cut-off value of the PLR for liver metastasis was 194.7, giving a sensitivity of 74.2% and specificity of 72.7%. Patients with lymph node positivity (group 2a) had significantly higher PLR ( $p<0.001$ ) than patients in group 2b. The cut-off value of the PLR for lymph node positivity was 163.95, giving a sensitivity of 56.8% and specificity of 56.3%.

**Conclusion:** As an inexpensive and feasible parameter, PLR could be useful for predicting liver metastasis and even lymph node positivity of colorectal cancers.

**Keywords:** Platelet, lymphocyte, colon carcinoma, liver metastasis

## Giriş

Kolorektal kanser genel olarak tüm dünyada 3. sıklıkta görülen kanserdir. 1990 sonrası kolon kanserine bağlı mortalite oranları azalsa da hala üçüncü sıklıkta mortalite nedenidir.<sup>1,2</sup> Mortalite oranlarının azalmasında, başta kolonoskopi olmak üzere tarama testlerinin yaygın kullanılması ve saptanan premalign poliplerin çıkartılması ve lokal ileri evre tümörlerde neoadjuvan kemoradyoterapi protokollerinin efektif ve yaygın kullanımı önemli rol oynamıştır.<sup>3</sup> Tanı anında kolorektal kanserlerin %20'sinde uzak metastaz saptanmakta, buna ek olarak evre 4 kolorektal kanserlerde en iyi palyatif tedavi altında bile ortalama yaşam süresi 6-8 ay olarak değişmektedir.<sup>4</sup>

Enflamasyon ve kanser arasındaki ilişki 19. yüzyılda Rudolph Virchow tarafından tanımlandığından beri yapılan çalışmalar enflamasyonun tümör gelişimi, ilerlemesi ve tedaviye yanıt üzerindeki geniş ve önemli etkilerini göstermiştir.<sup>5</sup> Bununla birlikte birçok kanser enfeksiyon, kronik irritasyon ve enflamasyon zemininden gelişmiştir.<sup>6</sup> Bugüne kadar birçok biyokimyasal parametrenin kolorektal kanserdeki klinik etkisi araştırılmış olsa da, bu testlerin yüksek maliyeti, standardizasyonun eksikliği ve yaygın kullanıma uygun olmaması rutin klinik kullanımlarını sınırlandırmıştır.<sup>7</sup>

Periferik kanda en çok bakılan parametrelerden platelet ve lenfosit değerleri ucuz ve rutin kullanıma uygun olup en çok bakılan enflamasyon belirteçleridir. Platelet-lenfosit oranı (PLO) kolorektal kanser dahil olmak üzere birçok kanserde kötü prognoz ile ilişkilendirilmiştir.<sup>6,8,9</sup> Çalışmalar PLO'nun kolon kanserinde farklı evrelerdeki değişimi, prognostik etkisi, kemoterapiye cevap, rekürrens zamanı üzerindeki etkisi üzerine yoğunlaşmıştır.<sup>4,5,6,7,8,9,10</sup>

Çalışmamızda kolorektal bölge cerrahisi uygulanan hastalarda başvuru anında bakılan PLO'nun karaciğer metastazını ve lenf nodu pozitifliğini öngörebilmedeki etkisini saptamayı amaçladık.

## Gereç ve Yöntem

Kafkas Üniversitesi Tıp Fakültesi Etik Kurul onayı alınmasını takiben (Onay no: 80576354-050-99/87), hastanelerimiz genel cerrahi klinikleri ve acil servislerine Mart 2010 ve Eylül 2016 tarihleri arasında karın ağrısı, gaz, gaita çıkaramama ve gaitada kanama şikayetleri ile başvurarak yapılan incelemeler sonucu kolorektal kanser tanısı konularak operasyona alınan hastaların dosya kayıtları retrospektif olarak incelendi. Dosya kayıtlarından yaş, cinsiyet, ek hastalık anamnezleri, preoperatif başvuru anında bakılan PLO, intraoperatif bulgular ve postoperatif tümör-lenf nodu tutulumu ve metastaz varlığını esas alan tümör-nod-metastaz (TNM) evrelemesine göre histopatoloji raporları kaydedildi. PLO tam kan sayımından ölçüldü. Hematolojik analizlerde, Beckman Coulter R Gen-S System® (Beckman Coulter Diagnostic System Laboratories, Inc., Teksas, ABD) cihazı kullanıldı. Hastalar, karaciğer metastazı saptananlar grup 1a ve saptanmayanlar grup 1b ve lenf nodu pozitifliği olanlar 2a ve olmayanlar 2b olarak 2 gruba ayrıldı. Hematolojik hastalığı ve son bir hafta içinde aktif enfeksiyon varlığı olan, dosya kayıtlarına ulaşılamayan ve son 10 günde kan transfüzyon öyküsü olan 35 hasta çalışma dışı bırakıldı.

## İstatistiksel Analiz

İstatistiksel analiz için Windows için SPSS 22 paket programı kullanıldı (Chicago, Illinois, ABD). Devamlı değişkenlerin normal dağılıp dağılmadığı Kolmogorov-Smirnov testiyle belirlendi. Tanımlayıcı istatistikler kullanım yerine ve uygunluğuna göre devamlı değişkenler, ortalama  $\pm$  standart sapma veya medyan veya aralık olarak raporlandı. Kategorik değişkenler ise olgu raporu ve oranlar ile ifade edildi. Gruplar arasındaki farklılıklar ortalama değerler için student's t-testi ile, medyan değerler için ise Mann-Whitney U testi ile karşılaştırıldı. Kategorik değişkenler için Pearson'un ki-kare testi uygulandı. Sensitivite, spesifite, pozitif prediktif değer (PPD), negatif prediktif değer (NPD) ROC curve analizi ile karşılaştırıldı.  $P<0,05$  istatistiksel olarak anlamlı olarak kabul edildi.

## Bulgular

Çalışmaya dahil edilen 152 hastada erkek/kadın oranı 1,53 idi. Tümörlü kolon segmenti en sık rektosigmoid bölge olarak tespit edildi (%73,7). Sekiz hastada ailesel kolorektal bölge kanseri öyküsü varken, 66 hastada komorbid hastalık anamnezi tespit edildi. Postoperatif 30 günlük dönemde sekiz hastada (%5,3) pulmoner emboli, anastomoz kaçağı ve komorbid hastalıklara bağlı erken mortalite gözlemlendi. Hastaların 31'inde intraoperatif dönemde karaciğer metastazı ile uyumlu kitle lezyonu saptanarak metastazektomi uygulandı ve histopatoloji ile adenokarsinom metastazı olduğu korele edildi. Hastaların demografik özellikleri Tablo 1 ve 2'de verilmiştir.

Gruplar arası cinsiyet ve yaş dağılımları incelendiğinde; hem cinsiyet hem de yaş dağılımlarının homojen olduğu gözlemlendi ( $p=0,357$  ve  $p=0,240$ ) (Tablo 3). Tümörlü kolon segmentleri araştırıldığında; karaciğer metastazı üzerine yerleşim yeri özelliğinin etki etmediği gözlemlendi ( $p=0,596$ ).

PLO'nun gruplar arası karşılaştırmasında, metastaz saptanan grupta PLO değerinin 232,4 (79,4-837,5) ile, non-metastatik

hasta grubundaki 159,7 (57,4-289,3) değerinden anlamlı şekilde daha yüksek olduğu tespit edildi ( $p<0,001$ ). Gruplar arası dağılım grafiği Şekil 1'de verilmiştir.

Yaş, cinsiyet ve komorbid hastalıkların ortak etkisi incelendiğinde ise, PLO değerinin bakılan bu üç parametreden bağımsız olarak karaciğer metastazlı hastalarda anlamlı şekilde yüksek olduğu saptandı ( $p<0,001$ ).

PLO'nun karaciğer metastazını öngörmeye ROC curve eğrisi ile tespit edilen 194,7 cut-off değeri baz alındığında, %74,2 sensitivite, %72,7 spesifite, %91,7 NPD ve %41,1 PPD'nin olduğu tespit edildi (Şekil 2).

PLO'nun gruplar arası karşılaştırmasında, lenf nodu pozitifliği saptanan grupta PLO değeri, anlamlı şekilde yüksekti ( $p<0,001$ ) (Şekil 3).

PLO'nun lenf nodu pozitifliğini öngörmeye ROC curve eğrisi ile tespit edilen 163,95 cut-off değeri baz alındığında, %56,8 sensitivite, %56,3 spesifite, %53,3 NPD ve %59,7 PPD'nin olduğu tespit edildi (Şekil 4).

## Tartışma

Kolon kanserinin karaciğer metastazları önemli bir klinik problem teşkil etmektedir.<sup>11</sup> Kolon lenfatik drenajı daha çok portal ven yoluyla olduğu için ilk metastaz yerleri sırayla reyonel lenf nodları, karaciğer, akciğer ve peritondur.<sup>12</sup> Karaciğer metastazlı kolon kanseri olgularında tedavi seçenekleri arasında adjuvan

Tablo 1. Hastaların demografik özellikleri

Cinsiyet	Sayı	Oran (%)
Kadın	60	39,5
Erkek	92	60,5
Aile öyküsü	Sayı	Oran (%)
Yok	144	94,7
Var	8	5,3
Mortalite	Sayı	Oran (%)
Yok	144	94,7
Var	8	5,3
Komorbid hastalık	Sayı	Oran (%)
Yok	85	55,9
Var	66	43,4

Tablo 2. Hastaların tutulan kolon segmentlerine göre dağılımı

Kolon segmenti	Sayı	Oran (%)
Sağ kolon	32	21,1
Transvers kolon	4	2,6
Sol kolon-sigmoid	31	20,4
Rektum	81	53,3
Anal kanal	1	0,7
Total kolon	3	2,0

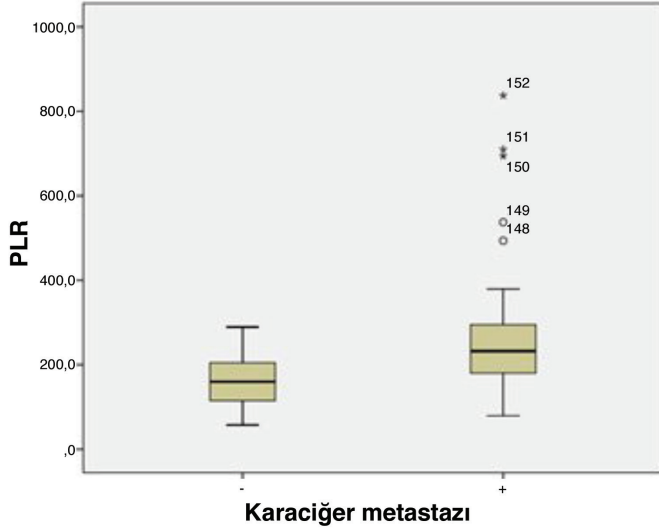
Tablo 3. Gruplar arası yaş ve cinsiyet dağılımı

	Cinsiyet	M0	M1	Toplam	
	Kadın	50	10	60	
	Erkek	71	21	92	
	Toplam	121	31	152	
Yaş	Ortalama	Standart sapma	Minimum	Maksimum	Medyan
M0	61,21	12,934	24	85	63,00
M1	64,23	12,412	32	88	65,00
Toplam	61,82	12,847	24	88	63,00

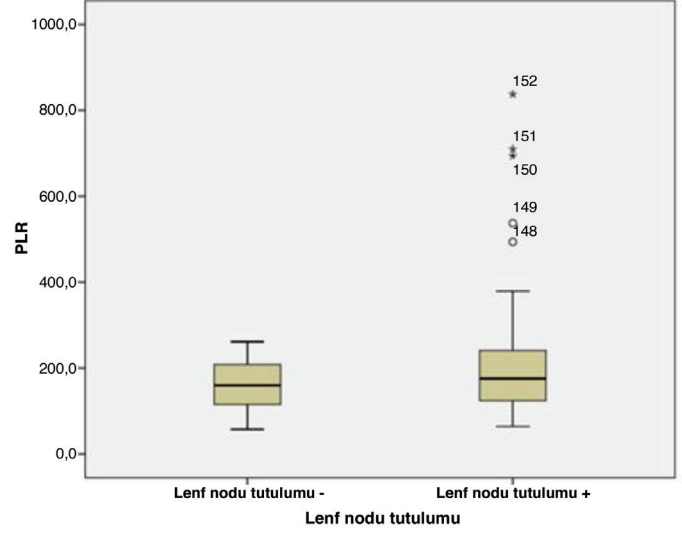
M0: Karaciğer metastazı olmayanlar, M1: Karaciğer metastazı olanlar

kemoterapi protokollerine ek olarak cerrahi rezeksiyon, lokal tümör ablasyonu, radyo frekans ablasyonu, rejyonel intraarteriyel kemoterapi, kemoembolizasyon ve radyoterapi bulunmaktadır. Bu yöntemlerden sadece cerrahinin yaşam süresini uzattığı bildirilmiştir. Bu nedenle son yıllarda gelişen cerrahi teknikler ve teknolojinin de etkisiyle karaciğer metastazlı olgularda operabilite kriterleri genişletilmiştir.<sup>11,13</sup>

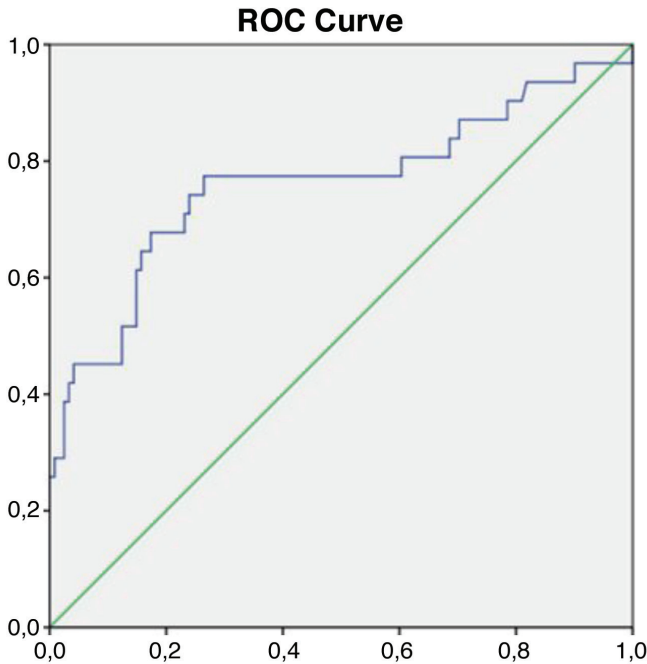
Biz de bu çalışmamızda önceki çalışmalardan farklı olarak PLO'nun kanserdeki prognostik etkisinin yanı sıra, kolon kanseri tanısı konan hastalarda ilk bakılan preoperatif PLO'nun hastalarda postoperatif patoloji raporuyla tasdik edilen karaciğer metastazlarını ve lenf nodu pozitifliğini öngörebilmedeki etkisini saptamayı amaçladık. Çalışmamızın retrospektif olması, hasta sayısının nispeten az olması çalışmamızın temel kısıtlılıkları arasında yer almaktadır.



