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Turkish Journal of COLORECTAL DISEASE

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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 **TÜBİTAK/ULAKBİM, Directory of Open Access Journals (DOAJ), British Library, ProQuest, Root Indexing, Idealonline, Gale/Cengage Learning, Index Copernicus, Turkish Citation Index, Hinari, GOALI, ARDI, OARE, J-GATE** and **TürkMedline.**

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/.

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Instructions for authors are published in the journal and at www.turkishjcrd.com

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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.

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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 epidemiyoloijk 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, patologlar, onkologlar, gastroenterologlar ve kolorektal hastalarına hizmet veren profesyoneller oluşturur. Derginin amacı; uluslararası düzeyde en yüksek bilimsel ve klinik değeri olan orijinal çalışmaları yayınlamaktır. 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, **TÜBİTAK/ULAKBİM, Directory of Open Access Journals (DOAJ), British Library, ProQuest, Root Indexing, Idealonline, Gale/Cengage Learning, Index Copernicus, Türk Atıf Dizini, Hinari, GOALI, ARDI, OARE, J-GATE 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.

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

Yazarlar için Kılavuz

Yazarlar için kılavuz hem yayınlanan 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 araştırmacılardır. Kendi araştırmalarının da Türk Kolon ve Rektum Hastalıkları Dergisi'nde yayınlanmasını 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 aşılabilir.

Abonelik Bilgileri

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

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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). 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

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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.

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The ORCID (Open Researcher and Contributor ID) number of the correspondence author should be provided while sending the manuscript. A free registration can create at http://orcid.org.

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 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, 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,

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COLORECTAL DISEASE

Instruction for Authors

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.

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 it's 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, and provide both a CONSORT checklist and flow diagram. We require that you choose the MS Word template at 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.

Turkish Journal of
COLORECTAL DISEASE

Instruction for Authors

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 Systéme 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 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.

Video Article

Article length: Not to exceed 500 words.

Reference Number: Not to exceed 5 references

Briefly summarize the case describing diagnosis, applied surgery technique and outcome. Represent all important aspects, i.e. novel surgery technique, with properly labelled and referred video materials. A standalone video vignette, describing a surgical technique or interesting case encountered by the authors.

Requirements: The data must be uploaded during submission with other files. The video should be no longer than 10 minutes in duration with a maximum file size of 350Mb and 'MOV, MPEG4, AVI, WMV, MPEGPS, FLV, 3GPP, WebM' format should be used. Documents that do not exceed 100 MB can be uploaded within the system. For larger video documents, please contact iletisim@galenos.com.tr All videos must include a narration in English. Reference must be used as it would be for a Figure or a Table. Example: ".....To accomplish this, we developed a novel surgical technique (Video 1)." All names and institutions should be removed from all video materials. Video materials of accepted manuscripts will be published online.

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.

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COLORECTAL DISEASE

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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.

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Turkish Journal of
COLORECTAL DISEASE

Instruction for Authors

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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.

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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

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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. 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

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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 alınamazsa, 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 alınmış olur. 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 izin alındıktan sonra yapılacaktır. Tüm makalelerin tam metinleri derginin www.journalagent.com/krhd web sitesinden indirilebilir.

YAZAR KILAVUZU

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Telif hakkı devir bildirimi

Açıklama bildirimi

Üst yazı

Makale Gönderme Kuralları

Makale Hazırlama Kuralları

Metin biçimlendirme

Giriş sayfası

Yayın tipleri

Orijinal Makaleler

Talepli derlemeler

Olgu sunumları

Teknik notlar

Editöre mektuplar

Editöryal Yorumlar

Yazarların Etik Sorumlulukları

İnsan katılımcılı araştırma ve/veya hayvan deneyleri

Bilgilendirilmiş Onam

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Üst Yazı

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Makale Yazım Kuralları

Tüm makaleler online başvuru sistemi üzerinden teslim edilmelidir. Yazarlar web sitesi www.journalagent.com/krhd adresinde oturum açtıktan sonra internet üzerinden yazılarını sunmalıdır.

Makale gönderimi yapılırken sorumlu yazarın ORCID (Open Researcher ve Contributor ID) numarası belirtilmelidir. http://orcid.org adresinden ücretsiz olarak kayıt oluşturabilir.

Online Başvuru

Gecikmeyi önlemek ve hızlı hakemlik için sadece çevrim içi gönderimler kabul edilir. Yazılar word belgesi (*.doc) veya zengin metin biçimi (*.rtf) olarak hazırlanmalıdır. 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 dökümanları 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.

Turkish Journal of
COLORECTAL DISEASE

Yazarlara Bilgi

- 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 sürüm) kaydedin.

Giriş sayfası

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

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- Makalenin kısa başlığı;

- Yazarların isimleri, isimlerinin baş harfleri ve her yazarın akademik ünvanı;

- Her yazarın görevi;

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- Herhangi bir yazarın olası bir çıkar çatışması olduğunu teyit eden bir ifade, aksi takdirde çatışma olmadığını belirtir bir açıklama;

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- Varsa yayının yayınlanmış olduğu bilimsel toplantının tarihi, yeri ve varsa kongre özet kitabındaki özeti.

Makale Tipleri

Orijinal 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 dergiye gönderilmiş, baskıda veya basılmış ilgili herhangi bir çalışmaya atıfta bulunmak istiyorlarsa 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 müracaat edin. Randomize kontrollü çalışmaların yazarları da, www.consort-statement.org adresinden başvurulabilen CONSORT kılavuzuna uymalıdır ve yayınlarıyla birlikte CONSORT kontrol listesi ve akış diyagramı tebliğ edilmelidir. Akış şeması olarak 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.

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

Orijinal 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 gerekçesini 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 diğerlerininkiyle 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 diğerlerininkiyle karşılaştırın. 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 1'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 sembolleri 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. Kısaltmalardan 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 yayınla beraber değerlendirmeye 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.

Turkish Journal of
COLORECTAL DISEASE

Yazarlara Bilgi

Derlemeler, üzerine konuyla ilgili yeni bir hipotez ya da çalışma oturtulabilecek bir sonuç içermelidir. Literatür taraması metodlarını veya kanıt düzeyi yöntemlerini yayınlamayın. 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.

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 bakışımızı 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

Video Makale

Makale Uzunluğu: 500 kelimeyi aşmamalıdır.

Kaynak Sayısı: 5 kaynağı aşmamalıdır.

Tanıyı, uygulanan cerrahi tekniği ve sonucu açıklayarak olguyu kısaca özetleyiniz. Uygun şekilde adlandırılmış ve referans edilmiş video materyalleri ile tüm önemli noktaları, örn; yeni cerrahi tekniği, belirtiniz. Materyaller, yazarların cerrahi tekniğini anlattıkları veya karşılaştıkları ilginç vakalardan oluşmalıdır.

Teknik Gereklilikler: Veriler, makale yükleme sırasında diğer dosyalarla birlikte eklenmelidir. Video süresinin 10 dakikayı geçmemesi kaydıyla dosya boyutu maksimum 350 MB olmalı ve 'MOV, MPEG4, AVI, WMV, MPEGPS, FLV, 3GPP, WebM' formatlarından biri kullanılmalıdır. 100 MB'yi aşmayan video dokümanları sisteme yüklenebilir. Daha büyük video dokümanları için lütfen iletisim@galenos.com.tr adresinden bizimle iletişime geçiniz. Tüm video seslendirmeleri İngilizce olmalıdır. Video atıfları, Şekil veya Tablo atıfları ile aynı biçimde kullanılmalıdır. Örneğin; "….Bunu gerçekleştirmek için, yeni bir cerrahi teknik geliştirdik (Video 1)." Video materyallerinde isim ve kurumlar yer almamalıdır. Kabul edilen makalelerin video materyalleri online yayınlanacaktır.

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 tahhüt 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 yazarlık profesyonelliğine ve en sonunda tüm bilimsel çabalara zarar verebileceğinden dolayı, sakınmalıdır. Araştırma bütünlüğünün sürdürülmesi ve bunun sunumu, iyi bilimsel uygulama kurallarını takip ederek başarılır. 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 manüple edilmiş olmamalıdır.

- Yazarın kendine ait olmayan hiçbir veri, metin veya teori kendininmiş gibi sunulmamalıdır (intihal). Diğer eserlerin kullanımı, (eserin birebir kopyalanması, özetlenmesi ve/veya başka kelimeler kullanarak 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-zımnen 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 yapılamaz

- Yazının revizyon aşamasında, yayın öncesi veya yayınlandıktan sonra yazar isim eklenmesi veya çıkarılması istemi; ciddi bir konudur ve geçerli sebepler olduğunda değerlendirilebilir. Yazar değişikliği gerekçesi; 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 yayınlandıktan sonra değişiklik olması halinde, bu istek ve gerekli dökümantasyonun yayıncı yoluyla editöre gönderilmesi gerekmektedir. Gerek görüldüğünde bu isteğin gerçekleşmesi için daha fazla doküman talep edilebilir. Değişikliğin kabul veya red kararı 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. şeklinde 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.

Turkish Journal of
COLORECTAL DISEASE

Yazarlara Bilgi

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. Deneysel hayvan çalışmalarında "Guide for the care and use of laboratory animals http://oacu.od.nih.gov/regs/guide/guide.pdf doğrultusunda hayvan haklarını koruduklarını belirtmeli ve kurumlarından etik kurul onay raporu almalıdırlar.

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."

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

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

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

"Bu makalenin yazarları çalışmada hayvan kullanılmadığını bildirmektedir."

"Bu makalenin yazarları insan katılımlı 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 verebilme 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 alınmadıysa, 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 profilde, 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. Düzeltilen 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 açıklamalı kopyası bulunmalıdır (her yorumcunun yorumu nerede bulunabilir, yazarın 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 atıf yapılabilir "Kabul Edilmiş Makale" şeklinde online olarak yayınlanacaktır.

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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 müsade edilmemektedir.

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

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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 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.

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Turkish Journal of
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Reviews/Derlemeler

Research Articles/Özgün Makaleler

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Contents/İçindekiler

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COLORECTAL DISEASE

Editorial/Editöryal

Değerli Meslektaşlarım,

Bu yılın son sayısıyla karşınızdayız. Ülkemizde pandemi hız kesmeden devam etmekteyken, dergimize olan ilginizin hiç azalmaması hatta artan bir şekilde devam etmesi bizleri ziyadesiyle memnun etmektedir.

Bu sayıda diğer sayılardan farklı olarak oldukça dolu çıkıyoruz:

Bu sayıdan başlamak üzere, yeni bir konseptle, video makale yayımlamaya başladık. Bunu uzun bir süreden beri planlıyorduk. Hayata geçirdiğimiz için mutluyuz. Dergide video makalenin teorik kısmını göreceksiniz ve alttaki barkodu okutarak videoya ulaşabileceksiniz. Bu sayıda iki video makale yayınlayacağız, ancak gelecek sayılarda video makale sayısını artırmayı düşünüyoruz. Sizlerin tepkileri doğrultusunda bu bölüm düzenlenecektir.

Bununla birlikte, bu sayıdan itibaren sayı başına düşen makale sayısını artırdık. İlginin yoğun olması ve "hızlı değerlendirme ve hızlı basma" dergi politikamız gereği artan yayın akışını şimdilik böyle karşılamayı planladık. Yakın gelecekte, iki ayda bir çıkmayı planlamaktayız.

Bu sayıda, üç çok değerli derlemeye yer verildi. Dr. Rosen'in "divertiküler hastalık hakkında doğru bilinen yanışlar ve kabullenmeleri" bilimsel kanıtlar eşliğinde derlediği makaleyi zevkle okuyacağınızı umuyoruz. Bununla birlikte, Dr. Feza Remzi ve arkadaşlarının derlediği Crohn hastalığı zemininde gelişen ince bağırsak karsinomalarını ilgiyle okuyacaksınız. Bu derleme, bu konuda oldukça fakir olan literatüre önemli bir katkı sağlayacaktır. Diğer bir derleme ise oldukça güncel ve hayatımızı değiştiren COVID pandemisinde stomalı olmak ve stoma bakım hemşirelerinin yaklaşımını değerlendiren önemli bir yazıyı takdirlerinize sunuyoruz. Pratik yaklaşımlarda yol gösterici olacağını düşünmekteyiz.

Bununla birlikte bu sayıda birbirinden kıymetli on araştırma makalesi ve üç olgu sunumu ve bir editöre mektupa yer verildi. Özellikle güncel pratiğimizin nasıl değiştiğini göstermesi açısından pandemi sırasında gelişen kolorektal kanserlere bağlı acil olgulara yaklaşımı değerlendiren makaleye de dikkatinizi çekmek istiyorum. Bu özgün araştırmanın yanı sıra, keyifle okuyacağınız oldukça ilgi çekici makaleleri de bulacaksınız.

Morallerin düşük olduğu ve kişisel temasın en aza indiği bu dönemlerde TKRCD'nin kolorektal cerrahi farkındalığını aktif tutma ve bu konulara ilgi duyan meslektaşlarımıza verdiği bilimsel katkı verme çabaları takdire şayandır. Her ay yaklaşık dört online seminer ile meslektaşlarımızın pratik ve teorik kondisyonlarını ciddi bir şekilde desteklemektedir. Bu çabalarından dolayı TKRCD Yönetim kurulunu kutlarız.

Ayrıca yaklaşmakta olan yeni yılınızı "Editöryel Komite" olarak en içten dileklerimizle kutlar, yeni yılın en başta size ve ailenize sağlık getirmesini ve diğer tüm beklentilerinizin gerçekleşmesini dileriz.

Yeni yılda, bir sonraki sayıda buluşmak dileğiyle….

Prof. Dr. Tahsin Çolak
Baş-Editör

Dear Colleagues,

We are here with the last issue of this year. While the pandemic continues unabated in our country, we are very pleased that your interest in our journal never decreases or even continues to increase.

Unlike other issues we come out quite full with this issue:

Starting with this issue, with a new concept, we have started publishing video articles. We've been planning this for a long time. We are happy to make it happen. You will see the theoretical part of the video article in the magazine and you will be able to access the video by reading the barcode below. We will be publishing two video articles in this issue, but we are planning to increase the number of video articles in future issues. This section will be edited in line with your reactions.

However, since this issue, we have increased the number of articles per issue. Due to your intense interest in our journal and our "fast evaluation and fast printing" journal policy, we have planned to meet the increasing publication flow with this solution for now. We are planning to publish issue every two months in the near future.

This issue includes three very valuable reviews. We hope that you will enjoy reading Dr Rosen's article reviewed with scientific evidence and entitled "Wrongs which are known as trues, and acceptances about diverticular disease". In addition, you will read with interest the article about the small intestine carcinomas that develop on the basis of Crohn's disease reviewed by Dr Feza Remzi et al. This review will make an important contribution to the very limited literature on this subject. We also present to your appreciation an important article that evaluates the approach of stoma care nurses and living with a stoma in this very current and life-changing COVID-19 pandemic. We think it will be a guide in practical approaches.

In addition, this issue includes ten valuable research articles and three case reports and a letter to the editor. I would like to draw your attention to the article that evaluates the approach to emergency situations related to colorectal cancers that develop during the pandemic, especially in terms of showing how our current practice has changed. In addition to this original research, you will also find interesting articles that you will enjoy reading.

In these periods when morale is low and personal contact is minimized, TKRCD's efforts to keep colorectal surgery awareness active and to make scientific contribution to our colleagues who are interested in these issues are admirable. It seriously supports the practical and theoretical conditions of our colleagues with approximately four online seminars every month. We congratulate the TKRCD Board of Directors for their efforts.

In addition, as the "Editorial Board", we congratulate your upcoming new year with our sincere wishes, and wish the new year to bring health to you and your family and that all your other expectations will come true.

Hope to meet you in the next issue in the new year….

Prof. Dr. Tahsin Çolak
Editor-in-Chief

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REVIEW

Diverticular Disease-among Myths, Paradigms and Scientific Evidence

Divertiküler Hastalık-mitler, Paradigmalar ve Bilimsel Kanıtlar Arasında

Harald Rosen

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ABSTRACT

Diverticular disease is among the most common gastrointestinal disorders affecting the Western population. Although complications arising from colonic diverticula significantly affect a patient's quality of life and the overall health sector, the scientific evidence to facilitate its better management is limited in the literature. Several recommendations and guidelines have been made, albeit based on expert opinions rather than on the outcomes of controlled clinical trials. The more recent research on the natural history of this disorder has led to a shift from the historic dogmatic recommendations to a more individualised approach.

Keywords: Diverticular disease, epidemiology, risk factors, conservative treatment, surgery

ÖZ

Divertiküler hastalık, Batı'da en sık görülen gastrointestinal bozukluklar arasındadır. Kolonik divertikülden kaynaklanan komplikasyonlar, hastaların yaşam kalitesi ve sağlık hizmetleri sektörü üzerinde önemli bir etkiye sahip olmakla birlikte, divertiküler hastalığın tedavisi için bilimsel kanıtların sınırlı olduğu kabul edilmelidir. Pek çok öneri ve kılavuz, kontrollü klinik çalışmaların sonuçlarından ziyade uzman görüşüne dayanmaktadır. Bununla birlikte, bu bozukluğun doğası ile ilgili yeni araştırmalar, tarihsel dogmatik önerilerden daha kişiselleştirilmiş bir yaklaşıma geçişe yol açmıştır.

Anahtar Kelimeler: Divertiküler hastalık, epidemiyoloji, risk faktörleri, konservatif tedavi, cerrahi

Introduction

Diverticulosis and its associated problems can be regarded as one of the most common gastrointestinal disorders affecting the Western world, and it is ranked among the top 10 diagnoses in an outpatient setting.[1]

Diverticulosis was previously regarded as a rare disease that was diagnosed mainly based on the presentation of the clinical symptoms, and an increasing incidence of this disease was recorded with the beginning of the industrial revolution; however, this was long before the possibility arose to use modern diagnostic tools such as flexible endoscopy and computed tomography (CT).[2] This situation led to the development of "scientific assumptions" about the pathogenesis of diverticulosis and about diverticulitis leading to therapeutic recommendations, which began to be questioned with modern ongoing research.

As an example of this development, a past publication reported a risk of up to 25% of experiencing an episode of diverticulitis for all patients with asymptomatic diverticula, which was then revised to a maximum of 5% based on more recent findings.[3]

Similarly, the risk of having recurrent attacks following the first event of diverticulitis has been largely overestimated.[4,5] Back in the 90s of the last century, the recurrence rates of 45%-60% (which was associated with higher complication rates and morbidity) were considered acceptable[4,5], leading to therapeutic consequences (e.g. indication for surgery), which have also been completely questioned in the meanwhile.[6]

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Furthermore, it has been shown (contrary to previous, conventional perceptions) that increasing age is not associated with a higher risk for the development of diverticulitis. In this context, Strate et al.[7] demonstrated a decrease of 24% risk for diverticulitis per every additional decade of life.

This review attempted to elucidate some of the shifts of paradigms observed in the medical literature in the last decades as well as to indicate the updated recommendations for the management of this disorder (which varies partly among different societies and are partly under critical review).[8]

Classification

Diverticula per se cannot be regarded as a disease, since most of the patients will not experience symptoms from this condition and will not need any specific medical intervention.[9]

Potential complications include those that may arise due to inflammation, haemorrhage or pain and functional issues.

Therefore, the classification for diverticular disease includes the following entities:

a. Symptomatic Uncomplicated Diverticular Disease (SUDD)

b. Segmental Colitis Associated with Diverticulosis (SCAD)

c. Diverticulitis (complicated or uncomplicated)

d. Diverticular Haemorrhage

SUDD

SUDD is characterised by gastrointestinal (unspecific) and chronic symptoms in patients with diverticula, but without any evidence of inflammation or a history of diverticulitis.[10]

However, patients with SUDD show microscopic inflammatory infiltrates, contrary to healthy controls and sigmoid resection has been successful in acquiring pain resolution in >80% of the patients operated for persistent symptoms associated with SUDD. It is further noteworthy that, after histological evaluation of the resected colonic specimens, a majority (>75%) of the patients revealed features of deep bowel inflammation, despite no clinical history of diverticulitis.[11,12]

Contrary to this finding of "occult, chronic inflammation", an overlap of SCUDD with irritable bowel syndrome (IBS) has also been described with similar pathophysiological mechanisms, including visceral hypersensitivity.[7] Although some further evidence for a similarity of SCUDD with IBS has been demonstrated (altered colonic motility due to a reduction in the colonic interstitial cells of Cajal), at this time point, the exact pathomechanisms and the correlation between both the entities remain unclear and, in fact, only speculative.[7,13]

SCAD

SCAD is a subtype characterised by abdominal pain (mainly in the left lower quadrant), chronic diarrhoea (contrary to SUDD wherein constipation is predominant) and occasional episodes of bleeding. Endoscopic and histologic features are non-specific and can also be observed in inflammatory bowel disease (IBD).[14] In a prospective study, Tursi et al.[14] analysed more than 6,000 patients who underwent a colonoscopy for the above-mentioned symptoms matching IBD-like changes in 11.4% of the patients with concurrent diverticula. In their series, SCAD was mainly noted in male patients of age >60 years.

Consensus and/or recommendations regarding therapy and the outcomes are lacking due to the missing data from appropriate studies; however, there is some evidence that SCAD shows good response to medical therapy (mainly 5-ASA), but with a recurrence rate of >40%.[15,16]

Acute Diverticulitis

With the ongoing diagnostic progress as well as the availability of therapeutic options, acute inflammation of colonic diverticula requires a more distinct classification. Historically only diagnosed based on the clinical examination and barium enema, the introduction of CT as well as laboratory tests has led to the possibility of distinguishing patients with "diverticulitis" and with "complicated diverticulitis".

While there is a certain acceptance that a triad of left-sided lower abdominal pain, absence of vomiting and a C-reactive protein level of >5 mg/dL has a high sensitivity to define acute diverticulitis, CT is considered necessary to identify patients with complicated diverticulitis (such as abscess, perforation, fistula and stenosis).[8]

Galetin et al.[8] reviewed 11 national and/or international guidelines for diverticular disease and noted a concordance about the necessity to apply imaging methods for the diagnosis of symptomatic patients (11 out of 11 guidelines); however, a certain discordance was noted regarding the role and time point for the use of CT or ultrasound, respectively.

When CT was used, 7 of the 11 guidelines were in favour of the Hinchey score[17] to classify the severity of the disease; however, other scoring systems have also been repeatedly published[18,19,20] in the literature (Table 1).

It has been widely accepted that a distinction between patients with uncomplicated (e.g. Hinchey class I or Neff grade 0 in CT imaging) and complicated diverticulitis via a classification system may lead to the development of different therapeutic consequences (e.g. inpatient vs. outpatient treatment, antibiotic therapy vs. no antibiotic therapy).[21,22]

Table 1. Classification systems for acute diverticulitis

Stage	Hinchey	Ambrosetti	Neff	Buckley
I	Abscess	Wall thickening (<5 mm)	Wall thickening and/or fat stranding	Wall thickening and/or fat stranding
II	Contained pelvic abscess	Pericolic fat stranding	Locally complicated diverticulitis	Wall thickening >3 mm and/or small abscess
III	Purulent peritonitis	Abscess	Localised pneumoperitoneum	Wall thickening >5 mm and/or free air and/or abscess >5 mm
IV	Faecal peritonitis	Extraluminal air	Abscess <4 mm	
V		Extraluminal contrast	Abscess >4 mm in the pelvis	
VI			Abscess in the abdominal cavity	
VII			Significant pneumoperitoneum and/or intra-abdominal free liquid	

Diverticular Haemorrhage

Diverticular bleeding typically presents as acute-onset, painless haematochezia, but with no evidence of other colonic lesions (e.g. polyps, haemorrhoids and cancer) or bleeding sites identified on colonoscopy.

The mean incidence was recorded to be approximately 14 cases per 100,000 inhabitants per year by a recent publication from Iceland, and no change in the incidence rate has been observed over the last decade.[23] Advanced age, hypertension, coronary heart disease as well as medication associated with anti-coagulative or anti-thrombotic properties (such as aspirin, NSAID, clopidrogel, warfarin and NOAC) have been described as risk factors for colonic and/or diverticular bleeding.[24,25]

Although the majority of these patients can be managed successfully via conservative treatment, an elective colonoscopy following haemodynamic stabilisation and appropriate bowel preparation within the first 24 h has been suggested.[26]

An early endoscopic evaluation is recommended to establish the definitive diagnosis, albeit with the possibility to localise and eventually treat the potential bleeding source.[26,27]

If endoscopy fails to provide an exact localisation of the origin of bleeding; angiography, CT angiography or 99 mTc erythrocyte scintigraphy can also be performed.[27] All of these methods are limited due to the possible institutional issues as well as due to the need for a certain intensity of bleeding.

Barium enema has been historically used as the main diagnostic tool for diverticular diseases until the introduction of CT. For haemorrhage resulting from diverticula, some authors see a certain role for barium enema as a potential therapy for frail patients who are not fit for surgery or in whom other therapeutic measures have failed.[28,29] In collective reports, barium enemas have been described as being beneficial either due to its tamponade effect or due to the direct haemostasis resulting from barium. However, there does not exist any sufficient evidence for a strong recommendation for this approach.

The role of surgery is limited to the rare situation when bleeding cannot be controlled by conservative and/or endoscopic/radiological measures and rather consists of total colectomy or segmental colectomy, when the localisation of the bleeding source has been established.[27]

Risk Factors

Fibres

The common belief that diverticulosis is strongly associated to the Western lifestyle based on dietary factors dates back to the publication of Burkitt et al.[30] of >4 decades ago.

Their hypothesis about the decrease in colonic transit time due to the low-fibre diet (which is associated with high pressure in the sigmoid colon) has been questioned based on the outcomes of colonic motility studies as well as epidemiological evidence.[31,32]

Recently, diet has been challenged as the main risk factor responsible for diverticulosis and diverticular disease following recent epidemiological and genetic studies.[33,34,35,36] Based on anatomic studies showing the prevalence of diverticulosis in the right colon in the Asian population, the role of the "high pressure problem" in the sigmoid colon had to be revised. In addition, several studies dealing with population migration have failed to demonstrate an increase of diverticular disease and/or its related complication as well as a shift from the right sided to sigmoid localisation due to

a change to the Western lifestyle, thus proposing a genetic impact.[33,34,35,36]

Analysis of the Swedish twin registry by Granlund et al.[37] revealed an odds ratio of 7.15 to develop diverticular problems in monozygotic twins compared to only 3.2 for dizygotic twins. These results were partly confirmed by another study from Denmark that calculated a 40%-50% risk of developing diverticular disease based on the genetic factors.[38]

Furthermore, genome-wide studies conducted in Iceland and Denmark have identified variants in genes that were associated with diverticular disease (namely, ARHGAP15, COLQ, FAM155A) as well as variants in FAM155A, which were detected specifically in diverticulitis.[39]

Furthermore, the role of a fibre-poor diet as the only and the main causative factor has also been questioned by studies that could not determine any association between the fibre intake and the risk for the development of diverticulosis.[40,41] However, these results have been mainly based on one single study with a certain methodological limitation.

Despite these concerns about the "low fibre/high pressure hypothesis", a correlation of fibre intake and the risk for diverticular disease has been supported by two prospective studies which suggested that a low-fibre diet is associated with increased symptoms in patients with diverticular disease as well as with increased rates of hospital admission and deaths.[42,43]

There is strong evidence that different sources of dietary fibre may have different effects on the disease risk, which may explain the previous conflicting results on this topic.[43] In the "Million Women Study" by Crowe et al.[44], the type of fibre (i.e. from fruit or vegetables) played a key role on the effect observed from diverticular disease. A total of 690,075 women with known diverticular disease and with a consistent diet since >5 years were followed for 6 years and assessed by using a standardised (40-item) food questionnaire. The survey results revealed that 17,325 women were admitted to the hospital or died from a diverticular disease. Data analysis revealed a strong association between the risk of diverticular disease and the source of fibre, the reduced risk being strongest for cereal and fruit fibres.[44]

In summary, the assumption of a high-fibre diet as a prevention against the development of colonic diverticula (as suggested in the past) has rather shifted to a strong recommendation for fibre-rich diet as a preventive measure against the development of complications associated with diverticula.[8,45]

Nuts, Seeds and Corn

Historically, physicians have advised that individuals with diverticular disease should avoid nuts, seeds, popcorn, corn and other high-residue foods.[46,47] The recommendation that individuals with this condition should avoid them has evolved merely based from a theoretical assumption that a luminal, mechanical trauma could serve as a causal mechanism triggering inflammatory processes with subsequent diverticulitis, perforation or bleeding.

Contrary to this report, a histological study on bleeding colonic diverticula noted the absence of mucosal inflammation.[48] In fact, abnormalities were only recorded at the vasa rectum and involved intimal thickening near the site of bleeding as well as an asymmetric rupture toward the lumen.

Nuts and seeds do not appear to increase the risk, and in a large, prospective cohort (the Health Professionals Follow-up Study), nuts and popcorn were associated with a reduced risk of diverticulitis.[49] In fact, 47,228 US men (aged: 40-75 years) who were free of diverticular disease were evaluated by using a food-frequency questionnaire. During a follow-up of 18 years, 801 cases of diverticulitis and 383 cases of diverticular bleeding were identified. Multivariate analysis did not reveal any associations between corn consumption and diverticulitis or between nut, corn or popcorn consumption and diverticular bleeding or uncomplicated diverticulosis. Contrary to this report, an evidence has been provided for a protective effect of these food items.[49,50]

This observation is also supported by the findings for patients with cardiac disorders showing that nuts are rich in nutrients with anti-inflammatory properties, such as vitamin E, α-linoleic acid and other unsaturated fatty acids and phytochemicals.[51,52] Nut consumption has been reported to have a protective action against certain inflammatory disease states.[51,52]

In addition to some of these contradictions against historical believes, the so-called "typical" Western lifestyle is associated with an increased risk for the development of complicated diverticular disease. The lack of physical activity, obesity (with a special emphasis on central obesity), greater consumption of red meat and fat as well smoking has been shown to lead to a higher incidence of diverticulitis.[50,53,54]

Microbiome and the Role of Probiotics

In general, the role of colonic microbiome can be considered as a basis for an intact mucosal barrier protecting against intraluminal inflammatory factors as well for providing an intact defence system against inflammation. Short-chain fatty acids (SCFAs) are regarded as one of the "key players" that support this function as they are responsible for an increased production of mucus and antimicrobial peptides, thus mediating an unimpaired colonic barrier function and homeostasis, respectively.

Past studies on the microbiome in patients with diverticular disease have provided evidence of a decrease in bacterial population, which are the main producers of SCFAs.[55]

Furthermore, a depletion of Clostridium Cluster IV-usually a group of bacteria with anti-inflammatory properties has been described during the inflammatory processes of the colon, which suggest that a decrease in the population of anti-inflammatory gut bacteria together with an increase in mucosal inflammation may play a role in the development of diverticulitis.[56]

Apart from the impairment of the protective system that should be supported by an intact colonic microbiome, dysbiosis of the microbiota is supposed to be associated with inflammation.[57] In this context, Barabara et al.[57] showed a 70% increase in colonic macrophages during the study of the microbiome as well as the metabolome in patients with diverticulitis.

This observation as well as other research provide a strong evidence that several mechanisms per se or together, including pathogenic bacterial overgrowth (due to an impairment of the competitive bacterial inhibition), or a decrease in the tight junction integrity lead to the deterioration of the mucosal defence as a step toward development of inflammation in the colon.[57]

Therefore, the idea to use probiotics in order to promote adequate bacterial colonisation so as to restore the healthy colonic microenvironment appears to be an attractive therapeutic approach.

Although single-controlled trials using probiotics for diverticular diseases have occasionally shown a trend toward a positive clinical response on the abdominal symptoms or their recurrence, most of them have failed to present an effect in preventing complications and/or recurrence in the future.[58,59,60]

Accordingly, the AGA (as well as most other guidelines of Western associations) does not recommend probiotics as a standard therapy for diverticular diseases.[45]

Treatment

Historically, patients with diverticulitis had to be admitted to hospital, followed by conducting a treatment involving restriction to a fluid diet and intravenous antibiotics therapy; these therapeutic recommendations were not based on modern scientific evidence.[61]

In addition, strong criteria for elective surgery were considered appropriate to prevent the recurrence of diverticulitis and/or the risk for perforation, but the modern research strongly contradicted against these older dogmas.

However, recently, newer concepts with a tendency toward a less aggressive treatment approach have evolved in surgery as well as in conservative therapy.

Conservative Treatment

Antibiotics

Beside several observational studies, two randomised trials compared patients with uncomplicated diverticulitis (Hinchey 1) who received either antibiotics (intravenously, followed by oral administration) versus a control group with intravenous fluids only or intravenous antibiotics versus observation alone, respectively.[62,63]

Both studies (one conducted in Sweden and Iceland and the other in the Netherlands) could not find any benefit for antibiotic treatment with regard to the time of recovery and/or the rate of development of subsequent complications.[62,63]

Although several societies have subsequently stopped recommending antibiotics for patients with uncomplicated diverticulitis.[64,65], this approach must be regarded more critically based on the recent data from longer follow-up studies.[66] In a Dutch analysis conducted after 2-year follow-up, the evidence showed that a higher number of patients in the placebo group (7.7%) went for elective surgery due to recurrent symptoms when compared to the antibiotic group (4.2%).[66] Furthermore, this rate could have markedly increased as some patients were rated as censored owing to the fact that they were included into another trial (elective surgery versus conservative management), which prevented a much higher rate of patients who required surgery in the longer follow-up study.[67] Therefore, we believe that a final recommendation for the need of antibiotics (as well as dietary management) in the treatment of uncomplicated diverticulitis will require further well-designed trials in the future.

In or Outpatient Treatment

Back in 1998, oral hydration and oral antibiotics were proposed for patients with uncomplicated diverticulitis, but recommendations for outpatient management of this population were vague.[61,68]

More recently, a Spanish study (DIVER trial) attempted to evaluate the role of outpatient treatment. They randomised 132 patients and found that four patients in group 1 (inpatient treatment) and three patients in group 2 (outpatient treatment) showed no significant difference with regard to treatment failure (p=0.619), recommending the management of patients with uncomplicated diverticulitis in an outpatient setting.[69]

The results of the present study and those of other clinically controlled trials suggest a high concordance among societies proposing the possibility for outpatient treatment in uncomplicated diverticulitis; however, certain individual factors (e.g. the lack of compliance and/or care at home and immunocompromised patients) still need to be considered.[8,69,70]

Rifaximin and Mesalamine

Rifaximin is a non-absorbable oral antibiotic with good effectivity in the intestinal tract. Based on the belief that rifaximin can reduce the bacterial overgrowth and improve the microbiota, it was primarily used as a treatment for SUDD.[71] Four prospective randomised trials (totally 1,660 patients) noted an improvement in symptoms within one year (64% with rifaximin versus 34% in the control arm); however, the effect of rifaximin on the reduction of recurrence episodes of diverticulitis has not been proven until date.[72] Therefore, there exists no uniform concordance regarding the recommendation for its use. On the other hand, the Italian Society of Gastroenterology (SIGE) regards the cyclic use of rifaximin, in association with high-fibre intake, as safe and useful for the treatment of SUDD.[73] Contrary to this recommendation, the American Gastroenterological Association (AGA) disapproves the use of rifaximin as an agent preventive against the recurrence of diverticulitis.[45]

Due to the chronic inflammation during the pathogenesis of patients suffering from SUDD a possible beneficial effect of mesalamine has been postulated based on the outcomes of a randomised trial conducted over 12 weeks after an episode of acute diverticulitis.[74] Although the symptoms scores suggested some improvement, no effect on recurrence could be evaluated. Moreover, a larger randomised, double-blinded placebo-controlled trial (1,182 patients) did not find any beneficial effect of mesalamine in preventing the recurrence of diverticulitis as well as for the necessity of surgery.[75] These findings are in accordance with those of a meta-analysis describing no evidence for the reduction of recurrent episodes of diverticulitis by using mesalamine.[76,77] However, its role in the treatment of patients with SUDD remains debatable.[78]

Surgery

Elective Surgery

Historically, diverticulitis was regarded as a progressive disease in which the possibility of developing complications was strongly related to the number of recurrent episodes.[79] This perspective led to the recommendation for a more aggressive surgical approach in order to prevent the chance for perforation. However, complications, with the exception of fistula formation, occurred more commonly during the first episode of diverticulitis than after its subsequent episodes.[80]

Ritz et al.[81] described, in a prospective study of 900 patients, the risk of free perforation with 25% at the first episode, which decreased to zero with ongoing episodes.