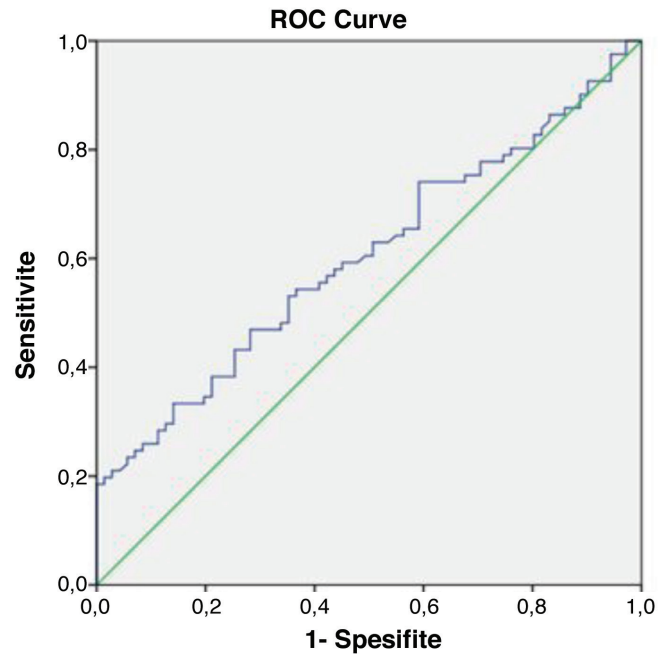
Şekil 1. Karaciğer metastazı açısından değerlendirilen grup 1a ve grup 1b arası platelet-lenfosit oranı dağılım grafiği  
PLR: Platelet-lenfosit oranı



Şekil 3. Lenf nodu tutulumu açısından değerlendirilen grup 2a ve grup 2b arası platelet-lenfosit oranı dağılım grafiği  
PLR: Platelet-lenfosit oranı



Şekil 2. Karaciğer metastazı açısından değerlendirilen grup 1a ve grup 1b arası ROC curve analizi



Şekil 4. Lenf nodu tutulumu açısından değerlendirilen grup 2a ve grup 2b arası ROC curve analizi

Plateletler hemostaz ve trombozda önemli rol oynar. Ayrıca tümör hücrelerinin büyüme, yayılma ve yeni damar oluşumu süreçlerine pozitif etki eder. Ayrıca tümörün agrege ettiği plateletler kanser ilişkili tromboza yol açar. Plateletlerden başlıca salgılanan ve tümörün büyümesine yol açan, platelet türevli büyüme faktörü ve doku büyüme faktörü de tümörün büyümesine yol açar.<sup>5,14</sup> Birçok çalışmada PLO'nun anlamlı yüksekliği birçok kanser türünde kötü prognozla ilişkilendirilmiştir.<sup>14,15,16,17</sup>

Hastaların demografik özellikleri incelendiğinde, erkek-kadın oranı literatürle uyumlu olarak erkek lehine ön plandaydı. Yine literatürle uyumlu olarak en sık gözükten tümörlü kolon segmenti rektosigmoid bölgede idi.<sup>1</sup> Sekiz hastada ailesel kolorektal bölge kanseri öyküsü varken, 66 hastada komorbid hastalık anamnezi tespit edildi. Postoperatif 30 günlük dönemde sekiz hastada (%5,3) pulmoner emboli, anastomoz kaçağı ve komorbid hastalıklara bağlı erken mortalite gözlemlendi. İntraoperatif olarak karaciğer metastazı saptanan hastaların oranı literatürle uyumlu olarak %20,3 seviyesindeydi.<sup>4</sup>

Gruplar arası cinsiyet ve yaş dağılımları incelendiğinde; hem cinsiyet hem de yaş dağılımlarının homojen olduğu gözlemlendi ( $p=0,357$  ve  $p=0,240$ ). Literatüre bakıldığında erkeklerde, kadınlara göre mortalitenin %25 oranında fazla olduğu, kadınlarda ise kolorektal kanserlerin daha proksimal yerleşimli olduğu gösterilmiştir.<sup>18</sup>

Çalışmada tümörlü kolon segmentleri araştırıldığında; karaciğer metastazı üzerine yerleşim yeri özelliğinin etki etmediği gözlemlendi ( $p=0,596$ ). Literatürde de bu konuda bir bulguya rastlanmadık.

PLO'nun gruplar arası karşılaştırmasında, metastaz saptanan grupta PLO değerinin 232,4 (79,4-837,5) ile non-metastatik hasta grubundaki 159,7 (57,4-289,3) değerinden anlamlı şekilde daha yüksek olduğu tespit edildi ( $p<0,001$ ). Bu durum, tümör yükü ile PLO'nun ilişkisini göstermesi açısından önemlidir. Literatürde birçok çalışmada, PLO'nun artan sayısal miktarının başta kolorektal kanserde kötü prognoz işareti olduğu gösterilmiştir. Malign solid tümörlerin salgıladığı sitokinlerin indüklediği hiperkoagülabilitate reaktif trombositoz oluşturur. Bununla birlikte özellikle interlökin-6, kemik iliğinde megakaryositlerin platelete dönüşümüne öncülük eder. Aynı şekilde, platelet ilişkili enflamatuvar reaksiyonların artışı, görece azalan lenfositlerin yokluğuyla azalan antitümör yanıtı, dolaşan aktif plateletlerden salgılanan çeşitli epitelyal, endotelyal büyüme faktörlerinin yol açtığı tümöral büyüme ve yayılım önemli faktörlerdir.<sup>4,5,6,7,8,9,10</sup>

Yaş, cinsiyet ve komorbid hastalıkların ortak etkisi incelendiğinde ise, PLO değerinin bakılan bu üç parametreden bağımsız olarak karaciğer metastazlı hastalarda anlamlı şekilde yüksek olduğu saptandı

( $p<0,001$ ). Kolon kanserinde en önemli prognostik belirteç hastalığın evresi iken, preoperatif olarak saptanan bir karaciğer metastazı hastalığı ileri evreye taşımakta; rezektabl olgularda bile ortalama 5 yıllık sağkalımı da %35-58 oranlarında tutmaktadır. Yapılan prognostik çalışmaların yanı sıra, PLO'nun anlamlı artışı kolorektal kanserin artan evrelerinde de anlamlı oranda yüksek bulunmuş, TNM evrelemesinin T basamağını anlamlı ölçüde etkilemiştir.<sup>9</sup> Bir başka çalışmada, cerrahi tedavi sonrası artan PLO değerinin evre 2 ve 3 hastalarda hastalık rekürrensini istatistiksel olarak anlamlı oranda gösterebildiği bildirilmiştir.<sup>7</sup> Yine PLO'nun kolorektal kanserlerde bir başka kullanımı kemoterapiye yanıtın değerlendirilmesidir. Wu ve ark.<sup>10</sup>, metastatik kolorektal kanser hastalarıyla yaptıkları çalışmada kemoterapiye yanıt değerlendirmesinde PLO değerinin normale dönmesini iyi bir prognoz belirtisi olarak bildirmişlerdir.

Kolorektal kanserlerin karaciğer metastazlarını değerlendiren ve PLO'yu inceleyen literatürde sadece bir çalışma yer almaktadır. Bu çalışma sonucunda, PLO neoadjuvan kemoterapi sonrası kütatif karaciğer rezeksiyonu yapılan ve yalnız karaciğer metastazı olan kolorektal kanser olgularında, genel sağkalımı ve hastaliksiz sağkalımı göstermede anlamlı ve bağımsız bir faktör olarak bulunmuştur. Bunun yanında, bu olgularda kötü bir belirteç olarak PLO'nun preoperatif değeri nötrofil-lenfosit oranından (NLO) üstün bulunmuştur.<sup>19</sup>

Çalışmamızda baktığımız bir diğer parametre olan lenf nodu pozitivitesi de istatistiksel olarak yüksek PLO değeri olan hastalarda tutulumu öngörebilmiştir. Ancak bu oran çalışmamızda saptadığımız, PLO'nun karaciğer metastazını öngörebilen sensitivite ve spesifitesi kadar anlamlı yüksek değildir. Literatüre baktığımızda PLO'nun kolon kanserindeki lenf nodu tutulumunu öngören bir çalışmaya rastlanmadık. Ancak Özgehan ve ark.'nın<sup>20</sup> kolon kanserindeki tümör evrelemesinde NLO'nun etkisini incelediği çalışmada, NLO lenf nodu pozitifliği saptanan hastalarda anlamlı oranda yüksek bulunmuştur. Bu durum NLO gibi bir enflamatuvar belirteç olan PLO'nun önemini göstermesi bakımından önemlidir.

2015 yılında Çakmur ve ark.'nın<sup>21</sup> Kuzeydoğu Anadolu Bölgesi'nde yaptıkları çalışma sonucunda, kolorektal olguların ülkemizde literatürün aksine geç olarak tanı aldıkları ifade edilmiştir. Tarama testlerinin özellikle koruyucu sağlık hizmetleri bağlamında önemine vurgu yapılmıştır.<sup>21</sup> Çalışmamızın sonuçları ışığında da bu veri yeniden değerlendirildiğinde, PLO'nun ucuz, kolay uygulanabilen, evrensel, invazif olmayan bir belirteç olarak yeni tanı konan kolorektal kanser olgularındaki karaciğer metastazlarını öngörmeye kullanılabileceği kanaatindeyiz.

## Etik

**Etik Kurul Onayı:** Etik kurul onayı Kafkas Üniversitesi Tıp Fakültesi Etik Kurulu'ndan alınmıştır (Onay no: 80576354-050-99/87, Tarih: 11.01.2017).

**Hasta Onayı:** Çalışma retrospektif dizayn edilmiştir, bununla birlikte hastalardan cerrahi onam formu alınmıştır.

**Hakem Değerlendirmesi:** Editörler kurulu tarafından değerlendirilmiştir.

## Yazarlık Katkıları

Cerrahi ve Medikal Uygulama: T.A., A.C.Y., Konsept: T.A., Dizayn: T.A., Veri Toplama veya İşleme: T.A., A.C.Y., Analiz veya Yorumlama: T.A., A.C.Y., Literatür Arama: T.A., A.C.Y., Yazan: T.A.

**Çıkar Çatışması:** Yazarlar bu makale ile ilgili olarak herhangi bir çıkar çatışması bildirmemiştir.

**Finansal Destek:** Çalışmamız için hiçbir kurum ya da kişiden finansal destek alınmamıştır.

## Kaynaklar

1. Siegel RL, Miller KD, Jemal A. Cancer statistics, 2016. *CA Cancer J Clin* 2016;66:7-30.
2. Ryerson AB, Ehemann CR, Altekruse SF, Ward JW, Jemal A, Sherman RL, Henley SJ, Holtzman D, Lake A, Noone AM, Anderson RN, Ma J, Ly KN, Cronin KA, Penberthy L, Kohler BA. Annual Report to the Nation on the Status of Cancer, 1975-2012, featuring the increasing incidence of liver cancer. *Cancer* 2016;122:1312-1337.
3. Lee BY, Sonnenberg A. Time trends of mortality from colorectal cancer in the United States: a birth-cohort analysis. *JAMA Intern Med* 2013;173:1148-1150.
4. Maeda K, Shibutani M, Otani H, Nagahara H, Ikeya T, Iseki Y, Tanaka H, Muguruma K, Hirakawa K. Inflammation-based factors and prognosis in patients with colorectal cancer. *World J Gastrointest Oncol* 2015;7:111-117.
5. Zou ZY, Liu HL, Ning N, Li SY, DU XH, Li R. Clinical significance of pre-operative neutrophil lymphocyte ratio and platelet lymphocyte ratio as prognostic factors for patients with colorectal cancer. *Oncol Lett* 2016;11:2241-2248.
6. Mahsuni Sevinc M, Riza Gunduz U, Kinaci E, Armagan Aydin A, Bayrak S, Umar Gursu R, Gunduz S. Preoperative neutrophil-to-lymphocyte ratio and platelet- to-lymphocyte ratio as new prognostic factors for patients with colorectal cancer. *J BUON* 2016;21:1153-1157.
7. Szkandera J, Pichler M, Absenger G, Stotz M, Armingier F, Weissmueller M, Schaberl-Moser R, Samonigg H, Kornprat P, Stojakovic T, Avian A, Gerger A. The elevated preoperative platelet to lymphocyte ratio predicts decreased time to recurrence in colon cancer patients. *Am J Surg* 2014;208:210-214.
8. Min GT, Wang YH, Yao N, Zhao JM, Wang J, Wang HP, Chen W, Deng SJ, Li YM. The prognostic role of pretreatment platelet-to-lymphocyte ratio as predictors in patients with colorectal cancer: a meta-analysis. *Biomark Med* 2017;11:87-97.
9. Jia J, Zheng X, Chen Y, Wang L, Lin L, Ye X, Chen Y, Chen D, Dettke M. Stage-dependent changes of preoperative neutrophil to lymphocyte ratio and platelet to lymphocyte ratio in colorectal cancer. *Tumour Biol* 2015;36:9319-9325.
10. Wu Y, Li C, Zhao J, Yang L, Liu F, Zheng H, Wang Z, Xu Y. Neutrophil-to-lymphocyte and platelet-to-lymphocyte ratios predict chemotherapy outcomes and prognosis in patients with colorectal cancer and synchronous liver metastasis. *World J Surg Oncol* 2016;14:289.
11. Khatri VP, Petrelli NJ, Belghiti J. Extending the frontiers of surgical therapy for hepatic colorectal metastases: is there a limit? *J Clin Oncol* 2005;23:8490-8499.
12. Siegel RL, Miller KD, Jemal A. Cancer statistics, 2016. *CA Cancer J Clin* 2016;66:7-30.
13. Kopetz S, Chang GJ, Overman MJ, Eng C, Sargent DJ, Larson DW, Grothey A, Vauthey JN, Nagorney DM, McWilliams RR. Improved survival in metastatic colorectal cancer is associated with adoption of hepatic resection and improved chemotherapy. *J Clin Oncol* 2009;27:3677-3683.
14. Yodying H, Matsuda A, Miyashita M, Matsumoto S, Sakurazawa N, Yamada M, Uchida E. Prognostic Significance of Neutrophil-to-Lymphocyte Ratio and Platelet-to-Lymphocyte Ratio in Oncologic Outcomes of Esophageal Cancer: A Systematic Review and Meta-analysis. *Ann Surg Oncol* 2016;23:646-654.
15. Song W, Wang K, Zhong FP, Fan YW, Peng L, Zou SB. Clinicopathological and prognostic significance of platelet-to-lymphocyte ratio in patients with hepatocellular carcinoma. *Oncotarget* 2016;7:81830-81838.
16. Xu Z, Xu W, Cheng H, Shen W, Ying J, Cheng F, Xu W. The Prognostic Role of the Platelet-Lymphocytes Ratio in Gastric Cancer: A Meta-Analysis. *PLoS One* 2016;11:e0163719.
17. Chen L, Zhang F, Sheng XG, Zhang SQ, Chen YT, Liu BW. Peripheral platelet/lymphocyte ratio predicts lymph node metastasis and acts as a superior prognostic factor for cervical cancer when combined with neutrophil: Lymphocyte. *Medicine (Baltimore)* 2016;95:e4381.
18. Schoenfeld P, Cash B, Flood A, Dobhan R, Eastone J, Coyle W, Kikendall JW, Kim HM, Weiss DG, Emory T, Schatzkin A, Lieberman D; CONCERN Study Investigators. Colonoscopic screening of average-risk women for colorectal neoplasia. *N Engl J Med* 2005;352:2061-2068.
19. Neofytou K, Smyth EC, Giakoustidis A, Khan AZ, Cunningham D, Mudan S. Elevated platelet to lymphocyte ratio predicts poor prognosis after hepatectomy for liver-only colorectal metastases, and it is superior to neutrophil to lymphocyte ratio as an adverse prognostic factor. *Med Oncol* 2014;31:239.
20. Özgehan G, Kahramanca Ş, Kaya İO, Bilgen K, Bostancı H, Güzel H, Küçükpınar T, Kargıcı H. Neutrophil-lymphocyte ratio as a predictive factor for tumor staging in colorectal cancer. *Turk J Med Sci* 2014;44:365-368.
21. Çakmur H, Anuk T, Önder T, Güven H, Neşet K. Kuzey-Doğu Anadolu Bölgesinde Görülen Kolorektal Kanserlerin Özellikleri. *Turk J Colorectal Dis* 2015;25:21-27.



# Small Bowel Intussusception After Rectal Surgery: Case Report

## Rektum Cerrahisi Sonrası İnce Barsak İnvajinasyonu: Olgu Sunumu

**Barış Sevinç<sup>1</sup>, Semiha Canverenler<sup>2</sup>**

<sup>1</sup>Medicalpark Uşak Hospital, Clinic of General Surgery, Uşak, Turkey

<sup>2</sup>Medicalpark Uşak Hospital, Clinic of Radiology, Uşak, Turkey

### ABSTRACT

Adult small bowel intussusception is a very rare entity. However, it may cause mechanical small bowel obstruction. In this report, a case with small bowel intussusception after anterior resection for rectal tumor is presented. The patient was operated and the invaginated segment was resected. Postoperative evaluation of the resected material revealed no lead point lesion for invagination. Small bowel intussusception should be kept in mind in the differential diagnosis of postoperative ileus.

**Keywords:** Intussusception, rectal surgery, small bowel

### ÖZ

Yetişkinlerde ince barsak invajinasyonu çok nadir görülmesine rağmen barsak tıkanıklığına yol açabilir. Bu bildiriye rektum tümörü için yapılan anterior rezeksiyon sonrası gelişen ince barsak invajinasyonu olgusunu sunmak istedik. Hasta cerrahiye alınarak, invajine olan segment rezekt edildi. Çıkarılan materyal incelendiğinde invajinasyona neden olabilecek herhangi bir tetik lezyon bulunamadı. Sonuç olarak, postoperatif barsak tıkanıklığının ayırıcı tanısında spontan ince barsak invajinasyonu da akılda tutulmalıdır.

**Anahtar Kelimeler:** İnvajinasyon, rektum cerrahisi, ince barsak

## Introduction

Intussusception is the second most common cause of acute abdomen in children and most of the cases are idiopathic. However, intussusception in adult patients is a very rare entity.<sup>1</sup> In most of the adult cases there is an underlying pathology like polyp or carcinoid tumors.<sup>1</sup> Most of the cases invagination is a result of pulling by the leading point. The leading point pulls the proximal segment into the distal segment and invagination occurs.

Postoperative ileus can be seen after any abdominal surgery. It mostly represents with nausea, vomiting, abdominal discomfort and constipation. Postoperative ileus can be either paralytic (due to intraabdominal inflammation) or mechanic (due to luminal obstruction by adhesions etc). In most of the cases “wait and see” strategy with nasogastric drainage can be chosen.<sup>2</sup>

Postoperative intussusception is a very rare entity and there are only two cases in literature with intussusception after rectal surgery.<sup>3,4</sup>

Here we present a case with small bowel intussusception after anterior resection for rectal carcinoma.

## Case Report

Seventy-one years old male patient admitted to hospital with rectal bleeding. After initial evaluation colonoscopy was performed. At colonoscopy, a 3 cm polypoid mass at rectosigmoid junction was detected. Pathological evaluation revealed adenocarcinoma. Abdominal computed tomography (CT) scan showed no distant metastasis and no lymph node involvement. Anterior resection and primary colocolic anastomosis was performed at operation. Patient stayed stable at postoperative period with no complication. Intestinal



Address for Correspondence/Yazışma Adresi: Barış Sevinç MD  
Medicalpark Uşak Hospital, Clinic of General Surgery, Uşak, Turkey  
Phone: +90 505 488 05 11 E-mail: drbarissevinc@gmail.com  
Received/Geliş Tarihi: 24.10.2016 Accepted/Kabul Tarihi: 16.11.2016



peristalsis returned at postoperative 2<sup>nd</sup> day. He had gas and fecal discharge at postoperative 4<sup>th</sup> day. At postoperative 8<sup>th</sup> day he has nausea and vomiting. Abdominopelvic CT scan showed ileal intussusception (Figure 1). At laparotomy, there was intussusception at ileum 60 cm proximal from cecum. Fifteen cm of proximal segment was invaginated to distal segment (Figure 2). When the specimen was opened there was no leading point at the invaginated segment (Figure 3).

## Discussion

Although, intussusception is the second most common cause of abdominal emergencies in children, it is very rare in adults.<sup>1</sup> In children even all of the cases can be treated by manual reduction.<sup>5,6</sup> However, in adults, most of the cases have a leading point and in more than half of the cases the leading point is malignant.<sup>7,8</sup>

Although it is a significant cause of intestinal obstruction, it is very rare in postoperative period. There are only two

cases in literature with small bowel intussusception after rectal surgery.<sup>3,4</sup> The very first case was diagnosed 22 days after the initial surgery. According to authors, the delay was due to lower index of suspicion.<sup>3</sup> In the recent case, intussusception was diagnosed at the postoperative 8<sup>th</sup> day.

There are several reasons for postoperative ileus. First of all, mechanical obstruction must be differentiated from paralytic ileus. As the recent case has nausea and vomiting with positive bowel sounds, mechanical obstruction was suspected. Intussusception can be diagnosed by ultrasonography or abdominal CT. In the recent case, it would be difficult to evaluate the cause of obstruction due to distended abdomen and surgical wound. Therefore, abdominal CT was chosen. Similarly, both of the cases in literature were diagnosed by abdominal CT.<sup>3,4</sup>

In adult intussusception most of the cases have a leading point. In the recent case, operated for rectal adenocarcinoma, the probability for a second malignancy was high. Therefore,

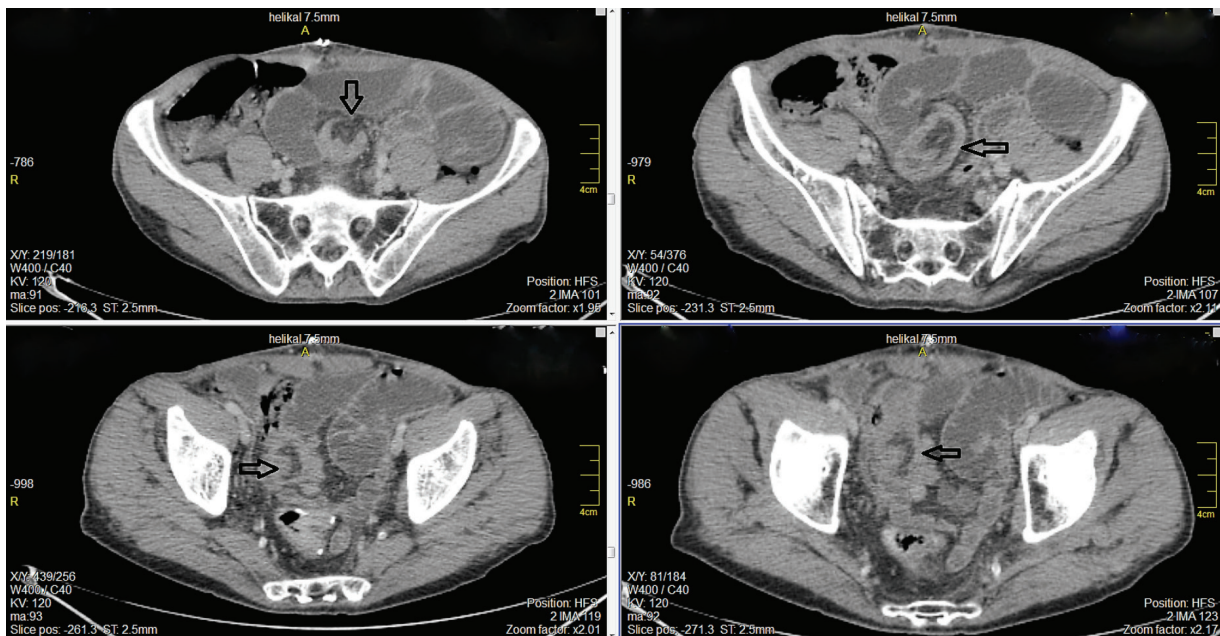


Figure 1. Computed tomography image showing small bowel intussusception



Figure 2. Operative image showing invaginated segment

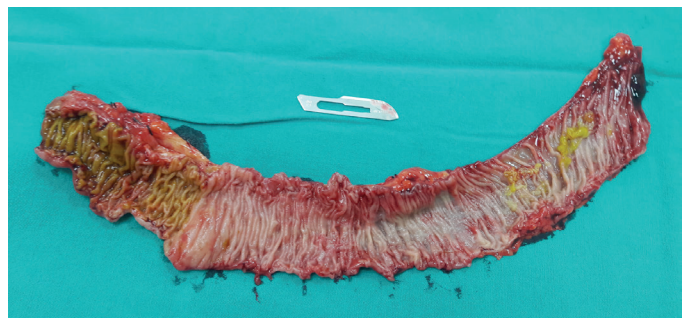


Figure 3. Resected small bowel segment. After opening the material there is no leading point for invagination

surgical intervention was chosen as first step treatment option.

Both of the small bowel intussusception cases after rectal surgery, had no leading point. Similarly, recent case had no leading point. This situation brings into mind the question that; there can be another reason for spontaneous intussusception. Increased intestinal peristalsis due to preoperative bowel preparation or temporary adhesions in the small bowel may have a role.

As conclusion, here we present the third case with spontaneous small bowel intussusception after rectal surgery. Even in adult cases, in differential diagnosis of postoperative intestinal obstruction intussusception should be kept in mind.

### **Ethics**

**Informed Consent:** Informed consent was taken from the patient.

**Peer-review:** Internally peer-reviewed.

### **Authorship Contributions**

Surgical and Medical Practices: B.S., S.C., Concept: B.S., S.C., Design: B.S., S.C., Data Collection or Processing: B.S., S.C., Literature Search: B.S., Writing: B.S.

**Conflict of Interest:** No conflict of interest was declared by the authors.

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

### **References**

1. Marinis A, Yiallourou A, Samanides L, Dafnios N, Anastasopoulos G, Vassiliou I, Theodosopoulos T. Intussusception of the bowel in adults: a review. *World J Gastroenterol* 2009;15:407-411.
2. Di Saverio S, Coccolini F, Galati M, Smerieri N, Biffi WL, Ansaloni L, Tugnoli G, Velmahos GC, Sartelli M, Bendinelli C, Fraga GP, Kelly MD, Moore FA, Mandalà V, Mandalà S, Masetti M, Jovine E, Pinna AD, Peitzman AB, Leppaniemi A, Sugarbaker PH, Goor HV, Moore EE, Jeekel J, Catena F. Bologna guidelines for diagnosis and management of adhesive small bowel obstruction (ASBO): 2013 update of the evidence-based guidelines from the world society of emergency surgery ASBO working group. *World J Emerg Surg* 2013;8:42.
3. Hussain AS, Warriar R, Papaconstantinou HT. Small bowel intussusception causing a postoperative bowel obstruction following laparoscopic low anterior resection in an adult. *Proc (Bayl Univ Med Cent)* 2014;27:128-130.
4. Kim YW. A case of postoperative spontaneous intussusception after laparoscopic low anterior resection for rectal cancer. *Mil Med Res* 2016;3:19.
5. Turkyilmaz Z, Sonmez K, Demiroğullari B, Karabulut R, Ozen IO, Moralioglu S, Başaklar AC, Kale N. Postoperative intussusception in children. *Acta Chir Belg* 2005;105:187-189.
6. Bai YZ, Chen H, Wang WL. A special type of postoperative intussusception: ileoileal intussusception after surgical reduction of ileocolic intussusception in infants and children. *J Pediatr Surg* 2009;44:755-758.
7. Azar T, Berger DL. Adult intussusception. *Ann Surg* 1997;226:134-138.
8. Huang BY, Warshauer DM. Adult intussusception: diagnosis and clinical relevance. *Radiol Clin North Am* 2003;41:1137-1151.



# A Case of Tuberculosis Mimicking Colon Cancer

## Kolon Kanserini Taklit Eden Tüberküloz Olgusu

Hüseyin Çiyiltepe, Durmuş Ali Çetin, Ulaş Aday, Ebubekir Gündeş, Emre Bozdağ, Mustafa Duman

Kartal Koşuyolu High Speciality Training and Research Hospital, Clinic of Gastroenterological Surgery, İstanbul, Turkey

### ABSTRACT

The incidence of tuberculosis (TB) is increasing all over the world. Although pulmonary involvement is more frequent, 3% of patients present with abdominal involvement which requires differential diagnosis from malignancy. The clinical presentation of abdominal TB is abdominal pain, fever, and weight loss, and it is difficult to differentiate from Crohn's disease and malignancies. In this article, we aimed to report a patient with cecal TB which could be confused with colon tumor in clinical and imaging modalities.

**Keywords:** Tuberculosis, colon, cancer

### ÖZ

Tüm dünyada tüberküloz (TB) insidansı giderek artmaktadır. Daha sıklıkla pulmoner tutulum izlense de hastaların %3'ü abdominal tutulum ile başvurmaktadır ve malignite ile ayırıcı tanısı yapılması gerekmektedir. Abdominal TB'de klinik prezentasyon karın ağrısı, ishal, ateş, kilo kaybı şeklinde olup Crohn hastalığı ve gastrointestinal sistem maligniteleri ile ayırıcı tanı yapmak zordur. Bu yazıda klinik ve görüntüleme yöntemlerinde kolon tümörü ile karışabilecek cecal TB hastasını bildirmeyi amaçladık.