This report was in accordance with the findings of others observing an episode of complicated diverticulitis in only 4% of all patients within 2 years of the presentation of primary uncomplicated diverticulitis.[82]

This knowledge led to a shift from the dogma of "the second episode of diverticulitis as indication for elective surgery"[79] to an individual "case to case" decision.[83] This finding was also associated with a marked decrease in the number of elective resections without an increase in the number of patients experiencing diverticular perforations.

Although there is a wide concordance among most societies that individual patient factors (e.g. comorbidities) as well as the quality of life (QoL) should have the strongest impact on the decision process (Table 2) considering the lack of scientific evidence and the controversies about more specific issues (e.g. time point for surgery, decision after concealed perforation, the role of age, immunosuppression and suspicion for cancer).[8]

Although some epidemiological data indicate that younger patients are at a higher risk of experiencing recurrent episodes of diverticulitis, it has not been sufficiently proven that this collective will have a worse outcome compared to older patients.[84,85]

Therefore, an aggressive approach in younger patients cannot be absolutely recommended, albeit a more conservative management of older patients has been proposed owing to the potential risks for morbidity and mortality associated with surgery.[86]

Acute Surgery

There remains an overall agreement about the role of surgery in the acute and emergency situations, such as in controlling the source of infection and achieving an acceptable QoL.

However, recommendations about the exact surgical approach have continuously evolved with time. Starting

Table 2. Indications for elective surgical therapy ("!" accepted, "?" under discussion)

Failure of conservative treatment and/or interventional drainage in acute diverticulitis!
Deterioration of quality of life due to recurrent attacks!
Possibility of cancer without further diagnostic options!
Presence of fistula!
Immunocompromised patients?
Young patients?

with a (historic) 3-stage strategy (Hartmann resection and reconstruction with rectal anastomosis plus protective stoma, followed by stoma closure), surgical strategies have continuously evolved in the last two decades. The most important negative impact for QoL is associated with the construction of a long-term or even permanent stoma.[87]

Therefore, the necessity of a policy for delayed reconstruction that is based on expert opinion rather than on scientific evidence has been more and more questioned.[88,89]

Recent randomised trials have attempted to compare the surgical approach with resection and primary anastomosis (with/without loop ileostomy) against the Hartmann procedure in patients with Hinchey III-IV diverticulitis.[88] The DIVERTI-trial showed no statistical difference between both the groups for morbidity and mortality; however, a significantly higher rate for long-term stoma in patients following a Hartmann approach (35% of patients after Hartmann procedure had a stoma after 18-month follow-up when compared to 4% after primary anastomosis).[88]

Similar to these findings, the LADIES trial noted a significantly better 12-month stoma-free survival outcome in patients with primary anastomosis (65 patients with/without protective loop ileostomy) when compared with that in patients who underwent a Hartmann procedure (68 patients).[89]

Although the authors concluded that, in haemodynamically stable, immunocompetent patients aged <85 years, primary anastomosis was preferable to Hartmann's procedure as a treatment for perforated diverticulitis (Hinchey III or Hinchey IV disease), these findings have been questioned by others.[90]

While Cauley et al.[90] observed a higher rate for morbidity and mortality after primary anastomosis, Goldstone et al.[91] described a correlation in the complication rate (7.4% mortality after Hartmann surgery versus 15% after primary anastomosis) and the training of the surgeon. In the later study, patients treated by the colorectal board certified surgeons demonstrated a significantly lower mortality rate when compared with patients operated by general surgeons.[91]

Another strategy to avoid the formation of a colostomy during acute diverticulitis is to employ laparoscopic lavage in order to control infection, which has shown promising results by first cohort studies.[92,93,94]

However, long-term follow-up of randomised trials comparing lavage with primary resection showed a greater number of deep-site infection and unplanned operations in the lavage group as well as the risk for overlooking cancer.[95,96]

A possible explanation for the controversial results could be found in the different strategy for using laparoscopic lavage, such as, was the lavage approach applied in order to overcome the acute infectious situation, which could have been followed by an elective resection or was lavage regarded as a definitive treatment for acute, purulent diverticulitis (i.e. without any plan for sigmoid resection)?

At this time point, thus, laparoscopic lavage cannot be recommended as a standard procedure outside of clinical trials.

In conclusion, it must be accepted that, although research dealing with the management of diverticular diseases has increased in the past two decades, recommendations for the relevant diagnosis and treatment still relies mainly on expert opinions (which have replaced older, historic expert opinions themselves).[8] Randomised trials producing valid scientific evidence have recently evolved; however, planning and performing protocols for such studies have been often hampered by various factors, such as the heterogeneity of patients and the lack of blinding (especially in acute settings), among others. Since diverticular diseases have a strong impact on the patient's QoL as well as on the health care system, further efforts to further elucidate the appropriate diagnostic and therapeutic approach are warranted.

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INVITED REVIEW

Small Bowel Adenocarcinoma in the Setting of Crohn's Disease: A Systematic Review of the Literature

Crohn Hastalığıyla İlişkili İnce Bağırsak Adenokarsinomu: Sistematik Derleme

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ABSTRACT

This study aimed to conduct a systematic literature review of small bowel adenocarcinoma (SBA) associated with small bowel Crohn's disease (CD). A systematic literature review was conducted using MEDLINE, PubMed, Embase, CINAHL, Cochrane and Google Scholar databases. Data regarding demographics, presentation, diagnosis, treatment and survival were extracted. The review included articles that reported the location of SBA in the setting of CD and excluded articles that did not state the CD location and/or cancer type. We identified 218 patients diagnosed with SBA in the setting of small bowel Crohn's disease. SBA should be in the differential diagnosis in patients with long-standing ileal CD presenting with small bowel obstruction, anaemia and perforation. SBA in the setting of CD presents diagnostic and treatment challenges; however, a high clinical index of suspicion may lead to early diagnosis and increased survival.

Keywords: Adenocarcinoma of the small bowel, Crohn's disease, small bowel cancer

ÖZ

Bu çalışmanın amacı ince bağırsak Crohn hastalığıyla (CH) ilişkili ince bağırsak adenokanseri (İBA) hakkında sistematik literatür derlemesi yapmaktır. MEDLINE, Pubmed, Embase, CINAHL, Cochrane and Google Scholar portalları kullanılarak sistematik bir derleme yapılmıştır. Hastaların demografik bilgileri, prezentasyon, tanı ve tedavi süreci ve sağkalım bilgileri analiz edilmiştir. Bu derlemeye sadece ince bağırsak CH kapsayan çalışmalar dahil edilmiş, CH'nin lokalizayonu veya kanser turunun açıkça belirtilmediği çalışmalar derlemeye dahil edilmemiştir. Toplamda ince bağırsak CH ile ilişkili olarak ince bağırsak adenokanseri tanısı alan 218 hasta saptanmıştır. İnce bağırsak adenokarsinomu, uzun sureli ileal CH olan ve ince bağırsak obstruksiyonu, perforasyonu veya anemisi olan hastaların ayırıcı tanısında akılda tutulmalıdır. CH ile ilişkili İBA'sı tanısı ve tedavisi zor bir hastalıktır, ancak yüksek bir şüphe indeksi erken tanı almayı sağlayarak sağkalımı uzatabilir.

Anahtar Kelimeler: İnce bağırsak adenokarsinomu, Crohn hastalığı, ince bağırsak kanseri

Introduction

Small bowel cancer (SBC) is a rare entity that can be associated with Crohn's disease (CD).[1] The incidence of SBC in patients with CD is increased 18.75-fold than in the normal population.[1] The pathogenesis of SBC in the setting of CD is not fully understood, but the disease has a poor prognosis due to diagnostic challenges and concluding late stage presentation associated with the primary disease. This study aimed to conduct a systematic literature review of small bowel adenocarcinoma (SBA) associated with small bowel CD (SBCD).

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Materials and Methods

Data Search

A systematic search on published literature was conducted using the PRISMA guidelines.[2] The literature search was performed on MEDLINE, PubMed, Embase, CINHAL, Cochrane and Google Scholar, and the databases were searched systematically by screening all publications between January 1947 and January 2017. In addition, Google search engine was used. Citations from the included articles were also searched, but they revealed no other relevant articles. The final query date was 2 January 2017. Information regarding keywords and medical subject headings is summarised in the PRISMA flow (Figure 1). The limitations during search were "species human" and "age ≥18."

Inclusion/Exclusion Criteria

Case reports, case series, comparative studies, clinical trials, controlled clinical trial, randomised controlled trial and cohort studies were included for PubMed and articles for Embase. Two cases of SBA associated with SBCD from our institution were included as well. Systematic reviews and meta-analyses were excluded. Articles were selected for full text reading if the abstract reported on malignancy in CD. Full text of the relevant studies were retrieved for further selection. Studies containing mixed series of colonic and SBCD were included if data on patients with SBCD diagnosed with SBA could be isolated and extracted. Studies that did not clearly report the location of CD or studies including only colonic CD, ulcerative colitis, familial adenomatous polyposis and other polyposis syndromes were excluded.

Data Collection and Analyses

The authors reviewed the full text articles that met the inclusion criteria and extracted information on study population characteristics: age at CD and SBA diagnosis, gender, initial/presenting symptoms and CD and SBA location, diagnosis timing (preoperative, intraoperative

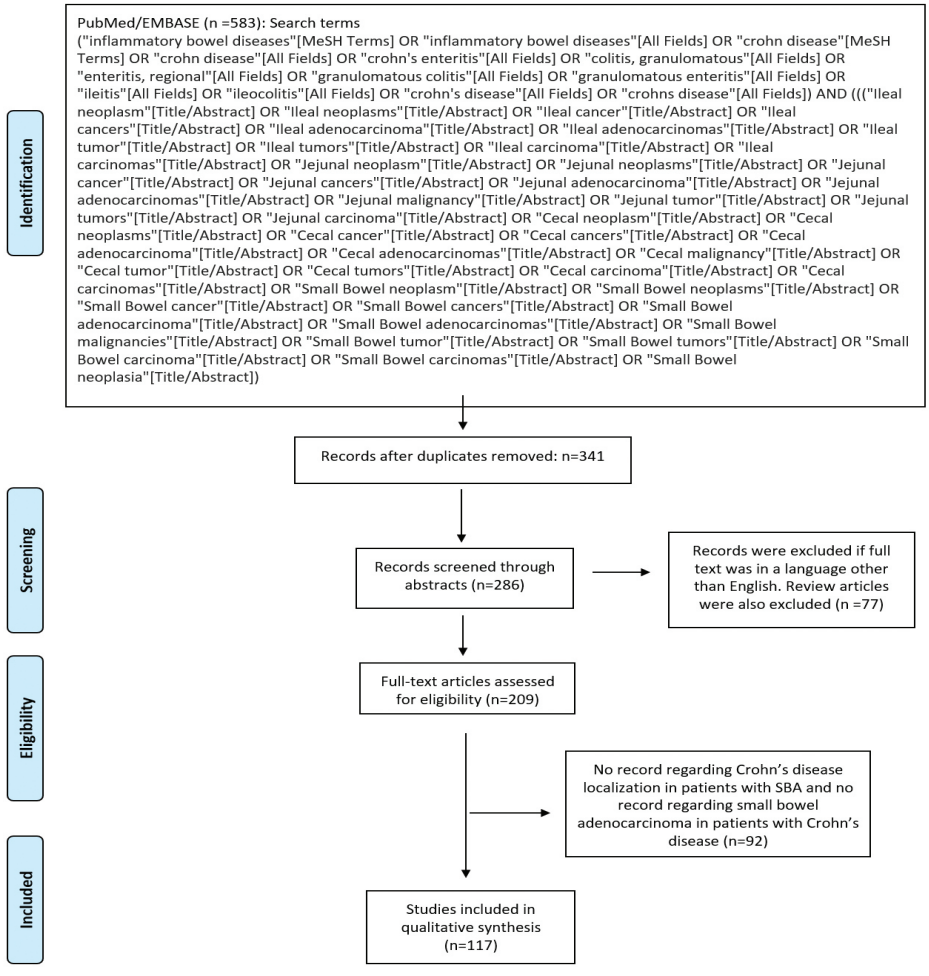

Figure 1. Flow diagram

and postoperative), tumour location, time from initial diagnosis (CD) to SBA diagnosis, stage/cancer spread[3] and survival outcomes. The CD location was reported per Vienna classification (Figure 2).[4] The diagnosis timing of the SBA was grouped into three: preoperatively if the primary tumour and/or the metastasis were diagnosed or suspected for malignancy with preoperative diagnostic studies, intraoperative if the diagnosis of the tumour was made either under direct vision or with frozen pathology report during surgery, and postoperative if the diagnosis was established with postoperative final pathology report. We identified 218 patients from 117 studies (2 patients from our institution; unpublished data).[5-121]

Epidemiology

More than half of the patients with CD experienced SB involvement during their lives.[88,122] There is a link between CD and SBA; however, the pathogenesis has not been delineated because of the rarity of the disease. One proposed hypothesis is that chronic inflammation of CD might be the accelerating factor in cancer development, but this theory has not been substantiated. The lifetime prevalence of SBA in patients with SBCD is 0.3-3%, and the risk of SBA is 18.75 times greater in patients with SBCD than in the general population.[1,21,55,77,119] A single-centre study identified only one SBA in 295 CD patients (0.3%) during a 30-year period.[21] CD associated with SBA is reported to be more frequent among men with a male-to-female ratio of 3:1; however, there is no gender-related difference in the prevalence of non-CD associated with SBA.[48,123]

We identified 218 patients from the literature, including two unpublished cases from our institution, who were diagnosed with SBA in the setting of SBCD. The detailed information regarding our cohort is summarised in Table 1.

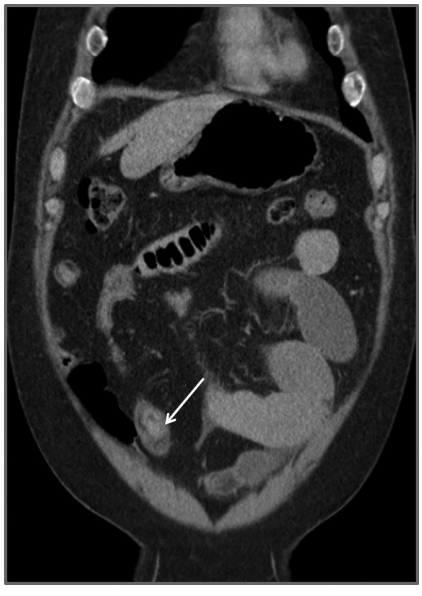

Figure 2. Computed tomography enterography from 2015 reveals changes of Crohn's disease affecting the mid to distal ileum (arrow)

In a comparative study, patients diagnosed with SBA in the setting of SBCD were younger than those diagnosed with sporadic SBA [43 (33-72) vs 48 (41-95) years old].[80] Although there are no recommendations for screening SBA in patients with CD, keeping the diagnosis germane to the clinician might impact diagnosis timing. In our cohort, the mean age of SBA diagnosis was 50.6 (range 24-86) years. The male predominance was consistent with the literature.

Risk Factors

Multiple risk factors have been proposed to play a role in the development of SBA in patients with CD.[124] Adenocarcinoma development in the setting of previous strictureplasty site has been reported in four cases,[75,78,82,109] and adenocarcinoma development in the stricture site has been reported in eight cases.[46,68,69,70,73,81,87,89] Partridge and Hodin[78] described malignant transformation in patients with a history of strictureplasty as being a (1) development of a new cancer in the area of previous strictureplasty and (2) failure to recognise the cancer due to the limited intervention without SB resection. The absence of a well-defined mass in most of the cases might preclude the diagnosis (Figure 3); thus, biopsy of the strictures adjacent to mucosal ulcers might be useful if there is a clinical concern, especially in long-standing disease.[78] A case report revealed a 49-year-old man with long-standing CD who underwent surgery due to SB obstruction and was subsequently diagnosed with multiple SB strictures in an ulcer adjacent to a stricture on intraoperative biopsy. An inconclusive frozen pathology report led to the decision to perform SB resection (Figure 4). SBA was identified in the final pathological specimen.[78] Marchetti et al.[68] reported another case where a biopsy of a stricture secondary to ileal CD was performed before Heineke-Mikulicz strictureplasties. Biopsies were negative

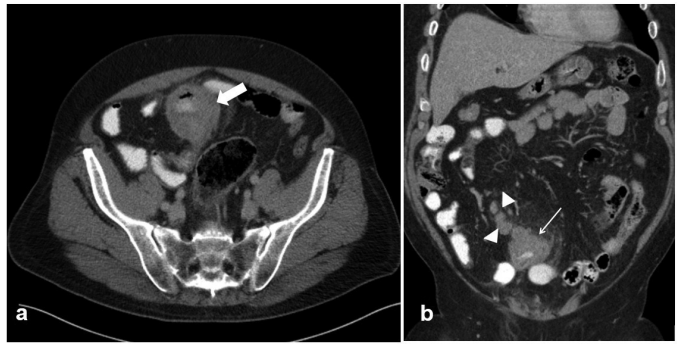

Figure 3. a) Axial computed tomography (CT) image obtained 15 months later shows bulky mass with soft tissue attenuating wall (arrow) representing the adenocarcinoma. b) CT from the same patient/time reveals that a soft tissue mass has grown within the previously affected bowel loop (arrow) with associated infiltrative changes in the local small bowel mesentery. Multiple lymph nodes have also appeared (arrowheads)

at the time of surgery, but 6 years after the surgery, the patient was diagnosed with adenocarcinoma at the site of prior strictureplasty, which was identified by a previously placed clip. In spite of these two case reports, the overall risk of SBA in the strictureplasty site is so low that routine biopsy of all strictures is not warranted.[68]

The presence of an intra-abdominal fistula is another pathologic state that has been proposed to be associated with SBA development in patients with CD.[71,96] However, it is unclear whether the SBA originates at the fistula site or fistulas occur secondary to SBA. Irrespective of the above theories, the incidence of SBA in the setting of intra-abdominal fistula associated with CD is extremely rare. A previous history of bypassed bowel segments is also a risk factor and has been reported in numerous cases.[5,10,11,12,13,14,15,16,17,18,19,20,22,24,38,40,41,49,65]Bacterial inoculation

Table 1. Information regarding 216 patients-cohort collected with literature review

Age at the diagnosis of CD, years*,1	34.4 (6-78) age <40 years old: 134 patients, age ≥40 years old: 77 patients
Gender[1]	78 female, 127 male
Age at the diagnosis of SBA*,1	50.6 years (range 24-86)
Disease duration, months[1]	20.7 (range 1-300) 27 patients diagnosed with cancer during their initial visit and they didn't included in the calculation of disease duration
Location of the CD, n L1: Terminal ileum L2: Colon L3: Ileocolic L4: Upper gastrointestinal tract	L1: 117 L1-L4: 18 L2-L4: 2 L3: 36 L3-4: 6 L4: 13 Diffuse small bowel CD or enteritis: 24
Bypassed bowel segment	24 patient have history of bypass and 22 of these patients had the SBA in the bypassed segments
Intraabdominal fistula	4 patients had the SBA in the fistula site
Stricture/stricturoplasty	12 patients have history of SB stricture, 8 patients developed cancer in the stricture site, 4 developed cancer in the stricturoplasty site
Location of the cancer	-206 patients with one adenocarcinoma: Ileum- 154, Jejunum- 28, SB- 18 (no details) Jejunoileal- 4, Ileocolic- 2 -10 patients with more than one adenocarcinoma: Ileum-colon- 7, Duodenum- ileum- 1, Jejunum-ileum- 1, Jejunum-ileum-colon-1 In addition to adenocarcinoma 4 patients were diagnosed with colorectal carcinoid tumors at the diagnosis.
Presenting symptoms	82 obstruction, 12 pain, 11 anemia/bleeding, 10 diarrhea, 8 perforation/peritonitis, 5 fistula, 3 flare, 2 ileus, 2 mass, 2 fatigue, 1 high stoma output.
Survival§,1	In 132 patients followed with a mean follow up time of 19 mo (0.1-156 mo), 4 patients were reported to die within a year of surgery- no details. 68/128 patients (53.1%) were alive at 1 year, 36/118 patients (30.5%) were alive at 2 year.
Chemotherapy (CT)	A total of 37 patients had information; 27/75 patients (36%) in stage 4, 4/33 patients (12.1%) in stage 3, 4/46 patients (8.7%) with stage 2 and 1/16 patients (6.3%) with stage 1. One patient was missing data on tumor stage. 21 patients received 5-FU based adjuvant CT, 1 patient received oxaliplatin, 15 patients received adjuvant CT- no specific info
Disease stage, n[1]	Stage 1- 16 patients (9.4%), Stage 2- 46 patients (27.1%), Stage 3- 33 patients (19.4%), and Stage 4- 75 patients (44.1%) (25 to carcinomatosis/mesentery/peritoneal, 19 to liver, 5 to lung, 2 to brain, 2 to ovary, 2 to colon, 27 not reported)

[1]Missing data : Age: 6 patients, gender:11, age at the SBA diagnosis: 11 patients, disease duration: 7 patients, survival: 72 patients, disease stage: 46 patients

*Reported values mean (range), §Only patients who underwent surgery included, CT: Chemotherapy

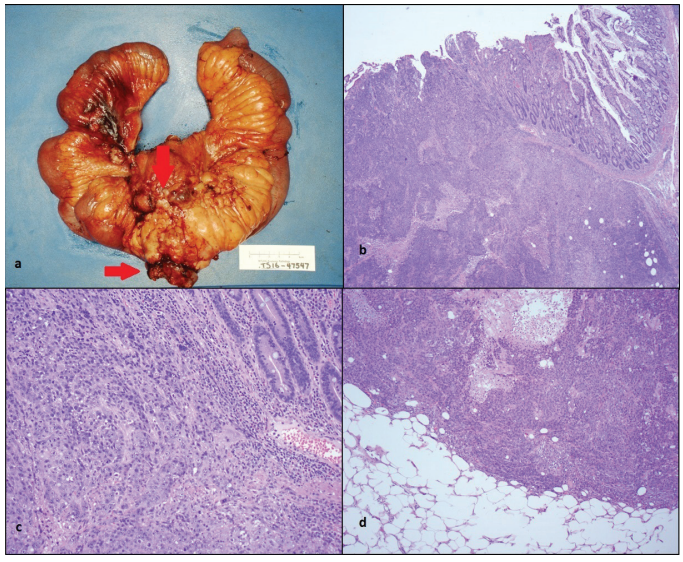

Figure 4. a) Gross image of the small bowel resection (red arrows are pointing to the tumour). b) High power view of the tumour (left) and benign small intestine (right). c) Low power view of the tumour (left) and benign small intestine (right). d) Tumour invasion of the peri-intestinal fat tissue

might also affect pathophysiology.[125] In a matched case-control study, occupational exposure to halogenated aromatic compounds and aliphatic amines, asbestos, cutting oil solvents and abrasives were shown to have a relationship with SBA development in CD.[51]

Additionally, some have suggested that medications used to control CD such as 6-mercaptopurine might contribute to cancer development when the drug is used for more than 6 months.[51,52] However, further observational studies are needed.

Presentation

These patients present with various symptoms that vary from non-specific fatigue to bleeding and complete obstruction.[69,76,83] Usually, the symptoms are subtle and indistinguishable from CD and, therefore, might be a risk factor contributing to a diagnostic delay of SBA. In some cases, the predominant initial presentation may be that of SBA rather than CD.[72,91,121] The initial findings of SBA in the setting of CD are intestinal obstruction, followed by abdominal pain, diarrhoea, weight loss and abdominal fistulae.[42,65,108] In this review, obstruction was the most common initial symptom (n=82, 59%; missing data in 77 patients). Other common symptoms were abdominal pain (n=12), anaemia-bleeding (n=11), diarrhoea (n=10) and fistulas (n=5). Additionally, the incidental finding of SBA during screening colonoscopy with retrograde ileoscopy may be the first presentation of the disease. Incidental identification of liver metastasis with biopsy has also been reported in the literature.[86,96] Free perforations in the setting of CD should arouse suspicion as to the possibility of SBA.[87,94]

SBA associated with CD is usually related to the ileum.[23,65,77,80] Palascak-Juif et al.[80] reported on 19 of 20 patients who were diagnosed with ileal SBA in the setting of CD. On the other hand, *de novo* SBA is equal throughout the proximal and distal SB.[126] In this review, there were 206 patients with one adenocarcinoma and 10 patients with two different adenocarcinomas. Among the patients with only one tumour, 154 patients (74.7%) had ileal SBA. The time from the initial CD diagnosis to the development of SBA is longer compared with other benign indications for surgery.[23] In the literature, the time lapse between diagnoses of CD and SBA ranged from 3 weeks to 15 years; in the current review, 25 patients (11.6%) were diagnosed with cancer within a month of their CD diagnosis. The median time to SBA diagnosis from CD diagnosis was 18 months (1-300 months, data on 10 patients were missing). However, it is important to acknowledge that the delay in the initial diagnosis of CD might be a factor contributing to the delay in diagnosing SBA.

Pathophysiology and Pathology

To date, the pathophysiology of SBA has not been delineated.[89] An inflammation-dysplasia-adenocarcinoma process has been suggested to affect the development of SBA in CD similar to the colorectal cancer (CRC).[71,89] In a retrospective study, similar phenotypic features of the dysplastic areas in SBA and CRC have been illustrated.[89] Recognised CRC genetic mutations such as K-Ras, APC and mismatch repair genes have been shown to be present in CRC and *de novo* SBA.[127,128,129] The presence of p53, K-Ras mutations or high microsatellite instability in the setting of CD-related SBA has also been documented in the literature.[71,115]

The incidence of sporadic SBA and carcinoid tumours has been reported to be equal in the most recent national reports.[126] However, adenocarcinoma is more common in the setting of CD than carcinoid tumour.[114] SBA is commonly diagnosed as an isolated tumour, occasionally synchronous with colonic adenocarcinomas or SB carcinoid tumours.[57,59,107,111,114] Four cases of concurrent SBA and carcinoid tumour in the setting of CD have been identified in the literature.[59,107,111,114]

Diagnosis

Commonly, the diagnosis of SBA in the setting of CD is incidental and made postoperatively. The challenge, however, is to make the diagnosis preoperatively and ensure timely extirpation.[83,91] The delays in the diagnosis were less than 2 months due to the failure of patients to report their symptoms, 8.2 months due to the absence of appropriate

diagnostic tests and 12 months due to the failure of detection on the radiological tests in patients with primary SBC.[130] Patients more commonly undergo exploratory laparotomy to treat the complications of Crohn's flair including obstruction, infection, bleeding and perforation rather than the rare diagnosis of SBA. Out of 129 patients, 64 (49.6%) were diagnosed with cancer after the surgical procedure, whereas 46 (35.6%) and 15 (11.6%) were diagnosed intraoperatively and preoperatively, respectively. Four patients (3.2%) were diagnosed at autopsy without any surgical interventions, and data were missing in 87 patients. Currently, preoperative diagnostic tools are insufficient to differentiate SBA from complicated CD. To identify malignancy preoperatively, clinicians should consider it to be the differential diagnosis, particularly in patients with new symptom onset or recurrent SB obstruction after a long-standing stable disease, fistula tracks resistant to treatment and recurrent stricture after a recent stricturoplasty (Figure 5).[45]

Imaging and Endoscopy

Imaging studies are not fully reliable to diagnose SBA in the setting of SBCD as chronic inflammation of CD maybe indistinguishable from a tumour-desmoplastic reaction.[85,131] Standard imaging techniques such as computed tomography (CT),[25] barium enema,[12,40] upper gastrointestinal and SB series,[44,47,50] magnetic resonance enterography,[86] positron emission tomography/CT and double-balloon enteroscopy[14] may be helpful in enabling the diagnosis, but these sophisticated studies may only identify a small portion of malignancies in these cases preoperatively.[47,84]

Small bowel enteroclysis and SB that follow through exams detected 90% and 33% of SB tumours in non-CD patients, respectively, but neither one is commonly utilised.[132]

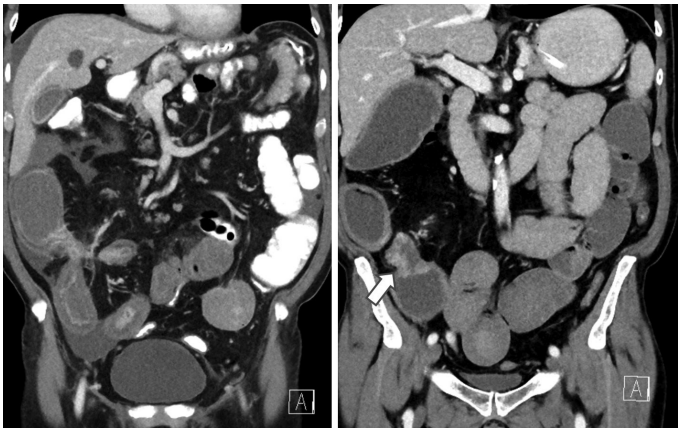

Figure 5. Patient with long-standing penetrating/fistulising CD with non-responsive bowel obstruction necessitating surgical resection. At surgery, an adenocarcinoma was found embedded in the CD changes. Although this was not prospectively recognised, in review, there are some irregular nodular mural changes in the affected region (arrow)

Conversely, CT enterography has become the imaging modality of choice, and it has been widely adopted for both the initial diagnosis and follow-up of SBA in patients with CD.[79] Although video capsule endoscopy has been used as an important endoscopic tool, the presence of CD increases the risk of capsule retention as a result of CD stricture formation.[133]

The radiological diagnosis of SBA in patients with CD has been historically challenging. Weber et al.[131] reviewed 34 CD patients with SBA, of whom 14 had preoperative imaging. They also enumerated 17 imaging features that might suggest the presence of tumours, including mass, obstruction, annular mass morphology, active inflammation with abscess cavity, perforation, abrupt luminal margins, nodularity at the mesenteric border of the mass, homogeneous enhancement patterns, bowel wall thickening, presence of penetrating disease near mass lesion or elsewhere, aneurysmal bowel dilatation and localised mesenteric stranding or metastatic disease to liver or elsewhere. Patients with malignancy at an ileocolic anastomosis were excluded. Despite the abovementioned features, only 2 of the 14 cases were prospectively diagnosed.[131] In a separate study, Soyer et al.[85] reported that only five of seven SBA in CD patients could be retrospectively identified on CT enterography. They listed SB mass, heterogeneous strictures, high-grade obstruction or irregular and circumferential bowel wall thickening as suggestive features of identifying SBA.[85] Both reports highlighted the overlap of imaging findings in patients with long-standing CD with or without superimposed adenocarcinoma. The ability to use diffusion restriction as an imaging parameter allowed for the prospective diagnosis of two SBAs in CD.[86] However, both cases were described as bulky masses that would have likely been diagnosed by other modalities such as CT or barium studies.

Treatment and Prognosis

Therapy options are limited, and surgery is the main stay of management when feasible. Locoregional SBA is treated with wide resection and lymph node dissection. Lymph node spread is commonly seen in patients with jejunal or ileal adenocarcinomas, which are the locations frequently observed in SBA in the setting of CD.[47,134] For tumours confined in the terminal ileum, adequate SB margins plus a formal right colectomy are indicated to properly remove the tumour and lymph node basin. Adjuvant chemotherapy with different regimens has been recommended and used in patients with positive lymph nodes, but a recent retrospective study reported no statistically significant difference in disease-free survival and overall survival with or without neoadjuvant therapy.[124] The rationale behind using adjuvant chemotherapy to treat SBA is mainly to prevent recurrent

disease, akin to the management principles of the colonic adenocarcinoma. Small numbers preclude prospective clinical trials on specific regimens.[135] The literature largely consists of case reports and case series. We identified 75 patients (44.1%) with distal metastasis and 33 (19.4%) with lymph node metastasis at the time of diagnosis. The locations of distal organ metastasis and incidences are summarised in Table 1. The regimens used for adjuvant therapy showed great heterogeneity with regimens including fluorouracil (5-FU), 5-FU and leucovorin, 5-FU with lomustine, cyclophosphamide with methotrexate (in a patient where 5-FU was not available), folinic acid, 5-FU and oxaliplatin (FOLFOX), FOLFOX and cetuximab, 5-FU and steroids, and oxaliplatin, bevacizumab and capecitabine. Of 75 patients with metastasis, only 27 had information regarding adjuvant therapy. Among 62 patients (32.6%) with local disease and negative lymph nodes, 5 received adjuvant chemotherapy. Combination 5-FU and leucovorin in patients with SBA and combination capecitabine and oxaliplatin have been shown to improve the outcome in metastatic disease in a phase II trial.[136,137,138]

After the failure of 5-FU, irinotecan might be beneficial in patients with SBA in the setting of CD.[139] The prognosis of SBA in the setting of CD has been a subject of controversy in the literature. Many reports suggested worse outcomes in patients with SBA in the setting of CD compared with those in *de novo* SBA.[43,44,48,65] In young patients with distally located SBA in the presence of CD-like symptoms including abdominal pain, fatigue and weight loss, the diagnosis has been delayed, thus affecting the prognosis. When patients present with obstruction and are diagnosed with SBA, the disease is typically advanced and cannot achieve a cure with surgical treatment alone.[83] The 2-year survival rate in patients with SBA in the setting of CD was 27%, whereas the 5-year survival rate was 32.5% in patients with *de novo* SBA unrelated to CD in the SEER database.[83,126] In this review, 36.7% (18/49 patients) of patients operated for obstruction were alive at 1 year and 15.2% (7/46 patients) at 2 years. Although these percentages are lower than other studies reported in the literature, data were missing in 34 patients, which might have affected the outcomes. Palascak-Juif et al.[80] reported a median survival rate of 28 (range 7–26) months compared with that of 12 (2-74) months survival in patients with *de novo* SBA, yet half of their patients with CD received adjuvant chemotherapy, whereas none in the *de novo* group did. Weber et al.[131] reported their experience with SBA in CD and showed that 70% of patients were alive at 1 year and 52% at 2 years. However, only 73.5% of their patients were available for follow-up. In our cohort, 1-year and 2-year survival rates were 53.1% (68/128) and 30.5% (36/118), respectively, which are comparable to the data reported in the literature. Of patients, 66% were followed up with subsequent survival information. The difference in the outcomes is multifactorial, and prospective studies with matched cohorts are needed to generate evidence-based data upon to provide recommendations.

Summary

We report a meta-analysis of SBA in the setting of CD and have summarised the challenges of timely diagnosis, surgical and adjuvant treatment and survival outcomes in complicated SBA in the presence of CD. With a delay in diagnosis already present, further concern that an increase in the availability of biologics may only delay referral for timely surgery and prompt diagnosis of this highly aggressive cancer.