**Anahtar Kelimeler:** Tüberküloz, kolon, kanser

## Introduction

In developed countries, the incidence of tuberculosis (TB) is rising as a result of immunosuppression induced by increasingly prevalent causes like cancer and human immunodeficiency virus infection. In developing nations, poor living conditions are the main cause of TB infection.<sup>1</sup>

According to a report published in 2014 by the Public Health Institution of Turkey entitled "The War on Tuberculosis in Turkey 2013", the annual incidence of TB fell from 26/100.000 in 2005 to 19.3/100.000 in 2011.<sup>2</sup>

TB is an infectious disease which can involve any organ or tissue, is a major cause of morbidity and mortality, and is characterized by calcified granulomas. The most common form is pulmonary TB. Abdominal TB is seen in 15-20% of all extrapulmonary TB cases and 3% of TB cases overall.<sup>3,4</sup>

Abdominal TB may involve the enteric, peritoneal, omental, and mesenteric lymph nodes, as well as intra-abdominal solid organs such as the liver, spleen, and pancreas.<sup>5</sup> The

ileocecal region or jejunum are involved in approximately 75% of gastrointestinal system (GIS) TB cases.<sup>6</sup>

The clinical presentation of abdominal TB includes abdominal pain, diarrhea, fever, and weight loss, and can be difficult to differentially diagnose from Crohn's disease and GIS malignancies. In patients with suspicious clinical and imaging findings, biopsy and bacteriological diagnosis are very important, but unfortunately mycobacteria are difficult to culture.<sup>7</sup>

With this report, we aimed to present a case of cecal TB whose clinical and imaging findings could be mistaken for colon tumor.

## Case Report

A 32-year-old male patient presented to our clinic for colonoscopy after undergoing tests for about 6 months at another center for malaise, chronic diarrhea, abdominal pain, and anemia. On physical examination, a palpable mass



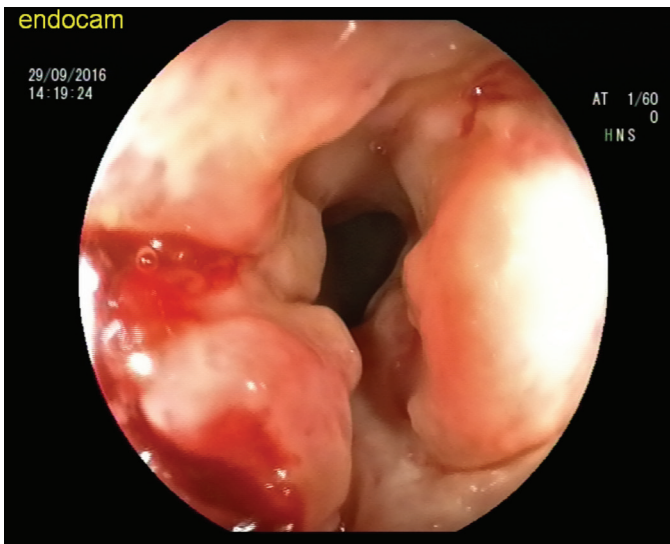
Address for Correspondence/Yazışma Adresi: Hüseyin Çiyiltepe MD

Kartal Koşuyolu High Speciality Training and Research Hospital, Clinic of Gastroenterological Surgery, İstanbul, Turkey

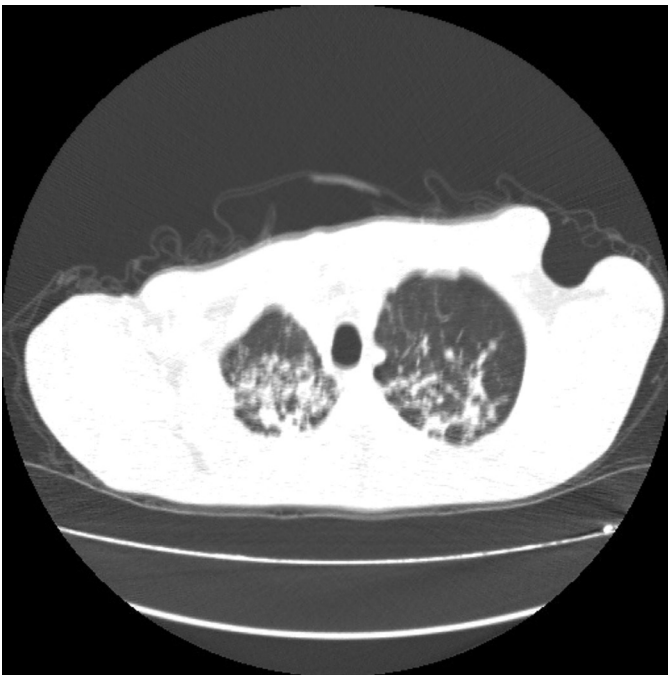
Phone: +90 216 500 15 00 E-mail: drciyiltepe@hotmail.com

Received/Geliş Tarihi: 18.11.2016 Accepted/Kabul Tarihi: 26.12.2016

was detected in the right lower quadrant. Colonoscopy revealed a cecal mass invading the ileocecal valve causing circular stenosis and showing the features of a hemorrhagic, fragile malignancy. Biopsy samples were obtained during colonoscopy (Figure 1). Thoraco-abdominal computed tomography (CT) imaging with oral and intravenous contrast was conducted. CT evaluation showed nodal densities of approximately 9x8 mm and 13x12 mm suggestive of cavitary lesions in the superior segment of the lower lobe of the left lung (Figure 2). In addition, asymmetric wall



**Figure 1.** Colonoscopy image showing tuberculous involvement of the cecum



**Figure 2.** Thoraco-abdominal computed tomography image showing pulmonary tuberculosis

thickening (maximum thickness of 17 mm) was observed in a colonic segment starting at the cecum and extending about 6 cm up the ascending colon, and multiple enlarged, likely metastatic lymph nodes (maximum size 13x12 mm) were detected in the surrounding adipose tissue (Figure 3). Although pulmonary findings initially suggested a TB-like infectious process, it could not be differentiated from atypical lymphangitis carcinoma. The ascending colon lesion was evaluated as a malignant process and associated infiltrative appearance. Biopsy results indicated ulcer with a base of granulation tissue and extensive granulomatous inflammation, and the findings were considered suggestive of TB. The patient was referred to the clinic of chest diseases for TB testing and treatment. The patient's sputum was positive for acid-fast bacilli (AFB), and treatment for active TB was initiated. Follow-up colonoscopy was recommended.

## Discussion

Gastrointestinal TB, caused by *Mycobacterium tuberculosis*, can manifest anywhere in the GIS. Although seen infrequently in developed nations, it can still present an important health problem in Turkey.<sup>1</sup> Extrapulmonary TB, which accounts for 15-20% of all TB cases, occurs in both developed and developing countries and is growing in importance. Abdominal TB is seen in 3% of all TB cases.<sup>3</sup>

The symptoms of abdominal TB are not specific, but most patients present with abdominal pain, and may also have diarrhea, fever, anorexia, and weight loss. Without current or previous pulmonary disease, TB is not usually considered as an initial diagnosis.<sup>7</sup> Our patient also presented with complaints of malaise, anorexia, chronic diarrhea, and weight loss. In 25-50% of cases, a mass is palpable in the right lower quadrant during physical examination, as in we detected in our patient.<sup>8</sup>



**Figure 3.** Thoraco-abdominal computed tomography image showing colonic tuberculosis

Gastrointestinal involvement is the sixth most common form of extrapulmonary TB. The ileocecal region, ascending colon, jejunum, appendix, duodenum, stomach, esophagus, sigmoid colon, and rectum are usually involved. Due to the multifocal nature of intestinal TB, involvement of the colon alone is extremely rare.<sup>9</sup>

Findings from radiologic imaging studies to identify GIS involvement are non-specific. Imaging findings which may suggest abdominal TB are narrowing or apple-core sign on barium colonography. Ascites, omental thickening, abdominal lymph nodes, and bowel wall thickening may be observed on CT. However, these findings alone are not sufficient for diagnosis and are not disease-specific signs. Colonoscopy has an important place in the diagnosis of ileocecal and colon TB. Ulceration, nodular appearance, cecal mass, and ileocecal valve deformation are the most common colonoscopy findings.<sup>10</sup> Similarly, colonoscopic examination of our patient revealed a cecal mass lesion extending to the ileocecal valve with a malignant appearance and circulatory involvement, which mimicked a colon tumor.

Biopsy samples obtained during colonoscopy facilitate rapid diagnosis. Specific microbiologic analysis or polymerase chain reaction analysis are necessary for a definitive diagnosis.<sup>10,11</sup> In our case, pathologic examination report of the biopsy samples indicated ulcer with a base of granulation tissue and extensive granulomatous inflammation. Considering the presence of pulmonary signs and AFB+ sputum, the patient's findings were evaluated as TB.

The differential diagnosis includes inflammatory bowel diseases, colon cancer, diverticulitis, appendicitis, and other causes of infectious colitis. Anti-TB drugs are used as medical treatment. Surgical intervention should also be considered in complicated cases.<sup>3</sup> The most common complications are intestinal obstruction, GIS fistula, perforation, and gastrointestinal hemorrhage.

In conclusion, TB infection should be considered in the differential diagnosis of patients with no history of pulmonary TB presenting with non-specific GIS symptoms. We believe that in developing countries where the frequency of TB is high, such as Turkey, intestinal TB should be suspected and advanced testing performed when granulomatous inflammation is detected in biopsy specimens obtained from GIS organs.

## Ethics

**Informed Consent:** Retrospective study.

**Peer-review:** External and internal peer-reviewed.

## Authorship Contributions

Surgical and Medical Practices: H.Ç., M.D., Concept: D.A.Ç., Design: E.G., Data Collection or Processing: E.B., Analysis or Interpretation: U.A., Literature Search: D.A.Ç., E.B., Writing: H.Ç.

**Conflict of Interest:** No conflict of interest was declared by the authors.

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

## References

1. Raviglione MC, Snider DE Jr, Kochi A. Global epidemiology of tuberculosis. Morbidity and mortality of a worldwide epidemic. *JAMA* 1995;273:220-226.
2. Musaonbaşıoğlu S, Özkan S. Türkiye'de Verem Savaşı 2013 Raporu. Ankara: Türkiye Cumhuriyeti Sağlık Bakanlığı, 2014.
3. Sharma SK, Mohan A. Extrapulmonary tuberculosis. *Indian J Med Res* 2004;120:316-353.
4. Suri S, Gupta S, Suri R. Computed tomography in abdominal tuberculosis. *Br J Radiol* 1999;72:92-98.
5. Ibrarullah M, Mohan A, Sarkari A, Srinivas M, Mishra A, Sundar TS. Abdominal tuberculosis: diagnosis by laparoscopy and colonoscopy. *Trop Gastroenterol* 2001;23:150-153.
6. Bektaş A. Gastrointestinal sistem ve periton tüberkülozu. 21. Yüzyılda Tüberküloz Sempozyumu (11-12 Haziran 2003, Samsun) ve II. Tüberküloz Laboratuvar Tanı Yöntemleri Kursu (13-14 Haziran 2003, Samsun) Kitabı. İstanbul: Klinik Mikrobiyoloji ve Enfeksiyon Hastalıkları Derneği & Toraks Derneği Samsun Şubesi; 2003:135-140.
7. Shi XC, Zhang LF, Zhang YQ, Liu XQ, Fei GJ. Clinical and Laboratory Diagnosis of Intestinal Tuberculosis. *Chin Med J (Engl)* 2016;129:1330-1333.
8. Golden MP, Vikram HR. Extrapulmonary tuberculosis: an overview. *Am Fam Physician* 2005;72:1761-1768.
9. Şahbaz S, Yılmaz A, İnönü H, Çelik A, Köseoğlu DR, Acı B, Yenişehirli G. Kolonda kronik granülatöz inflamasyon ve akciğer tüberkülozu. *Solunum Hastalıkları* 2008;19:113-117.
10. Ergün M, Tunç B, Ülker A, Şaşmaz N. Doktorlar için bir klinik zorluk: Abdominal tüberküloz 24 olgunun derlemesi. *Endoskopi Dergisi* 2012;20:72-76.
11. Yajnik V, McDermott S, Khalili H, Everett JM. Case Records of the Massachusetts General Hospital. Case 7-2016. An 80-Year-Old Man with Weight Loss, Abdominal Pain, Diarrhea, and an Ileocecal Mass. *New Engl J Med* 2016;374:970-979.

# Kolon Kanserini Taklit Eden Tüberküloz Olgusu

## A Case of Tuberculosis Mimicking Colon Cancer

Hüseyin Çiyiltepe, Durmuş Ali Çetin, Ulaş Aday, Ebubekir Gündeş, Emre Bozdağ, Mustafa Duman

Kartal Koşuyolu Yüksek İhtisas Eğitim ve Araştırma Hastanesi, Gastroenteroloji Cerrahisi Kliniği, İstanbul, Türkiye

### ÖZ

Tüm dünyada tüberküloz (TB) insidansı giderek artmaktadır. Daha sıklıkla pulmoner tutulum izlense de hastaların %3'ü abdominal tutulum ile başvurmakta ve malignite ile ayırıcı tanısı yapılması gerekmektedir. Abdominal TB'de klinik prezentasyon karın ağrısı, ishal, ateş, kilo kaybı şeklinde olup Crohn hastalığı ve gastrointestinal sistem maligniteleri ile ayırıcı tanı yapmak zordur. Bu yazıda klinik ve görüntüleme yöntemlerinde kolon tümörü ile karışabilecek çekal TB hastasını bildirmeyi amaçladık.

**Anahtar Kelimeler:** Tüberküloz, kolon, kanser

### ABSTRACT

The incidence of tuberculosis (TB) is increasing all over the world. Although pulmonary involvement is more frequent, 3% of patients present with abdominal involvement which requires differential diagnosis from malignancy. The clinical presentation of abdominal TB is abdominal pain, fever, and weight loss, and it is difficult to differentiate from Crohn's disease and malignancies. In this article, we aimed to report a patient with cecal TB which could be confused with colon tumor in clinical and imaging modalities.