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REVIEW

In the COVID-19 Pandemic Living with a Stoma and Being a Stoma Nurse

COVID-19 Pandemisinde Stomayla Yaşamak ve Stoma Hemşiresi Olmak

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ABSTRACT

Stoma is created for reasons such as cancer, inflammatory bowel diseases and trauma to increase the quality of life of patients and to correct the underlying pathological condition. However, stoma causes major changes in patients' later life after opening. Patients take a great deal of time to adapt to the stoma and they need stoma therapy nurses. Stoma nurses, on the other hand, are responsible for the processes of diagnosis, treatment, and care services for these people, regardless of their conditions. During the coronavirus disease-19 (COVID-19) pandemic period, the responsibilities of stoma nurses continue to increase. Because of the pandemic conditions, the need of individuals with stoma for nurses increases more and it becomes difficult to reach nurses. This review was written to address the care of individuals with stoma and the issues that stoma nurses should pay attention during the pandemic period. The review was discussed in two parts: The individual with stoma and the stomatherapy nurse in the COVID-19 pandemic. As a result, individuals with stoma in the COVID-19 pandemic should stay at home as much as possible. When he/she needs to go to the hospital, he/she should contact the stoma nurse. During this period, stoma nurses should carry their daily work to online platforms. They should support individuals with stoma using phone, e-mail, and telehealth applications.
Keywords: Stoma individual, stomatherapy nurse, COVID-19 pandemic

ÖZ

Stoma; kanser, enflamatuvar bağırsak hastalıkları ve travma gibi nedenlerle hastaların yaşam kalitesini artırmak ve alttaki yatan patolojik durumu düzeltmek amacıyla açılmaktadır. Fakat stoma, açıldıktan sonra hastaların sonraki yaşamlarında büyük değişiklikler yapmasına neden olmaktadır. Hastaların stomaya uyum sağlaması büyük bir zaman almakta ve stoma terapi hemşirelerine gereksinimleri bulunmaktadır. Stoma hemşireleri ise koşulları ne olur olsun bu kişilere yönelik tanı, tedavi ve bakım hizmetlerinin etkin bir şekilde yerine getirilmesinden sorumludur. Koronavirüs hastalığı-19 (COVID-19) pandemisi döneminde de stoma hemşirelerinin sorumlulukları artarak devam etmektedir. Çünkü pandemi koşulları nedeniyle stomalı bireylerin hemşirelere olan gereksinimi daha fazla artmakta ve hemşirelere ulaşımı zorlaşmaktadır. Bu derleme pandemi döneminde stomalı bireylerin bakımı ve stoma hemşirelerinin dikkat etmesi gereken konuları belirtmek amacıyla yazıldı. Derleme, COVID-19 pandemisinde stomalı birey ve stomaterapi hemşiresi olmak üzere iki bölüm üzerinden ele alındı. Sonuç olarak, COVID-19 pandemisinde stomalı olan bireyler mümkün olduğu kadar evde kalmalıdır. Hastaneye gitmesi gerektiği durumlarda stoma hemşiresi ile iletişime geçmelidir. Bu dönemde stoma hemşireleri ise günlük olarak yapması gereken işlerini çevrimiçi platformlara taşımalıdır. Stomalı bireylere telefon, e-posta ve telesağlık uygulamalarını kullanarak destek vermelidir.
Anahtar Kelimeler: Stomalı birey, stomaterapi hemşiresi, COVID-19 pandemisi

Introduction

Stoma creation due to reasons such as colorectal cancers, ulcerative colitis, Crohn's disease, diverticular diseases, imperforate anus, traumas, intestinal obstructions, familial polyposis and congenital abnormalities greatly affects the lives of individuals. Because stoma requires individuals to change their life habits besides changes in body integrity and intestinal discharge.[1,2] Although stoma seems to negatively

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affect the lives of individuals at first glance, the purpose of stoma is to prolong the life of people, to maket hem return to healthy and productive life, to increase the quality of life, and to correct the underlying pathological condition.[3,4] It may take some time for individuals to realize the purpose of a stoma and adapt to it. Therefore, stoma nurses and other health professionals are needed to accelerate the adaptation process to the stoma.[1,3,5] Due to the ongoing needs of individuals with stoma throughout their lives, communication with the stoma nurse continues. The stoma nurse, on the other hand, is responsible for the processes of diagnosis, treatment and care services for people with stoma, wound, incontinence and fistula problems, regardless of their conditions.[6]

Due to coronavirus disease-19 (COVID-19), which emerged on December 1, 2019 in Wuhan, the capital of the Hubei region of China and was declared a pandemic by the World Health Organization (WHO) on March 11, 2020, approximately 1,038,534 people died so far, and as of October 5, 2020, 8,498 people died in our country.[7,8] All health professionals and nurses caring for the patient were at the forefront in controlling the COVID-19 pandemic that affected the world.[9,10] Stoma nurses also worked in emergency and pandemic services like other nurses during the pandemic period. They also continued to provide services for individuals with stoma.

The pandemic has caused many adverse events on the global health system.[10,11] The COVID-19 pandemic has potentially devastating effects for patients without COVID-19 due to its burden on the health system. Even in the normal lives of individuals, the presence of stoma has a great effect on the quality of life, while the need of these individuals for a nurse increases during the COVID-19 pandemic period.[12] In this period, individuals with stoma represent a neglected group. Because, during the pandemic period, reducing the number of people admitting to the hospital to prevent in-hospital contamination, canceling elective surgeries in surgical clinics and employing health professionals in pandemic wards with insufficient medical resources made it difficult for individuals with stoma to reach stoma nurses.[10,11,12]

Many recommendations, guidelines and reviews on surgical and endoscopic applications in the COVID-19 pandemic have been published, and none of them has focused on individuals with stoma and stoma nurses. This review was written to address the care of individuals with stoma in the COVID-19 pandemic and the issues that stoma nurses should pay attention to. The review was evaluated in two parts: The individual with stoma and the stoma nurse during the pandemic period (Figure 1).

Being an Individual with Stoma in the COVID-19 Pandemic

In the COVID-19 pandemic, patients who show severe signs and symptoms of disease and have a poor prognosis are the patients in the fourth group. This group, that has a poor prognosis, represents 5% of all patients and does not show signs and symptoms in the first five days. In the following days, they begin to present with severe symptoms and signs and require intensive care. Of the patients in this group 50% result in death.[9] The patients in this group are generally people over the age of 60-65 with chronic diseases such as cardiovascular disease, diabetes, obesity, chronic respiratory failure, cancer or immunodeficiency.[13]

Colorectal cancers that cause creating a stoma are ranked third worldwide in terms of mortality and morbidity.[14] In our country, colorectal cancer is the third most common cancer type in both women and men.[15] Most colorectal cancers occur in people over the age of 50 and the average age in men is 68 and the average age in women is 72. It is 63 years for both men and women in rectal cancers.[16] Therefore, individuals with stoma during the pandemic period have a higher risk of developing severe diseases, because individuals with stoma are generally elderly individuals with chronic disease. During this period, individuals with stoma are recommended to consult primary health care services in the assessment of risk factors for COVID-19. Stool and urine should be evaluated in terms of COVID-19 transmission.[13] Recent studies have found that the virus remains in stool samples longer than in nasopharyngeal swab samples.[17]

Care guidelines should be created for individuals with stoma during the pandemic period. By following the established guidelines, treatment should be provided in a hospital that does not accept COVID-19 patients or in hospitals where patients with positive and negative COVID-19 are clearly distinguished. All individuals with stoma should be considered positive until proven otherwise.[11] During the pandemic period, individuals with stoma should be evaluated in two ways: Inpatient and outpatient.

Patients with Stoma in Hospital

In the COVID-19 pandemic, it is recommended to open a stoma instead of the primary anastomosis to reduce the complication rate in general surgery services.[10,11] During the pandemic period, the stoma place should be marked by the stoma nurse before the stoma is created. For this reason, both the stoma patient and their family should be educated and supported.[12] Patients should wear a surgical mask and maintain hand hygiene during their stay in the hospital due to stoma creation. During stay in the hospital, the patient should avoid any personal contact with other patients and maintain physical distance measures. Disposable products/ accessories should be used and disposed of in special

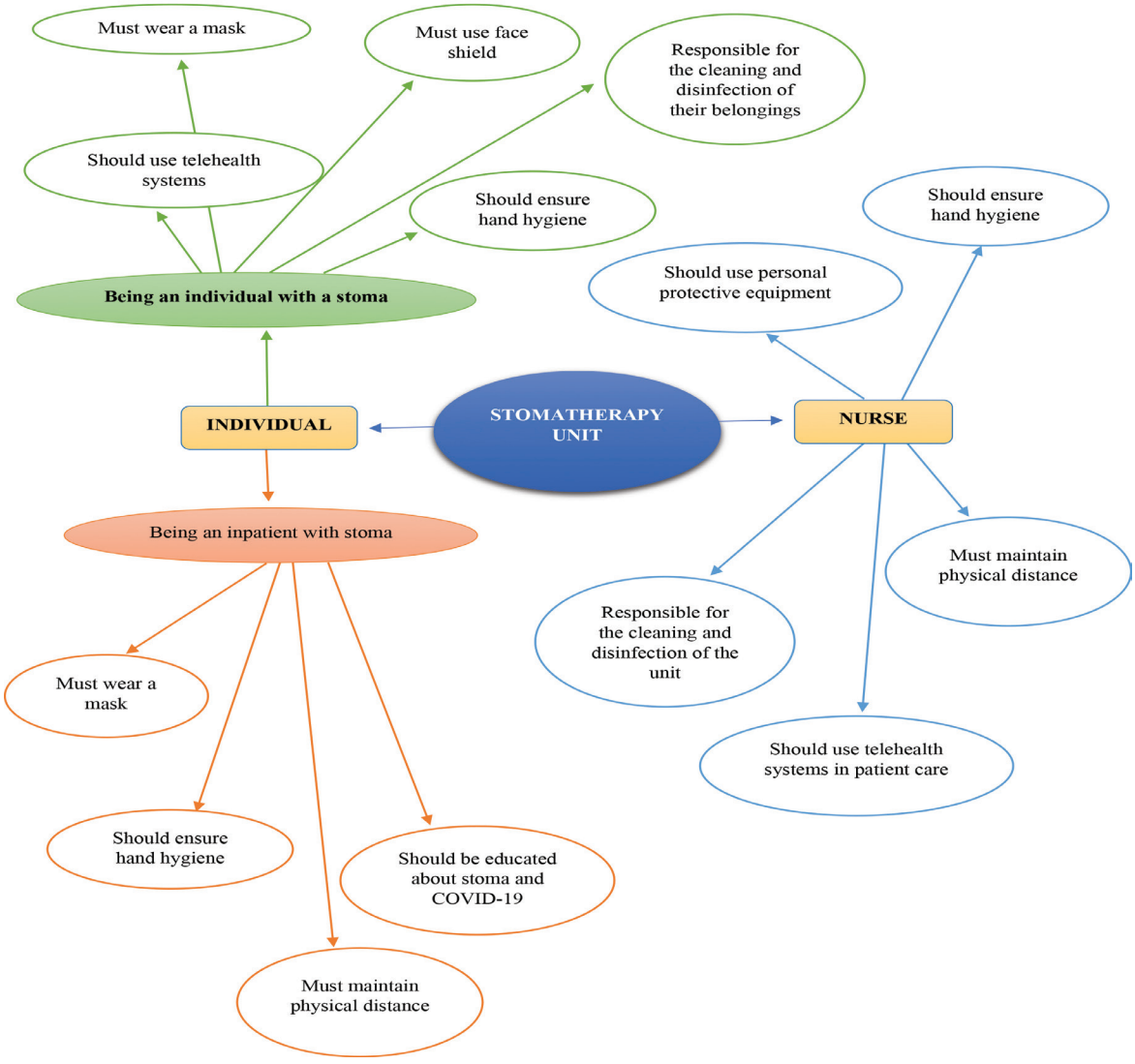

Figure 1. Being a stoma individual or a stoma nurse in the COVID-19 pandemic

infectious waste bins.[11] When the individual with a stoma is discharged, his/her room must be thoroughly cleaned. On discharge, individuals should be informed to minimize the risk of COVID-19 transmission and to manage their home conditions.[13] These informations include stoma management (stoma care, stoma products, supply of products, peristomal skin, intestinal gas, odor, constipation and diarrhea), stoma complications (describing situations requiring medical assistance or re-hospitalization) and living with stoma (personal cleaning, bathing or showering, return to work, clothing, nutrition and diet, traveling, sexual activities, stress management and worship).[19,20] Apart from these issues, information should be given about home cleaning and disinfection (cleaning of the surface, electronic devices and laundry), food and garbage in the pandemic period.[21] During the pandemic period, stoma care training may be somewhat lacking than it is under normal conditions.[22] Therefore, after the stoma patient is discharged, the patient should be supported with home health care support and digital applications (telephone, mobile systems, application, video conferences).

Outpatients with Stoma

Elective patients should not be admitted to the stomatherapy unit during the pandemic period. Individuals who are planned to come to the stomatherapy unit should be called by phone for triage.[11] The last 14 days of the individuals who are planned to come to the stomatherapy unit should be

questioned in terms of COVID-19. Individuals with stoma should wear a face shield and mask before and after the visit, and should pay attention to hand hygiene. The individual with a stoma should be admitted to the stomatherapy unit alone and his/her body temperature should be measured. Individuals with stoma should be advised to wipe the items and surfaces they use with a cloth moistened with alcohol or bleach-based products. If possible, they should use a different bathroom than other family members and their underwear should be washed separately from those in the house.[13]

For individuals who do not come to the stomatherapy unit, telehealth (voice, image, speech and video and information transfer with tools such as telephone, computer, interactive television) should be applied. In a study in Italy during the COVID-19 pandemic, it was revealed that individuals with stoma who received telehealth applications on stoma care issues were satisfied.[13] Individuals with stoma who cannot be managed with telehealth can be visited at home to reduce hospital visits.[11] With all these practices, physical and psychosocial problems experienced by individuals with stoma should be tried to be minimized.

Being a Stoma Nurse in the COVID-19 Pandemic

During the pandemic period, stoma nurses should work as private branch nurses in hospitals and should be present in stomatherapy units so that their care giving continues without interruption. Stomatherapy units should remain open throughout the pandemic and should only accept individuals whose condition is an emergency. If there is a COVID-19 positive individual among the individuals who are planned to come to the stomatherapy unit during the pandemic period, the stoma nurse is recommended to provide care to this patient after other patients. The stoma nurse should examine the patient's file with stoma in a safe place before providing care. The information that should be added to the file should be asked to the patient and recorded by the stoma nurse. Then the nurse should wear personal protective equipment (gown, medical mask/N95/FFP2 mask, goggles/face shield, gloves). Stoma care should be made with as little contact with the patient as possible.[11,23] Due to pandemic, a specific area should be determined in the unit before caring for the individual with stoma. The nurse should disinfect the materials to be used and select a clean area to store the materials he/she needs. For the products he/she uses, the nurse should determine the dirty area and arrange a container to collect the dirty products.[24] The nurse should prepare brochures for individuals with stoma and their families in line with all current information. Apart from the individual with stoma, the nurse should also give the stoma care to the patient's caregiver in accordance with the physical distance rules.[11]

Stoma nurses should use personal protective equipment and maintain hand hygiene to protect their health and prevent cross contamination. Stoma nurses are responsible for the daily cleaning of the stomatherapy units. Cleaning the unit should be done from the clean area to the dirty area. In floor and surface disinfection, 1/100 diluted bleach or chlorine tablets (according to the product recommendation) should be used in areas contaminated with patients. Liquid soap and paper towels should be kept in the toilet of the unit and if there is a hand dryer, it should not be operated.[25] Good ventilation of the units should be provided. The windows should be left open for at least 15 minutes after the care of each stoma.[26] Ventilation systems that take fresh air from outside should be installed for stomatherapy units within hospital facilities. In these systems equipped with specific motors and fans, two ventilation systems must be active to ensure air flow. Hall type air conditioners and ventilators should not be used.[11,25]

Except for non-emergency situations, the stoma nurse should remotely monitor issues such as tracking products, accessories, and prescriptions/reports and should provide consultancy service. For this, he/she can use e-mail, phone or digital applications. During the pandemic period, direct care for the patient with stoma decreases and consultations over the phone increase. Individuals can take photos and send them to their nurses when they have problems with their stoma.[27] Online support group initiatives in digital applications can be made to increase the compliance of the patient with stoma. The online support group ensures that individuals with stoma can talk to each other, share their experiences and feelings, advise and guide each other via the internet.[3] Online support groups can be made through associations and organizations related to stoma, forum sites, instagram and facebook.[3,5] While providing these supports, the patient's primary caregiver should also be included. Thus, patient's compliance with digital applications can develop faster.[5] In this period, ostomy product companies should also assist stoma nurses. In cases where the patient with a stoma cannot be adapted despite all the attempts made, the stoma nurse can go home visits at infrequent intervals by using personal protective equipment. However, during home visits, the institution may experience difficulties caused by the physical environment and the individual or their caregivers.[28] Therefore, although telehealth application does not completely solve the problems of individuals with stoma, it reduces the workload of nurses as it reduces home visits.[29] In addition, telehealth applications reduce the use of personal protective equipments and viral exposure.[30]

Another issue that stoma nurses should pay attention to in all these digital and telehealth applications is ethical issues. Protecting the privacy and confidentiality of individuals is one of the most important ethical principles. Necessary measures should be taken against the risk of inappropriate disclosure of information from these databases containing personal data of individuals. Informed consent forms should be transferred to electronic media. Individuals should sign an informed consent form that offers confidentiality in line with legal policies. For the security of the data collected with telehealth, it is important to perform two-factor authentication. Because, with hacking, this information can be passed on to third parties. Finally, although the internet infrastructure and electronic communication devices are on the rise, they may not be sufficient in some regions, especially in rural areas. For this reason, access to desired individuals can be difficult with these applications. Providing all individuals with access to digital and telehealth applications is also an ethical problem. Because everyone has the right to receive the same service.[31]

In addition, stoma nurses are also psychologically negatively affected by the difficulties they experience during the pandemic period.[32] Among the difficulties experienced are risky working environments and working alone.[33] In the forums organized for stoma nurses in the world, nurses stated that the virus lived longer in the stool and somatherapy units were at risk, that they did not know how to protect themselves because stomatherapy units were closed places, that it was difficult to face an invisible enemy, that they went home anxiously, that the number of patients decreased significantly due to the increase in telephone consultations, and that working alone in a quiet place and eating alone were boring, and that they missed close contact with their colleagues and patients.[27,34]

Conclusion

Patients with stoma during the COVID-19 pandemic should stay at home as much as possible. In order not to be infected, patients should be very careful even indoors. Before going to the hospital, the patient should contact the stomatherapy nurse by phone, e-mail or digital applications for problems with stoma. In cases where the patient needs to go to the hospital in an emergency, he/she should call the stoma nurse by phone. In cases where he/she must go to the hospital, he/she should go using a mask and face shield, even if he/she does not have signs and symptoms of COVID-19.

Stoma therapy nurses should not accept individuals with stoma in the stomatherapy unit during the pandemic period, except for emergencies. For patients who need urgent stoma creation, stoma site marking should be made using personal protective equipment. The stoma nurse should carry the daily work he/she does to digital platform. Individuals with stoma should be contacted daily by phone or e-mail. The stoma nurse is responsible for the cleaning of the stomatherapy unit. Throughout the pandemic, stoma nurses should both protect their health and serve individuals with stoma as much as possible.

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RESEARCH ARTICLE

Effects of COVID-19 Outbreak on Emergency Surgeries for Occlusive Colorectal Cancers

COVID-19 Salgınının Acil Cerrahide Tıkayıcı Kolorektal Kanser Ameliyatları Üzerindeki Etkileri

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ABSTRACT

Aim: Coronavirus-19 (COVID-19) is caused by severe acute respiratory syndrome-coronavirus 2 (SARS-CoV-2). Since the CoV-19 outbreak, public health has been affected in several areas, especially, mortality from malignancies has increased. Colorectal cancers (CRCs) is the third-most common cause of cancer-related deaths across the world. The present study aimed to investigate the time of CRC patients' admission to hospital and its effects in the light of COVID-19 outbreak.

Method: We examined the case of 62 patients who visited our hospital emergency department with intestinal obstruction due to CRC between 2019 and 2020. We categorised the patients admitted during the COVID-19 pandemic as group 1 and the others as group 2. We comparatively evaluated the demographic data, complaints and duration, tumour characteristics, blood values, complications, mortality rates and the length of hospital stay of the patients. We noted that the duration of admission to the hospital was prolonged after the patients developed obstructive symptoms.

Results: As incidences of nausea/vomiting became more frequent, the duration of admission to the hospital after the complaints began and the resultant mortality rate were statistically higher among the group 1 patients. The haematocrit (htc) value was lower and the tumour size was larger in the deceased patients.

Conclusion: COVID-19 pandemic delayed the diagnosis of patients with colorectal cancer. The time that elapsed after occlusion in CRC increased the rate of mortality and morbidity. It was observed that, especially, mortality was higher for elderly patients with low htc values. This increase in the mortality rates suggests the importance of the time of admission to the hospital in case of obstructive CRC. We thus believe that it is essential to propagate that the hospitals are safe from COVID to encourage the public to avail hospital services for serious cases in order to ensure timely diagnosis and treatment.

Keywords: Colorectal cancer, COVID-19, mortality, occlusion

ÖZ

Amaç: Koronavirüs-19 (COVID-19), şiddetli akut solunum sendromu-koronavirüs 2'den (SARS-CoV-2) kaynaklanır. COVID-19 salgını sırasıda, çeşitli alanlarda halk sağlığı etkilenmiş, özellikle malignitelerden ölüm oranları artmıştır. Kolorektal kanserler (CRC), dünya çapında kansere bağlı ölümlerin üçüncü en yaygın nedenidir. Bu çalışma, CRC hastalarının hastaneye yatış sürelerini ve etkilerini COVID-19 salgını etkisinde incelemeyi amaçlamaktadır.

Yöntem: 2019-2020 yılları arasında CRC'ye bağlı bağırsak tıkanıklığı nedeniyle hastanemiz acil servisimize gelen 62 hastayı inceledik. COVID-19 salgını sırasında başvuran hastaları grup 1 ve diğerlerini grup 2 olarak kategorize ettik. Hastaların demografik verilerini, şikayet ve süresini, tümör özelliklerini, kan değerlerini, komplikasyonlarını, ölüm oranlarını ve hastanede kalış sürelerini karşılaştırdık. Hastalarda obstrüktif semptomlar geliştikten sonra hastaneye başvuru süresinin uzadığını belirledik.

Bulgular: Bulantı/kusma sıklığı arttıkça, şikayetler başladıktan sonra hastaneye başvuru süresi ve sonuçta ortaya çıkan ölüm oranı grup 1 hastalarında istatistiksel olarak daha yüksek bulundu. Ölen hastalarda hematokrit (Htc) değeri daha düşüktü ve tümör boyutu daha büyüktü.

Sonuç: COVID-19 salgını, kolorektal kanserli hastaların teşhisini geciktirdi. CRC'de oklüzyondan sonra geçen süre mortalite ve morbidite oranını artırdı. Özellikle Htc değeri düşük yaşlı hastalarda mortalitenin daha yüksek olduğu görüldü. Ölüm oranlarındaki bu artış, obstrüktif CRC durumunda hastaneye yatış süresinin önemini ortaya koymaktadır. Bu nedenle, zamanında tanı ve tedaviyi sağlamak için halkı ciddi olgularda hastane hizmetlerinden yararlanmaya teşvik etmenin gerekli olduğuna inanıyoruz.

Anahtar Kelimeler: Kolorektal kanser, COVID-19, mortalite, tıkanma

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Introduction

The 2019 novel coronavirus disease-19 (COVID-19) originated in Wuhan, China in December 2019. COVID-19 is caused by severe acute respiratory syndrome-coronavirus 2 (SARS-CoV-2).[1] On 11 March 2020, the first COVID-19 patient was reported in Turkey. Since then, major hospitals across the country were rapidly transformed into pandemic care centres.[2] The intensive care units of the hospitals began to prioritise COVID-19 cases. Some hospitals' operating rooms were converted into special intensive care units. All physicians, irrespective of their expertise, were involved in the treatment of COVID-19 patients during the pandemic period. Hospitals had restricted their services other than emergency services and treatment for cancer patients.[3] This process continued until the normalisation began on 1 June 2020. Since then, the closed outpatient clinics have reopened, and doctors have returned to care for patients in their respective clinics and care centres. Between 11 March and 1 June 2020, the public was notified by the government to not go outside unless necessary. People aged >65 and <18 years were banned from strolling on the streets. A nationwide curfew was declared by the government on weekend days.[2,4] Considering these prohibitions and adaptations, patients with any medical conditions were hesitant to visit a hospital, which delayed their diagnosis.[5]

Our hospital is a tertiary state hospital and a level 1 trauma centre that serves as a training hospital. Every year, >100 patients are operated here for occlusive colorectal cancers (CRCs) in our hospital's emergency surgery department.[6]

CRC is the third-most common cause of cancer-related death worldwide, taking into account >1 million new cancer diagnoses and 600,000 cancer deaths every year.[7] The incidence of cancer in Turkey is not different from that in the world. CRC is the fourth-most common malignancy affecting both the sexes.[8] Patients can be diagnosed with cancer with incidental or community scans (e.g. colonoscopy, hidden stool blood, etc.). However, in the emergency departments, complaints such as abdominal pain, intestinal obstruction, bloating, increased body temperature and significant weight loss can be diagnosed. Unfortunately, gastrointestinal symptoms are not specific, which often causes a delay in the presentation of the patient as well as misdiagnosis, consequently delaying the CRC diagnosis. About one-third of the CRC patients showed delayed seeking of medical advice and treatment. In addition, approximately half of the patients were affected by this delay in their cancer diagnosis. In the absence of adequate screening programmes or health promotion programmes for the CRC, 93.7% of the cases were expected to be diagnosed after symptomatic presentation. In CRC, the incidence of surgery in the emergency room is approximately 15% with the initial diagnosis.[9,10,11]

The gold-standard method for CRC screening is colonoscopy as it has high sensitivity, especially for the detection and removal of precancerous lesions.[12] According to the US Preventive Services Task Force, colonoscopy can detect CRC and precancerous lesions in adults of ages 50-75 years at an early stage.[13] Colonoscopy may be performed at an earlier age, especially in individuals with a familial predisposition.[12] During the covid-19 epidemic, the numbers of non-emergency endoscopy procedures performed were reduced based on the recommendations of relevant associations and literatures.[14,15,16] This reduced numbers of colonoscopies delayed the treatment of newly detectable CRCs. Early diagnosis of CRC can decrease the mortality and morbidity rates of patients as well as increase their 5-year survival rates.[17]

Regarding delay in the presentation of symptoms, abdominal distension has the longest mean duration, followed by rectal pain. Rectal pain had the longest median duration of 180 days, followed by diarrhoea (median duration =150 days).[18,19] In addition, other symptoms such as weight loss, anaemia, stool occult blood, weakness and change in the defecation routine has been reported. Severe abdominal pain, nausea/vomiting and bloating in the abdomen have been reported, especially after full occlusion of the colon by tumour.[20]

Because of the rapid spread of COVID-19, hospitals all across the world have become an important source of transmission.[21] This fast spread of infection has made people paranoid about visiting a hospital. People aged >65 years, in particular, with the effect of the curfew, refused to visit hospitals even when faced with ailments.[5,22]

The aim of the present study was to examine patients with colorectal occlusion tumours who delayed coming to the hospital during the COVID-19 outbreak. Apart from the primary outcomes of the COVID-19 outbreak, it is important to specifically investigate the effect on patients with pre-existing malignancy. Early admission to the hospital is therefore considered to improve the mortality and morbidity of patients with occlusive CRC.

Materials and Methods

This is a retrospective study. The study was approved by the local ethics committee and the Ministry of Health Scientific Research Institution (Ref. No: 2020-06-16T14_25_40). Patients who underwent emergency surgeries between March and June 2020 and between March and June 2019 were examined. In the study patients, the tumour mass was confirmed by computed tomography using oral, rectal and intravenous contrast in the colorectal region. In some of

the study patients, the tumour mass caused obstruction in the colorectal region and they were accordingly stented or operated. Patients who were admitted in the year 2020 were categorised in group 1 and those admitted in the year 2019 were categorised in group 2.

Patients under the age of 18 years and who did not have obstruction, bowel-wide dilatation, routine defecation, stent, neoadjuvant chemotherapy, benign causes and recurrence were excluded from the study.

Thorax CT was performed in all patients of group 1 before their surgery. Polymerase chain reaction (PCR) was performed for patients suspected of COVID-19. Patients with COVID-19 findings in Thorax CT or PCR were considered to be COVID-19 positive.

Stent attachment was attempted in obstructive CRC patients with colonoscopy. In case of a suspicion of perforation or a high degree of dilatation of the bowel diameter on CT, the patient was operated. Oncological surgery was performed for patients without metastasis in the abdomen and with a resectable tumour. Advanced-stage tumour was opened to diverting stoma in hemodynamically unstable patients. All anastomoses were prepared using staples. Linear staples were preferred as 70 mm or 100 mm and circular staples were preferred as 31 mm.

The data on age, gender, presence of comorbidity, the American Society of Anaestology score, body mass index (BMI), colonoscopy outcomes, complaint time, stent status, operation time, need for intensive care unit, complication, white blood cells (WBC), neutrophil count, haematocrit value, C-reactive protein (CRP), the location of the tumour, tumour size, histopathological type, hospitalisation time and mortality were transferred to the computer system. The comorbidities of the patients were graded based on the Charlson comorbidity index. Groups 1 and 2 patients were compared statistically with each other.

Group 1 patients were separated according to mortality rate in order to examine the causes of death in further detail. The data of the deceased patients were compared with those of other patients.

All procedures performed in this study involving human participants were performed in accordance with the 1964 Helsinki Declaration and its later amendments or with comparable ethical standards. Informed consent was obtained from all individual participants included in the study. The authors declare no competing financial interests and no conflict of interests.

Statistical Analysis

Statistical analysis was performed with JMP® software version 10.0.0 (SAS® Institute, Inc., Cary, North Carolina, USA). Patient characteristics were analysed via descriptive statistics. For continuous variables, the mean and standard derivation or the median and interquartile ranges were calculated. For categorical variables, the numbers and percentages were recorded for each category. Differences between the parameters were compared with Mann-Whitney U test. Categorical variables were compared by chi-square test. $P \leq 0.05$ were accepted to be statistically significant.

Results

A total of 62 patients admitted between March-June 2020 and March-June 2019 were compared. Group 1 consisted of 35 patients and group 2 consisted of 27 patients. Of all, 23 (37.1%) of the patients were women and 39 (62.9%) were men. The mean age of the patients was 63 (±12.13) years and their mean BMI was 26.5 (±5.7). According to the Charlson comorbidity index, the mean value of group 1 patients was 6.9 (±2.45), while that of group 2 patients was 7.1 (±2.68).

When the tumour's location in the colon was evaluated, the most common malignancy was recorded in the recto-sigmoid region, followed by hepatic flexor tumours. Histopathologically, adenocarcinoma was the most common type detected (Table 1).

When the patients' complaints were studied, abdominal pain and nausea/vomiting were observed to be most frequent. Abdominal swelling and rectal bleeding were among the additional complaints. The average duration of complaints in group 1 was 8.9 (±4.97) days, while this period was 2.3 (±1.46) days in group 2. Stent attachment was attempted in 26 patients via colonoscopically. The stent could not be inserted in 6 patients due to the complete blockage of the lumen by the tumour or due to technical incompetence. These patients underwent operation. Two patients were operated after successful stent placement because of insufficient defecation (Table 1).

Examination of the preoperative blood results revealed the mean WBC count of 11.900 (±5.21)/μL, the average neutrophil count of 9.6 (±5.09)/μL, the mean haematocrit value of 37 (±7.11) and the average CRP value of 102.8 (±108.23) mg/L. In all, 5 (14.3%) patients were diagnosed with COVID-19 by thorax CT imaging and/or PCR (Table 2).

A total of 44 patients were operated for occlusive CRC. During the operation, 7 patients with metastases in the abdomen were exposed to the stoma and 37 patients were operated under surgical oncology techniques. All surgeries were performed by using open techniques. The mean operation time was 169.1 (±50.21) min, and 12 (34.3%) patients in group 1 and 10 (37%) patients in group 2 required intensive care unit (ICU). During the follow-up of the patients, evisceration was recorded in 4 (6.5%) patients,

anastomotic leak in 2 (3.2%) and bleeding in 1 (1.6%). These patients were operated for the second time. Stoma was opened to patients with anastomosis leak. Intra-abdominal abscess was noted in 2 (3.2%) patients. A drain was installed via interventional radiology (Table 3).

The pathological examination revealed the average tumour size of 5.4 (±1.46) cm and 4.3 (±0.99) cm for groups 1 and 2, respectively. According to the Union for International Cancer Control, based on the tumour-node-metastasis (TNM) staging system, 16 patients were classified as T3, 20 as T4, 9 as N0, 16 as N1 and 9 as N2 (Table 4).

The patients were followed up on an average for 8.3 (±7.02) days in the hospital. Eleven patients died (17.7%): 9 (25.7%) from group 1 and 2 (7.41%) from group 2.

The patients in group 1 were separated according to their mortality status and their results were compared. The mean age of the patients who died was 69 (±5.94) years, mean BMI was 27.6 (±7.62) and mean Charlson comorbidity

Table 1. Group 1 patients presented with occlusive colon for colorectal cancer during COVID-19 outbreak. Group 2 patients applied for the same period of 2019. The demographic data, tumour locations, blood values and colonoscopy stent conditions are depicted

	Group 1 (2020 n=35)	Group 2 (2019 n=27)	Total (n=55)	p
Gender				
Female	13 (37.1%)	10 (37%)	23 (37.1%)	0.993
Male	22 (62.9%)	17 (63%)	39 (62.9%)	
Age	61.3 (±10.86)	65.3 (±13.48)	63 (±12.13)	0.164
ASA*				
II	7 (20%)	4 (14.8%)	11 (17.7%)	
III	24 (68.6%)	20 (74.1%)	44 (71%)	0.860
IV	4 (11.4%)	3 (11.1%)	7 (11.3%)	
BMI**	26.9 (±5.88)	25.9 (±5.53)	26.5 (±5.7)	0.268
Charlson comorbidity index	6.9 (±2.45)	7.1 (±2.68)	7 (±2.54)	0.931
Tumour localisation				
Cecum	1 (2.9%)	3 (11.1%)	4 (6.5%)	
Right colon	1 (2.9%)	3 (11.1%)	4 (6.5%)	
Hepatic flexura	7 (20%)	3 (11.1%)	10 (16.1%)	
Transverse colon	2 (5.7%)	0 (0%)	2 (3.2%)	
Splenic flexura	1 (2.9%)	1 (3.7%)	2 (3.2%)	0.431
Left colon	2 (5.7%)	1 (3.7%)	3 (4.8%)	
Sigmoid	9 (%25.7)	10 (%38.4)	19 (30.6%)	
Recto-sigmoid	7 (20%)	4 (15.4%)	11 (17.7%)	
Rectum	5 (%14.3)	2 (7.7%)	7 (11.3%)	
Blood				
WBC†	12.4 (±5.39)	11.3 (±5.02)	11.9 (±5.21)	0.281
Neutrophils	10.3 (±5.19)	8.6 (±4.9)	9.6 (±5.09)	0.142
HTC‡	38.6 (±7.1)	35.1 (±6.75)	37 (±7.11)	0.120
CRP††	107.6 (±121.27)	96.6 (±90.43)	102.8 (±108.23)	0.837
Stent insertion				
Successful	11 (31.4%)	9 (33.3%)	20 (32.3%)	0.335
Fail	5 (14.3%)	1 (3.7%)	6 (9.7%)	

*ASA: American Society of Anestology, **BMI: Body mass index, †WBC: White blood cell, ‡HTC: Haematocrit, ††CRP: C-reactive protein, COVID-19: Coronavirus disease-19

index was 8.2 (±2.49). The most common tumour was recorded in the hepatic flexure and the rectum. The mean CRP value was 133.8 (±144.87) mg/L. On the other hand, the colonoscopy procedure was performed in 2 patients, and a stent was inserted in 1 patient. All patients required ICU after the surgery. They were all admitted to the hospital most frequently for abdominal pain and nausea/vomiting. The average duration of the complaints was 13.1 (±4.57) days. The results of the tests revealed that 1 patient was COVID-19 positive. The average length of stay in the hospital was 8.2 (±8.29) days (Tables 3 and 4).

The patients who were divided into group 1 and group 2 were compared based on their gender, age, ASA score, Charlson comorbidity index, localisation of the tumour, blood values, surgical technique, duration of surgery and the need for ICU. No statistically significant difference was noted between the groups (Table 1).

The time lapse since the patients' complaints and admission to the hospital was significantly longer in group 1 than in group 2 (p<0.001). Moreover, the mortality rate was statistically significantly higher of group 1 than of group 2 (p=0.036). Especially, the complaints of nausea/vomiting

Table 2. During the operation, stomata was applied to metastatic patients who were at the advanced disease stage. The other patient was operated as per the oncological principles. Intensive care (ICU) needs. complications. complaints and admission times, tumour sizes and the disease stages of the patients are shown. Presence of COVID-19 infections were evaluated

	Group 1 (2020 n=35)	Group 2 (2019 n=27)	Total (n=55)	p
Operation				
Only stoma	5 (20%)	2 (10.5%)	7 (15.9%)	0.386
Oncological procedure	20 (80%)	17 (89.5%)	37 (84.1%)	
Operation time (minute)	173.4 (±46.55)	163.4 (±55.42)	169.1 (±50.21)	0.585
ICU* need	12 (34.3%)	10 (37%)	22 (35.5%)	0.822
Complication				
Evisceration	1 (2.9%)	3 (11.1%)	4 (6.5%)	0.277
Anastomosis leak	1 (2.9%)	1 (3.7%)	2 (3.2%)	
Bleeding	1 (2.9%)	0 (0%)	1 (1.6%)	
Abscess	2 (5.7%)	0 (0%)	2 (3.2%)	
Complaint				
Nausea-vomiting	25 (71.4%)	10 (37%)	35 (56.5%)	0.007
Abdominal pain	23 (65.7%)	15 (55.6%)	38 (61.3%)	0.416
Bloating abdominal	19 (54.3%)	16 (59.3%)	35 (56.5%)	0.695
Rectal bleeding	18 (51.4%)	9 (33.3%)	27 (43.5%)	0.154
Complaint time (day)	8.9 (±4.97)	2.3 (±1.46)	6 (±5.06)	0.001
COVID-19 +	5 (14.3%)	0 (0%)	5 (8.1%)	
Tumour size (mm)	5.4 (±1.46)	4.3 (±0.99)	4.9 (±1.36)	0.025
Tumour stage				
T3	4 (20%)	12 (70.6%)	16 (43.2%)	0.001
T4	16 (80%)	4 (23.5%)	20 (54.1%)	
Lymph node stage				
N0	3 (16.7%)	6 (35.3%)	9 (25.7%)	0.102
N1	8 (44.4%)	8 (47.1%)	16 (45.7%)	
N2	7 (38.9%)	2 (11.8%)	9 (25.7%)	
Hospital stay (day)	7.8 (±6.01)	9 (±8.22)	8.3 (±7.02)	0.909
Mortality	9 (25.7%)	2 (7.41)	11 (17.7%)	0.036

*ICU: Intensive care unit

were more frequently recorded for group 1 (p=0.007). Tumour sizes were statistically significantly larger among group 1 patients (p=0.025). In TNM staging, T4 tumours were statistically more common in group 1 than in group 2 (p=0.009) (Table 2).

Group 1 patients were divided in accordance with their mortality status. The details of the deceased patients and others are compared in Tables 3 and 4. Age and the complaint duration was significantly longer among the deceased patients. Notably, all patients required intensive care after the surgery. The htc values of the deceased patients were statistically lower than those of other patients (p=0.005).

Discussion

Past studies in the literature had evaluated the time between the first complaint and the surgery. Several studies have demonstrated that prolonging this period reduces the overall 5-year survival.[23,24] In some studies, when the first symptom

Table 3. Patients who were admitted during the COVID-19 outbreak were categorised based on their mortality status. The demographic data. tumour locations, blood values and colonoscopic stent conditions are shown

	2020 (n=9)	2020 (n=26)		p
	Deceased patients	Other patients	Total	
Gender				
Female	5 (55.6%)	8 (30.8%)	13 (37.1%)	0.190
Male	4 (44.4%)	18 (69.2%)	22 (62.9%)	
Age	69 (±5.94)	58.6 (±10.96)	61.3 (±10.86)	0.007
ASA*				
II	1 (11.1%)	6 (23.1%)	7 (20%)	0.444
III	6 (66.7%)	18 (69.2%)	24 (68.6%)	
IV	2 (22.2%)	2 (7.7%)	4 (11.4%)	
BMI**	27.6 (±7.62)	26.7 (±5.26)	26.9 (±5.88)	0.838
Charlson comorbidity index	8.2 (±2.49)	6.5 (±2.32)	6.9 (±2.45)	0.101
Tumour localisation				
Cecum	0 (0%)	1 (3.8%)	1 (2.9%)	0.057
Right colon	1 (11.1%)	0 (0%)	1 (2.9%)	
Hepatic flexura	3 (33.3%)	4 (15.4%)	7 (20%)	
Transverse colon	1 (11.1%)	1 (3.8%)	2 (5.7%)	
Splenic flexura	0 (0%)	1 (3.8%)	1 (2.9%)	
Left colon	0 (0%)	2 (7.7%)	2 (5.7%)	
Sigmoid	0	9 (34.6%)	9 (25.7%)	
Recto-sigmoid	1 (11.1%)	6 (23.1%)	7 (20%)	
Rectum	3 (33.3%)	2 (7.7%)	5 (14.3%)	
Blood				
WBC†	11.7 (±6.15)	12.6 (±5.22)	12.4 (±5.39)	0.725
Neutrophils	9.8 (±6.18)	10.5 (±4.93)	10.3 (±5.19)	0.565
HTC‡	33.2 (±4.88)	40.4 (±6.84)	38.6 (±7.1)	0.005
CRP††	133.8 (±144.87)	98.6 (±113.81)	107.6 (±121.27)	0.469
Stent insertion				
Successful	1 (50%)	10 (71.4%)	11 (68.8)	0.203
Fail	1 (50%)	4 (28.6%)	5 (31.2)	

*ASA: American Society of Anestology, **BMI: Body mass index, †WBC: White blood cell, ‡HTC: Haematocrit, ††CRP: C-reactive protein

was noted, the duration of the first consultation to the doctor and the duration until the surgery were examined, and the prolongation of this period was found to affect the patients negatively. The difference between our study from those in the literature is that CRC patients evaluated the time after the development of occlusion symptoms. After the tumour clogged the intestines, we evaluated the duration of abdominal pain, nausea/vomiting, bloating and rectal bleeding among the patients.

CRC is predominantly a disease of the elderly and an important cause of morbidity and mortality in the population. It is the third-most common cancer in the world, but the most common malignant disease among the elderly.[25] In addition to being common, CRC is a condition that can potentially be improved by surgery. CRCs should be managed as early as possible to prevent occurrence of late complications, such as congestion and perforation, via surgical resection of the primary tumour.[17,26] As mentioned in several past studies, the primary reason for delaying diagnosis in CRC is the delay in the patients' consultation with a doctor for their complaints. It is an important reason for its attachment to haemorrhoids without investigation, especially for rectal bleeding. The doctors' approach to their patients, their way of listening, and detailed questioning

Table 4. The factors of mortality intensive care (ICU) needs complications complaints and admission times tumour sizes and stages of the patients are shown. The presence of COVID-19 infections were evaluated

	2020 (n=9)	2020 (n=26)		p
	Deceased patients	Other patients	Total	
Operation				
Only stoma	2 (25%)	3 (17.6%)	5 (20%)	0.672
Oncological procedure	6 (75%)	14 (82.4%)	20 (80%)	
Operation time (minute)	169.5 (±35.44)	175.3 (±51.86)	173.4 (±46.55)	0.887
ICU* need	9 (100%)	3 (11.5%)	12 (34.3%)	0.001
Complication				
Evisceration	0 (0%)	1 (3.8%)	1 (2.9%)	
Anastomosis leak	1 (11.1%)	0 (0%)	1 (2.9%)	0.130
Bleeding	1 (11.1%)	0 (0%)	1 (2.9%)	
Abscess	1 (11.1%)	1 (3.8%)	2 (5.7%)	
Complaint				
Nausea-vomiting	8 (88.9%)	17 (65.4%)	25 (71.4%)	0.151
Abdominal pain	8 (88.9%)	18 (69.2%)	23 (65.7%)	0.462
Bloating abdominal	4 (44.4%)	15 (57.7%)	19 (54.3%)	0.492
Rectal bleeding	6 (66.7%)	12 (46.2%)	18 (51.4%)	0.282
Complaint time (day)	13.1 (±4.57)	7.4 (±4.26)	8.9 (±4.97)	0.004
COVID-19 +	1 (11.1%)	4 (15.4%)	5 (14.3%)	0.747
Tumour size (mm)	5.4 (±1.82)	5.4 (±1.39)	5.4 (±1.46)	0.893
Tumour stage				
T3	2 (25%)	4 (23.5%)	6 (24%)	0.964
T4	6 (75%)	13 (76.5%)	19 (76%)	
Lymph node stage				
N0	1 (11.1%)	5 (29.4%)	6 (24%)	0.047
N1	0 (0%)	9 (52.9%)	8 (36%)	
N2	7 (77.8%)	3 (17.6%)	10 (40%)	
Hospital stay (day)	8.2 (±8.29)	7.7 (±5.2)	7.8 (±6.01)	0.725

*ICU: Intensive care unit

are important to reveal the complaints of the patients. Attempting to treat the issue without proper investigation can cause iron deficiency (anaemia), which is among the known causes of delay.[27,28,29,30]

The treatment processes of patients diagnosed with CRC prior to the COVID-19 outbreak could be configured accordingly. CRC patients diagnosed during this period were directed to neoadjuvant chemotherapy or operated based on the recommendations. Since the patients with symptoms are aware of the seriousness of their own condition, they visit the hospital early and are operated electively.[31] This process was more complicated for patients who were unaware of any suspicious lesion in the colorectal area before the pandemic with colonoscopy or radiological imaging.

Mounce et al.[32] examined 4,512 patients with delayed CRC. In CRC, a diagnosis period of 9-32 days is reasonable, and any further delay in diagnosis increases the mortality and morbidity rates of the patients.[32] Survival depends on the stage of diagnosis, For instance, the 5-year survival is 90% for early cancers (Dukes A), whereas it is 15% for advanced tumours, where only palliative resection is possible.[33] However, studies on the examination of the time to admit to a hospital after the manifestations of the complaints in patients with advanced CRC are very rare. During the COVID-19 outbreak, especially, elderly patients preferred not to visit a hospital due to the curfew imposed on individuals aged >65 years and for the fear of hospital-acquired infections.[5] While the average time to hospital admission was 2.3 (±1.46) days after the complaints of patients started in 2019, this period was extended to 8.9 (±4.97) days during the pandemic period. For patients who lost their lives, this period was 13.1 (±4.57) days.

It is known that CRC cancers are the most common ones in the recto-sigmoid region. In delayed CRC, the most common tumours are recorded in the cecum and right colon. In our study, tumour placement of patients was most frequently in the recto-sigmoid region. Although these patients had serious complaints, they did not prefer to go to the hospital.

When the complaints of the patients to be admitted to the hospital were examined, the most common complaints were nausea and vomiting in group 1 patients. Abdominal bloating and pain were more common in group 2 patients. However, the common complaint was rectal bleeding. In a study by Tomlinson et al.[34], patients with complaints since >1 month and <1 month were compared to reveal that the most common complaints were abdominal pain and rectal bleeding. Although we recorded similar outcomes from the literature, the fact that nausea and vomiting are more common can be explained by the fact that patients delay their arrival to the hospital after the occurrence of complete occlusion. One of the most important reasons for the prolongation of this process may be that the public does not have sufficient information about CRCs.

Conclusion

In conclusion, COVID-19 pandemic delayed the diagnosis of patients with CRC. The number of elective colonoscopies and surgeries performed were relatively less during these 3 months of lockdown. Accordingly, the time to admit patients to the hospital was extended. Patients preferred not to visit the hospital until their complaints worsened. The time elapsed after occlusion in advanced CRCs increased the subsequent complications and chances of morbidity. It was observed that, especially, mortality was higher for elderly patients with low htc value. This increase in the mortality rate suggests the importance of the time to admit to the hospital in case of obstructive CRC. The inconveniences caused due to the COVID-19 outbreak are innumerable. Unless treated at hospitals, the state of these patients cannot be normalised. Especially, during this period, when all healthcare professionals examined the patients in more detail than normal, they may compensate for the time lost during the pandemic period. Notably, patients who presented with nausea/vomiting complaints are considered to be at higher risk. Promoting that hospitals are safe from COVID-19 infection will ensure that the public, especially individuals who are afraid to go to the hospital out of their COVID-19 infection fear, can easily reach the hospitals when required. It may be an option to distinguish our hospitals as COVID-19 infected and non-infected. Moreover, we noted that the complaints of patients are also difficult to monitor. It is not easy to determine which complaint should be given immediate attention and which complaint can be managed at home. Governmental and non-governmental organisations may require long-term training for their staff on this point. We believe that, this way, we can prepare ready-made health institutions for more efficient management in case of any future pandemic scenario.

Ethics

Ethics Committee Approval: The study was approved by the local ethics committee and the Ministry of Health Scientific Research Institution (Ref. No: 2020-06-16T14_25_40).

Informed Consent: Informed consent was obtained from all individual participants included in the study.

Peer-review: Internally peer reviewed.

Authorship Contributions

Surgical and Medical Practices: S.F., T.D., A.S., H.A., A.Y.G., M.K., Concept: S.F., T.D., Design: T.D., Data Collection or Processing: A.S., H.A., Analysis or Interpretation: M.K., Literature Search: A.S., H.A., Writing: S.F.

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RESEARCH ARTICLE

Randomised Comparison of the Effect of 0.2% Glyceryl Trinitrate and 0.5% Topical Nifedipine in Acute Anal Fissure Treatment

Akut Anal Fissür Tedavisinde %0,2 Gliseril Trinitrat ile %0,5 Topikal Nifedipinin Etkilerinin Randomize Karşılaştırılması

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ABSTRACT

Aim: This prospective clinical trial study aimed to compare the effects of 0.2% glyceryl trinitrate (GTN) and 0.5% topical nifedipine (ND) on acute anal fissure treatment and recurrence prevention.

Method: The study included 100 patients who were diagnosed with acute anal fissure and randomly divided into two groups: the 0.2% GTN and 0.5% topical ND groups. On the first visit, age, sex, constipation, pain duration after defaecation and visual analogue scale (VAS) score were recorded. After 21 days of treatment, symptomatic relief levels, healing, VAS score and drug side effects were recorded.

Results: The female/male ratios for the GTN and ND groups were 50%/50% and 54%/46%, respectively. The mean ages were 29.3 and 30.7 years for the GTN and ND groups, respectively. After treatment, the excellent symptomatic relief level in the ND group (56%) was higher than in the GTN group (22%; p=0.005). Post-treatment mean VAS score was significantly lower in the ND group than in the GTN group (p<0.001). The mean decrease of VAS score in the ND group between pre-treatment and post-treatment was significantly higher than in the GTN group (p=0.001). The healing rate in the ND group (86%) was higher than in the GTN group (64%; p=0.011). The drug side effect rate was significantly lower in the ND group (4%) than in the GTN group (22%; p=0.007). The recurrence rates were 38% in the GTN group and 18% in the ND group (p=0.026).

Conclusion: Our study shows that both GTN and topical ND have favourable effects on anal fissure treatment. However, 0.5% topical ND is superior to 0.2% GTN for treating anal fissure in terms of symptomatic relief, pain score, healing, drug side effects and recurrence rate.

Keywords: Acute anal fissure, glyceryl trinitrate, nifedipine

ÖZ

Amaç: Bu prospektif klinik çalışma %0,2 gliseril trinitrat (GTN) ve %0,5 topikal nifedipinin (ND) akut anal fissür tedavisinde ve rekürrensin önlenmesindeki etkilerini karşılaştırmayı amaçlamaktadır.

Yöntem: Çalışmaya akut anal fissür tanılı 100 hasta dahil edildi ve hastalar %0,2 GTN ve %0,5 ND olmak üzere rastgele iki gruba ayrıldı. İlk muayenede yaş, cinsiyet, konstipasyon, defekasyon sonrası ağrı süresi ve visual analog skala (VAS) skorları kaydedildi. Yirmi bir günlük tedavinin ardından semptomatik rahatlama düzeyleri, iyileşme, VAS skoru ve ilaç yan etkileri kaydedildi.

Bulgular: GTN ve ND gruplarında kadın/erkek oranı sırasıyla %50/50 ve %54/46 idi. Ortalama yaş GTN ve ND gruplarında sırasıyla 29,3 ve 30,7 idi. Tedavi sonrası mükemmel semptomatik rahatlama düzeyi ND grubunda (%56) GTN grubuna (%22) göre daha yüksekti (p=0,005). Tedavi sonrası VAS skoru ND grubunda GTN grubuna göre anlamlı ölçüde daha düşüktü (p<0,001). Tedavi öncesi ve sonrası VAS skoru düşüşü ortalaması ND grubunda GTN grubuna göre anlamlı ölçüde daha yüksekti (p=0,001). ND grubundaki iyileşme oranı (%86) GTN grubuna (%64) göre daha yüksekti (p=0,011). İlaç yan etkileri oranı ND grubunda (%4) GTN grubuna (%22) göre anlamlı ölçüde daha düşüktü (p=0,007). GTN grubunun rekürrens oranı %38, ND grubunun ise %18 idi (p=0,026).

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Sonuç: Çalışmamız hem GTN hem de topikal ND'nin akut anal fissür tedavisinde olumlu etkileri olduğunu göstermektedir. Bununla birlikte, akut anal fissür tedavisinde %0,5 topikal ND; semptomatik rahatlama, ağrı skoru, iyileşme, ilaç yan etkileri ve rekürrens açısından %0,2 GTN'den üstündür.
Anahtar Kelimeler: Akut anal fissür, gliseril trinitrat, topikal nifedipine

Introduction

Anal fissures are painful tears that occur in stratified squamous epithelium of the anal canal. The exact etiology is unclear, however, it's believed that sphincter spasm which occurs due to traumatic injury of hard stool passage, leads to an increase in anal canal pressure and local ischemia of the anal mucosa.[1,2] The most common symptoms are pain, spasm and rectal bleeding. Acute anal fissures are short-term shallow lesions, while chronic anal fissures are deep and persisting lesions lasting more than 6-8 week.[3] The vast majority of the anal fissures are localized in the posterior midline.[4] The aim of the treatment is to decrease internal anal sphincter resting pressure and to improve blood flow again in the ischemic area. The majority of anal fissures resolve without surgical intervention. Traditional surgical approaches are anal dilatation and lateral internal sphincterotomy but may result with anal incontinence.[5] In addition to this important complication, the workload and cost of surgical intervention lead to searching alternative management methods. Recent literature analysis acknowledges that medical treatment should be the first-line of therapy, and surgical treatment should be planned in case of recurrence and medical treatment failure.[6] Agents such as glyceryl trinitrate, diltiazem, nifedipine, botulinum toxin, bethanechol, and indoramin are among chemical sphincterotomy options.[7] There is still debate on which medical agent is superior in anal fissure healing and recurrence prevention. Glyceryl trinitrate, a nitric oxide donor, has been shown by multiple studies to be effective in the treatment of anal fissure by lowering anal sphincter resting pressure.[6,8,9] Nifedipine which is a calcium channel blocker decreases anal sphincter tone through blocking voltage-gated and non-voltage-gated adrenergic receptor-operated calcium channels in smooth muscle membrane of vessels.[10]

The aim of this study is to compare the effect of 0.2% glyceryl trinitrate and 0.5% topical nifedipine on acute anal fissure treatment and recurrence prevention.

Materials and Methods

This prospective study included a total of 100 patients who were diagnosed with acute anal fissure at Hakkari State Hospital General Surgery Clinic between April 2019 and February 2020. Approval has been obtained from local ethics committee for the study (approval no: 02/20.11.2019). The patients were informed in detail about the study and written consents were obtained. Patients over 18 years of age diagnosed with an acute anal fissure for the first time were included in the study. Patients with chronic anal fissure, inflammatory bowel disease, hemorrhoid, tuberculosis, anal cancer, history of anal surgery, pregnant and lactating, under the age of 18 and patients who didn't want to enroll in the study were excluded.

Patients were randomly separated into two groups, 0.2% glyceryl trinitrate (GTN) group, and 0.5% topical nifedipine (ND) group. At the first visit age, sex, presence of constipation, difficulty in defecation, pain duration after defecation, amount of fluid consumed daily, anatomic localization of the fissure and visual analog scale (VAS) score ranging from 0 to 10 for pain assessment were recorded. Roma-4 criteria was used as a reference for diagnosis of constipation.[11] While questioning the daily fluid consumption amounts of the patients, 0.5-1.0-1.5-2.0-2.5-3.0-3.5-4.0 liter options are presented to them and the approximate amount of fluid consumed by the patients is recorded in this way. 0.2% glyceryl trinitrate was applied to the GTN group and 0.5% topical nifedipine to the ND group twice daily for twenty-one days. Patients were informed to apply the ointment as much as chickpea grain around the anus and 1 cm within the anal canal. 0.2% glyceryl trinitrate and 0.5% nifedipine ointments were prepared by a pharmacist because neither of the ointments is available by there trade names in Turkey. Powder forms of 0.5 grams nifedipine capsule active ingredient and 0.2 grams of glyceryl trinitrate were mixed with 100 grams of petroleum jelly and placed in 100-gram ointment boxes. Ointments were obtained from the pharmacy with a magistral prescription. All patients of both groups were prescribed stool softeners and informed to consume a fiber-rich diet. All patients were advised usage of warm sitz bath for 10-15 minutes, 2-3 times daily. No analgesics were prescribed.

Patients were assessed after twenty-one days of treatment. In this second assessment, symptomatic relief levels, healing, VAS scores after treatment and side effects of drugs (such as headache, perineal irritation) were recorded. Symptomatic relief levels were assessed in a 4 level model as "excellent, good, moderate and nil". Patients who were found to have fissure again in the control examination were given additional therapy with the same drug and dosage for two more weeks. Rectoscopy was done for all of the patients

after symptomatic relief and other pathologies were ruled out. None of the patients had undergone rectoscopy before treatment. All cases were re-examined for recurrence three months after treatment.

Statistical Analysis

The statistical analysis of the findings obtained from the study was performed with the SPSS version 17.0 program. Suitability of variables to normal distribution was assessed by histogram graphics and Kolmogorov-Smirnov test. While presenting descriptive analyzes, mean, standard deviation and median values were used. Pearson chi-square and Fischer's exact tests were used in 2x2 tables. Mann-Whitney U test was used for the evaluation of not normally distributed (non-parametric) variables between groups. A p value of <0.05 was considered statistically significant.

Results

There were 50 patients in each group, the female/male ratio for the GTN group was 25/25 (50/50%), while it was 27/23 (54/46%) for the ND group. The mean age was 29.3 for the GTN group and 30.7 for the ND group. There was no statistically significant difference between the groups in terms of age and sex distribution (Table 1).

When the symptoms of the patients were evaluated in both groups, the most common symptom was pain (100%), then bleeding, and itching respectively (Table 2). Constipation was seen in 62% of GTN group patients, and 68% of the ND group. 12 (24%) patients in the GTN group and 14 (28%) in the ND group reported that they always had difficult defecation. The average pain duration after defecation was observed to be 3.25 hours for the GTN group and 3.30

Table 1. Demographic characteristics of patients participating in the study according to the groups

n		GTN		ND		Total		p
		%	n	%	n	%		
Gender	Male	25	50.00	27	54.00	52	52.00	0.689[a]
	Female	25	50.00	23	46.00	48	48.00	
Age (years)		29.36±8.97	27.00	30.78±8.55	29.00	30.07±8.75	28.00	0.288[b]

[a]Chi-square test, [b]Mann-Whitney U test, GTN: Glyceryl trinitrate, ND: Nifedipine

Table 2. Comparison of symptoms, constipation, defaecation difficulty and fissure localisation of patients on the first presentation between the groups

n		GTN		ND		p
		%	n	%		
Pain	No	0	0	0	0	***
	Yes	50	100.00	50	100.00	
Bleeding	No	17	34.00	20	40.00	0.534
	Yes	33	66.00	30	60.00	
Itching	No	38	76.00	37	74.00	0.817
	Yes	12	24.00	13	26.00	
Constipation	No	19	38.00	16	32.00	0.529
	Yes	31	62.00	34	68.00	
Difficulty in defaecation	Never	1	2.00	2	4.00	0.889
	Sometimes	18	36.00	16	32.00	
	Often	19	38.00	18	36.00	
	Always	12	24.00	14	28.00	
Location	Anterior midline	15	30.00	13	26.00	0.656
	Posterior midline	35	70.00	37	74.00	

Chi-square test, GTN: Glyceryl trinitrate, ND: Nifedipine

hours for the ND group. When daily fluid consumption was questioned, it was found that those in the GTN group consumed 1.55 liters/day and those in the ND group consumed 1.57 liters/day (Table 3). Fissures were found to be located in the posterior midline in 70% of the GTN group and 74% of the ND group. There was no statistically significant difference between the two groups in terms of symptoms, constipation, frequency of difficult defecation, pain duration after defecation, daily fluid consumption, and localization of the fissure (Table 2,3).

When the patients were seen and examined after 21 days of treatment the proportion of patients with excellent symptomatic relief in the ND group was 56% and 22% in the GTN group. While the good and moderate symptomatic relief rates in the ND group were 24% and 14%, respectively, these rates were 50% and 22% in the GTN group. Excellent symptomatic relief was significantly higher in ND group than in GTN group (p=0.005) (Table 4). No significant difference was seen between the groups when the pre-treatment mean VAS score was evaluated (p=0.273). Post-treatment mean VAS score was significantly lower in the ND group than the GTN group (p<0.001). The mean decrease of VAS score in the ND group between pre and post-treatment was 6.14±2.07, while it was 5.02±1.92 in the GTN group and the decrease of VAS score in ND group was significantly higher than GTN group (p:0.001) (Table 4).

When the patients were seen and examined after 21 days of treatment, the healing rate in the ND group (86%) was higher than the GTN group (64%) (p=0.011). Headache was seen in 11(22%) patients of the GTN group, 2(4%) patients in the ND group experienced local irritation. None of the patients interrupted the treatment due to the side effects of the drugs. The drug side effect rate was significantly lower in the ND group compared to GTN group (p=0.007).

Evaluation after 3 months of follow-up showed that the recurrence rate was 38% in the GTN group, 18% in the ND group, and the recurrence rate in the ND group was statistically significantly lower (p=0.026).

Table 3. Comparison of the pain duration after defaecation and amount of fluid consumed daily between the groups

	GTN			ND			p
	Mean	SD	Median	Mean	SD	Median	
Pain duration after defaecation (h)	3.25	±2.47	2.00	3.30	±2.44	2.50	0.967
Amount of fluid consumed daily (L)	1.57	±0.83	1.25	1.55	±0.80	1.50	0.928

Mann-Whitney U test, SD: Standard deviation, GTN: Glyceryl trinitrate, ND: Nifedipine

Table 4. Comparison of clinical characteristics of the groups after treatment

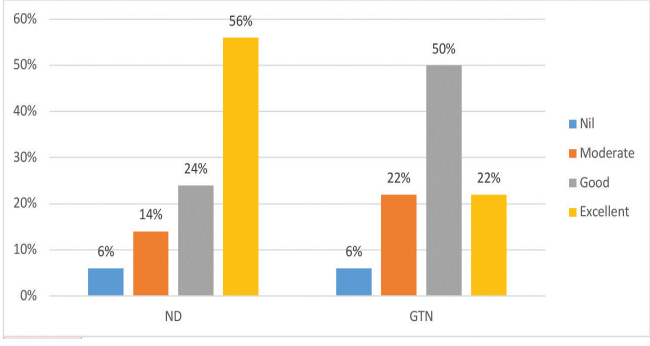
n		GTN		ND		p
		%	n	%		
Symptomatic relief level	Nil	3	6.00	3	6.00	**0.005**[a]
	Moderate	11	22.00	7	14.00	
	Good	25	50.00	12	24.00	
	Excellent	11	22.00	28	56.00	
Healing (21 days)	No	18	36.00	7	14.00	**0.011**[a]
	Yes	32	64.00	43	86.00	
Drug side effects	No	39	78.00	48	96.00	**0.007**[a]
	Yes	11	22.00	2	4.00	
Recurrence (3 months)	No	31	62.00	41	82.00	**0.026**[a]
	Yes	19	38.00	9	18.00	
Pre-treatment VAS score*		7.94±1.46		7.68±1.28		**0.273**[b]
Post-treatment VAS score*		2.92±1.75		1.54±1.43		**0.001**[b]
Decrease of VAS score*		5.02±1.92		6.14±2.07		**0.001**[b]

[a]Chi-square test, [b]Mann-Whitney U test, *Mean ± standard deviation, GTN: Glyceryl trinitrate, ND: Nifedipine

Discussion

An anal fissure is one of the most commonly seen anorectal diseases. Clinically the development of fissure is almost always due to chronic constipation or following passage of hard/difficult stool. The posterior midline is known to be more susceptible to trauma and to be torn first due to the anorectal angle and topography of the pelvic floor muscles.[3] In the light of anal manometry, arteriography, and doppler findings, internal anal sphincter hypertonicity, and relative poor perfusion are believed to be two main factors in the pathogenesis of anal fissure.[12,13,14] Klosterhalfen et al.[15] showed that posterior commissure, where 90% of anal fissures are localized, is less perfused than the other parts of the anal canal in postmortem angiographies. For this reason, typically anal fissures are often located in the posterior midline. In the literature, it has been reported that anal fissures are located in the posterior midline at a rate of 70.5-94%.[16,17,18] In 72% of the patients in our study, the fissure was located in the posterior midline, while in 28% in anterior midline. Atypical fissures are multiple, localized outside the midline, and develop secondary to diseases such as AIDS, crohn, malignancy, and tuberculosis. Patients with atypical fissures were not included in our study.

Due to surgery-related anal incontinence and other complications, there is a tendency in today's medicine from surgery towards medical modalities in the treatment of anal fissures.[19] Chemical sphincterotomy is preferred as the first-line of treatment since it is non-invasive, does not require anesthesia, reversible, repeatable, applicable at home, economic, and practical.[20,21] Topical GTN is the most widely used chemical agent in the treatment of anal fissures, it reduces anal sphincter tonicity by its non-adrenergic, non-cholinergic effect and its main side effect is headache which occurs in 40% of the patients.[22] Besides, it also has side effects like tachyphylaxis, orthostatic hypotension, and syncope.[23] The high recurrence rate is another disadvantage of GTN.[23,24] It has been reported that there is no significant difference between 0.4% and 0.2% GTN forms in terms of healing of anal fissure, and 0.4% GTN has a higher rate of headache.[25,26] For these reasons, we preferred the 0.2% GTN form in our study.



Graphic 1. Comparison of symptomatic relief levels of patients at the end of treatment between groups

GTN: Glyceryl trinitrate, ND: Nifedipine

Calcium channel blockers like nifedipine and diltiazem are successful agents in the treatment of anal fissures in both oral and topical application.[7,10,22] It has been shown that topical application of nifedipine has fewer side effects and a higher healing rate compared to oral administration.[16,27,28] The transport of calcium through L-type calcium channel is essential in maintaining internal anal sphincter tone, and nifedipine breaks the fissure cascade by reducing spontaneous sphincter activity through preventing intracellular access of calcium.[29] Experimental studies have shown that nifedipine has also a local anti-inflammatory and a favorable effect on microcirculation.[30,31]

A significant decrease in the VAS score and symptomatic relief was observed in both GTN and ND group patients in our study. However, when the decrease in the VAS score rate and symptomatic relief levels were compared between the two groups, nifedipine was observed to be significantly more effective. Besides, the rate of healing in anal fissure was higher in the ND group (86% vs 64%) when an anal examination was done after treatment. The healing rate in anal fissure was reported to be 94% by Perrotti et al.[32] and 85% by Katsinelos et al.[7] when nifedipine was used. Similar to our study, Shrestha et al.[21] also showed that topical ND has a higher healing rate than GTN. In another study, it was reported that both drugs lead to a significant decrease in pain scores with no difference between the groups, but the healing rate was higher in the ND group than the GTN group.[33]

When drug side effects were examined in our study, it was significantly higher in GTN group than ND group (p=0.007). This ratio was 40% vs 5% and 16% vs 7% in the studies of Ezri et al.[33] and Shreshta et al.[21], respectively, and both studies have shown that the side effects of the GTN group were significantly higher. Headache; the most important side effect of GTN reduces drug compliance and prevents the patients from taking the drug regularly and for the expected duration. For this reason, we can say that ND is more advantageous than GTN concerning both patient satisfaction and tolerance.

After chemical sphincterotomy treatment, anal canal pressure returns to pre-treatment levels and from this aspect, chemical sphincterotomy differs from surgical sphincterotomy. For this reason, chemical sphincterotomy has a higher risk of recurrence. In our study, the recurrence rate of the ND group was significantly lower than that of

the GTN group (18% vs 38%) (p=0.026). Shrestha et al.[21] reported similar results in their study, while two other studies reported no difference between the two drugs in terms of recurrence.[33,34]

Study Limitations

The limitations of our study were it's small number of patients, being single-centered, short follow-up period (3 months), and inability to measure anal canal resting pressure before and after treatment in the institution where the study was done.

Conclusion

Data obtained from our study shows that both glyceryl trinitrate and topical nifedipine have favorable effects on anal fissure treatment. However, topical 0.5% nifedipine is superior to 0.2% glyceryl trinitrate in the treatment of anal fissure in terms of symptomatic relief, decrease in pain score, healing, drug side effects, and recurrence. But, it is a fact that there is a need for prospective clinical studies with a larger number of patients, long-term follow-up, and that are supported with manometric measurements.

Ethics

Ethics Committee Approval: This study was approved by Van Yüzüncü Yıl University, Clinical Trials Ethics Committee.

Informed Consent: A written informed consent about the risks of the study was obtained from all patients.

Peer-review: Externally and internally peer reviewed.