**Keywords:** Tuberculosis, colon, cancer

### Giriş

Gelişmiş ülkelerde gittikçe yaygınlaşan insan immün yetmezlik virüsü enfeksiyonu ve kanser gibi nedenlerle gelişen immünsüpresyon sonucu tüberküloz (TB) insidansı giderek artmaktadır. Gelişmekte olan ülkelerde ise kötü yaşam şartları TB enfeksiyonunun ana nedeni olarak ortaya çıkmaktadır.<sup>1</sup>

Türkiye Halk Sağlığı Kurumu Başkanlığı'nın 2014'te yayınlamış olduğu "Türkiye'de Verem Savaşı 2013" raporuna göre 2005 yılında 26/100,000 olan TB insidansında yıllar içerisinde bir azalma meydana gelmiş ve 2011 yılında 19,3/100,000 yeni olgu olarak rapor edilmiştir.<sup>2</sup>

TB tüm organ ve dokuları tutabilen, önemli morbidite ve mortaliteye neden olan, kazeifiye granülomlarla karakterize bir enfeksiyon hastalığıdır. Pulmoner TB daha sık görülen formudur. Ekstrapulmoner TB tüm olguların %15-20'si

oranında, abdominal TB ise tüm olguların %3'ü oranında görülür.<sup>3,4</sup>

Abdominal TB enterik, peritoneal, omental, mezenterik lenf nodlarının; ayrıca karaciğer, dalak, pankreas gibi intraabdominal solid organların tutulumu şeklinde olabilir.<sup>5</sup> Gastrointestinal sistem (GİS) TB'li olguların yaklaşık %75'inde tutulum yeri ileoçekal bölge veya jejunumdur.<sup>6</sup>

Abdominal TB'de klinik prezentasyon karın ağrısı, ishal, ateş, kilo kaybı şeklinde olup Chron hastalığı ve GİS maligniteleri ile ayırıcı tanı yapmak zordur. Klinik ve görüntüleme yöntemlerinde şüphe olan hastalarda biyopsi yapılması ve basilin gösterilmesi önemli olmakla birlikte basil üretilmesi güçlükle arz etmektedir.<sup>7</sup>

Bu yazıda klinik ve görüntüleme yöntemlerinde kolon tümörü ile karışabilecek çekal TB hastasını bildirmeyi amaçladık.



Yazışma Adresi/Address for Correspondence: Dr. Hüseyin Çiyiltepe

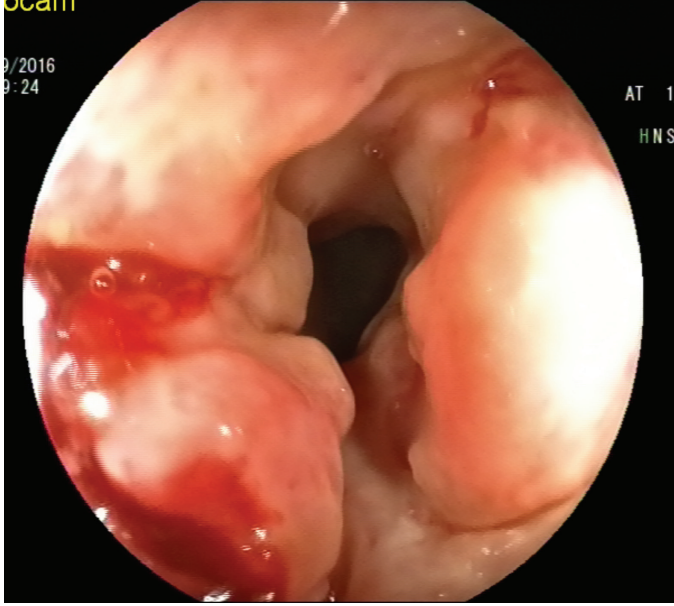
Kartal Koşuyolu Yüksek İhtisas Eğitim ve Araştırma Hastanesi, Gastroenteroloji Cerrahisi Kliniği, İstanbul, Türkiye

Tel.: +90 216 500 15 00 E-posta: drciyiltepe@hotmail.com

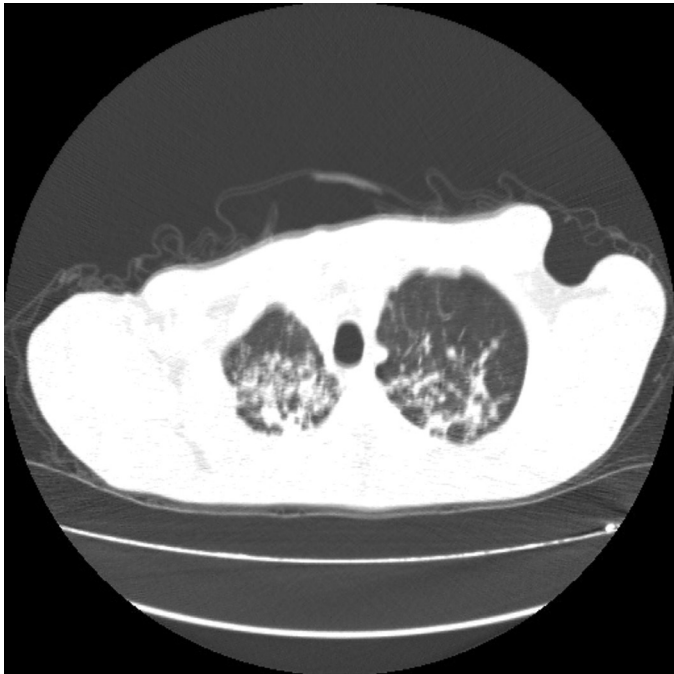
Geliş Tarihi/Received: 18.11.2016 Kabul Tarihi/Accepted: 26.12.2016

## Olgu Sunumu

Otuz iki yaşında erkek hasta halsizlik, kronik ishal, karın ağrısı ve anemi nedeniyle dış merkezde yaklaşık 6 ay tetkik edilirken kolonoskopi yapılması üzere kliniğimize başvurdu. Yapılan fizik muayenede sağ alt kadranda ele gelen kitle olduğu izlendi. Kolonoskopide çekumda ileoçekal valvi de invaze ettiği düşünülen, sirküler darlık



Resim 1. Kolonoskopide çekumda tüberküloz tutulumu

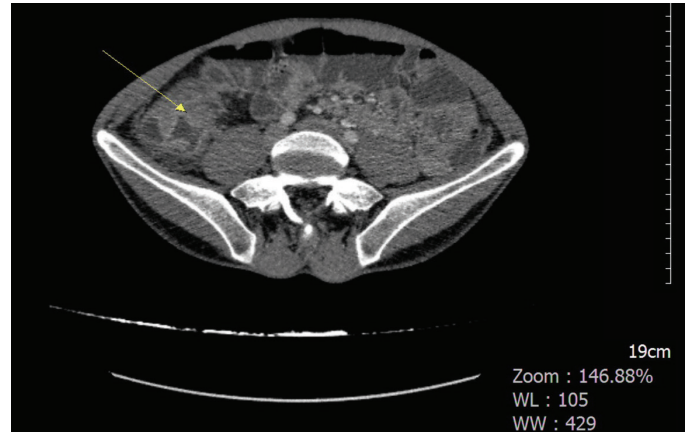


Resim 2. Torakoabdominal bilgisayarlı tomografide tüberküloz akciğer tutulumu

oluşturan, kanamalı frajil malign görünümlü kitle izlenerek biyopsiler alındı (Resim 1). Hastaya oral intravenöz (IV) kontrastlı torakoabdominal bilgisayarlı tomografi (BT) çekildi. BT değerlendirmesinde sol akciğer alt lob superior segment düzeyinde kavite başlangıcı açısından şüpheli yaklaşık 9x8 mm ve 13x12 mm'lik nodüler dansite izlendi (Resim 2). Ayrıca çekum düzeyinden başlayıp çıkan kolona doğru uzanan kolonik anslarda yaklaşık 6 cm'lik segmentte en kalın yerinde kalınlığı yaklaşık 17 mm'ye ulaşan asimetric duvar kalınlaşması ve çevre yağlı dokuda en büyüğü 13x12 mm boyutlarında muhtemel metastatik tutulum olarak değerlendirilen çok sayıda lenf nodu izlendi (Resim 3). Akciğerde saptanan bulgular ilk etapta TB gibi enfektif süreci düşündürmekle beraber atipik bir lenfanjitis karsinomatoz ayrımı yapılamadı. Çıkan kolondaki lezyon ise malign süreç ve buna bağlı infiltratif görünüm olarak değerlendirildi. Kitleden alınan biyopsi sonucu ülser zemininde granülasyon dokusu gelişimi ve yaygın granümatöz enflamasyon olduğu ve bulguların TB açısından şüpheli olduğu rapor edildi. Hasta göğüs hastalıkları kliniğine TB açısından tetkik ve tedavi edilmesi amacıyla yönlendirildi. Balgamda AARB + olan olguya aktif TB tanısıyla tedavi başlandı. Kontrol kolonoskopi önerildi.

## Tartışma

*Mycobacterium tuberculosis*'in etkeni olduğu gastrointestinal TB GİS'in herhangi bir lokalizasyonunda görülebilmektedir. Gelişmiş ülkelerde görülme sıklığı azalmakla birlikte ülkemizde halen önemli bir sağlık sorunu olarak karşımıza çıkabilmektedir.<sup>1</sup> TB olgularının %15-



Resim 3. Torakoabdominal bilgisayarlı tomografide tüberküloz kolon tutulumu

20'sini oluşturan ekstrapulmoner TB, hem gelişmekte olan hem de gelişmiş ülkelerde görülmekte ve giderek önemi artmaktadır. Abdominal TB ekstrapulmoner TB olgularının %3'ünde görülür.<sup>3</sup>

Yakınlıklar hastalığa spesifik değildir, olguların önemli kısmı karın ağrısı ile başvurur, ishal, ateş, iştahsızlık ve kilo kaybı görülebilir. Aktif ya da geçirilmiş pulmoner hastalık olmadığında ilk tanı olarak düşünülmesi genellikle çok zordur.<sup>7</sup> Bizim olgumuzda da başvuru şikayetleri halsizlik, iştahsızlık, kronik ishal ve kilo kaybı idi. Olguların %25-50'sinde fizik muayenede sağ alt kadranda ele gelen kitle lezyonu saptanabilir, olgumuzda da batın fizik muayenesinde sağ alt kadranda ele gelen kitle mevcuttu.<sup>8</sup>

GİS tutulumu ekstrapulmoner TB olguları arasında 6. sırada yer alır. Sıklıkla ileoçekal bölge, çıkan kolon, jejunum, apendiks, duodenum, mide, özefagus, sigmoid kolon ve rektum tutulur. İntestinal TB multipl odaklar şeklinde tutulumu neden olabilirken tek başına kolon tutulumu son derece nadir görülmektedir.<sup>9</sup>

GİS tutulumuna yönelik radyolojik görüntüleme tetkiklerindeki bulgular non-spesifiktir. Abdominal TB tanısını görüntüleme yöntemleri ile düşündüren bulgular; baryumlu kolon grafisinde darlık, elma yeniği görünümü olabilir. BT'de asit, omental kalınlaşma, abdominal lenf nodları ve barsak duvarında kalınlaşma görülebilir. Fakat bunlar tek başına tanı koymada yeterli ve hastalığa spesifik bir bulgu değildir. İleoçekal bölge ve kolon yerleşimli TB'nin tanısında kolonoskopi önemli bir yer tutmaktadır. Kolonoskopide en sık saptanan bulgular ülserasyon, nodüler görünüm, çekumda kitle imajı ve ileoçekal valvde deformasyondur.<sup>10</sup> Olgumuzda da yapılan kolonoskopik incelemede kolon tümörüne benzer biçimde çekumda sirküler tutulumlu, malign görünümlü ve ileoçekal kapağa uzanan kitle lezyonu izlendi.

Kolonoskopi ile alınan biyopsi örnekleri hızlı tanı konulmasına yardımcı olur. Kesin tanı için spesifik mikrobiyolojik incelemeler veya polimeraz zincirleme tepkimesi incelemesi gereklidir.<sup>10,11</sup> Olgumuzda alınan biyopsilerin patolojik incelemesinde ülser zemininde granülasyon dokusu gelişimi ve yaygın granülomatöz enflamasyon olduğu rapor edildi. Hastanın akciğer bulgularının olması ve balgamda AARB + olması nedeniyle bulgular TB lehinde değerlendirilmiştir.

Ayrırcı tanıda enflamatuvar barsak hastalıkları, kolon kanseri, divertikülit, apandisit ve diğer enfeksiyöz kolit nedenleri yer alır. Medikal tedavide anti-TB ilaçlar kullanılır. İntestinal TB'de cerrahi tedavi komplikasyonların varlığında düşünülmelidir.<sup>3</sup> En sık görülen komplikasyonlar intestinal obstrüksiyon, GİS fistülü, perforasyon ve gastrointestinal kanamadır.

Sonuç olarak, geçirilmiş pulmoner TB hikayesi olmayan ve nonspesifik GİS semptomları ile başvuran hastaların ayrırcı tanısında TB enfeksiyonu akılda tutulmalıdır. Ülkemiz gibi TB görülme sıklığının yüksek olduğu gelişmekte olan ülkelerde GİS organlarından elde edilen biyopsi örneklemelerinde saptanan granülomatöz enflamasyon varlığında intestinal TB'den şüphelenip tanıya yönelik ileri tetkikler yapılması kanaatindeyiz.

## Etik

**Hasta Onayı:** Retrospektif sunum olması nedeniyle alınmamıştır.

**Hakem Değerlendirmesi:** Editörler kurulu ve editörler kurulu dışında olan kişiler tarafından değerlendirilmiştir.

## Yazarlık Katkıları

Cerrahi ve Medikal Uygulama: H.Ç., M.D., Konsept: D.A.Ç., Dizayn: E.G., Veri Toplama veya İşleme: E.B., Analiz veya Yorumlama: U.A., Literatür Arama: D.A.Ç., E.B., Yazan: H.Ç.

**Çıkar Çatışması:** Yazarlar bu makale ile ilgili olarak herhangi bir çıkar çatışması bildirmemiştir.

**Finansal Destek:** Çalışmamız için hiçbir kurum ya da kişiden finansal destek alınmamıştır.

## Kaynaklar

1. Raviglione MC, Snider DE Jr, Kochi A. Global epidemiology of tuberculosis. Morbidity and mortality of a worldwide epidemic. JAMA 1995;273:220-226.
2. Musaonbaşıoğlu S, Özkan S. Türkiye'de Verem Savaşı 2013 Raporu. Ankara: Türkiye Cumhuriyeti Sağlık Bakanlığı, 2014.
3. Sharma SK, Mohan A. Extrapulmonary tuberculosis. Indian J Med Res 2004;120:316-353.
4. Suri S, Gupta S, Suri R. Computed tomography in abdominal tuberculosis. Br J Radiol 1999;72:92-98.
5. İbrarullah M, Mohan A, Sarkari A, Srinivas M, Mishra A, Sundar TS. Abdominal tuberculosis: diagnosis by laparoscopy and colonoscopy. Trop Gastroenterol 2001;23:150-153.
6. Bektaş A. Gastrointestinal sistem ve periton tüberkülozu. 21. Yüzyılda Tüberküloz Sempozyumu (11-12 Haziran 2003, Samsun) ve II. Tüberküloz Laboratuvar Tanı Yöntemleri Kursu (13-14 Haziran 2003, Samsun) Kitabı. İstanbul: Klinik Mikrobiyoloji ve İnfeksiyon Hastalıkları Derneği & Toraks Derneği Samsun Şubesi; 2003:135-140.