Authorship Contributions

Surgical and Medical Practices: O.A., Concept: O.A., S.M.F.A., N.S.Y., A.P., M.S.E., Design: O.A., S.M.F.A., N.S.Y., A.P., S.E.,Data Collection or Processing: O.A., S.M.F.A., Ö.G., Analysis or Interpretation: O.A., N.S.Y., A.P., S.E., Literature Search: S.M.F.A., Ö.G., Writing: O.A.

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RESEARCH ARTICLE

Differences Between Right and Left Colon Cancers in Terms of Clinicopathological Features and Long-term Oncological Outcomes

Sağ ve Sol Kolon Kanserleri Arasında Klinikopatolojik Özellikler ve Uzun Dönem Onkolojik Sonuçlar Açısından Farklılıklar

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ABSTRACT

Aim: Although there are clinical differences in colon cancer (CC) according to the location of the tumor, the differences between right and left CC in terms of survival are not clear. Our aim was to analyze the clinicopathological differences between right and left CC and to investigate the effect of primary tumor location on recurrence and survival.

Method: The data of 330 patients who underwent curative surgery for right (n=155) or left (n=175) colon cancer between 2011 and 2018 were retrospectively analyzed. Demographic characteristics, surgical data, pathological data, recurrence and survival rates of the patients were examined and the two groups were compared in terms of these parameters.

Results: Male to female ratio was significantly higher and operative time was significantly longer in the left CC than in the right CC. The mean number of harvested lymph nodes was significantly higher in the right CC than the left CC (32±3 and 27±9, respectively, p=0.001). Compared to patients with left CC, those with right CC had higher tumor diameter and tumor volume, had more poorly differentiation and tended to have more mucinous and medullary type cancer. As a result of a median follow-up of 54 months, it was determined that the 5-year overall survival in stage I-III patients was worse in the right CC than in the left CC. Especially in stage III patients, both overall and disease-free survival rates were found to be statistically significantly lower in the right CC compared to the left CC (In stage III disease, overall survival was 66.9% in right CC and 81.8% in left CC, p=0.03; disease-free survival was 54.2% in right CC and 70.6% in left CC, p=0.04).

Conclusion: There may be clinicopathological and prognostic differences in CC depending on the location of the tumor. As a result of the long follow-up period in our case series, the prognosis in the right CC was worse, especially in stage III patients.

Keywords: Colon cancer, prognosis, tumor location, oncological outcomes

ÖZ

Amaç: Kolon kanserinde (KK) tümörün yerleşim yerine göre klinik farklar görülmesine rağmen sağkalım açısından sağ ve sol KK arasındaki değişiklikler tam olarak netlik kazanmamıştır. Amacımız; sağ ve sol KK'si arasındaki klinikopatolojik farklılıkları analiz etmek ve primer tümör yerleşiminin nükse ve sağkalıma etkisini araştırmaktır.

Yöntem: 2011-2018 tarihleri arasında, sağ (n=155) veya sol (n=175) kolon kanseri tanısıyla küratif cerrahi uygulanan 330 hastanın verileri retrospektif olarak incelendi. Hastaların demografik özellikleri, ameliyat verileri, patolojik verileri, nüks ve sağkalım oranları incelendi ve iki grup arasında karşılaştırmalar yapıldı.

Bulgular: Sol KK'sinde erkek/kadın oranı ve ameliyat süresi sağ KK'sine göre anlamlı derecede yüksekti. Çıkarılan ortalama lenf nodu sayısı sağ KK'inde sol KK'sine göre anlamlı derecede fazlaydı (32±3 ve 27±9 sırasıyla, p=0,001). Ayrıca sağ KK'sinde tümör çapı ve tümör hacmi daha fazla, az diferansiyasyon oranı, müsinöz ve medüller kanser oranı sol KK'sine göre istatistiksel olarak anlamlı derecede daha yüksekti. Ortanca 54 ay takip sonucunda, evre 1-3 hastalarda 5 yıllık genel sağkalımın sağ KK'sinde daha kötü seyrettiği özellikle evre 3 hastalarda hem genel hem de hastalıksız

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sağkalım oranının sağ KK'sinde sol KK'sine göre istatiktiksel olarak anlamlı derecede düşük olduğu tespit edildi (Evre 3 genel sağkalım: sağ %66,9 ve sol %81,8, p=0,03; evre 3 hastalıksız sağkalım: sağ %54,2 ve sol %70,6, p=0,04).
Sonuç: Kolon kanserinde tümörün yerleşim yerine göre klinikopatolojik ve prognostik farklılıklar olabilir. Kendi serimizdeki uzun takip süresi sonucunda, sağ KK'sinde prognoz özellikle evre 3 hastalarda daha kötü seyretmektedir.
Anahtar Kelimeler: Kolon kanseri, prognoz, tümör yerleşim yeri, onkolojik sonuçlar

Introduction

Colon cancers (CC) are common types of cancer in both men and women. The World Health Organization has reported that there are 1.8 million new cases diagnosed as having colorectal cancer each year according to the GLOBOCAN 2018 database.[1] For the first time, in 1990, Bufill et al.[2] suggested that colon tumors might have biological and genetic differences according to their distal and proximal location. Colon is separated as right and left accepting the splenic flexure as the transition point. CCs of right and left colon develop from different carcinogenetic pathways and accordingly show different clinical, pathological and genetic features.[3,4,5]

Despite the described biological variety, the differences between the right and left CCs in terms of prognosis are not clear yet. In recent studies, it has been reported that the prognosis is worse in metastatic patients if the primary tumor is in the right colon.[6,7,8,9] However, the effect of the location of the primary tumor on the prognosis in non-metastatic patients is still controversial.[9,10,11,12,13,14]

In this study, our aim was to analyze the clinicopathological differences between right and left CCs and to investigate the effect of primary tumor location on recurrence and survival.

Materials and Methods

Study Protocol

In our study, prospectively collected data of 389 patients who underwent curative surgery with the diagnosis of CC between March 2011 and March 2018 in the General Surgery Clinic of the American Hospital were retrospectively analyzed. Fifty-nine patients who had hereditary cancers, synchronous tumors, tumors developed on the basis of inflammatory bowel disease, history of cancer, and underwent cytoreductive surgery were excluded from the study. Three hundred thirty patients operated with a diagnosis of right (n=155) or left (n=175) CC were included in the study. Written consent was obtained from all patients for surgery.

Right CC was defined cecum tumors, ascending colon tumors, hepatic flexure tumors or transverse colon tumors up to the splenic flexure, whereas left CC was defined splenic flexure tumors, descending colon tumors or sigmoid colon tumors up to rectosigmoid junction.

Preoperative staging was performed in all patients with colonoscopy, thorax and whole abdominal computed tomography and/or positron emission tomography. Patients who were eligible for surgery underwent curative surgery by the same surgeon (DB). In the right CC; right hemicolectomy, extended right hemicolectomy or subtotal colectomy was performed. In the left CC; left hemicolectomy, extended left hemicolectomy or anterior resection was performed. Patients who underwent simultaneous radical R0 liver surgery (resection, metastasectomy and/or radiofrequency ablation) and patients with omentum metastasis who underwent R0 omentum resection were also included in the study.

Demographic characteristics, surgical data, pathological data, recurrence and survival rates of the patients were examined and comparisons were made between the two groups. Pathology results were analyzed in terms of TNM stages, differentiation, histological type, tumor deposit, tumor perforation, lymphatic invasion, vascular invasion and perineural invasion, total number of harvested lymph nodes, tumor diameter and tumor volume, and the groups were compared statistically. Pathological examinations were performed by the same team experienced in gastrointestinal pathology.

Postoperative Treatment and Follow-up

Chemotherapy was applied to all stage III and IV patients. Chemotherapy was also applied to stage II patients with poor prognostic factors such as tumor at pathological T4 stage, perforation, obstruction, poor differentiation, presence of signet-ring cell component, lymphovascular or perineural invasion. Follow-up was performed every 3 months for the first 2 years after surgery, using physical examination, carcinoembryonic antigen, and imaging methods. In the next 3 years, follow-up was performed every 6 months.

Overall survival was defined as the time from surgery to death from any cause or to the last control date. Disease-free survival was defined as the time from surgery to first recurrence proven radiologically or histopathologically or the time from surgery to death.

Statistical Analysis

Statistical analyzes were performed using SPSS version 24.0. Continuous variables were expressed as mean ± standard deviation, and categorical variables as number (%). Visual histograms and analytical tests (Shapiro-Wilk test or

Kolmogorov-Smirnov test) were used to test the normal distribution of continuous variables. Descriptive statistics were used for the analysis of clinical and pathological parameters between the two groups formed according to tumor location. Categorical variables were compared using the chi-square test or Fisher's exact test. The independent samples t-test was used to compare the means of continuous variables with normal distribution between the two groups, or the Wilcoxon test when normal distribution was not met. Kaplan-Meier method was used for overall survival and disease-free survival analysis. Univariate and multivariate Cox regression analyses were used to determine independent predictors of overall survival and disease-free survival. A multivariate Cox regression model was created using parameters with $p<0.05$ in univariate analyzes. For all analyzes, a p value less than 0.05 was considered significant.

Results

Male to female ratio was significantly higher in left CC compared to right CC (M/F: 2.2 and 1.1 respectively, p=0.005). There was no significant difference between the two groups in terms of mean age and body mass index. The number of ASA II patients in the left CC group and the number of ASA III patients in the right CC group were higher (p=0.04). Laparoscopic surgery was performed in 78% of the patients in the right CC group and in 83.5% of the patients in the left CC group (p>0.05). The operative time was significantly longer in the left CC group compared to the right CC group (157±59 minutes and 142±53 minutes, respectively, p=0.02) (Table 1). Right hemicolectomy was performed in 126 (81.3%) patients, extended right hemicolectomy in 21 (13.5%) patients, and subtotal colectomy in 8 (5.2%) patients in the right CC group. Anterior resection was performed in 116 (66.3%) patients, left hemicolectomy in 55 (31.4%) patients and extended left hemicolectomy in 4 (2.3%) patients in the left CC group.

The mean number of harvested lymph nodes was significantly higher in the right CC group than the left CC group (32±3 and 27±9, respectively, p=0.001). There was no difference between the two groups in terms of lymph node metastasis (right CC: 46.4% and left CC: 45.7%). While there was no difference between the two groups in terms of the rates of TNM stages, it was determined that there were significant differences in terms of histological type and differentiation (Table 2). In the left CC group, 93.1% of the cancers were adenocarcinoma and 6.9% mucinous adenocarcinoma, while in the right CC group, 74.8% of the cancers were adenocarcinoma, 17.5% mucinous adenocarcinoma and 7.7% medullary carcinoma (p=0.001).

Table 1. Comparison of demographic characteristics and surgical data between right colon cancers and left colon cancers

	Right colon cancer n (%)	Left colon cancer n (%)	p
Gender			0.005
Female	74 (47.8)	55 (31.5)	
Male	81 (52.2)	120 (68.5)	
Age, years, mean ± SD	65±14	64±13	0.42
BMI, kg/m^2, mean ± SD	27.8±5.3	27.1±4.8	0.31
ASA			0.04
I	29 (18.7)	36 (20.6)	
II	71 (45.8)	98 (56)	
III	52 (33.5)	41 (23.4)	
IV	3 (2)	0	
Operative method			0.32
Laparoscopic	121 (78)	146 (83.5)	
Open	27 (17.4)	24 (13.7)	
Conversion	7 (4.6)	5 (2.8)	
Operative time, minutes, mean ± SD	142±53	157±59	0.02
Length of hospital stay, days, mean ± SD	7±5	7±4	0.56

SD: Standart deviation, BMI: Body mass index, ASA: American Society of Anesthesiologists

While the poor differentiation rate was higher in the right CC group, the well differentiation rate was higher in the left CC group (p=0.04). Except that vascular invasion was more common in the left CC group, no difference was found between the two groups in terms of other prognostic factors (Table 2). Mean tumor diameter and tumor volume were also significantly higher in the right CC group (p=0.01 and p=0.002, respectively).

As a result of the median follow-up period of 54 months, it was determined that the 5-year overall survival and disease-free survival in the right CC group in stage I-III patients were worse (Figure 1, 2). When the survival analysis was performed according to the stages, although the 5-year overall survival and disease-free survival rates were lower in the right CC group compared to the left CC group in stage I and II patients, no statistically significant difference was found. However, the 5 year overall survival and disease-free survival rates were found to be statistically significantly lower in the right CC group compared to the left CC group in stage III patients (overall survival rate was 66.9% in right CC group and 81.8% in left CC group, p=0.03; disease-free survival rate was 54.2% in right CC group and 70.6% in left CC group, p=0.04) (Table 3, Figure 3, 4).

Table 2. Comparison of pathological data between right colon cancers and left colon cancers

	Right colon cancer n (%)	**Left colon cancer n (%)**	**p**
T stage			0.59
T1	20 (12.9)	23 (13.1)	
T2	12 (7.7)	15 (8.6)	
T3	67 (43.2)	85 (48.6)	
T4	56 (36.2)	52 (29.7)	
Lymph node metastasis (N +)	72 (46.4)	80 (45.7)	0.88
pTNM stage			0.48
I	26 (16.8)	29 (16.6)	
II	58 (37.4)	61 (34.8)	
III	56 (35.4)	55 (31.5)	
IV	16 (10.4)	30 (17.1)	
Histologic type			0.001
Adenocarcinoma	116 (74.8)	163 (93.1)	
Mucinous adenocarcinoma	27 (17.5)	12 (6.9)	
Medullary carcinoma	12 (7.7)	0	
Differentiation			0.04
Well	13 (8.4)	25 (14.3)	
Moderate	120 (77.5)	138 (78.8)	
Poor	22 (14.1)	12 (6.9)	
Lymphatic invasion	91 (58.7)	98 (56)	0.62
Vascular invasion	39 (25.1)	66 (37.7)	0.02
Perineural invasion	36 (23.2)	46 (26.2)	0.51
Tumor perforation	18 (11.7)	18 (10.2)	0.58
Tumor deposit	28 (18.1)	39 (22.3)	0.29
Harvested lymph nodes, mean ± SD	32±3	27±9	0.001
Tumor size, cm, mean ± SD	4.7±2.6	4±1.8	0.01
Tumor volume, cm^3, mean ± SD	70.9±141.4	31.9±42.9	0.002
Recurrence	24 (15.4)	35 (20)	0.27

SD: Standart deviation

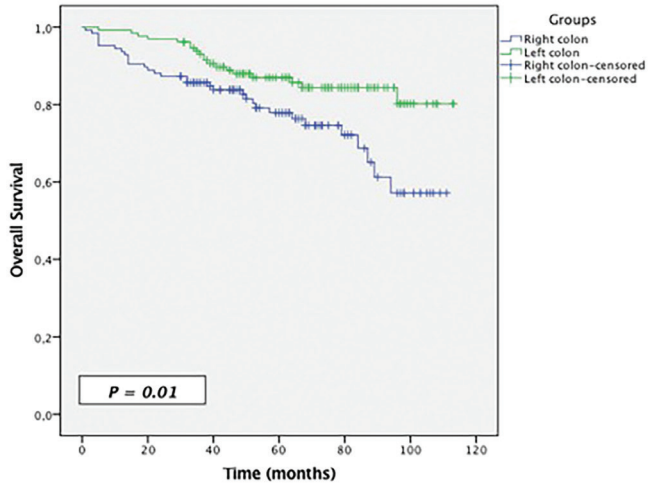

Figure 1. Kaplan-Meier curves for overall survival between right and left-sided colon cancers in stage I, II, and III

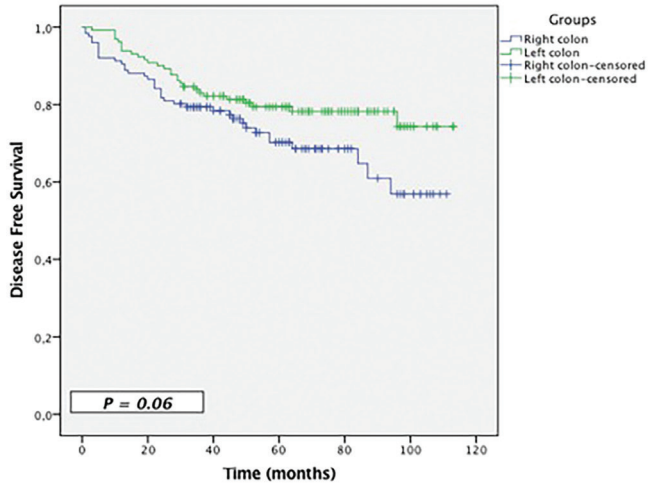

Figure 2. Kaplan-Meier curves for disease free survival between right and left-sided colon cancers in stage I, II, and III

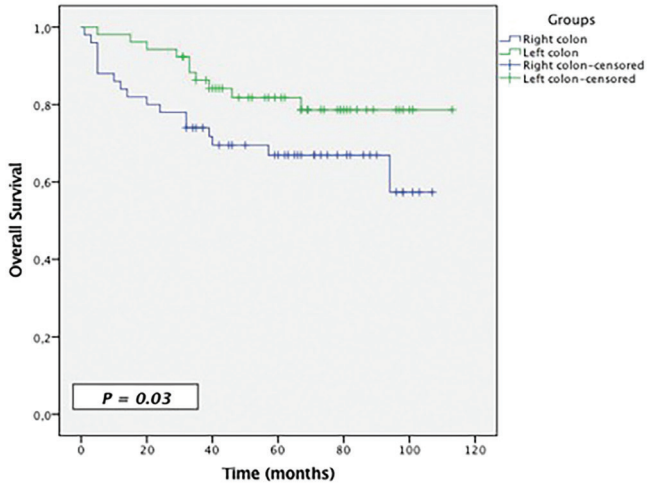

Figure 3. Kaplan-Meier curves for overall survival between right and left-sided colon cancers in stage III

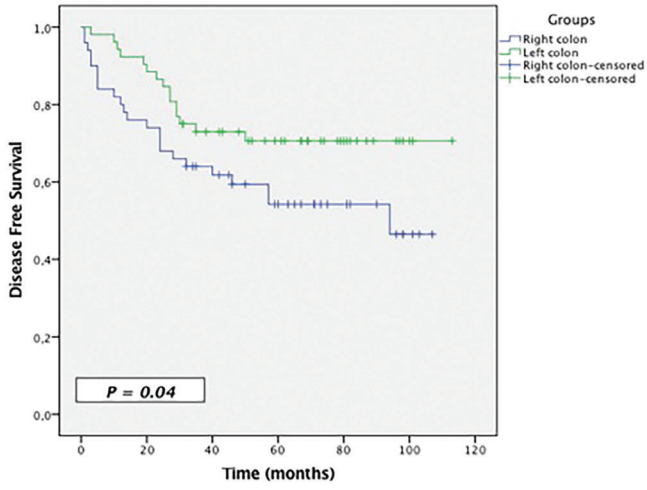

Figure 4. Kaplan-Meier curves for disease free survival between right and left-sided colon cancers in stage III

Table 3. Five year overall and disease-free survival rates on right colon cancer and left colon cancer

	Stage	Right colon cancer 5-year survival (%)	Left colon cancer 5-year survival (%)	p
Overall survival	All stages	74.4	81.8	0.02
	I-III	77.9	86.9	0.01
	I	91.3	95.8	0.65
	II	83	87.5	0.23
	III	66.9	81.8	0.03
	IV	40.4	54.9	0.41
Disease-free survival	All stages	66.9	71.5	0.27
	I-III	70.6	79.4	0.06
	I	91.3	95.5	0.65
	II	79.3	80.2	0.51
	III	54.2	70.6	0.04
	IV	34.6	43.8	0.67

In the univariate analyzes performed in terms of the effect of prognostic factors on survival, it was found right CC, the presence of lymphatic, vascular and perineural invasion and the large tumor diameter had an effect on survival. In multivariate analyzes; it was found that advanced age, poor differentiation, tumor perforation, presence of tumor deposits, and large tumor volume significantly and negatively affected survival (Table 4).

Discussion

The proximal and distal parts of the splenic flexure are two different colon sections of which embryological origins are not the same.[3] In CC, the location of the primary tumor creates clinical, pathological and genetic differences.[3,4] Changes in molecular features may also cause this difference.[15,16] It has been reported that microsatellite instability-high (MSI-H) ratio is significantly higher in the right CC and that it affects the treatment of stage II patients.[15,17] BRAF mutation is also a poor prognostic factor associated with peritoneal carcinomatosis, which is more common in the right CC.[18,19,20] In studies comparing two different tumor locations, it was reported that there were clinicopathological differences in right CC such as not very pronounced symptoms, higher rate of T4 stage, higher rate of poor differentiation and more common mucinous adenocarcinoma and medullary carcinoma, and female predominance.[21,22] In the left CC, on the other hand, more pronounced symptoms, lower stage and chromosomal differences were observed.[22,23,24] Although the reason for these changes between the two colon segments is not fully understood, different embryological origins are probably the most important factor.[25] In our study, female/male ratio, rate of poor differentiation, and rate of medullary carcinoma and mucinous adenocarcinoma were higher in right CC than left CC in accordance with the literature. In addition, tumor diameter was larger and tumor volume was higher in the right CC compared to the left CC.

However, a clear conclusion could not be reached in studies comparing the two groups in terms of survival. Many authors have stated that the prognosis of the right CC is worse.[11,26,27] However, some studies have reported that the right CC has a better prognosis.[9,12,13] Weiss et al.[13] reported in their survival analysis in 53,801 patients with stage I-III CC that there was no difference in terms of prognosis between right and left CCs when all stages were included and also only in stage I disease. In the same study, it was reported that right CC had a better prognosis than left CC in stage II disease [hazard ratio (HR)=0.92; 95% confidence interval (CI): 0.87-0.97; p=0.001)]; while in stage III disease, right CC had a worse prognosis (HR=1.12; 95% CI: 1.06-1.18; p=0.001).[13] In a study conducted by Warschow et al.[12] in more than 90,000 patients, 5-year overall survival in the right CC in stage I and II patients (in stage I disease, 77.4% in right CC and 74.9% in left CC; in stage II disease; 68.3% in right CC and 63.9% in left CC) and cancer-specific survival (In stage I disease, 94% in right CC and 91.7% in left CC; in stage II disease; 84.6% in right CC and 80.1% in left CC) were reported to be better. In the same study, the

Table 4. Cox regression analyses for prognostic factors of overall survival

Factors	Univariate		Multivariate	
	HR (95% CI)	p	HR (95% CI)	p
Female gender	0.85 (0.53-1.37)	0.51	-	-
Age	1.04 (1.02-1.06)	0.001	1.03 (1.01-1.05)	0.002
Right colon cancer	1.62 (1.03-2.56)	0.03	1.47 (0.89-2.42)	0.13
Harvested lymph nodes	0.98 (0.96-1.01)	0.14	-	-
Poor differentiation	3.34 (1.95-5.75)	0.001	2.57 (1.26-4.64)	0.005
Lymphatic invasion	2.91 (1.72-4.89)	0.001	1.69 (0.91-3.12)	0.11
Vascular invasion	1.60 (1.01-2.54)	0.04	1.28 (0.63-1.91)	0.38
Perineural invasion	2.41 (1.52-3.79)	0.001	1.37 (0.82-2.47)	0.25
Tumor perforation	2.45 (1.39-4.31)	0.002	2.33 (1.21-4.48)	0.01
Tumor deposit	2.57 (1.58-4.16)	0.001	2.05 (1.18-3.58)	0.01
Tumor size	1.02 (1.01-1.03)	0.01	0.99 (0.98-1.01)	0.34
Tumor volume	1.005 (1.003-1.006)	0.001	1.004 (1.002-1.006)	0.005

CI: Confidence interval, HR: Hazard ratio

prognosis in stage III patients was similar in both groups (overall survival; 53.3% in right CC and 52.9% in left CC, cancer-specific survival; 63.6% in right CC and 64.6% in left CC).[12] In the study conducted by Yang et al.[9] in 57,847 patients, it was stated that the right CC had better cancer-specific survival in stage I and II patients, but it was worse in stage III patients. In a meta-analysis performed by Petrelli et al.[28], 66 studies were included and it was found that left CC had a better prognosis (HR: 0.82; 95% CI: 0.79-0.84; p<0.001), and the location of the tumor was reported to be a prognostic criterion. In a study conducted by He et al.[29] in 377,849 patients, it was stated that liver and lung metastases were more in the left CC, but the prognosis was better than in the right CC. In addition, there are studies showing that complete mesocolic excision technique has a positive effect on prognosis, especially in right CC, as well as studies reporting that it does not affect prognosis.[30,31,32,33] In our study, while there was no statistically significant difference in terms of overall survival and disease-free survival in stage I and II patients, both overall survival and disease-free survival rates were statistically significantly worse in stage III patients with right CC compared to left CC patients.

There are some limitations in interpreting the results of this study. The first of these is the retrospective feature of the study. The genetic or molecular characteristics of all patients could not be examined and a comparison could not be made in this direction in terms of the two groups. MSI has been routinely evaluated in pathological examinations since 2015, but MSI could not be included in the comparison since this examination could not be performed in patients in the first years of the study. In addition, the fact that adjuvant chemotherapy protocols vary over the years and according to the oncologist is another limitation.

Conclusion

As a result, there might be clinicopathological and prognostic differences in CC depending on the location of the tumor. At the end of the long follow-up period in our series, it was found that, the prognosis in right CC was worse especially in stage III patients. We anticipate that the data obtained as a result of our study should be taken into account by the medical oncology department that we work together, in the selection and application process of adjuvant oncological treatments.

Ethics

Ethics Committee Approval: Retrospective study.

Informed Consent: Written consent was obtained from all patients for surgery.

Peer-review: Internally and externally peer review.

Authorship Contributions

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

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RESEARCH ARTICLE

Classification of Pilonidal Sinus Disease According to Physical Examination, Ultrasonography and Magnetic Resonance Imaging Findings

Pilonidal Sinüs Hastalığının Fizik Muayene, Ultrasonografi ve Manyetik Rezonans Görüntüleme Bulgularına Göre Sınıflaması

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ABSTRACT

Aim: We could not find a study in the literature based on physical examination findings, ultrasonography (USG) and magnetic resonance imaging (MRI) in the treatment of pilonidal sinus. In this study, we aimed to accomplish a classification based on clinical findings, ultrasonographic and magnetic resonance to provide objective criteria for diagnosis, treatment, and recurrence follow-up of pilonidal sinus.

Method: This study included patients who presented to Necmettin Erbakan University Meram Medical Faculty, the clinic of general surgery and were diagnosed with pilonidal sinus disease between 2015 and 2016. After receiving medical history, physical examination was carried out. Then MRI and USG of the patients were ordered, and the relationship of pilonidal sinus with skin, subcutaneous tissues and surrounding were recorded and analyzed. Patients were categorized as 3 groups based on average of the sum of depth and width on MRI and USG imaging. Patients with acute abscess considered as stage 2 according to the navicular region classification were not categorized.

Results: Patients were divided into three groups according to average of the sum of width and depth on USG. It was found that duration of hospitalization, work absence and frequency of operation increased as the mean values increased. Status of being operated was statistically significantly different (p=0.007).

Conclusion: Patients with average of the sum of width and depth on MRI and USG;
Stage 1: <15 mm.
Stage 2: 15-30 mm.
Stage 3: >30 mm.
In conclusion; we obtained a significant classification based on MRI and USG. We concluded that informing the patients classified according to MRI and USG on treatment procedure would be meaningful. This study will guide further studies to be conducted with a larger number of patients.

Keywords: Imaging, classification, pilonidal sinus

ÖZ

Amaç: Pilonidal sinüsün (PS) tedavisinde fizik muayene bulguları, ultrasonografik ve manyetik rezonans (MR) görüntülemeyi esas alan bir çalışmaya literatürde rastlamadık. Bu çalışma ile PS'nin tanı, tedavi ve nüks yönünden takibinde objektif kriterler oluşturmayı sağlayacak klinik, ultrasonografik ve MR görüntülemesine dayalı bir sınıflama yapılmasını amaçlandık.

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Yöntem: Bu çalışmada 2015 ile 2016 yılları arasında Necmettin Erbakan Üniversitesi Meram Tıp Fakültesi Genel Cerrahi Kliniği'ne başvuran ve PS hastalığı tanısı konan hastaları kapsamaktadır. Gerekli anamnez bilgileri alındıktan sonra fizik muayaneleri yapıldı. Sonrasında hastalara (MR) ve ultrasonografi (USG) görüntülemesi yapılarak PS deri derialtı dokular ve çevre ile ilişkisi belirlenecek ve veriler tek tek dosya halinde hazırlandı.
Bulgular: Çalışmamıza katılan 68 hastanın %82,4'ü (56) erkek, %17,6'sı (12) kadındı. Erkeklerin yaş ortalaması 25,89±8,97 iken kadınların yaş ortalaması 23,33±8,15 idi.
Yaptığımız MR görüntülemesinin uzunluk ve genişliğinin toplamının ortalamasına göre 3 gruba ayrıldı. Ortalama değerler arttıkça hastaneden kalış, işe gidememe durumu ve cerrahi işlem sıklığının arttığı görüldü. Cerrahi uygulanma durumu istatistiksel olarak anlamlı farklı bulunmuştur (p=0,001).
Sonuç: MR veya USG'de derinlik ve genişlikleri toplamı ortalamasına göre evreleme
Evre 1: 15 mm altı
Evre 2: 15-30 mm arası
Evre 3: 30 mm üstü
Sonuç olarak yaptığımız çalışma ile MR ve USG bazında bir anlamlı bir sınıflama elde edildi. MR ve USG verilerine göre sınıflama yapılan hastaların tedavi prosedürü ve hastayı bilgilendirme açısından anlamlı olabileceği sonucuna ulaştık. Yaptığımız çalışma ileri dönemde daha fazla hasta sayısı ile yapılacak olan geniş çaplı çalışmalara öncelik oluşturacaktır.
Anahtar Kelimeler: Görüntüleme, sınıflandırma, pilonidal sinüs

Introduction

Pilonidal sinus (PS) is a common disease in the sacrococcygeal region that adversely affects the patient's life. The treatment protocol of this disease is very different, and the quality of life can be severely impaired. The aim of this disease is to make the treatment in the earliest and most appropriate way. Unfortunately, there is no common treatment protocol approach in the literature yet.

In the literature, there is no study based on physical examination findings, ultrasonography and magnetic resonance imaging in the classification of PS. With this study, we aimed to make a classification based on clinical, ultrasonography and magnetic resonance imaging that will provide objective criteria for diagnosis, treatment and follow-up of PS.

Materials and Methods

This study covered the patients who were admitted to Necmettin Erbakan University Meram Faculty of Medicine General Surgery Clinic between 2015 and 2016 and were diagnosed as having PS disease (PSD). The study was approved by Necmettin Erbakan University Meram Faculty of Medicine Ethics Committee (Date: 18.09.2015 and number: 2015/331).

Detailed information about the study was given to the patients included in the study and their written consents were obtained. A total of 70 patients participated in the study. Two patients were excluded from the study by their own wills. Demographic information of the patients participating in the study was recorded. Physical examinations were performed. The patients were classified according to the navicular region classification which was based on the physical examination findings and made by Tezel.[1]

After obtaining the necessary anamnesis information, physical examinations were performed. Afterwards, magnetic resonance imaging (MRI) and ultrasonography (USG) imaging were performed on the patients, and the relationship of the PS with the skin, subcutaneous tissues and the surrounding tissues was determined and the data were prepared as a single file.

Photographs of the diseased area were taken from the patients who gave permission. Pit numbers were noted. After the imaging, the results of USG and MRI were recorded. The procedure performed on our patients (surgery, conservative approach or abscess drainage), duration of hospital stay and the time to return to work in the postoperative period were recorded. All data were evaluated statistically. MRI and USG results were compared among themselves and with other values.

Statistical Analysis

Statistical analyzes were performed using SPSS version 20 software. Descriptive statistics were summarized as number, percentage, mean and standard deviation. P value <0.05 was considered statistically significant.

Results

Of the 68 patients participating in our study, 82.4% (n=56) were male and 17.6% (n=12) were female. The mean age of males was 25.89±8.97, while the mean age of females was 23.33±8.15. Of the patients, 42.6% (n=29) were smoking. The sociodemographic characteristics of the patients are given in Table 1.

The distance of the pits in the navicular area to the anus was evaluated. The average distance to the anus of the patients who underwent surgery was 3.09±092 cm, and the average distance to the anus of the non-surgical group was 3.07±0.73 cm. The distance to the anus of the drained group was 3.36±0.92 cm. A relationship between the surgical and non-surgical groups in terms of the distance to the anus could

not be determined (p=0.640). There was no correlation between the duration of hospital stay and the proximity of PSD to the anus (p=0.485, r=0.086).

While 63.2% (n=43) of the patients were hospitalized and operated, a conservative approach was preferred in 20.6% (n=14) of them. Drainage was applied to 16.2% (n=11) of PS abscess (these patients were evaluated as stage 2 in the Tezel classification). The interventions performed in the patients are shown in Table 2. No statistically significant correlation was found between smoking status and status of undergoing surgery (p=0.058). No relationship was found between the smoking status of the patients and duration of hospital stay and the time to return work in the patients who underwent surgery (p=0.216, p=0.351).

According to the Tezel classification based on the physical examination, 44.1% of the patients were in stage 3, 17.6% in stage 1, 14.7% in stage 2, 14.7% in stage 4, and 7.4% in stage 5. The clinical characteristics and stagings of the patients are given in Table 3.

The depth and width ratios of the groups measured by MRI and USG that underwent surgery, conservative approach and drainage are given in Table 4. There was a significant difference between the groups in terms of width and depth of lesion measured in MRI and width and depth of lesion measured in USG (p=0.018, p=0.008, p=0.006, p=0.002).

Duration of hospital stay and time to return work of the patients are given in Table 5. There was a statistically significant difference between the Tezel stages of the patients in terms of duration of hospitalization and time to return work (p<0.001).

Drainage was applied in stage 2 patients due to abscesses. Surgery was performed in 30.8% (n=4) of stage 1 patients, 83.3% (n=25) of stage 3 patients, 90% (n=9) of stage 4 patients, and 100% (n=5) of stage 5 patients. As the stage increased, the increase in surgical intervention was found to be statistically significant (p=0.001) (Table 6).

The patients were categorized in 3 groups by taking the average of the depth and width sum of lesion in MRI and USG imaging (Figures 1,2,3,4). In this grouping, patients with acute abscess accepted as having stage 2 according to Tezel classification were excluded from the category.

Table 1. Demographic data

	Number(n) Percentage(%)	Mean ± SD
Gender		
Male	56 (82.4)	
Female	12 (17.6)	
Age		
Male		25.89±8.97
Female		23.33±8.15
Smoking status		
Smoker	29 (42.6)	
Non-smoker	39 (57.4)	
Type		
Brown	44 (64.7)	
Blonde	24 (35.3)	
BMI		
Male		26.13±3.59
Female		22.25±4.12

BMI: Body mass index

Table 2. Treatment choices

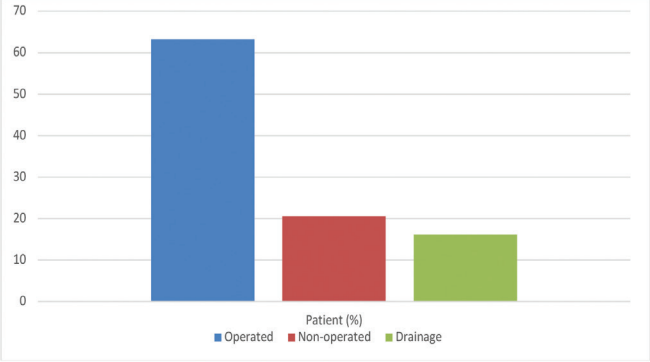

Table 3. Stage, operation and outcomes of patients

	Number (n), Percentage (%)	Mean ± SD
Stage		
1	12 (17.6)	
2	10 (14.7)	
3	31 (44.1)	
4	10 (14.7)	
5	5 (7.4)	
Operation		
Yes	43 (63.2)	
No	14 (20.6)	
Drainage	11 (16.2)	
Duration of hospitalization		
Operated		3.88±3.79
Non-operated		----------
Drainage		0.18±0.60
Duration of work absence		
Operated		24.39±16.05
Non-operated		----------
Drainage		4.18±5.60

The patients were divided into 3 groups according to the average of the total length and width of lesion in MRI: Group 1 between 0-15 mm, group 2 between 15.1-30 mm, and group 3 >30 mm. Surgery was performed in 45% (n=9) of group 1, 90% (n=27) of group 2, and 100% (n=7) of group 3 (p<0.001) (Table 7). The duration of hospitalization and the situation of not returning to work increased significantly from group 1 to group 3 (p<0.001).

The patients were divided into 3 groups according to the average of the total length and width of lesion in USG imaging: Group 1 between 0-15 mm, group 2 between 15.1-30 mm, and group 3 >30 mm. Surgery was performed in 52.4% (n=11) of group 1, 86.7% (n=26) of group 2, and 100% (n=6) of group 3. Surgical intervention status was found to be statistically significantly different (p=0.007) (Table 8). Again, from group 1 to group 3, the duration

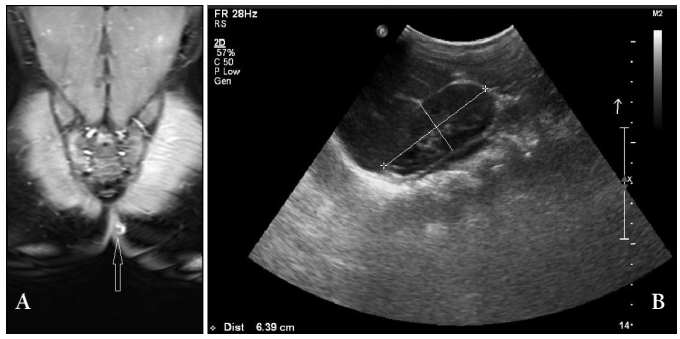

Figure 1. A) View of sinus extension on MRI coronal axial section in the patient in group 1 (width + depth /2 on MRI: 8 mm), **B)** USG imaging of the patient with pilonidal sinus in group 1 (Average of depth and width on USG: 6 mm)

MRI: Magnetic resonance imaging, USG: Ultrasonograpy

Table 4. Comparison of MRI and USG measurements according to treatment method

	Operated	Non-operated	Drainage	p
MRI depth	25.34±14.3	14.14±9.48	20.90±7.28	**0.018**
MRI width	20.93±15.9	9.35±7.16	11.09±4.45	**0.008**
USG depth	24.02±13.0	12.57±8.95	18±6.26	**0.006**
USG width	18.74±11.9	8.35±5.93	10.36±4.17	**0.002**
Duration of work absence	24.39±16.0	-	4.18±5.60	**<0.001**
Duration of hospitalization	3.88±3.79	-	0.18±0.60	**<0.001**

MRI: Magnetic resonance imaging, USG: Ultrasonography

Table 5. Evaluation of MRI and USG by staging

	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	p
MR depth	9.69±7.85	21.00±7.67	24.43+12.35	32±16.28	25.80±9.90	<0.001
MR width	6.38±5.12	10.70±4.49	17.06±8.91	32.40±23.08	25.40±17.27	0.001
USG depth	9.69±5.83	17.80±6.56	22.83±10.97	30±16.32	23.60±8.20	0.001
USG width	6.23±4.45	9.90±4.09	16.10±8.09	26.40±13.43	22±18.23	0.001
Duration of hospitalization	0.30±0.63	-	2.83±2.91	6.30±5.70	3.40±1.67	<0.001
Duration of work absence	3.83±8.69	2.60±2.06	16.96±11.35	31.50±23.33	39.00±15.16	<0.001

MRI: Magnetic resonance imaging, USG: Ultrasonography

Table 6. Treatment options by staging

	Operated	Non-operated	p
Stage 1	4 (30.8%)	9 (69.2%)	0.001
Stage 3	25 (83.3%)	5 (16.7%)	
Stage 4	9 (90%)	1 (10)	
Stage 5	5 (100%)	0	

of hospitalization and period of not returning to work increased significantly (p<0.001).

Discussion

Although PSD is seen as a simple disease, it emerges as a disease with increasing frequency in the population.[2]

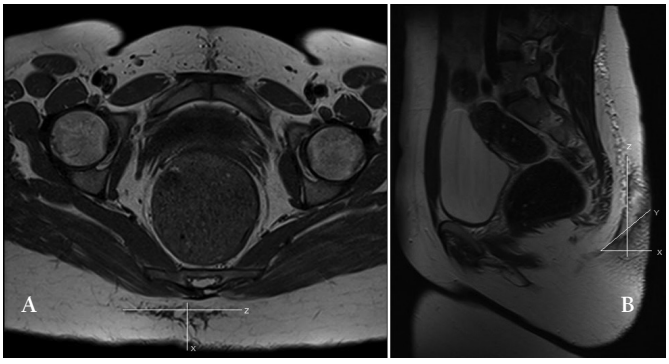

Figure 2. A) Axial T1 sequence view on MRI of the patient with pilonidal sinus in group 2. X: Distance from the skin to the fascia (depth), Z: Subcutaneous transverse spreading (width) (Patient with average of the depth and width on MRI: 22 mm. X:15 Y:29 X+Z/2=22 mm)
B) Sagittal T1 sequence view on MRI of the patient with pilonidal sinus in group 2 X: Perpendicular distance from the skin to the presacral fascia (deep) Y: Expansion of the sinus tract, Z: Subcutaneous transverse spreading (width)
MRI: Magnetic resonance imaging

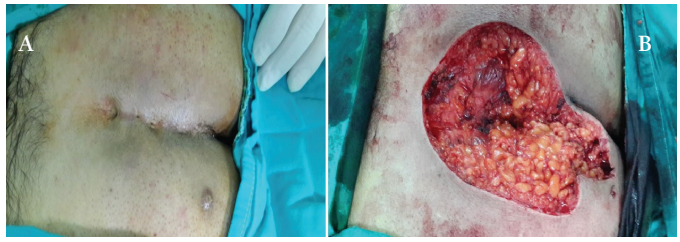

Figure 3. A) Patient with pilonidal sinus in group 3 with pits out of the navicular region, **B)** Operation image of our patient with pilonidal sinus in group 3

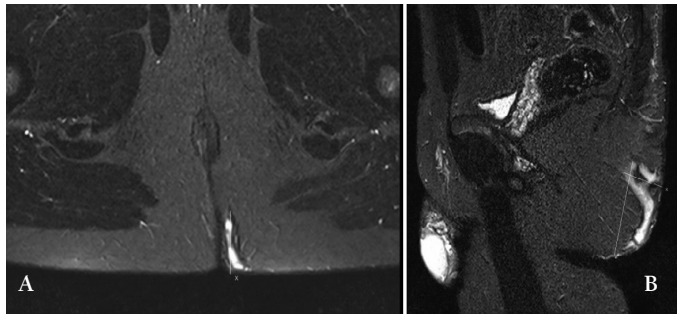

Figure 4. A) Axial T1 sequence on MRI of the patient with pilonidal sinus in group 3, **B)** Sagittal T1 sequence view on MRI of the patient with pilonidal sinus in group 3 (Average of depth + width on MRI 52 mm, X:34 mm Y:70 mm)
MRI: Magnetic resonance imaging

Table 7. Evaluation according to average of depth + width on MRI

	Operation	Hospitalization	Work absence	p
Group 1 (<15 mm)	45%	0.75±1.01	6.60±1.52	p< 0.001
Group 2 (15-30 mm)	90%	3.06±2.51	21.23±13.61	p<0.001
Group 3 (>30 mm)	100%	8.57±6.34	40±23.62	p<0.001

MRI: Magnetic resonance imaging

Table 8. Evaluation according to average depth + width on USG

	Operation	Hospitalization	Work absence	p
Group 1 (<15 mm)	52.4%	0.85±1.01	8.42±11.41	p=0.007
Group 2 (15-30 mm)	86.7%	3.46±3.35	21.23±14.53	p<0.001
Group 3 (>30 mm)	100%	7.50±6.22	39.16±26.34	p<0.001

USG: Ultrasonography

Table 9. Classification according to navicular region based on physical examination by Tezel[1]

Type I	Asymptomatic, sinus pits in navicular region, abscess, no discharge
Type II	Acute pilonidal abscess
Type III	Sinus pits in navicular region with a history of drained abscess or discharge
Type IV	One or more sinus pits out of the limits of navicular region
Type V	Patients developing recurrence

Some surgeons prefer conservative methods in patients on the grounds that relapse is less, and some surgeons prefer based on hospitalization and time to return to work.[3,4] It is obvious that PSD is an important disease due to its frequent postoperative complications and relapses, the long duration of care, and the prolonged period of not returning to work.[5]

PSD is a chronic inflammatory disease that occurs in the intergluteal region. The disease often affects the population aged 15-35 years. It is seen 3-4 times more frequently in men than women.[6,7,8] In a study conducted by Kuvvetli et al.[9], the female/male ratio was found to be 1/5.6. In our study, 82.4% of the patients were male and 17.6% were female. The mean age was 24 years which was in line with the literature.

There was no study in the literature conducted to search for the relationship between smoking and the frequency of the disease. In some studies, it has been suggested that smoking causes complications seen in the early period since it causes hypoxia in peripheral tissues.[10] In our study, the rate of smoking in our patients was 42.6%. No significant relationship was found between the disease and smoking.

Toker et al.[11] reported that 67% of the patients were dark-skinned in their study.[11] In our study, in line with the literatüre, 64.7% of our patients were dark-skinned and 35.3% were light-skinned.

In a study it was found that the average distance of the sinus pits to the anal wedge was 5 cm.[12] In our study, it was 3.2 cm.

In cases such as perianal fistula where determination of fistula tract is required, MRI has become a method used in almost all surgical clinics.[14] In our study, we performed MRI and USG imaging for our patients in order to visualize the PS tract under the skin and to determine the treatment procedure accordingly. In our study, the distance (depth) of the lesion from the skin and its course (width) in parallel under the skin were evaluated with MRI and USG. No additional meaningful evaluation data were found for the presacral fascia and surrounding tissues. It was observed that as the depth of the lesion in MRI increased, the depth of the lesion in USG increased and the width of the lesion in USG increased as the width of the lesion in MRI increased. However, unlike USG, MRI provided better image quality, easier interpretation and clearer information in terms of differential diagnosis.

When we examined the MRI and USG images, no relation was found between the patient's age and the depth or width of the lesion in MRI, and the depth or width of the lesion in USG.

According to the classification made by Tezel[1], patients with stage 4 disease had more pits and their pits were outside of the gluteal cleft, so depth and width of the lesion in MRI and USG were found to have higher values than other stages in this group.[1] The details of the classification by Tezel[1] are available in Table 9. We think that preoperative MRI and USG examinations will be valuable in patients whose pits are outside the gluteal region.

We observed that the rate of undergoing surgery, the duration of hospital stay and the period of not returning to work increased from group 1 to group 3 in patients who were categorized based on the the depth and width of the lesion in MRI and USG. Patients with PSD with acute abscess were not included in this category due to undergoing drainage procedure and then conservative or surgical procedures for PSD.

When the treatments we applied in the patients were evaluated, it was seen that we performed more surgical procedure instead of conservative treatment in patients with lesions with high depth and width in MRI and USG. It was observed that the depth and width of the lesion in MRI and USG in the patients who were treated conservatively were significantly less than the others. This shows that MRI and USG imaging to be performed during treatment planning may be important in determining the appropriate treatment protocol to be applied to the patient.

The study by Sözen[15] showed that the longer the hospital stay, the longer the time to return to work. When we examined the MRI and USG values of patients with a long hospital stay and patients with long period of not returning to work, we found that as the depth and width of the lesion in MRI and USG increased, the duration of hospitalization and the period of not returning to work increased. While doing this evaluation, we excluded the patients at stage 2 in Tezel classification. We observed that patients with stage 5 disease had smaller lesions in MRI and USG compared to patients with stage 4 disease and parallel to this, the duration of hospital stay was shorter. Based on this data, we observed that performing an imaging before starting PSD treatment was important both in terms of the course of the treatment and informing the patient in the postoperative period.

When the staging performed by Tezel[1] based on the navicular region was compared with the MRI and USG data, it was observed that the depth and width of the lesion in MRI and USG increased in parallel with increase in stage. However, it was observed that MRI and USG values were lower in patients with stage 5 compared to stage 4. It was observed that the duration of hospital stay was shorter in patients with stage 5 than in patients with stage 4. Although patients with stage 5 were accepted as having relapse, it was thought that the prognosis might be worse in stage 4. It was thought that using imaging studies for staging in evaluating the prognosis of patients with PSD would be more meaningful.

In the study by Harlak et al.[13], the average number of pits was reported as 2.71. In our study, it was 1.92. We could not obtain significant findings in imaging in some of our patients

who had an average number of pits below 2 and did not have complex findings in physical examination. However, in patients who appeared to be at a more advanced stage on physical examination (those with a high number of pits outside the gluteal cleft, those with recurrent PSD, etc.), the imaging to be performed would determine the method of treatment and would predict the duration of hospitalization and period of not returning to work if surgery was to be performed. When we examined the number of pits and MRI and USG values, it was observed that as the number of pits increased, the depth of lesion in MRI and USG increased. It was concluded that MRI and USG examinations might be more meaningful in patients with more than 2 pits.

Evaluating patients with PSD only with a physical examination does not provide sufficient information about the course of the disease under the skin, and this does not provide an opportunity to make a treatment decision and does not predict the outcome of the disease.

Conclusion

As the average of depth and width of lesion in imagings increases, the rate of performing surgical treatment increases. Parallel to this, the length of stay in the hospital and the duration of not returning to work are also increasing.

Although MRI is valuable in terms of image quality and in differential diagnosis, we think that USG is as effective as MRI, and it is convenient and practical in imaging the disease. We collected MRI and USG values in the same category while doing our own staging. In the light of the data we have obtained, we suggest a staging that can give an idea about appropriate treatment method to be preferred and about the prognosis of the disease. It is possible to create a more realistic and close to ideal staging with multi-center and large population studies.

Classification of PSD without acute abscess according to the average depth and width of lesion in MRI or USG:

Stage 1: Patients whose mean depth and width of lesion in MRI or USG are less than 15 mm (we recommend conservative treatment in this group).

Stage 2: Patients whose mean depth and width of lesion in MRI or USG are between 15-30 mm. (Conservative approach should be considered primarily in this group.)

Stage 3: Patients whose mean depth and width of lesion is above 30 mm in MRI or USG. (Surgical treatment will be more appropriate in this group of patients with a large lesion.)

Ethics

Ethics Committee Approval: The study was approved by Necmettin Erbakan University Meram Faculty of Medicine Ethics Committee (Date: 18.09.2015 and number: 2015/331).

Informed Consent: Detailed information about the study was given to the patients included in the study and their written consents were obtained.

Peer-review: Externally and internally peer reviewed.

Authorship Contributions

Surgical and Medical Practices: Y.Y., A.V., Ö.K., Concept: Y.Y., Ö.K., Design: M.A.Y., Ö.K., Data Collection or Processing: Y.Y., M.Ç., Analysis or Interpretation: M.A.Y., A.V., Literature Search: Y.Y., M.Ç., Writing: M.A.Y., A.V.

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

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RESEARCH ARTICLE

Outcomes of Our Laparoscopic Surgery in Colorectal Cancer: Our First Experiences

Kolorektal Kanserde Laparoskopik Cerrahi Sonuçlarımız: İlk Deneyimlerimiz

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ABSTRACT

Aim: The laparoscopic approach in colorectal surgery is widely applied in experienced centers. In this study, we aimed to present the short-term results of our first laparoscopic experience on the patients with primary diagnosis of colorectal cancer (CRC) in our newly opened hospital.

Method: Between 10 August 2018-1 November 2019, patients who underwent elective laparoscopic surgery with the primary diagnosis of CRC in the Sancaktepe Şehit Prof. Dr. İlhan Varank Training and Research Hospital, Clinic of General Surgery were included in the study. Demographic characteristics, type of surgery, duration of surgery, pathology results, length of hospitalization, first bowel movements time, oral intake starting days, drainage catheter removal time, rate of conversion to open surgery, complications and early mortality were evaluated.

Results: A total of 20 patients (11 male, 9 female) were included in the study. The median age was 60 (41-80) years. The most performed operation was the right hemicolectomy (50%). In 3 (15%) patients laparoscopic surgery was converted to open surgery. Three (15%) patients developed wound infection, hematoma was seen in 1 (5%) patient, and 1 patient (5%) developed ileus. The mean operative time was 172±31 min and the duration of hospitalization was 7 days (5-15). The total number of dissected lymph nodes was higher in female patients (p=0.02). There was a positive correlation between operation time and length of hospitalization (p=0.016, r=0.532), and tumor diameter and oral intake time (p=0.03, r=0.621). There was no anastomotic leakage or early mortality.

Conclusion: Especially our rate of conversion to open surgery, complications, and oncologic outcomes were in line with the literature.

Keywords: Laparoscopic colorectal surgery, colorectal cancer, experience

ÖZ

Amaç: Kolorektal cerrahide laparoskopik yaklaşım deneyimli merkezlerde yaygın olarak uygulanmaktadır. Bu çalışmada, yeni açılan hastanemizde primer kolorektal kanser (KRK) tanısı alan hastalardaki ilk laparoskopik deneyimlerimizin kısa dönem sonuçlarını sunmayı amaçladık.

Yöntem: Sancaktepe Şehit Prof. Dr. İlhan Varank Eğitim ve Araştırma Hastanesi Genel Cerrahi Kliniği'nde, 10 Ağustos 2018-1 Kasım 2019 tarihleri arasında KRK tanısı ile laparoskopik ameliyat olan hastalar çalışmaya dahil edildi. Hastaların demografik özellikleri, ameliyatın tipi, ameliyat süresi, patoloji sonuçları, hastanede kalış süresi, ilk gaz-gayta çıkış zamanı, oral gıda başlama günleri, dren çekilme zamanı, açığa dönüş oranı, komplikasyonlar ve erken dönem mortalite değerlendirildi.

Bulgular: Toplam 20 hasta (11 erkek, 9 kadın) çalışmaya dahil edildi. Yaş ortalamaları 60 (41-80) idi. En fazla sağ hemikolektomi (%50) uygulandı. Üç hastada (%15) açığa dönüldü, 3 hastada (%15) yara yeri enfeksiyonu, 1 hastada (%5) yara yeri hematomu, 1 hastada (%5) ileus gelişti. Ortalama ameliyat süresi 172±31 dk ve hastanede yatış süresi 7 gündü (5-15). Toplam diseke edilen lenf nodu sayısı kadın hastalarda daha fazla saptandı (p=0,02). Ameliyat süresi ile hastanede yatış süresi arasında (p=0,016, r=0,532) ve tümör çapı ile oral gıda başlama zamanı arasında pozitif bir korelasyon olduğu saptandı (p=0,03, r=0,621). Anastomoz kaçağı ve erken dönem mortalite görülmedi.

Sonuç: Başta açığa dönüş oranımız olmak üzere komplikasyonlarımız ve onkolojik sonuçlarımız literatürle benzer bulunmuştur.

Anahtar Kelimeler: Laparoskopik kolorektal cerrahi, kolorektal kanser, deneyim

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Introduction

Colorectal cancer (CRC) is considered one of the leading causes of morbidity and cancer-related deaths nationally and worldwide. According to GLOBACAN 2018 data, approximately 10% of cancers are CRC. Approximately 1,800,000 new CRC cases are detected each year, and approximately 850,000 are estimated to result in death.[1]

In the early 1990s, laparoscopic colorectal surgery applications started. There are many significant advantages compared to open surgery, such as less hospitalization time, less perioperative blood loss, earlier postoperative recovery of the patient, better cosmetic results, less analgesic requirement, and faster return of the gastrointestinal system functions.[2] More importantly, it has no negative impact on oncological results. In a randomized controlled study published by the Japan Clinical Oncology Group in 2019, a total of 1,057 patients (laparoscopic 529, open 528) who underwent surgery for stage 2/3 colon cancer were evaluated, and no difference was found between 2 groups in terms of recurrence and overall survival.[3]

The laparoscopy learning curve is high in colorectal surgery, especially rectum cancer, which has a limited work area due to the narrow pelvis. In the international multicenter systematic analysis performed by Miskovic et al.[4], a total of 4,852 cases were evaluated in 7 studies, and it was shown that the learning curve was an average of 152 cases for translation, an average of 143 cases for complications, and 96 cases for operation time.

Although CRC mortality mainly depends on the disease stage, there has recently been a growing interest in the effects of hospital-related factors on outcomes after CRC resection.[5] In a study using the National Inpatient Sample (NIS) data in 2019, complication and mortality rates were lower in high-volume and urban hospitals in patients operated for CRC.[6] In our study, the surgeries were performed by surgeons who had laparoscopic surgery experience (n>500 laparoscopic cholecystectomy), participated in more than 50 surgeries as the first assistant with experienced surgeons, but were less experienced in laparoscopic colorectal surgery (n=10-15). They participated in laparoscopic colorectal surgery training courses organized by the Turkish Society of Colon and Rectal Surgery. In this study, we aimed to present the first cases with CRC in whom we performed laparoscopic surgery in our newly established hospital. Our primary goal is to determine our conversion rate from laparoscopic to open surgery and secondarily compare the duration of surgery, pathology results, duration of hospitalization, perioperative complications, and early mortality rates with the literature.

Materials and Methods

Patients

Patients who had laparoscopic surgery due to CRC in the General Surgery Clinic of Sancaktepe Şehit Prof. Dr. İlhan Varank Training and Research Hospital between 10 August 2018-1 November 2019 were included in the study. Patient files were scanned retrospectively for the data. Demographic features, diagnoses, tumor localization, type of surgery, duration of surgery, tumor diameter, total number of lymph nodes and metastatic lymph nodes dissected, stages, hospital stay, first postoperative bowel movement time, watery and normal food starting days to the patient, drainage catheter removal time, conversion from laparoscopic to open surgery, complications and early mortality were examined. Patients with laparoscopic surgery for palliative purposes were excluded from the study. The duration of hospital stay was defined as the period beginning with the patient's hospitalization and lasting until the day before the patient was discharged. The operation time was defined as the time from the first skin incision to the last skin suture. The conversion to open surgery was defined as laparoscopic incomplete dissection or laparotomy incision of 10 cm or above. All patients were evaluated at the oncology council at the outer center with preoperative and postoperative pathology results. All patients underwent colonoscopy in our clinic, and after the pathology was reported as malignant, intravenous (iv) contrast-enhanced (Optiray® 350) abdominal and thorax tomographies were performed for preoperative staging purposes. Also, iv contrast-enhanced (Magnevist®) pelvic MRI was performed in rectum tumors. Information about the operation was verbally explained to all patients, and written consent was obtained. Preoperative American Society of Anesthesiologists (ASA) scores were recorded. Liquid food and mechanical bowel cleansings (2 Phospho-Soda® 21.6 g +8.1 g/45 Ml and 2 Fleet Enema® 133 mL) were started the day before surgery. Low molecular weight heparin (LMWH) (Oksapar 4000 anti-Xa IU/0.4 mL subcutaneous injection) was performed for deep vein thrombosis (DVT) prophylaxis 8-10 hours before surgery.

Preparation for blood transfusion was done, antibiotic prophylaxis (2 g cefazolin iv) was performed half an hour before surgery, and patients wore medium pressure anti embolic socks on the morning of surgery. Possible stoma locations of patients with left colon and rectum tumors were marked before surgery. Antibiotic dose was repeated in patients whose operation time exceeded 4 hours. All patients were operated on by the same surgical team (G.B. and A.I.). It was planned to converse from laparoscopic to open surgery if oncological reliability was uncertain or surgical margins were suspicious. DVT prophylaxis was

performed in all patients during their stay beginning from the day of surgery, and DVT prophylaxis continued after discharge for one month. The patients were invited to the outpatient clinic control on the 10th day after discharge and when the pathology results were obtained (on average 3-4 weeks). Early complications that occurred in patients were recorded. The 8th edition of the American Joint Committee on Cancer (AJCC) was used for staging.

All the procedures applied to the subjects are under the Helsinki Declaration of 1964, and the healing principles published afterward, and the institutional ethics committee approval was not received because of the retrospective study. Written informed voluntary consent form was taken from all patients included in the study.

Operation Technique

Pneumoperitoneum was performed by applying 12-14 mmHg pressure using a Veress needle with carbon dioxide gas. A thirty-degree vision camera was used, and a 10 mm trocar (Ethicon® or Covidien®) was placed from the infra umbilical region for the camera port (in the right colon surgeries, the trocar was placed through the umbilicus junction on the midclavicular line). The ports, their numbers, and entry points varied depending on the procedure to be performed (Figure 1). In the first two right colonic tumors, the specimen was retrieved from the 5-cm incision above the umbilicus, and the anastomosis was made with linear staples extracorporeally. The staples opening was closed in double layers with 3/0 vicryl. In all other surgeries, the specimen was removed from the 5-6 cm Pfannenstiel incision. Wound dressing (Alexis® Wound Protector/Retractor) was used in all patients to retrieve the specimen. Laparoscopic procedures were routinely performed by proximal ligation of the blood vessels (inferior mesenteric artery for the left colon and rectum, ileocolic artery for the right colon) and medial to lateral dissection, and a total mesocolic or total mesorectal excision technique was applied. Fully mobilization of splenic flexure was performed for left colon and rectal resection. In tumors located in the right colon, side-by-side ileo-transverse anastomosis was performed intracorporeally with a laparoscopic stapler (Ethicon® or Covidien®), and the stapler opening was closed laparoscopically with a single layer of primary suture (The V-LocTM or 2/0 vicryl). For tumors in the left colon and rectum, the anvil was placed extracorporeally at the end of the colon graft, and the pneumoperitoneum was obtained, the 31-mm circular stapler (Covidien® 31 mm-4.8 mm) placed in the distal colon by the anal route and an end-to-end anastomosis was performed. The stapler rings were controlled. In rectum tumor surgeries, diverting loop ileostomy was used in the lower right quadrant. A silicone drainage catheter (Jackson-Pratt® 10 mm) was routinely placed in the abdomen in all patients.

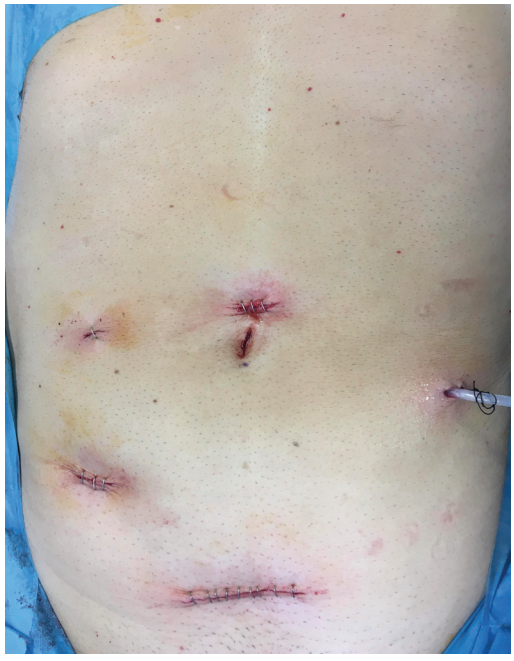

Figure 1. Post-operative image of a patient undergoing surgery due to a tumor located in the rectum

Statistical Analysis

The Shapiro-Wilk test was used to test for the normality of data. Normally distributed Numerical variables with normal distribution were shown as mean ± standard deviation (SD), ordinal data and numerical variables with extreme values or without normal distribution were shown as median (minimum-maximum). Pearson correlation analysis was used for data with normal distribution, and Spearman correlation analysis was used for ordinal data or data without normal distribution. Statistical analyzes were performed using SPSS package software (Version: 21.0) for Windows®. The data obtained were evaluated at a 95% confidence interval and a 5% significance level.

Results

Laparoscopic surgery was performed in 22 patients for CRC; two patients were operated for palliative purposes and were excluded from the study. A total of 20 patients were included in the study. Eleven (55%) were male, 9 (45%) were female, and the median age was 60 (41-80). Body mass index (BMI) average was 26±3 kg/m^2 (Table 1). Right hemicolectomy was the most common procedure (n=10, 50%) in this study. Two patients underwent simultaneous cholecystectomy for symptomatic cholecystolithiasis.

Preoperatively undetected small intestine invasions were detected at a distance of 20 cm and 110 cm from the Treitz ligament in one patient operated for a sigmoid colon

tumor. Laparoscopic anterior resection and en-block partial intestinal resection were performed, the specimen was removed from the incision above the umbilicus. Intestinal anastomosis was provided by linear staplers, and colorectal anastomosis was performed as previously described by obtaining pneumoperitoneum again. In the pathologic evaluation, invasion was detected in both small intestine segments removed as en-block, and the surgical margins were reported as negative (T4bN0). Regarding the T stage, pT3 was detected in 17 patients (85%), pT2 in 2 patients (10%), and pT4B in 1 patient (5%). In the pathologic examination of a patient who underwent extended right hemicolectomy due to a tumor located in the hepatic flexure, a second tumor focus (pT1) was detected 5 cm proximal to the primary tumor (pT3).

The average number of lymph nodes dissected was 29±12, and the total number of lymph nodes dissected in female patients was significantly higher than in male patients (p=0.02). Pathology results are shown in Table 2. Three patients had superficial wound infection at the Pfannenstiel incision line, and an empirical oral antibiotic (Augmentin-BID 1,000 mg PO) was initiated after a sample was taken for culture. There was no growth in the culture, and the patient was treated with dressing. In a patient using oral anticoagulants due to chronic atrial fibrillation (Coumadin 5 mg PO), a hematoma developed under the Pfannenstiel incision, and the hematoma was drained on the 5th postoperative day. A patient with a rectum tumor with a history of gastric ulcer who received neoadjuvant treatment [chemotherapy + radiotherapy (CRT)] had recurrent vomiting after surgery. A diagnostic laparoscopy showed that the small bowel was stuck to the anterior abdominal wall at 20 cm proximal to the diverting loop ileostomy. Complaints of the patient healed after laparoscopic bridectomy, and the patient was discharged.

The laparoscopic procedure was converted to open surgery in 3 patients (15%) (Table 3). The first patient was operated on because of a tumor located in the hepatic flexure. In the patient with suspected duodenum invasion, there was suspicion of the surgical margin, oncologically. The operation was terminated without a duodenal resection requiring a negative surgical margin due to seeing that the tumor adhered to the duodenum by desmoplastic reaction. The second patient with conversion was operated on due to the tumor located in the sigmoid colon. After the dissection during colon resection, a firing problem in laparoscopic stapler and laparoscopic procedure was converted to open surgery. Both these patients were reported as pT3N0, and no recurrence was detected in their follow-up after one year. The third patient was a distal rectum tumor who received neoadjuvant CRT. Laparoscopic resection can not be done because of the narrow pelvis. Anastomosis was completed laparoscopically by resecting with Pfannenstiel incision through a stapler (Covidien TA Auto Suture, 60 mm-4.8 mm). The drainage catheter was removed between 4-6 days after the first postoperative bowel movements depending on the incoming content and the patient's clinic (regardless of the amount received). A positive correlation was found between the duration of surgery and hospital stay (p=0.016, r=0.532) and between tumor diameter and onset time of oral

İTable 1. Clinical features of patients

	Mean ± SD **Median (minimum-maximum)**
Age (year)	60±11
BMI (kg/m^2)	26±3
Gender, n (%)	
Male	11 (55)
Female	9 (45)
ASA score, n	
I	7
II	11
III	2
Tumor localization, n, (%)	
Right colon	10 (50)
Left colon	8 (40)
Rectum	2 (10)

SD: Standard deviation

Table 2. Pathology results

	Mean ± SD **Median (minimum-maximum)**
Tumor diameter (cm)*, n	5±2
Total number of lymph nodes, n	29±12
Number of metastatic lymph nodes, n	0 (0-7)
TNM Staging (pathologic), n	
1	2
2A	8
2C	1
3B	7
3C	2

*The tumor diameter was based on the largest size of the tumor (e.g. if tumor size was 6.5x3 cm, the tumor diameter was defined as 6.5 cm)

Table 3. Peroperative characteristics and postoperative complications

	N	Treatment
Type of surgery, n, (%)		
Right hemicolectomy	10 (50)	
Anterior resection	4 (20)	
Low anterior resection	3 (15)	
Left hemicolectomy	3 (15)	
Complications		
Wound site infection	3	Medical
Wound site hematoma	1	Hemostasis
Ileus	1	Laparoscopic
Anastomosis leakage	0	Bridectomy
Conversion to open surgery	3	
Mortality (postoperative 30 days)	0	
Hospitalization (day)	7±3	
Duration of surgery (minute)	172±31	
First bowel movements and ileostomy working time (day)		
Flatus	2±0.7	
Feces	4±1	
İleostomy	1	
Time to start oral food (day)		
Watery food	1±0.8	
Normal food	4±0.8	

food intake (p=0.03, r=0.621). None of our patients had an anastomosis leak, and we had no early mortality.

Discussion

In our study, laparoscopic procedure was converted to open surgery in 3 (15%) patients. It was found that significantly more lymph nodes were harvested in female patients. It was found that there was a relationship between the prolongation of the operation time and the duration of hospital stay, and it was observed that the time to start oral intake was prolonged as the tumor size increased.

The conversion to open surgery depends on many factors. In a study on conversion rates in laparoscopic colorectal surgery, a total of 1,253 patients were evaluated. The conversion rate was determined as 10%, and BMI (>28.5 kg/m^2), ASA score (>3), resection type (left hemicolectomy and low anterior resection), surgeon's experience, and the presence of intraoperative abscess or fistula were found to be independent risk factors of conversion to open surgery.[7] In another study conducted by Masoomi et al.[8], a total of 207.311 patients were evaluated using the NIS database, and the conversion rate was determined as 16.6%, and the conversion rate was highest in patients with proctectomy surgery. It was reported that the complication and mortality rates were higher in patients with conversion to open surgery.[8] In our study, the only complication requiring reoperation occurred in a patient with conversion, as described.

In CRC surgery, it is recommended to remove a minimum of 12 lymph nodes in terms of correct staging and good prognosis.[9] In particular, it has been reported in studies that the number of lymph nodes removed in stage 2 (T3N0) disease directly affects oncological results.[10,11,12] The relationship between gender and the number of lymph nodes removed is not clear. Studies show no difference between the genders in terms of the number of lymph nodes removed.[13,14] In contrast, in a study by Orsenigo et al.[15] in 2019, 2,319 patients with colorectal surgery were evaluated, and the number of lymph nodes removed was higher in women (p=0.02). A minimum of 14 lymph nodes (14-61)

were harvested in our study, and significantly more lymph nodes were excised in female patients.