7. Shi XC, Zhang LF, Zhang YQ, Liu XQ, Fei GJ. Clinical and Laboratory Diagnosis of Intestinal Tuberculosis. *Chin Med J (Engl)* 2016;129:1330-1333.
8. Golden MP, Vikram HR. Extrapulmonary tuberculosis: an overview. *Am Fam Physician* 2005;72:1761-1768.
9. Şahbaz S, Yılmaz A, İnönü H, Çelik A, Köseoğlu DR, Acu B, Yenişehirli G. Kolonda kronik granülatöz inflamasyon ve akciğer tüberkülozu. *Solunum Hastalıkları* 2008;19:113-117.
10. Ergün M, Tunç B, Ülker A, Şaşmaz N. Doktorlar için bir klinik zorluk: Abdominal tüberküloz 24 olgunun derlemesi. *Endoskopi Dergisi* 2012;20:72-76.
11. Yajnik V, McDermott S, Khalili H, Everett JM. Case Records of the Massachusetts General Hospital. Case 7-2016. An 80-Year-Old Man with Weight Loss, Abdominal Pain, Diarrhea, and an Ileocecal Mass. *New Engl J Med* 2016;374:970-979.



# Foreign Body in Sacral Region: Remaining Part of Knife After Stabbing

## Sakrumda Yabancı Cisim: Bıçaklanma Sonrası Geride Kalan Bıçak Parçası

Dursun Özgür Karakaş<sup>1</sup>, Batuhan Hazer<sup>2</sup>, İbrahim Yılmaz<sup>3</sup>, Özgür Dandin<sup>3</sup>, Ali Kemal Sivrioğlu<sup>4</sup>, İlker Sücüllü<sup>5</sup>

<sup>1</sup>Okmeydanı Training and Research Hospital, Clinic of General Surgery, İstanbul, Turkey

<sup>2</sup>Bağcılar Tekden Hospital, Clinic of General Surgery, İstanbul, Turkey

<sup>3</sup>Gelibolu State Hospital, Clinic of General Surgery, Çanakkale, Turkey

<sup>4</sup>Okmeydanı Training and Research Hospital, Clinic of Radiology, İstanbul, Turkey

<sup>5</sup>Haydarpaşa Sultan Abdülhamid Han Training and Research Hospital, Clinic of General Surgery, İstanbul, Turkey

### ABSTRACT

Residual foreign bodies may be seen after penetrating injuries, accidents, or medical procedures. The head and neck are the most common sites of residual foreign bodies. Computed tomography is the best diagnostic modality for determining their shape, exact location, and relationship to adjacent tissues. Treatment consists of removing the foreign body if possible. We present a case of residual foreign body at the sacrum after stabbing.

**Keywords:** Foreign body, sacrum, stabbing

### ÖZ

Penetran yaralanma, kaza sonucu veya tıbbi işlem sonrası geride yabancı cisim kaldığı görülebilmektedir. Baş ve boyun bölgesi geride yabancı cismin kaldığı en sık bölgedir. Bilgisayarlı tomografi yabancı cismin şeklini, gerçek yerleşim yerini ve çevre dokular ile ilişkisini göstermedeki en uygun tanı yöntemidir. Tedavi; çıkarılması uygun olanların cerrahi çıkarılmasıdır. Burada bıçaklanma sonrası sakrumda geride yabancı cisim kalan olguyu sunmaktayız.

**Anahtar Kelimeler:** Yabancı cisim, sakrum, bıçaklanma

## Introduction

Remaining foreign bodies such as bullet, shrapnel, needle, wood, metallic pieces and medical materials (sponge, surgical or diagnosing instruments etc.) could be seen after stabbing, firearm or blastic injuries, accidental or suicidal attempt or medical procedures. These remaining foreign bodies are presented at head, neck, torax, abdomen, buttock and extremities or multiple locations. Remaining foreign body after stabbing especially at sacrum is a very rare condition. Foreign body can be seen at plain radiography but computed tomography (CT) is the most suitable diagnostic modality. Remaining foreign body can be removed if it is applicable. Here we present a case of remaining foreign body at sacrum after stabbing.

## Case Report

Twenty-one years old man with history of stabbing from sacral region six month before and remaining part of knife was applied to general surgery service with lumbosacral pain. There is an incision scar at gluteal region and pain in palpation at physical examination. Bright, smooth edged foreign body seen at lumbosacral plain graphy (Figure 1). Smooth edged, sharp, metallic foreign body image that terminal of it stuck in S2 vertebral spinous process but not damage spinal cord was seen at CT (Figure 2). After necessary operative preparation under local anesthesia and sedation with consultation of neurosurgery foreign body was removed (Figure 3). No complication was seen after operation and control evaluations



Address for Correspondence/Yazışma Adresi: Dursun Özgür Karakaş MD  
Okmeydanı Training and Research Hospital, Clinic of General Surgery, İstanbul, Turkey  
Phone: +90 212 238 79 00 E-mail: drdok1978@hotmail.com

Received/Geliş Tarihi: 12.12.2016 Accepted/Kabul Tarihi: 03.02.2017

This study was presented at the XV. Turkish Colon and Rectum Congress on 19-23 May 2015 in Antalya.

in postoperative neurological and surgical follow up at the two years were normal.

## Discussion

Penetrating injuries of buttock are important injuries and 2-3% of the penetrating injuries. These injuries are life-threatening conditions, and about one quarter of these injuries may occur neural, visceral and vascular injuries. It has been reported that total mortality rate of penetrating

injuries of buttock 2.9%, stabbing injury mortality rate 3.8% and gunshot injury mortality rate 2.6% in literature.<sup>1,2</sup> In our case, there is no neurologic, vascular or visceral injuries but only stuck in S2 vertebral spinous.

Remaining foreign bodies after penetrating injuries occur by firearm, blastic and stab injuries or accidents. Head and neck such as ear, eye, nose and pharynx are the most common site of remaining foreign body after penetrating injuries. Gunshot pellets could remain at torax, abdomen and extremities.<sup>3,4,5</sup> Remaining foreign body after stabbing is a very rare condition. Our case has an sacral operation history after stabbing but a part of knife remained at sacrum. Diagnosing the remaining foreign body can change according to foreign body feature. Although metallic foreign bodies can be seen at plain radiographies but it is very difficult to determine the exact location and the relationship of foreign body with vascular, visceral and neural structures. CT is the most appropriate diagnostic method because of determination the exact location and the relationship of foreign body with vascular, visceral and neural structures.<sup>6,7</sup> In our case, at plain graphy a bright smooth edged foreign body was seen but exact location and relationship of foreign body with vascular, visceral and neural structures could be evaluated by CT.

The mainstay of treatment is removing the foreign body as possible to remove without further complications. Vascular, visceral and neurologic statements must be evaluated carefully and consulted with cardiovascular surgeon or neurosurgeon pre or peroperatively.<sup>8,9</sup> In our case, according to CT image we consulted with neurosurgeon

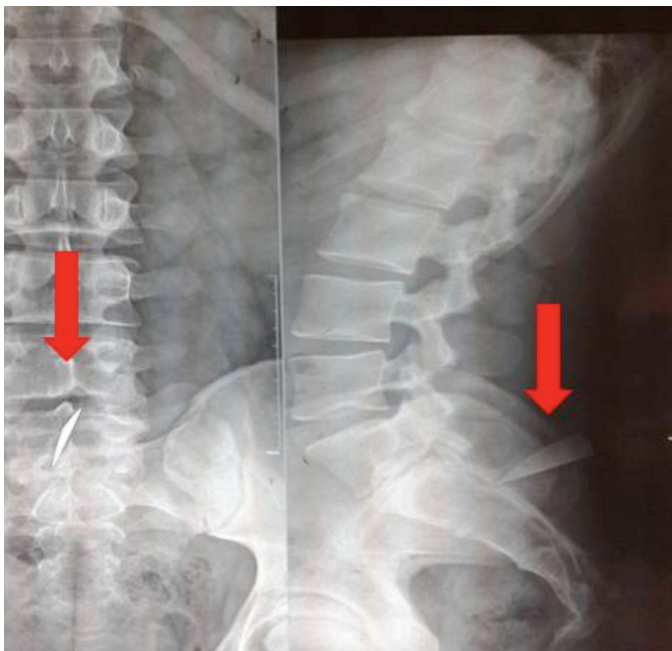


Figure 1. Image of lumbosacral plain graphy

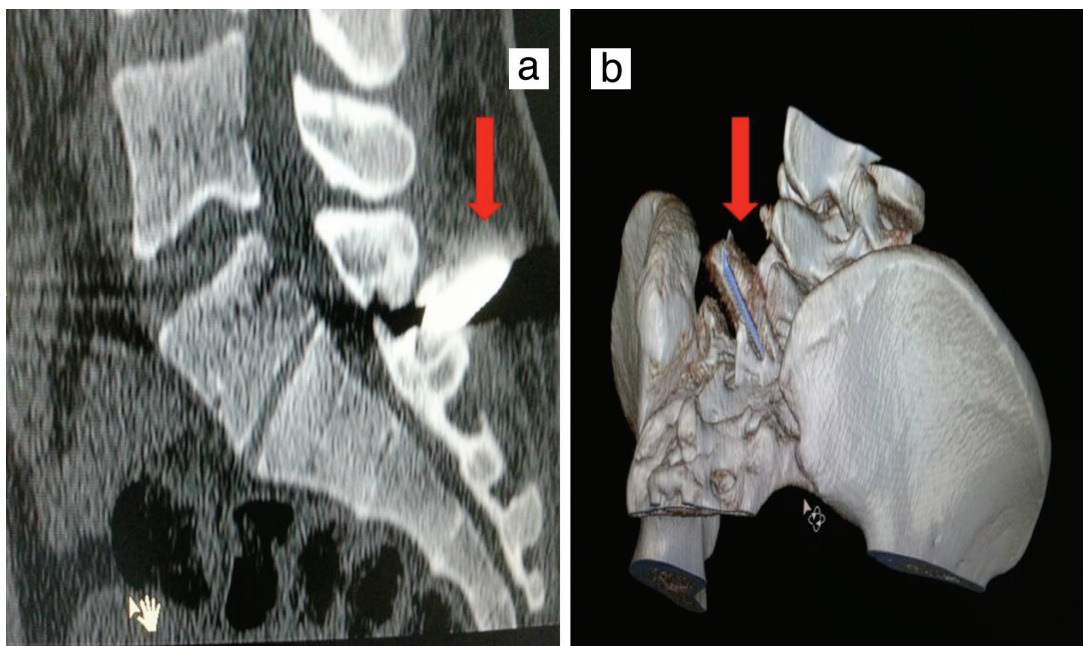
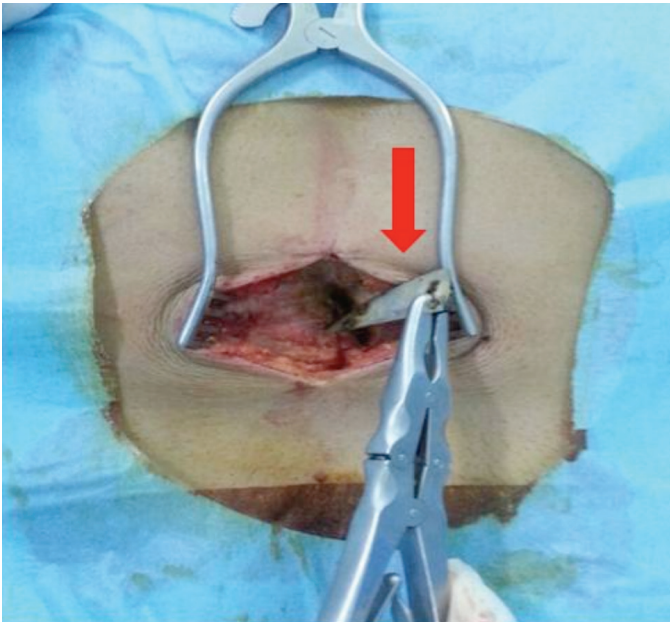


Figure 2. Image of computed tomography a) Horizontal section image, b) 3D image reconstruction of sacrum



**Figure 3.** Image of peroperative exploration

pre and peroperatively. There is an ossesos pathology on S2 vertebra and spinal cord was intact.

As a conclusion; penetrating injuries of sacrum is important and sometimes life-threatening injuries. CT is appropriate diagnosing modality for injuries or remaining foreign bodies due to increased risk of vascular, visceral and neural injuries. Preoperative and peroperative necessary consultation will reduce the morbidity and mortality rates.

### Ethics

**Informed Consent:** Consent form was filled out by participant.

**Peer-review:** Externally peer-reviewed.

### Authorship Contributions

Surgical and Medical Practices: D.Ö.K., B.H., A.K.S., Concept: İ.Y., Ö.D., Design: D.Ö.K., B.H., Data Collection or Processing: D.Ö.K., B.H., A.K.S., Analysis or Interpretation: D.Ö.K., B.H., A.K.S., Literature Search: İ.Y., Ö.D., İ.S., Writing: D.Ö.K.

**Conflict of Interest:** No conflict of interest was declared by the authors.

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

### References

1. Lunevicius R, Schulte KM. Analytical review of 664 cases of penetrating buttock trauma. *World J Emerg Surg* 2011;6:33.
2. Hefny AF, Salim EA, Bashir MO, Abu-Zidan FM. An unusual stab wound to the buttock. *J Emerg Trauma Shock* 2013;6:298-300.
3. Bosman WM, Ritchie ED, da Costa SA. Cutaneous fistula due to remaining foreign bodies after penetrating neck injury. *BMJ Case Rep* 2013:2013.
4. John SS, Rehman TA, John D, Raju RS. Missed diagnosis of a wooden intra-orbital foreign body. *Indian J Ophthalmol* 2008;56:322-324.
5. Kühnel TV, Tudor C, Neukam FW, Nkenke E, Stockmann P. Air gun pellet remaining in the maxillary sinus for 50 years: a relevant risk factor for the patient? *Int J Oral Maxillofac Surg* 2010;39:407-411.
6. Pham TN, Heinberg E, Cuschieri J, Bulger EM, O'Keefe GE, Gross JA, Jurkovich GJ. The evolution of the diagnostic work-up for stab wounds to the back and flank. *Injury* 2009;40:48-53.
7. Albrecht RM, Vigil A, Schermer CR, Demarest GB 3rd, Davis VH, Fry DE. Stab wounds to the back/flank in hemodynamically stable patients: evaluation using triple-contrast computed tomography. *Am Surg* 1999;65:683-687.
8. Stern LC, Moore TA. Nail gun injury to the sacrum: case report and review of the literature. *Spine (Phila Pa 1976)* 2011;36:1778-1780.
9. Gul S, Dusak A, Songur M, Kalayci M, Acikgoz B. Penetrating spinal injury with a wooden fragment: a case report and review of the literature. *Spine (Phila Pa 1976)* 2010;35:1534-1536.



# A New Approach to Classification of Pilonidal Disease

## Pilonidal Sinüs Sınıflandırmasında Yeni Bir Yaklaşım

Dursun Özgür Karakaş<sup>1</sup>, İbrahim Yılmaz<sup>2</sup>, Batuhan Hazer<sup>3</sup>, Özgür Dandin<sup>2</sup>, İlker Sücüllü<sup>4</sup>

<sup>1</sup>Okmeydanı Training and Research Hospital, Clinic of General Surgery, İstanbul, Turkey

<sup>2</sup>Gelibolu State Hospital, Clinic of General Surgery, Çanakkale, Turkey

<sup>3</sup>Bağcılar Tekden Hospital, Clinic of General Surgery, İstanbul, Turkey

<sup>4</sup>Haydarpaşa Sultan Abdülhamid Han Training and Research Hospital, Clinic of General Surgery, İstanbul, Turkey

**Keywords:** Pilonidal sinus, sacrococcygeal, classification

**Anahtar Kelimeler:** Pilonidal sinüs, sakrokoksigeal, sınıflandırma

Dear Editor;

Classification of pilonidal disease (PD) is necessary? This is an important question for adequate and standardized treatment of PD. There were a few classifications of PD in literature. Tezel<sup>1</sup> was classified PD into five types according to navicular area as Type I: asymptomatic pit, Type II: acute pilonidal abscess, Type III: pits in navicular area and previous abscess and drainage, Type IV: extensive disease and Type V: recurrent disease. Irkörüçü et al.<sup>2</sup> were classified PD as Type I: pit(s) on the natal cleft, Type II: pit(s) on either side of the natal cleft, Type III: pits on both sides of the natal cleft, Type IV: complex PD with multiple pits on and beside the natal cleft and Type V: recurrent PD. Awad et al.<sup>3</sup> was used scoring system for evaluation PD. Scoring system was based on sex, weight, hirsute and sinus characterization including number of sinus, site, size, recurrence and duration of disease.<sup>3</sup>

These classification models have missing points such as non-sacroccocygeal region or extension to lomber or perianal region. One third of our patients admitted and operated due to PD. We noticed that disease which extent to lomber region, turns to right or left side not extent midline. Disease which extent to perianal region, reach to 5 cm distance from anal verge and ends blindly in midline or fistula right or left side (outside of "Goodsall rule"). Recurrence occurs as a result of ingrown hairs stuck to open wounds generally. Asymptomatic patients are the patients who were examined

for another disease and detected sinus orifice or sinus tissue at sacrococcygeal region. If a patient admit to surgery then he or she is not asymptomatic. Treatment of pilonidal abscess is drainage initially then adequate surgery performed.

We aimed to offer a new approach for classification of PD in the light of above issues. First five types covers sacrococcygeal region and the sixth type is about non-sacroccocygeal region. Classification of sacrococcygeal region based on dividing sacrococcygeal region into four parts by lines as intergluteal sulcus, gluteal region, lomber region and perianal region (Figure 1).

Classification of PD;

Type I: A: Limited at intergluteal sulcus with single sinus orifice  
B: Limited at intergluteal sulcus with more than one sinus orifice,

Type II: Orifices of sinus or fistula extent from intergluteal sulcus to right/left gluteal region,

Type III: A: Orifices of sinus or fistula extent from intergluteal sulcus to lomber region,

B: Orifices of sinus or fistula extent from intergluteal sulcus to perianal region,

Type IV: Complex pilonidal sinus (orifices of sinus or fistula extent from intergluteal sulcus to lomber and/or perianal and/or gluteal region),

Type V: Recurrent pilonidal sinus,



Address for Correspondence/Yazışma Adresi: Dursun Özgür Karakaş MD  
Okmeydanı Training and Research Hospital, Clinic of General Surgery, İstanbul, Turkey  
Phone: +90 212 238 79 00 E-mail: drdok1978@hotmail.com

Received/Geliş Tarihi: 05.12.2016 Accepted/Kabul Tarihi: 09.12.2016

This study was presented at the XV. Congress of Turkish Colon and Rectal Surgery on 19-23 May 2015 in Antalya.

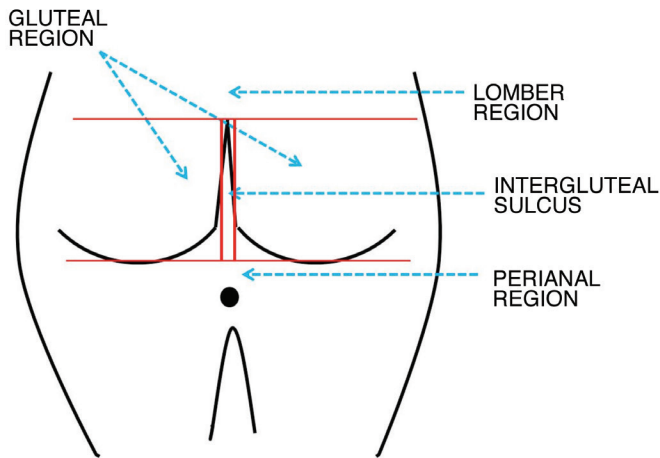


Figure 1. Lines and regions of classification

Type VI: Non-sacroccygeal pilonidal sinus (umbilical, interdigital, genital (penis or vulva), breast, eyelid or mixed type such as umbilical and sacroccygeal).

Classification of PD is important for adequate and standardized treatment. Intergluteal region is the starting point of sacroccygeal PD and extents to gluteal, lomber or perianal region unclearly.

## Ethics

Peer-review: Internally peer-reviewed.

## Authorship Contributions

Surgical and Medical Practices: D.Ö.K., İ.Y., B.H., Ö.D., Concept: D.Ö.K., İ.S., Design: D.Ö.K., İ.Y., Data Collection or Processing: D.Ö.K., İ.Y., B.H., Ö.D., Analysis or Interpretation: D.Ö.K., İ.S., Literature Search: D.Ö.K., Ö.D., Writing: D.Ö.K., İ.S.

**Conflict of Interest:** No conflict of interest was declared by the authors.

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

## References

1. Tezel E. A new classification according to navicular area concept for sacroccygeal pilonidal disease. *Colorectal Dis* 2007;9:575-576.
2. Irkörücü O, Erdem H, Reyhan E. The best therapy for pilonidal disease: which management for which type? *World J Surg* 2012;36:691-692.
3. Awad MM, Elbaset AA, Ebraheem S, Tantawy E, Elhafez MA, Elsayed AM. A scoring system as a method to evaluate pilonidal sinus disease to make an easy decision for its management. *Indian J Plast Surg* 2009;42:43-48.



# Necessity of Rational Use of Social Media in Colorectal Surgery

## Kolorektal Cerrahide Sosyal Medyanın Akılcı Kullanımının Gerekliliği

**Bahar Büşra Özkan<sup>1</sup>, Mustafa Berkeşoğlu<sup>2</sup>, Gökhan Selçuk Özbalcı<sup>3</sup>**

<sup>1</sup>Ondokuz Mayıs University Faculty of Medicine, Samsun, Turkey

<sup>2</sup>Mersin University Faculty of Medicine, Department of General Surgery, Mersin, Turkey

<sup>3</sup>Ondokuz Mayıs University Faculty of Medicine, Department of General Surgery, Samsun, Turkey

**Keywords:** Social media, Twitter, congress, altmetric, impact factor, surgery

**Anahtar Kelimeler:** Sosyal medya, Twitter, kongre, altmetrik, etki faktörü, cerrahi

Dear Editor;

Social media websites are web-based platforms used for computer-mediated communication.<sup>1</sup> In recent years, the influence of social media, and particularly of Twitter (Twitter Inc., San Francisco, USA), has become increasingly significant in surgical environments and at congresses.<sup>2</sup>

As reported by McDonald et al.<sup>1</sup>, many academic centers and journals have been using their Twitter accounts as a modern way to present academic news, publications, and related content. For example, the account @ACPGBI, run by the Association of Coloproctology of Great Britain and Ireland (ACPGBI), informs followers about events, meetings, and current publications. Similarly, the official journal of ACPGBI, Colorectal Disease, has its own Twitter account serving the same purpose.<sup>1</sup>

The hashtag #colorectalsurgery, created by colorectal surgeons, is one that brings together surgeons from all over the world with common areas of interest. In the first 10 weeks after the creation of this hashtag, 823 global users posted more than 5,200 tweets which were viewed about 17 million times.<sup>3</sup> With the help of common hashtags, people with the same field of interest can be simultaneously informed about many news items and recent developments.

Until recently, the prestige of publications, authors, and journals was evaluated by their citation number, calculated using conventional citation measurement. Altmetrics were

first used for scientific publications in 2010 as an alternative to impact factors. Altmetrics can be used for measuring not only the number of citations, but also how many times an article has been viewed, downloaded, shared in social media, mentioned, and discussed.<sup>4,5</sup> Therefore, even though the altmetric values of our journals and published articles are not as valuable as impact factors, they are still quite significant in this era.

From an ethical standpoint, another point which must be addressed is the obligation to respect patient confidentiality in all kinds of social media and avoid sharing unsupported and unnecessary information. We expect everyone to exercise due caution in this matter.

Besides having their official websites, our national surgical associations and journals should also create official Twitter, Facebook (Facebook Inc., California, USA) accounts and establish a YouTube channel (YouTube LLC, California, USA) and actively use these accounts to share information. This is a must for the rapid dissemination of published articles and announcements related to events, congresses and symposium, as well as for ensuring continual interaction among surgeons and interns. It may be possible to conduct journal club sessions, article hours, and online scientific discussions using common hashtags in Twitter by registering in symplur.com. These hashtags should also be used in congresses and symposiums to raise participant awareness



Address for Correspondence/Yazışma Adresi: Bahar Büşra Özkan MD  
Ondokuz Mayıs University Faculty of Medicine, Samsun, Turkey  
Phone: +90 543 438 89 73 E-mail: bbaharozkan@yahoo.com.tr  
Received/Geliş Tarihi: 20.02.2017 Accepted/Kabul Tarihi: 27.02.2017

and facilitate the sharing of accurate information. Rational use of social media should be encouraged in academia among surgeons and particularly surgery interns. With professional support, we estimate that the appropriate and accurate use of social media, and particularly of Twitter, will propel both our scientific societies and our journals beyond expectations and may in turn create a dynamic target audience.

### **Ethics**

**Peer-review:** Internally peer-reviewed.

### **Authorship Contributions**

Surgical and Medical Practices: B.B.Ö., G.S.Ö., M.B., Concept: M.B., Design: B.B.Ö., M.B., Literature Search: B.B.Ö., Writing: B.B.Ö., G.S.Ö.

**Conflict of Interest:** No conflict of interest was declared by the authors.

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

### **References**

1. McDonald JJ, Bisset C, Coleman MG, Speake D, Brady RR. Contemporary use of social media by consultant colorectal surgeons. *Colorectal Dis* 2015;17:165-171.
2. Chung A, Woo H. Twitter in urology and other surgical specialties at global conferences. *ANZ J Surg* 2016;86:224-227.
3. Chapman SJ, Mayol J, Brady RR. Twitter can enhance the medical conference experience. *BMJ* 2016;354:i3973.
4. Scarlat MM, Mavrogenis AF, Pecina M, Niculescu M. Impact and alternative metrics for medical publishing: our experience with International Orthopaedics. *Int Orthop* 2015;39:1459-1464.
5. Available from: URL: <https://en.wikipedia.org/wiki/Altmetrics>. Accessed 22 Dec 2016.



# Kolorektal Cerrahide Sosyal Medyanın Akılcı Kullanımının Gerekliliği

## Necessity of Rational Use of Social Media in Colorectal Surgery

Bahar Büşra Özkan<sup>1</sup>, Mustafa Berkeşoğlu<sup>2</sup>, Gökhan Selçuk Özbalcı<sup>3</sup>

<sup>1</sup>Ondokuz Mayıs Üniversitesi Tıp Fakültesi, Samsun, Türkiye

<sup>2</sup>Mersin Üniversitesi Tıp Fakültesi, Genel Cerrahi Anabilim Dalı, Mersin, Türkiye

<sup>3</sup>Ondokuz Mayıs Üniversitesi Tıp Fakültesi, Genel Cerrahi Anabilim Dalı, Samsun, Türkiye

**Anahtar Kelimeler:** Sosyal medya, Twitter, kongre, altmetrik, etki faktörü, cerrahi

**Keywords:** Social media, Twitter, congress, altmetric, impact factor, surgery

### Sayın Editör;

Sosyal medya siteleri, bilgisayar aracılı iletişimde kullanılan web tabanlı platformlardır.<sup>1</sup> Son yıllarda, sosyal medyanın özellikle de Twitter'ın (Twitter, Inc., San Francisco, ABD) cerrahi çevrelerde ve kongrelerdeki etkisi giderek büyük önem kazanmaktadır.<sup>2</sup>

McDonald ve ark.'nın<sup>1</sup> ifade ettiğine göre birçok akademik merkez ve dergi Twitter hesaplarını kullanarak; akademik haberleri, yayınları ve bunlarla ilişkili olabilecek içerikleri modern bir şekilde sunmaktadır. Örneğin; @ACPGBI hesabının paylaşımları, the Association of Coloproctology of Great Britain and Ireland (ACPGBI) tarafından yürütülmekte olup, takipçilerine organizasyonlarla, toplantılarla ve güncel yayınlarla ilgili bilgiler vermektedir. Benzer şekilde yine ACPGBI'nın resmi dergisi olan Colorectal Disease ise başka bir Twitter hesabına sahip olup aynı amaca hizmet etmektedir.<sup>1</sup>

Kolorektal cerrahlar tarafından oluşturulmuş #colorectalsurgery etiketi tüm dünyada bulunan ortak ilgi alanlarına sahip cerrahları birleştirici özelliğe sahiptir. Bu etiketin açılmasından itibaren ilk 10 haftada 823 global kullanıcı tarafından 5200'den fazla tweet atılmış olup yaklaşık 17 milyon kez görüntülenmiştir.<sup>3</sup> Ortak etiketlemeler kullanıldığında aynı konuya ilgi duyan kişiler birçok haberden ve yeni gelişmelerden aynı anda haberdar olabilmektedir.

Son zamanlara kadar yayınların, yazarların, dergilerin prestijleri geleneksel alıntı ölçümü kullanılarak alıntı sayılarıyla değerlendirilmekteydi. Bilimsel yayıncılıkta altmetrikler, etki faktörlerine alternatif olarak 2010 yılında ortaya atılmıştır. Altmetrikler sadece alıntı sayılarını değil aynı zamanda makalelerin görüntülenme, indirilme, sosyal medyadaki paylaşım, bahsedilme ve tartışılma gibi durumlarını da ölçebilmektedir.<sup>4,5</sup> Bu nedenle dergilerimizin ve yayınlanan makalelerimizin altmetrik ölçümleri, etki faktörleri kadar değerli olmasa bile çağımızda oldukça önemlidir.