Bleeding, ureteral injury, adhesion, intestinal obstruction, and particularly anastomosis leakage are the most common complications, and reoperation may be required. In a systematic review made by Chang et al.[16], a total of 11 studies were examined, and the most common complication requiring reoperation was anastomotic leakage. In patients who develop complications following initial laparoscopic colorectal resection, laparotomy will lose the benefits of laparoscopic surgery. Laparoscopic intervention in these patients may potentially preserve initial benefits. In our study, an early adhesion ileus developed in one patient. It was managed laparoscopically, and the patient was discharged without a problem. In T4 tumors, mostly if they are fixed or adjacent organ invasion, laparoscopic approach can be difficult, so T4 tumor is one reason that increases the rate of conversion to open surgery.[17] In such locally advanced tumors, more extensive surgical procedures are required, including en-block resection of the infiltrated organ.

In the CLASSIC study, the main reason for conversion was found to be fixed tumors with a frequency of 41%.[18] In another study conducted by Bretagnol et al.[19], the results of laparoscopic surgery in T4 tumors were evaluated, and the rate of conversion to open surgery was determined as 18%. Also, it has been emphasized that the results of the laparoscopic approach in locally advanced tumors are similar to open surgery oncologically, and the laparoscopic approach should not constitute a contraindication in locally advanced tumors.[19] In our study, simultaneous small bowel invasion was detected in a patient with sigmoid colon tumor, and en-block resection was done laparoscopically, as described. Publications are stating that the average operation time is 180 minutes (60-430 minutes) during the learning phase.[20] In our study, we found our average operation time as 172±31 minutes. We found that our operation time decreased after the first ten patients, although it was not statistically significant.

After abdominal and pelvic cancer surgery, DVT risk increases two-fold, and PE risk increases three-fold.[21] In randomized controlled studies, prolonged prophylaxis (4 weeks) has been shown to reduce the risk of venous thromboembolism (VTE), and similarly, administration of LMWH for four weeks is recommended in the ACCP guideline.[22,23,24,25] Prophylaxis was applied to our patients for one month, and no bleeding or VTE was detected clinically.

In the study by Nijhof et al.[26] performed in patients undergoing laparoscopic colorectal surgery in 2017; 523 patients were evaluated. Experienced surgeons and supervised trained surgeons were compared, and no difference was found between them in terms of patient safety and short-term results.[26]

Our surgery volume in about 15 months, we observed that 60% of the surgeries were performed in last 3-month period and our rate, which was one every 2-3 weeks, increased to once a week. We anticipate that our results will be better as our experience increases.

Study Limitations

The small number of patients and the study's retrospective design were the main limitations of the study. In contrast, complete patient follow-ups and data were the strengths of the study.

Conclusion

We determined that our conversion rate was the primary goal of our study, and our secondary results, such as complications and oncological results, were similar to the literature. We think that laparoscopic colorectal surgery can be performed in newly opened hospitals with sufficient equipment, provided to patient health and oncological principles.

Ethics

Ethics Committee Approval: The institutional ethics committee approval was not received because of the retrospective study.

Informed Consent: Informed voluntary consent form was taken from all patients included in the study.

Peer-review: Internally peer reviewed.

Authorship Contributions

Surgical and Medical Practices: B.G., İ.F.A., Concept: B.G., İ.H.Ö., E.O., Design: B.G., İ.H.Ö., E.O., Data Collection or Processing: B.G., İ.H.Ö., Analysis or Interpretation: B.G., E.O., Literature Search: B.G., İ.F.A., E.O., Writing: B.G., İ.F.A., E.O.

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

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RESEARCH ARTICLE

Analysis of the Factors Affecting Recurrence and Postoperative Incontinence after Surgical Treatment of Anal Fistula: A Retrospective Cohort Study

Anal Fistülün Cerrahi Tedavisi Sonrası Nüks ve Postoperatif İnkontinansı Etkileyen Faktörlerin Analizi: Retrospektif Bir Kohort Çalışması

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ABSTRACT

Aim: Surgical treatment of anal fistula in association with the high rates of recurrence and faecal incontinence is a problematic issue. The complexity of this disease and the diversity of available surgical techniques are the essential factors affecting the outcomes of the treatment. We aimed to assess the rates of recurrence and faecal incontinence as well as the risk factors that affect these outcomes among patients in a single institution.

Method: All consecutive patients with cryptoglandular anal fistula who underwent anal fistulotomy or seton placement were retrospectively evaluated during January 2016 and December 2019. The demographic and clinical features, including the Parks' and St. James' classifications, the number of surgical procedures, recurrence of fistula and the development and type of faecal incontinence based on the Wexner's score were evaluated. The recurrence and postoperative incontinence were considered as the primary outcomes of this study.

Results: A total of 98 patients of mean age 45.9±13.4 years (male to female ratio: 2.92) were enrolled in this study. Fistulotomy and seton placement were performed in 53 (54.1%) and 45 patients (45.9%), respectively. There were a total of 9 recurrences (9.2%). The age of the patients with recurrence was significantly lower (p=0.044). Postoperative incontinence developed in 11 patients (11.2%). No permanent solid or flatus type of incontinence was noted. No significant impact of the demographic and clinical variables on the development of recurrence and incontinence was noted (p>0.05 for all). For patients with fistulotomy (n=53) and seton placement (n=45), five and 67 extra surgical procedures, respectively, were involved. During the median follow-up time of 33 months, the healing rates after fistulotomy and seton placement were 100%.

Conclusion: The recurrence and postoperative incontinence were not influenced by patient, surgery and fistula-related factors. It is therefore feasible to treat anal fistula by using different surgical approaches with acceptable rates of recurrence and incontinence. In fact, a staged surgical approach including serial seton placements followed by fistulotomy may be a reliable technique in appropriate patients.

Keywords: Anal fistula, recurrence, faecal incontinence, surgery

ÖZ

Amaç: Anal fistülün cerrahi tedavisi yüksek nüks oranları ve fekal inkontinans nedeniyle sorunlu bir konudur. Hastalığın karmaşıklığı ve cerrahi tekniklerin çeşitliliği, tedavinin sonuçlarını etkileyen temel faktörlerdir. Tek kuruma ait nüks ve dışkı inkontinansı oranlarını ve bu sonuçları etkileyen risk faktörlerini değerlendirmeyi amaçladık.

Yöntem: Ocak 2016 ile Aralık 2019 tarihleri arasında anal fistülotomi veya seton uygulaması yapılan kriptoglandüler anal fistülü olan ardışık tüm hastalar retrospektif olarak değerlendirildi. Parks' ve St James' sınıflandırmaları, cerrahi prosedürlerin sayısı, fistül nüksü ve Wexner skoruna göre fekal inkontinans gelişimi ve tipi dahil olmak üzere demografik ve klinik özellikler değerlendirildi. Nüks ve postoperatif inkontinans çalışmanın birincil çıkarım noktalarıydı.

Bulgular: Bu çalışmada yaş ortalaması 45,9±13,4 olan (erkeklerin kadınlara oranı 2,92) 98 hasta mevcuttu. Fistülotomi ve seton uygulaması yapılan hasta sayıları sırasıyla 53 (%54,1) ve 45 (%45,9) idi. Dokuz hastada nüks vardı (%9,2). Rekürrens gelişen hastaların yaşı anlamlı olacak şekilde daha düşüktü (p=0,044). Ameliyat sonrası 11 hastada (%11,2) inkontinans gelişti. Kalıcı katı veya gaz tipi inkontinans tespit edilmedi. Demografik ve klinik değişkenlerin nüks ve inkontinans gelişimi üzerine anlamlı bir etkisi yoktu (bütün parametreler için p>0,05). Fistülotomi (n=53) ve seton yerleştirme (n=45) uygulanan hastalarda sırasıyla beş ve 67 ekstra cerrahi prosedür uygulandığı görüldü. Otuz üç aylık medyan takip süresinde fistülotomi ve seton yerleşimi sonrası iyileşme oranları %100 idi.

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Sonuç: Rekürrens ve postoperatif inkontinans gelişiminin hasta, cerrahi teknik ve fistül ile ilişkili faktörlerden etkilenmediği görüldü. Kabul edilebilir nüks ve inkontinans oranlarıyla farklı cerrahi yaklaşımlar kullanarak anal fistülü tedavi etmek mümkündür. Seri seton uygulamalarını içeren aşamalı cerrahi yaklaşım ve ardından fistülotomi uygun hastalarda güvenilir bir teknik olabilir.
Anahtar Kelimeler: Anal fistül, rekürrens, fekal inkontinans, cerrahi

Introduction

An anal fistula is defined as an abnormal connection between the anorectum and anal epithelium.[1] Besides their important clinical manifestations such as the local pain, purulent discharge and incontinence, the treatment of anal fistula remains a challenging one.[1,2] The eradication of the fistula tract without the development of recurrence and preservation of the anal sphincter function has been regarded as the goal of the surgical treatment of anal fistula.[3] However, the high rates of recurrence and faecal incontinence remain a significant problem in association with its surgical treatment.[4]

Different classification systems of anal fistula have been used for decision making to determine the best possible surgical approach.[5] The Park's system as intersphincteric, transsphincteric, suprasphincteric and extrasphincteric or a simpler classification as low or high in relation to the dentate line has been proposed.[5] In addition, it can be broadly classified into simple and complex fistulas.[6] The type of surgical treatment demonstrates great variability, depending on the type of anal fistula.[3] While a lay-open fistulotomy technique can be employed for intersphincteric or simple/low transsphincteric anal fistulas, the seton placement method or staged surgeries with extensive or conservative approaches are the techniques selected for complex anal fistulas, including high transsphincteric, suprasphincteric, extrasphincteric and recurrent fistulas.[3,7,8,9,10] For select cases, the use of serial setons and interval muscle-cutting fistulotomy has been used to treat complex or recurrent anal fistulas.[3] However, a clear advantage of one of the technique has not been shown on the healing rate or faecal incontinence.[10]

Previous studies have reported success rates of 35%-100%. In these studies, significant variations were noted in the rates of faecal incontinence from 0% to 62%, depending on the type of fistula and the operation conducted.[5,11] The complexity of the disease and the diversity of surgical techniques has been postulated as the underlying reasons for such differences.[5] Therefore, the optimisation of the outcomes for each surgical technique may be an essential step for the establishment of surgical treatment recommendations.

The aim of this study was to assess the outcomes of surgical techniques for anal fistula with due consideration to the rates of recurrence and faecal incontinence as well as the risk factors affecting the outcomes in a single institution.

Materials and Methods

Study

This study was a retrospective analysis of all patients who underwent surgical treatment for anal fistula at a tertiary medical centre (university hospital) between January 2016 and December 2019. The study was performed in accordance with the principles of the Declaration of Helsinki. The local ethical committee approved the study (Ethical Committee for Clinical Studies, Karadeniz Techinical University, Faculty of Medicine, 21.01.2015/2020-138). The requirement for written consent from the patients was waived by the local ethical committee due to the retrospective design of the study and the assurance of data anonymity.

Patients

A total of 116 consecutive patients with cryptoglandular anal fistula were evaluated. The patients with chronic inflammatory bowel disease (n=7), coexisting rectal and anal cancer (n=2), the development of any type of cancer on the fistulous tracts (n=2) and incomplete follow-up data (n=7) were excluded. Finally, 98 patients with anal fistula were included in the study.

In all patients, preoperative magnetic resonance imaging was performed and analysed by an experienced radiologist and the surgical team together. The Wexner score of 0-20 was applied for preoperative and postoperative assessment of incontinence.[11,12] Higher scores indicate a higher level of incontinence and vice versa.

The fistulas were classified in accordance with the Parks' and St. James' classification systems.[7] The fistulas with Grade I for Parks and Grades I-II for St. James' classifications were regarded as simple fistulas. Higher grades (Parks II-IV and St. James III-V) were considered as complex fistulas.

Operative Technique

The operations were performed for anal fistulotomy, loose seton placement, mucosal advancement flap and drainage of any type of anal abscess when detected. All operations were performed by a member of the specialised colorectal surgical team of the hospital. The type and sequence of the surgical treatment were determined based on the discretion

of the attending surgeon. As an institutional policy, either fistulotomy or seton placement was performed as the initial surgical treatment based on the type of fistula.

Surgical Technique

The patients were placed in the prone jack-knife position and subjected to general or spinal anaesthesia. The external and internal openings of the fistula were determined after digital and rectoscopic examinations. Standard fistula probes were used to identify the tract/s. In suspicious cases in which the internal openings were obscure, hydrogen peroxide was injected from the external opening to observe bubbles at the origin of the fistula tract as the internal opening. The skin and subcutaneous tissues starting from the external opening to the nearest point of the muscles of the external sphincter were incised by cauterisation. In case of an abscess or horseshoe extensions, drainage was performed by using a mushroom catheter.

Following the delineation of the fistula tract/s, the mucosa, internal sphincter, involved external sphincter (if it was less than one-third) and the skin between the internal and external openings was cut to perform lay-open anal fistulotomy for the fistulas involving less than one-third area of the external sphincter. This assessment was performed via palpation of the sphincter complex after putting the probe under anaesthesia just before the surgery. In the presence of multiple external openings in the same anal quadrant, the tracts were merged with fistulotomy. More than one fistulotomy was performed for the fistulas with the external openings located at different quadrants. In patients with the fistulas involving more than one-third area of the external sphincter or high/complex types, loose seton placement was performed by using a 2.0 silk thread. All patients were discharged the day after the operation.

Follow-up Studies

After the discharge of the patients, out-patient follow-up examinations were performed every 2 weeks. In each examination, the status of wound healing and continence, the position of the seton and abscess formation were recorded. The Wexner score was used to assess the postoperative continence status of the patients.

In patients with seton placement, a second surgery was planned in the postoperative 8 weeks. For the fistulas in which the involvement of the external sphincter was regarded to be less than one-third and no abscess was detected, fistulotomy was performed. In other situations, a second seton was replaced. In the case of non-healing, consecutive anal explorations to perform fistulotomy, serial seton placement or mucosal advancement flap procedures depending on the intraoperative findings were performed.

Face-to-face or telephonic interviews were performed for the final evaluation of the recurrence and continence status at 3-month intervals.

The demographic (age and sex) and clinical data of the patients were collected from the hospital information system. The number and place of fistulous tracts and openings, the type of fistula based on the preoperative magnetic resonance imaging, operative variables, the number of surgical procedures, complications, postoperative healing time following seton placement, recurrence of fistula and the development and type of faecal incontinence were evaluated.

Statistical Analysis

The primary outcomes were recurrence of anal fistula and any change in the status of postoperative continence for flatus, liquid and formed stool in accordance with the Wexner score.

The recurrence/failure was defined as recurring/persisting fistula in the same region during the follow-up period. The development of a new fistula at a different localisation at the anal region was not considered as a case of recurrence.

Statistical analysis was performed using a commercially available statistical software package (SPSS Inc., Chicago, IL). The Shapiro-Wilk test was applied to determine the normal distribution of continuous variables. The mean ± standard deviation and/or median (range) were used to express the continuous variables with and without normal distribution, respectively. The categorical variables were expressed as frequencies and percentages. The Pearson's chi-square and/or Fisher's exact tests were used for categorical variables. The Mann-Whitney U test was applied to compare continuous variables without normal distribution. One-way analysis of variance and Wilcoxon Signed Rank tests was used for the comparison of continuous variables with normal distribution. $P<0.05$ was considered to be statistically significant.

Results

The mean age of the patients was 45.9±13.4 years, with a male to female ratio of 2.92. A total of 18 patients (18.4%) underwent anorectal surgery for anal fistula prior to the index admission.

Preoperative imaging revealed presence of coexisting active anal abscess in 30 patients (30.6%). Based on the Parks' classification, intersphincteric type was the most common type noted in 55 patients (56.1%). St. James Grade 1 anal fistula was detected in 44 patients (44.9%). Considering the Parks' and St. James' classifications, a total of 52 (53.1%) and 46 patients (46.9%) with simple and complex anal fistula, respectively, were recorded. The demographic and clinical features of the patients are detailed in Table 1.

A total of 53 patients (54.1%) underwent fistulotomy as the initial surgery, whereas seton placement was performed in 45 patients (45.9%).

During the median follow-up time of 33 months, there were nine recurrences (9.2%) in the study group (Table 2), with five (9.4%) and four recurrences (8.9%) in the fistulotomy and primary seton placement groups, respectively. The median time interval for the development of recurrences was 8 months (range: 4-12). The age of the patients with recurrence was significantly lower than that of the patients without recurrences (p=0.044). No significant impact of the variables, including the type of fistula and surgery, was noted on the development of recurrence (p>0.05 for all). The second fistulotomy was performed for patients who experienced recurrence after fistulotomy (n=5) and were fully cured. Thus, the healing rate after fistulotomy was 100% in the present study.

In 11 patients (11.2%), a significant increase in the postoperative Wexner score was detected (p = 0.033) (Table 3). The average Wexner score increased from 0.02±0.142 to 0.29±1.14. There was no permanent solid or flatus type of incontinence. In 89 patients (90.8%), the postoperative Wexner score was 0. Although the median postoperative Wexner score in patients who reported an increase in their Wexner scores was 1, the scores of 3, 3, 5 and 9 were detected in four patients. The clinical features of the incontinence are summarised in Table 4. The incontinence to flatus was reported more commonly. The demographic and clinical features did not increase the risk of postoperative incontinence (p>0.05 for all; Table 5).

In patients with primary seton placement (n=45), outwards displacement of seton with complete healing was recorded in nine patients (Table 6). During the second exploration, serial seton placement was performed in 23 patients. In 11 and two patients, fistulotomy and flap procedures were, respectively, performed. There were four recurrences, three in the re-seton placement group and one in the fistulotomy group, respectively. The second seton placement was

Table 1. Demographic and clinical features of the study group (n=98)

Variable		Value
Age (year)†		45.9±13.4
Sex‡	Female	25 (25.5)
	Male	73 (74.5)
Recurrent fistula‡	Yes	18 (18.4)
Coexisting abscess‡	Yes	30 (30.6)
Type of fistula‡	Simple	52 (53.1)
	Complex	46 (46.9)
Number of tracks‡	Single	93 (94.9)
	Multiple	5 (5.1)
Parks classification‡	Intersphincteric	55 (56.1)
	Transsphincteric	36 (36.7)
	Suprasphincteric	7 (7.1)
St James's classification‡	Grade 1 (simple linear intersphincteric)	44 (44.9)
	Grade 2 (intersphincteric with abscess or secondary tract)	11 (11.2)
	Grade 3 (transsphincteric)	19 (19.4)
	Grade 4 (transsphincteric with abscess or secondary tract within the ischiorectal fossa)	16 (16.3)
	Grade 5 (supralevator and translevator extension)	8 (8.2)
Type or surgery‡	Fistulotomy	53 (54.1)
	Seton	45 (45.9)
Follow-up interval (months)§		21 (13-33)

†: Mean ± standard deviation, ‡: n (%), §: Mean (range)

Table 2. Association of demographic and clinical features of the patients with and without recurrence

Variable		With recurrence (n=9)	Without recurrence (n=89)	p
Age (year)†		37.3±9.6	46.7±13.8	0.044
Sex‡	Female	1 (11.1)	24 (27.0)	0.441
	Male	8 (88.9)	65 (73.0)	
Previous fistula surgery‡	Yes	1 (11.1)	17 (19.1)	1.0
	No	8 (88.9)	72 (80.9)	
Coexisting abscess‡	Yes	3 (33.3)	27 (30.3)	1.0
	No	6 (66.7)	62 (69.7)	
Type of fistula‡	Simple	5 (55.6)	47 (52.8)	1.0
	Complex	4 (44.4)	42 (47.2)	
Number of tracts‡	Single	9 (100)	84 (94.4)	1.0
	Multiple	0 (0)	5 (5.6)	
Parks classification‡	Intersphincteric	5 (55.6)	50 (56.2)	0.648
	Transsphincteric	4 (44.4)	32 (36.0)	
	Suprasphincteric	0 (0)	7 (7.9)	
St James's classification‡	Grade 1	3 (33.3)	41 (46.1)	0.658
	Grade 2	2 (22.2)	9 (10.1)	
	Grade 3	2 (22.2)	17 (19.1)	
	Grade 4	2 (22.2)	14 (15.7)	
	Grade 5	0 (0)	8 (9.0)	
Type or surgery‡	Fistulotomy	5 (55.6)	48 (53.9)	1.0
	Seton	4 (44.4)	41 (46.1)	

†: Mean ± standard deviation, ‡: n (%)

Table 3. Changes in the preoperative and postoperative Wexner scores of the patients

Variable	Preoperative	Postoperative	p
Wexner score†,§	0.02±0.142/0 (0-1)	0.29±1.14/0 (0-9)	0.003

†: Mean ± standard deviation, §: Median (range)

Table 4. Details of the postoperative incontinence (n=11) following surgical treatment of anal fistula based on the Wexner score

	Frequency				
Type of incontinence	Never	Rarely	Sometimes	Usually	Always
Solid	0	0	0	0	0
Liquid	0	1	1	1	0
Flatus	0	7	2	1	0
Wears pad	0	0	0	2	0
Lifestyle alterations	0	0	1	1	0

Never: No episode in the past 4 weeks; rarely, 1 episode in the past 4 weeks; sometimes: >1 episode in the past 4 weeks, but <1 a week; usually1 or more episodes a week but <1 a day; always: 1 or more episodes a day

Table 5. Association of demographic and clinical features of the patients with and without postoperative incontinence

Variable		With incontinence (n=11)	Without incontinence (n=87)	p
Age (year) †		43.4±12.8	46.2±13.5	0.528
Sex‡	Female	1 (9.1)	24 (27.6)	0.280
	Male	10 (90.9)	63 (72.4)	
Previous fistula surgery‡	Yes	7 (63.6)	73 (83.9)	0.114
	No	4 (36.4)	14 (16.1)	
Coexisting abscess‡	Yes	5 (45.5)	25 (28.7)	0.304
	No	6 (54.5)	62 (71.3)	
Type of fistula‡	Simple	4 (36.4)	48 (55.2)	0.339
	Complex	7 (63.6)	39 (44.8)	
Number of tracts‡	Single	11 (100)	82 (94.3)	1.0
	Multiple	0 (0)	5 (5.7)	
Parks classification‡	Intersphincteric	5 (45.5)	50 (57.5)	0.751
	Transsphincteric	5 (45.5)	31 (35.6)	
	Suprasphincteric	1 (9.1)	6 (6.98)	
St James's classification‡	Grade 1	4 (36.4)	40 (46.0)	0.881
	Grade 2	1 (9.1)	10 (11.5)	
	Grade 3	2 (18.2)	17 (19.5)	
	Grade 4	3 (27.3)	13 (14.9)	
	Grade 5	1 (9.1)	7 (8.0)	
Type of surgery‡	Fistulotomy	5 (45.5)	48 (55.2)	0.750
	Seton	6 (54.5)	39 (44.3)	
Recurrence‡	Yes	3 (27.3)	6 (6.9)	0.061
	No	8 (72.7)	81 (93.1)	

†: Mean ± standard deviation, ‡: n (%)

performed for patients who had recurrence and were fully cured. Thus, the healing rate after seton placement was 100% in the present study.

In patients with primary seton placement (n=45), the mean number of seton insertions was 1.5 (range: 1-3). The mean time for the removal of seton was 13.7 weeks (range: 5-30 weeks). A total of 67 extra surgical procedures were performed in the seton placement group, whereas five re-fistulotomy operations were performed in the fistulotomy group (Figure 1). In the seton placement group, re-seton placement (n=33) and fistulotomy (n=30) were the most common procedures conducted. Fistulotomy was repeated in five patients in the fistulotomy group.

Thrombosed haemorrhoids and postoperative bleeding, which were treated conservatively, developed in two and one patient, respectively. The mean healing time was significantly longer in the seton placement and rectal advancement flap procedure subgroups as 17.5±5.4 weeks and 21.0±1.4 weeks, respectively, when compared with 7.1±1.5 weeks and 9.9±3.2 weeks in the outward displacement and fistulotomy groups, respectively (p<0.001).

Discussion

In this study, we have reported the long-term outcomes of the surgical treatment of anal fistula in terms of the rates of recurrence and incontinence. Fistulotomy and seton placement were performed in 53 (54.1%) and 45 patients (45.9%), respectively. The rates of recurrence and incontinence were 9.2% and 11.2%, respectively. The patient, surgery and fistula-related factors were not found to be significantly associated with the development of recurrence and postoperative incontinence in the present study. All fistulas were healed at a median follow-up time of 33 months. In the fistulotomy group, five extra procedures

Table 6. Demographic and clinical features and postoperative outcomes of the patients who underwent primary seton placement (n=45)

Variable		Type of surgery following seton placement			
		Spontaneous removal (n=9)	Re-seton (n=23)	Flap procedure (n=2)	Fistulotomy (n=11)
Age (year)†		45.0±14.8	44.2±14.9	51.5±6.4	44.9±10.7
Sex‡	Female	4 (44.4)	7 (30.4)	0 (0)	3 (27.3)
	Male	5 (55.6)	16 (69.6)	2 (100)	8 (72.7)
Previous fistula surgery‡		3 (33.3)	6 (26.1)	2 (100)	5 (45.5)
Coexisting abscess‡	Yes	3 (33.3)	14 (60.9)	1 (50)	4 (36.4)
Number of tracts‡	Single	8 (88.9)	21 (91.3)	2 (100)	9 (81.8)
	Multiple	1 (11.1)	2 (8.7)	0 (0)	2 (18.2)
Type of fistula‡	Simple	0 (0)	0 (0)	0 (0)	1 (9.1)
	Complex	9 (100)	23 (100)	2 (100)	10
Parks classification‡	Intersphincteric	3 (33.3)	0 (0)	0 (0)	1 (9.1)
	Transsphincteric	6 (66.7)	18 (78.3)	0 (0)	10
	Suprasphincteric	0 (0)	5 (21.7)	2 (100)	0
St James's classification‡	Grade 1	3 (33.3)	0 (0)	0 (0)	1 (9.1)
	Grade 2	0 (0)	0 (0)	0 (0)	0 (0)
	Grade 3	6 (66.7)	5 (21.7)	0 (0)	7 (63.6)
	Grade 4	0 (0)	12 (52.2)	0 (0)	3 (27.3)
	Grade 5	0 (0)	6 (26.1)	2 (100)	0 (0)
Recurrence‡		0 (0)	3 (13.0)	0 (0)	1 (9.1)
Postoperative incontinence‡		0 (0)	6 (26.1)	0 (0)	0 (0)
Healing time (month)†		7.1±1.5	17.5±5.4	21.0±1.4	9.9±3.2

†: Mean ± standard deviation, ‡: n (%)

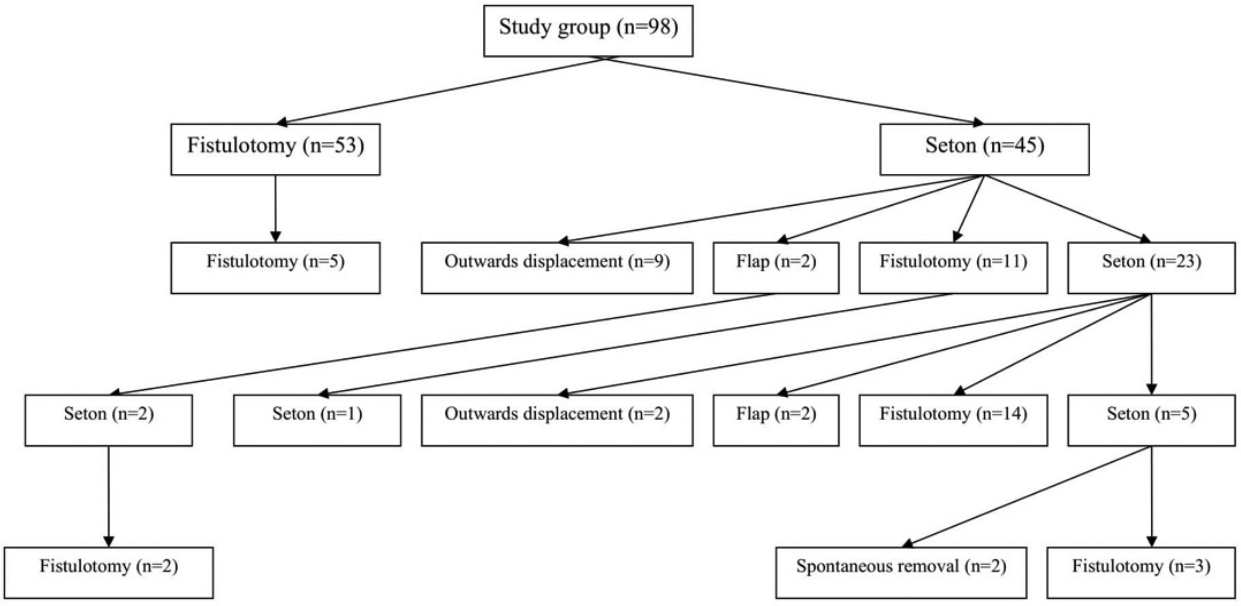

Figure 1. Schematic representation of the study groups

were performed, while a total of 67 extra surgical procedures were performed in the seton placement group.

The reduced recurrence rates and safeguarding of the sphincter muscles have been regarded as the major measurements for the success of anal fistula surgery.[3,5] The recurrence rates after anal fistula surgery has been reported to be 2.5% to 57.1% depending on the type of fistula and the surgical techniques used as well as the duration of follow-up time.[5] Meta-analyses and large-scale studies revealed that high transsphincteric fistula with/without supralevator extension, unidentified internal opening, the presence of a horseshoe-formed abscess, more than one fistula tracts, anterior fistula, seton placement surgery and prior anal surgery are the significant risk factors for recurrence.[13,14] It has also been mentioned that true incidence rates become more evident after longer follow-up periods.[5] Although our median follow-up time (33 months) can be regarded as sufficient to evaluate the true incidence rate, we could not find any significant associations between the demographic and clinical factors, except for the age of the patients and the recurrence, in the present study. Although the age of the patients with recurrence was significantly lower, no plausible explanation for this result seems concrete. The inclusion of all types of fistula and different surgical techniques may yield insignificant findings. In addition, the number of patients in each subgroup may be regarded as insufficient to conduct any statistical analysis. Therefore, large-scale studies are needed to evaluate the risk factors for recurrence following anal fistula surgery.

As per past studies, the rates of recurrence and incontinence vary widely depending on the type of fistula and the surgical procedures used. In Andreou's study[5], the reported recurrence rate following fistulotomy is 12%. The authors speculated that the presence of high fistula in almost one-third of the patients led to such a high rate. In Gang's study[7], seven recurrences (2%) fully cured after re-fistulotomy were recorded. Most of the fistulas (63.7%) treated via fistulotomy were simple. We also performed the fistulotomy technique more frequently for the intersphincteric type of anal fistulas, with five recurrences (9.4%), all of which healed after re-fistulotomy. Although there was no significant impact of the type of fistula defined as both Parks and St. James classification on the development of recurrence in our study, we believe that a preoperative, accurate detection of the type of fistula may be more helpful to tailor the optimum treatment modality, considering the higher recurrence rates after fistulotomy specifically performed for high anal fistula.

The variable recurrence rates of up to 22% after seton-based surgeries have been reported.[13] In studies using loose or draining setons for anal fistula, the authors reported recurrence rates of approximately 10%.[3,8,15] In the present study, the recurrence rate in the seton placement group was found to be 8.9%. Our rates were believed to be comparable with those of previously reported studies. However, it should be considered that the recurrence rates following seton placement may be related to the type of seton material, insufficient drainage from the internal fistula hole and the discharge from the external fistula hole.[8]

A combination of fistulectomy or fistulotomy and pulling seton was employed for treating high-type anal fistula.[16,17] In studies using combined approaches, 5%-17.2% of the patients developed recurrence of the fistula. Considering these variables recurrence rates in the studies using different surgical approaches, it is evident that there should be several confounding demographic, clinical and operative variables. Therefore, it is difficult to compare the outcomes of different studies to determine the ideal surgical approach for anal fistula.

The incontinence rates varying from 3.2% to 25.2% have been reported after seton-based surgeries.[13,17,18] For instance, Izadpanah et al.[17] reported 3% of transient flatus type of incontinence after fistulectomy with pulling seton for transsphincteric and suprasphincteric type of fistulas. The authors speculated that minimal damage to external anal sphincter via intermittent pressure on the fistulous tracts is the major reason for the low rate of faecal incontinence in their techniques. A faecal incontinence rate of 3.2% was reported in a study using fistulotomy and loose seton placement for high transsphincteric fistulas.[13] Cutting seton was used as an alternative surgical approach for high anal fistulas with controversial outcomes.[5,19,20] Raslan et al.[19] reported a recurrence rate of 9.8%, and the distribution to incontinence to flatus was similar to that in the present study. However, as we used a loose seton approach, we cannot compare the results obtained with the two seton techniques.

Serial seton placement followed by fistulotomy is another approach that is used for treating complex fistulas. The technical details have been described by Wang et al.[3] The authors recommended timely postoperative examinations at 2-3-week intervals so as to avoid the premature healing of the openings. At the final stage, they performed fistulotomy with marsupialisation of the wound edges. No faecal incontinence was reported in their study. We used a similar approach in our study. In almost half of the patients in the seton placement group, re-seton placement (with a second seton) was performed. In five patients, we replaced the second setons with a third one. After the serial seton placements, fistulotomy was performed as the final procedure in most of the cases. Considering the results obtained, such a staged approach may be considered for application in select cases.

In the present study, extra surgical procedures were required

in patients with seton placement. A total of 67 re-operations were performed in 45 patients with primary seton placement. In addition, the mean number of seton insertions was 1.5, in accordance with the results of the Wang's study.[3] Due to the fact that the ideal surgical technique is not known yet, information about the patients on the re-operations during the healing time and in case of recurrences should be performed.

The measurement of postoperative incontinence can be performed using several patient-reported outcome scales or an objective examination, such as anal manometry or endoanal ultrasonography.[5] Although non-weighted scales such as the Wexner score or the Cleveland Clinic Faecal Incontinence Severity Index can be highly subjective, comparison of the preoperative and postoperative scores reflect the overall faecal incontinence status of the patients and their quality of life.[5,21] Moreover, reporting or collection bias by the surgeons who act as the primary assessors and an assiduous data collection were also questioned.[21] However, we collected data pre- and postoperatively and detected a significant decrease between the postoperative and preoperative Wexner scores.

The retrospective nature of this single-institution study was inherently associated with the risk of selection bias, which can be considered as considered was regarded as the main limitation. We compared two main surgical techniques that were performed as the primary surgical approach, whereas the inclusion of all types of fistulas was another important factor studied. Furthermore, as per the institutional policy, we did not use minimally invasive, alternative sphincter-saving procedures including fibrin glue, anal fistula plug and laser closure of anal fistula (FiLaC) for the treatment of anal fistula. The limited number of patients with each specific type of fistula and the subgroups following seton placement prevented the detailed analysis for each subset. Although all operations were performed by a member of our specialised coloproctology unit, we did not apply a predetermined standard algorithm for all patients. However, the presence of both preoperative and postoperative Wexner scores for the evaluation of faecal incontinence status of the patients and the longer follow-up period were the main strengths of the study.

Conclusion

In conclusion, patient, surgery and fistula-related factors were not significantly associated with the development of recurrence and postoperative incontinence following surgical treatment of anal fistula. However, we demonstrated that it can be possible to treat anal fistula by using different surgical approaches with acceptable rates of recurrence and incontinence. A staged surgical approach involving serial seton placements, followed by fistulotomy, may thus be a reliable technique for patients with complex fistulas. However, the ideal surgical approach continues to remain an obscure issue that necessitates large-scale prospective studies.