Etik bakış açısıyla ifade edilmesi gereken bir diğer nokta, sosyal medya ortamlarının hiçbirinde hiçbir şekilde hasta-gizliliği ilkesinin ihlal edilmemesinin ve kanıta dayalı olmayan gereksiz bilgilerin paylaşılmamasının zorunluluğudur. Bu konuya ilişkin herkesin ciddi özen göstermesini umuyoruz.

Ulusal cerrahi derneklerimizin ve dergilerimizin kendi web sitelerine ek olarak yönettiği resmi Twitter hesabı, Facebook sayfası (Facebook, Inc., Kaliforniya, ABD) ve YouTube kanalı (YouTube, LLC, Kaliforniya, ABD) olmalı ve bu hesaplardan aktif bir şekilde veri paylaşımı yapılmalıdır. Dergide yayınlanan makalelerin, etkinlik, kongre, sempozyum duyurularının hızlıca iletilmesi ve konuyla ilgilenen cerrah ve asistanların sürekli etkileşim halinde olması için bu durum gereklidir. Twitter'de symplur.com'a kaydedilerek kullanılacak



Yazışma Adresi/Address for Correspondence: Dr. Bahar Büşra Özkan  
Ondokuz Mayıs Üniversitesi Tıp Fakültesi, Samsun, Türkiye  
Tel.: +90 543 438 89 73 E-posta: bbaharozkan@yahoo.com.tr  
Geliş Tarihi/Received: 20.02.2017 Kabul Tarihi/Accepted: 27.02.2017

olan ortak etiketlemelerle dergi kulüp oturumları, makale saatleri ve online olarak bilimsel tartışmalar yapılabilir. Aynı zamanda bu etiketlemeler kullanılarak kongre ve sempozyumlarda hem katılımcıların farkındalığı oluşturulmalı hem de doğru bilgilerin paylaşımına olanak sağlanmalıdır. Sosyal medyanın akılcı kullanımı akademik alanda yer alan cerrahlar ve özellikle de cerrahi asistanları arasında teşvik edilmelidir. Profesyonel bir destekle sosyal medya özellikle de Twitter bu şekilde uygun ve doğru kullanıldığında hem derneklerimizin hem de dergilerimizin beklenilenden çok daha fazla ön plana çıkacağını ve böylelikle dinamik bir hedef kitlesinin oluşabileceğini öngörmekteyiz.

### **Etik**

**Hakem Değerlendirmesi:** Editörler kurulu tarafından değerlendirilmiştir.

### **Yazarlık Katkıları**

Cerrahi ve Medikal Uygulama: B.B.Ö., G.S.Ö., M.B., Konsept: M.B., Dizayn: B.B.Ö., M.B., Literatür Arama: B.B.Ö., Yazan: B.B.Ö., G.S.Ö.

**Çıkar Çatışması:** Yazarlar bu makale ile ilgili olarak herhangi bir çıkar çatışması bildirmemiştir.

**Finansal Destek:** Çalışmamız için hiçbir kurum ya da kişiden finansal destek alınmamıştır.

### **Kaynaklar**

1. McDonald JJ, Bisset C, Coleman MG, Speake D, Brady RR. Contemporary use of social media by consultant colorectal surgeons. *Colorectal Dis* 2015;17:165-171.
2. Chung A, Woo H. Twitter in urology and other surgical specialties at global conferences. *ANZ J Surg* 2016;86:224-227.
3. Chapman SJ, Mayol J, Brady RR. Twitter can enhance the medical conference experience. *BMJ* 2016;354:i3973.
4. Scarlat MM, Mavrogenis AF, Pecina M, Niculescu M. Impact and alternative metrics for medical publishing: our experience with International Orthopaedics. *Int Orthop* 2015;39:1459-1464.
5. Available from: URL: <https://en.wikipedia.org/wiki/Altmetrics>. Accessed 22 Dec 2016.



# Is the Ischioanal Fossa the Most Appropriate Surgical Area for Fecal Incontinence Surgery?

## İskioanal Fossa, Fekal İnkontinans Cerrahisi için En Uygun Alan mıdır?

Ali Naki Yücesoy

Batı Bahat Hospital, Clinic of General Surgery, İstanbul, Turkey

### ABSTRACT

Fecal incontinence is the one of the surgical challenges faced by surgeons. Damage to the anal sphincter and neurological diseases are the major causes of fecal incontinence. Surgical interventions are especially necessary for reconstruction of the anal sphincter in patients with fecal incontinence patients due to anal sphincter damage. Surgical interventions performed for fecal incontinence can result in unsatisfactory postoperative outcomes, or initially satisfactory outcomes which deteriorate over time. We have performed surgical interventions with transvaginal access by combining the anal sphincteroplasty and gracilis transposition procedures in female patients who have anal sphincter damage subsequent to vaginal childbirth. The main aim of the transvaginal approach in our technique is to allow extrasphincteric dissection in the ischioanal fossa. As a result of our successful postoperative outcomes, this question came to our minds. Is the ischioanal fossa the most appropriate surgical area in fecal incontinence surgery?

**Keywords:** Fecal incontinence, anal sphincteroplasty, gracilis muscle transposition, ischioanal fossa

### ÖZ

Fekal inkontinans, cerrahların cerrahi zorluklarından birisidir. Anal sfinkter hasarları ve nörolojik hastalıklar, fekal inkontinansın majör nedenleridir. Cerrahi girişimler, özellikle anal sfinkter hasarı nedeni ile fekal inkontinansı olan hastalarda gereklidir. Fekal inkontinans için gerçekleştirilen cerrahi girişimlerin postoperatif hoşnutsuz sonuçları olabilir veya postoperatif başarılı sonuçlar zamanla bozulabilir. Vajinal doğumları takiben anal sfinkter hasarı gelişmiş kadın hastalarda, vajinal erişim ile anal sfinkteroplasti ve gracilis transpozisyon işlemlerini kombine ederek, cerrahi girişimler gerçekleştirdik. Tekniğimizdeki transvajinal erişim kullanılmasındaki ana amaç, ischioanal fossada ekstrasfinkterik disseksiyon sağlamaktır. Başarılı postoperatif sonuçlarımızın bir sonucu olarak şu soru aklımıza geldi. İskioanal fossa, fekal inkontinans cerrahisi için en uygun alan mıdır?

**Anahtar Kelimeler:** Fekal inkontinans, anal sfinkteroplasti, gracilis kas transpozisyonu, ischioanal fossa

## Introduction

Fecal incontinence (FI) can be defined as the lack of person's bowel control ability. FI is a clinical condition affecting patient's social and psychological life and is the one of the surgical challenges for the surgeons due to its postoperative dissatisfactory outcomes. FI is mostly seen in females. The most common causes of the FI in females are anal sphincteric damages which are subsequent to vaginal childbirths. Other common causes of FI are the surgical operations in which the anorectal region is involved, e.g. anal fistula, hemorrhoid, anal fissure or rectal cancer operations. Anal sphincteroplasty and muscle transposition operations are the most common used surgical methods performed for

FI surgery.<sup>1</sup> Combined anterior anal sphincteroplasty and adynamic gracilis muscle transposition operation using transvaginal access to in a female patient suffered from FI depending to anal sphincter damages was published by our group, and three more operations were performed by using same method with success in last 24 months.<sup>2</sup> All patients have adequate continence to gas, solid and liquid stool in their postoperative periods.

## Method

We performed combined anal sphincteroplasty and gracilis muscle transposition operations by using transvaginal access for anal sphincteric exposition in the



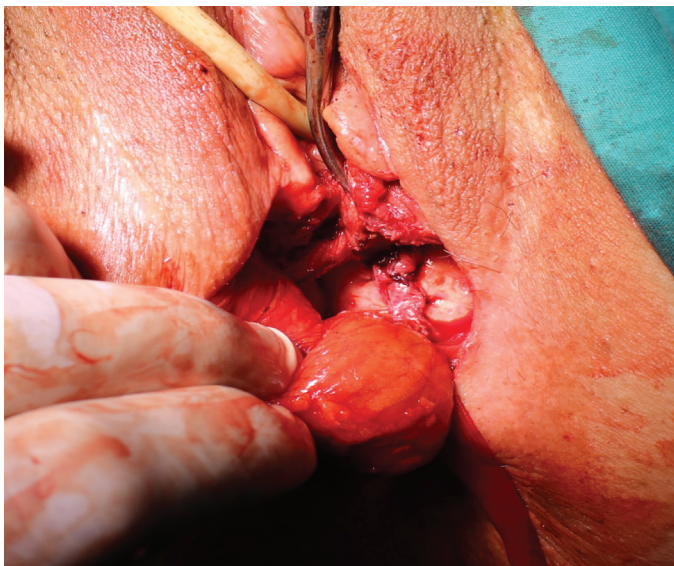
Address for Correspondence/Yazışma Adresi: Ali Naki Yücesoy MD  
Batı Bahat Hospital, Clinic of General Surgery, İstanbul, Turkey  
Phone: +90 212 471 33 00 E-mail: alinakiyucesoy@gmail.com

Received/Geliş Tarihi: 04.04.2017 Accepted/Kabul Tarihi: 09.05.2017

extrasphincteric plane in the ischioanal fossa in four female patients suffered from complete FI in last 24 months. The patients had difficult and prolonged vaginal delivery stories in their past. Internal and external anterior sphincteric defects were detected in preoperative endoanal ultrasonographic examinations. It is found that significant decreases in the resting anal pressure and the squeezing anal pressure values in their preoperative anal sphincteric pressure measurements. Operations were performed in Lloyd-Davies lithotomy position. Surgical exposition in the extrasphincteric plane in the ischioanal fossa was provided by using of the transvaginal access in the patients after passing rectovaginal septum. The retracted



**Figure 1.** Anterior anal sphincteroplasty in the ischioanal fossa by using transvaginal access in a female patient



**Figure 2.** Counter clock-wise manner rotation of the transposed gracilis muscle around of the external sphincteric musculature in ischioanal fossa by using transvaginal access in a female patient

ends of the damaged external and internal anal sphincteric muscles were found, and one by one repair was performed by using No 0 Vicryl U-sutures along the torn line (Figure 1). Usually, the right-side gracilis muscle was prepared by protecting its proximal neurovascular bundle. The gracilis muscle was transposed into ischioanal fossa via a subcutaneous tunnel, and its transposition was completed around of external anal sphincteric musculature in counter clock-wise rotation manner in 360 degree. Gracilis muscle was fixated to superficial external anal sphincteric muscle, levator ani muscle, peripheral tissues and itself to provide of the surgical anal canal and anterior anal sphincteroplasty line stabilization (Figure 2). On the magnetic resonance examination, the surgical anal canal which is completely surrounded by the transposed gracilis muscle was showed (Figure 3). Additionally, magnetic resonance imaging examination showed that preoperatively increased anorectal angle was decreased into normal limits. It is thought that anorectal angle decrease is emerged as a result of the counter clock-wise manner gracilis transposition. Combined anal sphincteroplasty and counter clock-wise manner rotated gracilis transposition operations were performed in four female patients with FI by using transvaginal ischioanal fossa access. There were no major complications. All patients have postoperative good continence to the solid and liquid stool and the gas.



**Figure 3.** Postoperative sagittal magnetic resonance views shows the anorectal angle reconstruction and counter clock-wise manner rotated gracilis muscle transposition in a female patient

## Discussion

Combined abdominal and perineal (anterior or posterior) perineal accesses have been used as alternative sphincter-saving surgical methods in lower rectal cancer surgery.<sup>3,4,5</sup> Combined abdominal and perineal rectal resection techniques have different anatomical and surgical features when compared with intersphincteric dissection technique which is the most commonly used sphincter-saving surgical technique for lower rectal cancer.<sup>6</sup>

Combined abdominal and perineal (anterior or posterior) approaches can be described as surgical procedures in which the sphincter-saving extrasphincteric dissection and proximal segmental sphincteric excision techniques are performed.<sup>7</sup> The main aim of the anterior or posterior perineal access in the combined abdominal and perineal approaches used for lower rectal cancer surgery is to provide of the surgical exposition of the surgical anal canal in the extrasphincteric plane in the ischioanal fossa. Anterior perineal access on the surgical anal canal can be easily provided by using transvaginal access in females. The surgical anal canal can be described as two intertwined cylindrical muscular tubes which are vertically situated in the ischioanal fossa. While the outer one of the intertwined muscular tubes is constituted by the external anal sphincteric musculature, inner muscular tube is formed by internal sphincteric muscle and distal part of the lower rectum. It should be noted that external anal sphincteric musculature has a vertically situated coil-like shape. In the FI surgery, it is important to have a surgical access to ischioanal fossa in which surgical anal canal is situated. In this way, a detailed surgical exposition of the anal sphincteric muscles, the visualization and reconstruction of the damaged external and internal sphincteric muscles can be provided easily. Therefore, it seems quite plausible the use of the transvaginal route for the ischioanal fossa access in females who constitute the majority of FI cases. The liberalization of

the surgical anal canal in the extrasphincteric plane between puborectal and superficial external anal sphincteric muscles to perform the surgical procedures for FI surgery can be provided by transvaginal access.

FI surgery is still controversial. Also, our technique may contain many controversial elements, e.g. the combination of the surgical techniques, the low number of the cases, the short follow-up periods. But, it seems that the ischioanal fossa is the most appropriate surgical area for performing surgical procedures of the FI surgery.

## Ethics

**Informed Consent:** Informed consent was filled out by all participants.

**Peer-review:** Internally peer-reviewed.

**Financial Disclosure:** The author declared that this study received no financial support.

## References

1. Madoff RD. Surgical treatment options for fecal incontinence. *Gastroenterology* 2004;126(Suppl 1):48-54.
2. Yücesoy AN, Cifçi M, Poçan S. Anal sphincteroplasty and gracilis muscle transposition using transvaginal access in a female patient with fecal incontinence. *Tech Coloproctol* 2015;19:53-56.
3. Williams NS, Murphy J, Knowles CH. Anterior Perineal PlanE for Ultra-low Anterior Resection of the Rectum (the APPEAR technique): a prospective clinical trial of a new procedure. *Ann Surg* 2008;247:750-758.
4. Qu H, Du YF, Li MZ, Zhang YD, Shen J. Laparoscopy-assisted posterior low anterior resection of rectal cancer. *BMC Gastroenterology* 2014;14:158.
5. Pena A, Hong A. The posterior sagittal trans-sphincteric and trans-rectal approaches. *Tech Coloproctol* 2003;7:35-44.
6. Schiessel R, Karner-Hanusch J, Herbst F, Teleky B, Wunderlich M. Intersphincteric resection for low rectal tumours. *Br J Surg* 1994;81:1376-1378.
7. Yücesoy AN, Poçan S. Letter to the editor on "The combined abdominal and perineal approach for dissection of the lower rectum. The development of new indications". How can we describe the anatomical and surgical basis of the combined abdominal and perineal approaches in lower rectal cancer surgery? *Int J Surg* 2015;19:33-34.