Ethics

Ethics Committee Approval: The local ethical committee approved the study (Ethical Committee for Clinical Studies, Karadeniz Techinical University, Faculty of Medicine, 21.01.2015/2020-138).

Informed Consent: The requirement for written consent from the patients was waived by the local ethical committee due to the retrospective design of the study and the assurance of data anonymity.

Peer-review: Externally and internally peer reviewed.

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RESEARCH ARTICLE

Effectiveness of Stenting as Bridge to Surgery in Left Sided Malignant Obstructions; Single Center Results

Sol Taraflı Malign Obstrüksiyonlarda Köprüleme Tedavisi Olarak Stent Yerleştirmenin Etkinliği; Tek Merkez Analiz Sonuçları

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ABSTRACT

Aim: Intestinal obstruction due to colorectal cancer should be urgently decompressed due to high morbidity. Its treatment includes palliative interventions, emergency laparotomy and bridge to surgery. In this study, we aimed to evaluate the effects of stenting on surgical and oncological outcomes by comparing it with the emergency surgery.

Method: Patients admitted between January 2019 and February 2020 due to acute malignant left-sided colon obstruction were analyzed. The groups who underwent emergency laparotomy (group E) and those who underwent elective surgery after stenting (group S) were compared. Demographic and preoperative basic characteristics, early postoperative outcomes and mortality rates of the patients were examined.

Results: Forty-six patients, 20 in the stenting group (group S) and 26 in the emergency surgery group (group E) were included in the study. Age, gender, tumor location, ASA status and N stage of the groups were similar. The T stages were significantly higher in the group E ($p<0.01$). While technical success was achieved in 17 patients (85.0%) and clinical success in 14 patients (70.0%) in the group S, emergency laparotomy was performed in 6 patients. In 7 patients (35.0%) in group S, the surgery was completed laparoscopically. The groups were similar in terms of permanent stoma, length of stay, and 30-day mortality rates, while significantly lower complications were observed in the stenting group (15% vs 50%, $p=0.013$).

Conclusion: Elective laparoscopic colectomy after stent decompression may be possible with less severe morbidity and lower 30 day mortality in the management of acute left-sided colon obstruction.

Keywords: Malignant obstruction, colonic stenting, bridge to surgery, laparoscopic resection

ÖZ

Amaç: Kolorektal kansere bağlı bağırsak tıkanıklığı yüksek morbidite nedeniyle acil dekomprese edilmelidir. Tedavisi palyatif girişimler, acil laparotomi ve köprüleme tedavisidir. Bu çalışamada stent yerleştirmenin cerrahi ve onkolojik sonuçlar üzerindeki etkilerini acil cerrahi grubu ile karşılaştırarak değerlendirmeyi amaçladık.

Yöntem: Akut malign sol taraflı kolon tıkanıklık nedeniyle Ocak 2019 ile Şubat 2020 tarihleri arasında müracaat eden hastalar analiz edildi. Acil laparotomi (grup E) yapılanlar ile stentleme sonrası elektif ameliyat edilen (grup S) gruplar karşılaştırıldı. Hastaların demografik ve ameliyat öncesi temel özellikleri, erken postoperatif sonuçları ve mortalite oranları incelendi.

Bulgular: Stent grubunda (grup S) 20 ve acil cerrahi grubunda (grup E) 26 olmak üzere 46 hasta çalışmaya dahil edildi. Grupların; yaş, cinsiyet, tümör yerleşimi, ASA durumu ve N evresi benzerdi. Acil laparatomi grubunda T evre oranı anlamlı düzeyde yüksekti ($p<0,01$). Stent grubundaki 17 hastada (%85,0) teknik ve 14 hastada (%70,0) klinik başarı sağlanırken 6 hastaya acil laparotomi yapıldı. Grup S'de 7 hastaya (%35,0) ameliyat laparoskopik tamamlandı. Gruplar; kalıcı stoma, yatış süresi ve 30 günlük mortalite oranları açısından benzerken, stentleme grubunda anlamlı derecede düşük düzeyde komplikasyon görüldü (%15'e karşı %50, $p=0,013$).

Sonuç: Akut sol taraflı kolon tıkanıklığının tedavisinde stent ile dekompresyonundan sonra elektif laparoskopik kolektomi daha az ciddi morbidite ve daha düşük 30 günlük mortalite ile mümkün olabilir.

Anahtar Kelimeler: Malign obstrüksiyon, kolonik stentleme, köprüleme tedavi, laparoskopik rezeksiyon

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Introduction

Colorectal cancer is one of the most common cancers affecting the population and often causes symptoms with acute obstruction findings. Intestinal obstruction due to colorectal cancer should be urgently decompressed due to colonic distension, bacterial translocation and the risk of colon necrosis and perforation as a result of electrolyte and fluid imbalance. While approximately 80% of emergency colon surgeries were performed due to obstruction,[1] emergency laparotomy with low primary anastomosis and high morbidity rates was classically involved in the treatment of obstruction.[2] In a study of 1,046 patients presenting with malignant bowel obstruction, 24.3% of the patients were treated with Hartmann's procedure or palliative stoma.[3] Of Hartmann procedures for left-sided malignant obstructions, 40% are not closed.[4]

Dohmoto et al.[5] defined the stenting technique for the palliative treatment of colorectal tumors causing stenosis in 1990. It has been stated that the main advantage of stenting is to transform an emergency surgery into an elective surgery as a result of colonic decompression, thereby reducing morbidity and mortality.[6] However, the benefits of endoscopic stenting both for palliation and as a bridge to elective surgery are controversial, as some studies published on this topic have shown conflicting results. Van Hooft et al.[7] reported in a randomized controlled study that the high colonic perforation rate in the stenting group caused more septic complications and an increase in 30 day mortality. In addition, the perforation caused by the stent is thought to cause the spread of tumor cells and therefore worse long-term oncological outcomes.[8]

The aim of this study was to evaluate the effects of stenting on surgical and oncological outcomes in patients with obstruction due to colorectal cancer by comparing with the emergency surgery.

Materials and Methods

Patients admitted to our hospital with acute malignant left-sided colon obstruction between January 2019 and February 2020 were analyzed retrospectively from a prospectively managed database. Patients with colon obstruction due to tumor between splenic flexure and rectosigmoid region were included. Patients with peritonitis, suspected ischemia on computed tomography (CT) scan, recurrent colorectal cancer, or evidence of diffuse disease were excluded.

In our endoscopy unit, stenting was performed by experienced endoscopists under fluoroscopy. A metal stent in the range of 8-12 cm (CHANGZHOU ZHIYE MEDICAL DEVICES INSTITUTE, No.127 xiaCheng Road, Wujin High-tech Industrial Development Zone, Changzhou) was placed using the images taken during contrast-enhanced CT and fluoroscopy. The technical success of stenting was assessed by spontaneous liquid stool discharge and stent patency confirmed by contrast agent administration (Figure 1). A routine abdominal X-ray was performed 24 hours after the procedure. Clinical success was defined as the regression of obstructive symptoms within 72 hours after the procedure with stool passage.[7] Patients with regression of obstruction findings underwent optimization of their medical conditions, including CT scanning of the chest, abdomen and pelvis, and extensive oncological study, if not performed prior to stenting.

Colectomy was performed by first trying the laparoscopic approach in all patients with clinical success in bowel decompression. If surgeons doubted the integrity and safety of the anastomosis during the peroperative period,

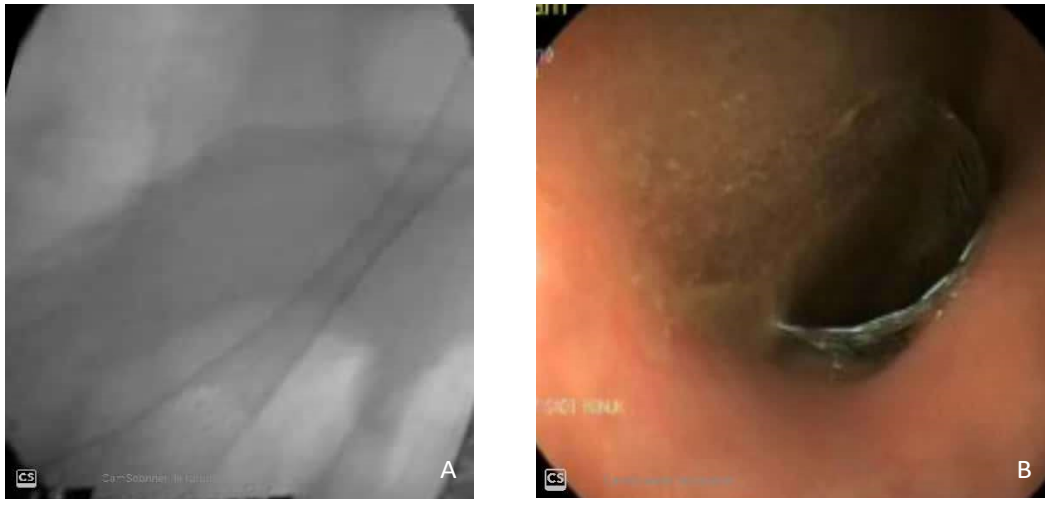

Figure 1. Confirmation of stent patency by fluoroscopy and colonoscopy (A: Fluoroscopy view, B: Colonoscopy view)

a diverting stoma was created. Emergency laparotomy was performed in patients with clinical failure, in whom stent could not be placed, or in whom complications developed after stenting.

Emergency laparotomy was performed, especially in the weekend conditions, when fluoroscopy was not available, or in patients who refused stenting. The surgical technique was determined due to the patient's clinical condition and the surgeon's decision. In the postoperative period, all patients were referred to a clinical oncologist for management of adjuvant chemotherapy. Demographic findings, ASA status, location of tumor, pathological features, technical and clinical success results of stenting, diverting stoma, hospital stay, postoperative complications and mortality data were prospectively recorded and retrospectively collected for all patients included in the study. Length of stay in hospital was defined as the total number of days spent in the hospital after surgery. Operative mortality was defined as deaths occurring within 30 days postoperatively. Anastomotic leak was defined as clinical or radiological evidence of leakage from the anastomosis.

The study was exempted from review by our hospital's ethics committee, as it was a retrospective case series presenting our center's clinical and oncological outcomes of colonic stenting which was bridge to surgery.

Statistical Analysis

Number Cruncher Statistical System (NCSS) 2007 Statistical Software (Utah, USA) program was used for statistical analysis. While evaluating the study data, in addition to descriptive statistical methods (mean, standard deviation, median, frequency, ratio), Shapiro Wilk test and boxplot graphics were used when variables had normal distribution. Student t-test was used to compare variables with normal distribution between groups, and Mann Whitney U test was used to compare variables without normal distribution between groups. For comparison of qualitative data, chi-square test, Fisher's exact test and Fisher-Freeman Halton test were used. P value <0.05 was accepted statistically significant.

Results

Between January 2019 and February 2020, 20 patients in the group S and 26 patients in the group E (a total of 46 patients) were included in the study. There was no difference between the two groups in terms of age, gender, tumor location, ASA status, and N stage (Table 1). There was a significant difference between the groups in terms of T stage (p<0.01). In group E, the rate of advanced stages was significantly higher (Figure 2).

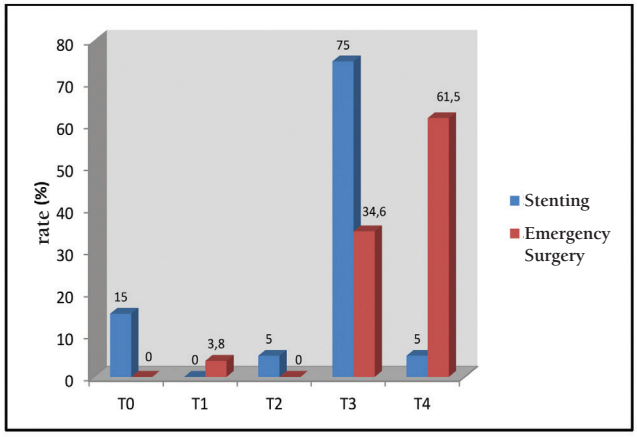

Figure 2. Distribution of T stage by groups

Table 1. Demographic and basic characteristics of the patients

	Stenting (n=20)	Emergency surgery (n=26)	p
Age (year, mean ± SD)	64.2±2.68	63.2±13.9	[a]0.800
Gender (M/F)	15/5	15/11	[b]0.222
Location			
Splenic flexure	7 (35.0)	3 (11.5)	[c]0.219
Descending colon	3 (15.0)	3 (11.5)	
Sigmoid colon	6 (30.0)	10 (38.5)	
Rectosigmoid	4 (20.0)	10 (38.5)	
ASA status (II/III/IV)	9/11/0	11/13/2	[c]0.691
T stage (Tx/T1//T2/T3/T4)	3/0/1/15/1	0/1/0/9/16	[c]0.001**
N stage (N0/N1/N2)	13/6/1	10/9/7	[c]0.113

SD: Standard deviation, M: Male, F: Female

Technical success was achieved in 17 patients (85.0%) in the stenting group. Technical failure occurred in 3 patients, as the guide wire could not pass proximal of tumor due to complete obstruction. T stages were accepted as Tx, since loop colostomy without resection was performed in these patients with emergency laparotomy. Clinical success was achieved in 14 patients (70.0%). While migration was observed in the abdominal X-ray of 1 patient with persistent bowel obstruction symptoms, perforation was observed in 3 patients, ongoing ileus was observed in 2 patients, and emergency laparotomy was performed in those patients. Laparoscopic resection was completed in 7 patients (35.0%) in the stenting group. Emergency surgeries were performed in patients with technical failure or clinical failure.

The diverting stoma rates did not differ significantly between the groups (5% in the stenting group and 11.5% in the emergency surgery group, p=0.622). The duration of hospital stay was similar between the two groups (6 and 7.5 days in the group S and E, respectively). Complications were graded according to Clavien-Dindo classification[9]. The total number of complications was significantly higher in the emergency surgery group and lower in the stenting group (15% vs 50%, p=0.013) (Figure 3). There was no significant difference between the groups in terms of the 30-day mortality rates (5% vs 11.5%, p=0.622) (Table 2).

Discussion

Left-sided colorectal tumors can emerge as an emergency resulting in large bowel obstruction, bacterial translocation, electrolyte and fluid imbalance. For this reason, the main goals of the treatment are to remove the obstruction, resection of the obstructive pathology, and maintain the intestinal continuity. Although gradual operation with resection and colostomy is often performed, one-stage procedure (resection and primary anastomosis) has become increasingly popular. Despite advances in surgical techniques and perioperative care, there are high morbidity and mortality rates in emergency surgery.[10,11] Therefore, the role of colorectal stenting as a bridge to both palliation and elective surgery has been widely discussed, despite several studies reporting conflicting results. Although some publications claim that the colonic stenting is harmful and can cause the spread of cancer secondary to tumor perforation[12] a meta-analysis has been reported showing that the oncologic results are acceptable and safe.[13]

In fact, stenting is often difficult in patients with total obstruction or narrow-angle tumors in relation to the lumen. These are also identified as risk factors for stent-related complications.[14] Similar to a recently reported meta-analysis, a technical success rate of 95.2% has been reported for stenting.[15] This procedure performed in low-volume centers and by endoscopists who are not experienced in invasive techniques such as endoscopic retrograde cholangiopancreatography has been shown to be related with higher technical failure and complication rates, particularly with respect to procedure-related perforations.[16] Colorectal stenting may be associated with complications in 5-20% of patients.[17] Therefore, the surgeon's familiarity with the stenting system is of paramount importance for technical and clinical success. Our clinical success rate (70.0%) is comparable to the literature, as all procedures performed using the endoscopic method (ERCP, EUS and other endoscopic invasive treatments) are performed in the endoscopy unit of our clinic and our center is a high-volume center.[18]

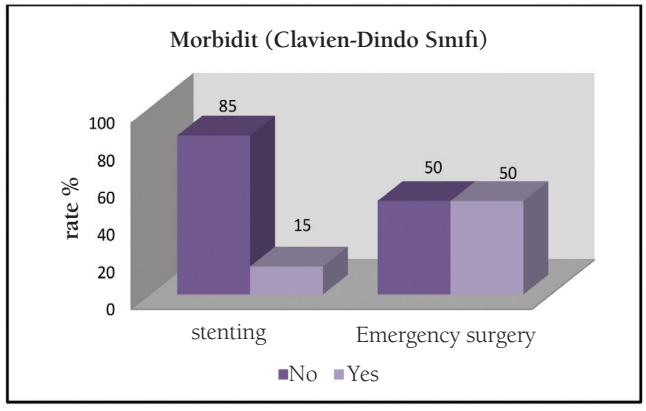

Figure 3. Distribution of morbidity rates by groups

Table 2. Early postoperative results

	Stenting (n=20)	Emergency surgery (n=26)	p
Diverting stoma n (%)	1 (5.0)	3 (11.5)	[d]0.622
Primary anastomosis n (%)	15 (75.0)	17 (65.4)	[b]0.482
30 days of death n (%)	1 (5.0)	3 (11.5)	[d]0.622
Morbidity (Clavien-Dindo (1-2/3-4)	17/3	13/13	[b]0.013*
Length of stay (day), median (IQR)	6 (5-7.8)	7.5 (5.8-9.0)	[e]0.056

First reported as a palliative therapy for unresectable colon tumors, stenting has recently been reported to lend assistance to intestinal decompression for delayed elective resection.[19] This approach prevents stoma and makes an emergency operation safer after the bowel has been prepared mechanically. The optimal timing for elective surgery after stenting remains controversial. An interval of 2 weeks is recommended for complete decompression of the colon and reduction of tissue edema. This also provides the opportunity to perform a primary anastomosis without creating a stoma by optimizing the patient's nutritional status until surgery. Because creating permanent or temporary stomata has been shown to negatively affect patients' quality of life and psychosocial well-being.[20] Two studies compared the results of elective open surgery following stenting with the results of emergency surgery without stenting, and showed an increase in the proportion of patients with successful primary anastomosis and a decrease in stoma formation in the stenting group.[21,22] When the results of our study were evaluated, we performed significantly less stoma in the stenting group compared to the emergency surgery group.

Similarly, minimally invasive colon surgery for colorectal malignancy is widely used in elective surgery. However, laparoscopic surgery is difficult to perform due to the limitation in the field of view as a result of bowel dilatation and the risk of injury is higher. The rate of laparoscopic bowel resection can be increased with decompression after stenting. In this study, laparoscopic colectomy was successfully performed in 7 patients (35%) with stenting. Although this was lower than the rate reported in a randomized controlled trial conducted by Cheung[23], our rate of conversion to open surgery was comparable with the rate of 25% reported in the MRC CLASSIC trial by Guillou et al.[24]

Emergency surgery for colorectal cancer obstruction is associated with higher morbidity (40-50%) than elective colorectal surgery.[25] When our results were evaluated, a difference was found between the two groups in terms of the total morbidity. There were more patients in the emergency surgery group with Clavien-Dindo grade III or IV complications. There was no significant difference between the two groups in terms of the total length of hospital stay. When evaluated in the light of the literature information, laparoscopic surgery has positive results on patient comfort and shortening of hospital stay due to early discharge.[23] We think that stent bridging treatment may lead to a decrease in the length of stay and complication rates in the current study, since it allows laparoscopic surgery.

Reported mortality rates for emergency colorectal surgery were higher in previous studies compared to elective surgery.[10,11] However, a recent randomized controlled trial did not show a significant difference in terms of 30-day mortality and total mortality between the two procedures.[26] The 30-day mortality rate in our study was comparable to other series in the literature.[27] It was lower in the stenting group compared to the emergency surgery group [n=3 (11.5%) and n=1 (5.0%), respectively, p=0.622].

There were some limitations of our study. Since it was a retrospective comparative study, it was not possible to standardize the patient selection and management protocol. Randomization of the patients was difficult because fluoroscopy was only available during working hours in the endoscopy unit. In addition, all elective colorectal surgeries were performed by colorectal surgeons in our clinic, while emergency colon surgeons were performed by on-duty general surgery specialists. The experience of the two groups of surgeons was different, so depending on the patient factor and surgeon preference, the decision to create a stoma was outside the standards.

Conclusion

As a result; the use of colonic self-expanding metallic stents as a bridge to surgery is feasible and effective in the treatment of acute left-sided colon obstruction. Less stoma formation is associated with less severe morbidity and lower 30-day mortality. Elective laparoscopic colectomy may be possible after successful colon decompression. We believe that multicenter prospective studies with higher number of patients will help define the role of colonic stenting as a bridge to surgery.

Ethics

Ethics Committee Approval: The study was exempted from review by our hospital's ethics committee, as it was a retrospective case series presenting our center's clinical and oncological outcomes of colonic stenting which was bridge to surgery.

Informed Consent:

Peer-review: Internally peer reviewed.

Authorship Contributions

Surgical and Medical Practices: H.S., K.D.P., M.K., Concept: H.S., Design: H.S., Data Collection or Processing: H.S., S.B., Analysis or Interpretation: H.S., F.G., Literature Search: H.S., F.G., S.B., Writing: H.S., F.G., K.D.P., M.K.

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

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RESEARCH ARTICLE

Is Age an Independent Risk Factor for Histopathology of Colorectal Polyps? A Retrospective Analysis

Yaş Kolonik Polip Histopatolojisi için Bağımsız Bir Risk Faktörü Müdür? Retrospektif Analiz

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ABSTRACT

Aim: Colorectal cancer and its precursor lesions are quite common in developed countries. Data on the prevalence of lesions located in the right colon have been reported to range from 20.5 to 48.1% depending on the gender and advanced age. Today, many countries are conducting studies for disseminating the screening programmes in order to detect and treat polyps at an early stage. In this paper, we aimed to evaluate the relationship that exists between the patient's age and the polyp localisation with histopathology of colorectal polyp.

Method: In our endoscopy unit, 789 patients underwent colonoscopy in the last two years. Among these, a total of 724 patients who met the criteria were included in the study group. The demography of the patients and histopathological data of the polyps were evaluated.

Results: Of the 724 patients included in the study, 317 had at least one pathology detected by colonoscopy. Of these, 57.4% had polyp, 13.6% had malignancy, 8.2% had diverticula, 6.9% had both diverticula and polyp, 5.4% had ulcerative colitis, 3.8% had Crohn's colitis, 4.1% had anastomotic stricture, and 0.6% had lipoma. The prevalence of precancerous and cancerous polyps was observed to be significantly higher in the left colon localisation and among cases aged 50 and over. No significant difference was noticed between polyp type and polyp localisation.

Conclusion: Age is an independent risk factor for histopathology of colorectal polyps. Therefore, we believe that screening programmes should be disseminated.

Keywords: Colonoscopy, colorectal polyps, risk factor

ÖZ

Amaç: Kolorektal kanser ve öncüleri gelişmiş ülkelerde oldukça yaygındır. Sadece sağ taraftaki lezyonların prevalansı için mevcut literatürdeki tahminler, cinsiyet ve ilerleyen yaşla ilişkili olarak %20,5 ile 48,1 arasında değişmektedir. Günümüzde birçok ülkede, poliplerin erken evrede tespit ve tedavi edilebilmesi amacıyla, tarama programlarının yaygınlığını artırıcı çalışmalar yapılmaktadır. Bizde bu yazımızda, hasta yaş ve polip lokalizasyonunun, kolorektal polip histopatolojisi ile ilişkisini değerlendirmeyi amaçladık.

Yöntem: Kliniğimizde son 24 ayda 789 hastaya kolonoskopi yapıldı. Bu hastalardan kriterlere uyan 724'ü çalışma grubuna dahil edildi. Hastaların klinik ve poliplerin histopatolojik verileri değerlendirildi.

Bulgular: Çalışmaya dahil edilen 724 hastanın 317'sinin kolonoskopisin de patoloji mevcut idi. Bunlardan %57,4'ünde polip, %13,6'sında malignite, %8,2'sinde divertikül, %6,9'unda divertikül ve polip, %5,4'ünde ülseratif kolit, %3,8'inde crohn koliti, %4,1'inde anastomoz darlığı ve %0,6'sında lipom tespit edildi. Sol kolon lokalizasyonunda ve 50 yaş ve üstü olgularda prekanseröz ve kanserli polip prevalansının anlamlı derecede yüksek olduğu gözlendi. Polip tipi ile polip lokalizasyonu arasında anlamlı fark yoktu.

Sonuç: Yaş, kolorektal poliplerin histopatolojisi için bağımsız bir risk faktörüdür. Bu nedenle, tarama programlarının yaygınlaştırılması gerektiğine inanıyoruz.

Anahtar Kelimeler: Kolonoskopi, kolorektal polip, risk faktörü

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Introduction

Colorectal cancer (CRC) has the second highest incidence of digestive system cancers according to the American Cancer Society (ACS).[1] In Turkey, it is the third most common cancer among men and women.[2] CRC and its precursor lesions are quite common in developed countries. Adenoma-carcinoma sequence, which aims to schematise the process of CRC development, is widely accepted.[3] Data on the prevalence of precursor lesions have been reported to range from 20.5 to 48.1% depending on the gender and advanced age.[4]

Studies have shown that age is one of the most important risk factors for developing colorectal adenoma, especially age of ≥65 years is reported to be related with higher prevalence rates for advanced adenomas and CRC.[5] Also, report has it that the left colon polyps and carcinomas detected in colonoscopy have a higher incidence than the right-sided colon.[4,6] Therefore, many countries today have been conducting studies for disseminating the screening programmes in order to detect and treat polyps at an early stage.[7]

Regular screening is therefore recommended for CRC in adults 45 years of age and older with an average-risk by the ACS Guideline (2018).[8] On the other hand, the American Society for Gastrointestinal Endoscopy emphasises that 50 years is the age to begin CRC screening for Caucasians with an average-risk, since the rate of adenoma detection at this age reaches 25% and 15% in men and women, respectively.[9]

In this study, our aim is to evaluate the relationship between the patient's age and the polyp localisation with histopathology of colorectal polyp.

Materials and Methods

The study protocol was approved by the institutional Ethics Committee. A written, informed consent was obtained from each patient. The study was conducted in accordance with the principles of the Declaration of Helsinki.

The medical records of patients, who underwent colonoscopy in the last two years in the surgical endoscopy unit of our department were evaluated retrospectively. Within this period; a total of 789 colonoscopy procedures had been performed (with the indications of positive faecal occult blood testing, rectal bleeding or hematochezia, regular health examination and constipation), and among them, 724 patients' medical records were evaluated. Of these 724 patients, 317 in whom a colonic pathology was detected were included in the study group.

The following inclusion criteria were used for patient selection: (1) the patients who underwent complete colonoscopy (caecal intubation), and (2) the patients who underwent a polypectomy and/or biopsy. The 65 patients who had (1) incomplete colonoscopy, (2) underwent an endoscopic mucosal resection or endoscopic submucosal resection (not decided and performed in screening, their prior biopsy results were known and colonoscopy was performed in them with a therapeutic purpose), and/or (3) in which polypectomy could not be performed (due to taking anticoagulant drugs, multiple comorbid conditions, etc.) (Since we did not perform polypectomy in the same session due to the risk factors, we did not know the histopathology of those polyps.) were excluded.

The following parameters were analysed for all patients: age, sex, presenting complaint, polyp location, and histological subtype of polyp. Precise characteristics of the colorectal polyps (that is, number, size, form and location) were documented in the colonoscopy reports by endoscopists.

Initially, the patients were classified into three groups according to their age (<40 years old, 40-49 years old, and ≥50 years). After that, colorectal polyps were divided into four groups: The right-sided, left-sided, rectum and multiple lesions. The polyps located proximal to the splenic flexure were considered right-sided (including the caecum, ascending colon and transverse colon), whereas those that were distal to the splenic flexure were considered left-sided (including the descending colon, sigmoid colon and rectum). Histopathological findings and degree of dysplasia (low and high) were also analysed.

Colonoscopy Procedure

Four trained endoscopists carried out the procedures. An Olympus Evis Exera III (CF-H260/CF-Q260) (Olympus, Tokyo, Japan) was used to conduct all investigations.

Sodium Dihydrogen Phosphate (B.T. Enema 210 ml) and Sennozid A+B Ca (X-M diet 150 ml) as a purgative was used for all patients for bowel preparation. Sedoanalgesia was performed by the anaesthesiologist. Polypectomies were performed using standard biopsy forceps (for polyps <5 mm) or polypectomy snares for larger polyps (>5 mm).

Statistical Analysis

The data was analysed using the SPSS statistical software, version 17. Common statistics were applied in order to estimate the significance of the results. Chi-square test, Mann-Whitney nonparametric test and Fischer's exact test were used were necessary. Differences were considered to be significant if $p<0.05$.

Results

At least one pathology was detected by colonoscopy in 317 (43.8%). Of these 317, 57.4% (n=182) had polyp, 13.6% (n=43) had malignancy, 8.2% (n=26) had diverticula, 6.9%

(n=22) had both diverticula and polyp, 5.4% (n=17) had ulcerative colitis, 3.8% (n=12) had Crohn's colitis, 4.1% (n=13) had anastomotic stricture, and 0.6% (n=2) had lipoma.

The characteristics of patients who had polyp are shown in Table 1. Among 182 patients with polyps, 57.7% were male. The mean age of these patients was 60.3±6,26 (37-86) and 85.8% of the patients were ≥50 years of age. The presenting complaints/symptoms were positive faecal occult blood (30.8%), rectal bleeding or hematochezia (14.3%), constipation (8.8%) and regular health examination (46.1%). A maximum of two polys was found in 72% of the patients. Of all polyps, 142 (78.1%) were adenomatous polyps (APs), 31 (17%) were hyperplastic or non-adenomatous polyps and 9 (4.9%) were intra-mucosal carcinoma. The 142 APs comprised 103 (56.8%) tubular adenomas, 26 (14.2%) tubulovillous adenomas and 13 (7.1%) villous adenomas. Among the APs, 49 (26.9%) were noted to have high grade dysplasia (HGD). Of the 182 patients with polyp; 41 (22.5%), 69 (38%), 41 (22.5%) and 31 (17%) polyps were detected in the right colon, the left colon, the rectum and multiple locations, respectively.

85.8% of all the polyps and 79.1% of all the malignancies were detected in cases ≥50 years of age (Table 2). There were significant statistical differences between groups when polyps and malignancy were compared according to age.

When the localisation of polyps by age was evaluated, the polyps in patients under the age of 50 were observed most commonly in the rectum, while those in patients 50 years of age and above were in the left colon (Table 3). Hyperplastic or non-APs were most commonly observed in <50 years of age, while intra-mucosal carcinoma was observed in ≥50 years of age (Table 4). Additionally, polyp type analysis by localisation, hyperplastic or non-adenomatous polyp (s), adenomatous polyp (s) and intra-mucosal carcinoma were most commonly detected in the left colon (Table 5). According to these results, there was a significant difference between the patient's age and polyp (s) localisation and type ($p<0.05$), but there was no difference between polyp type and localisation. Also, proximal rectum was the most common localisation for the rectal polyps.

Table 1. The general characteristics of patients with polyp

Features	n (182)
Gender (n, %)	
Male	111 (57.7)
Female	71 (42.3)
Mean age (year) (range)	60.3±6,26 (37-86)
Age (n, %)	
<40	1 (0.5)
40- 49	25 (13.7)
≥50	156 (85.8)
Presenting complaint (n, %)	
Positive faecal occult blood testing	56 (30.8)
Rectal bleeding or hematochezia	26 (14.3)
Regular health examination	84 (46.1)
Constipation	16 (8.8)
Number of polyp (n, %)	
1- 2	131 (72)
>2	51 (28)
Histopathology of colorectal polyp	
Adenomatous polyps	142 (78.1)
Tubular adenomas (Low dysplasia)	75 (41.4)
Tubular adenomas (High dysplasia)	28 (15.4)
Tubulovillous adenomas (Low dysplasia)	11 (6)
Tubulovillous adenomas (High dysplasia)	15 (8.2)
Villous adenomas (Low dysplasia)	7 (3.8)
Villous adenomas (High dysplasia)	6 (3.3)
Hyperplastic or non-adenomatous polyps	31 (17)
Intra-mucosal carcinoma	9 (4.9)
Polyp localisation	
Right colon	40 (22)
Left colon	70 (38.4)
Rectum	40 (22)
Multiple	32 (17.6)

Discussion

The present study retrospectively analysed the clinical and pathological characteristics of colorectal polyps and the relation between colorectal polyp localisation,

Table 2. Polyp and cancer detection analysis by age

Features	Age <50 n (%)	Age ≥50 n (%)	p value
Polyp (s) (n=182)	26 (14.2)	156 (85.8)	<0.01*
Malignancy (n=43)	9 (20.9)	34 (79.1)	<0.01*

Table 3. Polyp (s) localisation analysis by age

Polyp (s) localisation	Age <50 n (%)	Age ≥50 n (%)	p value
Right colon	4 (17.6)	36 (23)	
Left colon	7 (26.5)	63 (42.2)	<0.01*
Rectum	12 (41.2)	28 (17.6)	
Multiple	3 (14.7)	29 (18.2)	
Total (n)	26	156	

Table 4. Histopathology of colorectal polyp analysis by age

Age, (n)	Polyp type, n (%) Hyperplastic or non-adenomatous, 31 (17)	Adenomatous, 142 (78.1)	Intra-mucosal carcinoma, 9 (4.9)	p value
<50 (26)	20 (64.5)	84 (59.2)	2 (33.3)	<0.01*
≥50 (156)	11 (35.5)	58 (40.8)	6 (66.7)	

Table 5. Histopathology of colorectal polyp analysis by localisation

Polyp localisation, n (%)	Polyp type, n (%) Hyperplastic or non-adenomatous, 31 (17)	Adenomatous, 142 (78.1)	Intra-mucosal carcinoma, 9 (4.9)	p value
Right colon	6 (19.4)	33 (23.2)	1 (11.1)	
Left colon	10 (32.3)	54 (38.1)	6 (66.7)	
Rectum	7 (22.6)	31 (21.8)		
Upper	3 (42.9)	16 (51.6)	2 (22.2)	0.256
Middle	3 (42.9)	9 (29)	2 (100)	
Lower	1 (14.2)	6 (19.4)		
Multiple	8 (25.7)	24 (16.9)	-	

histopathology and patient's age in our patient group.

Advancing age has been reported to be an independent risk factor for the development of colorectal polyps and carcinoma.[5,10] However, publications evaluating the relationship between patient's age, polyp localisation and polyp histopathology are limited. In the present study, it was observed that age of patient with polyp was an independent risk factor for polyp histopathology, but polyp localisation did not have any effect on histopathology.

Current reports have identified that old age, obesity, smoking, alcohol, BMI, diet, physical activity, medication, and/or hormone replacement therapy are independent risk factors with colorectal polyps.[11,12,13] Age is equally an important factor in both men and women. More than 50% of CRC cases are diagnosed after the age of 70 years and only 10% of the cases are detected before the age of 55.[14] Another study with the participants between the age of 20 and 79 showed that the prevalence of colorectal adenoma increased significantly with age.[15] The effect of patient sex on polyp incidence is still controversial, whereas men have a higher risk of developing APs compared to women.[16,17] However, Kaminski et al.[18] reported that almost similar as CRC family history, there is an increased risk in male sex.

In our study, 23% of the patients who underwent colonoscopy were found to have polyp and the risk of polyp increased significantly with age. Median age of the patients with polyps was similar to other studies, in which the mean was 60.3 years.[19] In addition, the majority of the patients with polyps were male.

Determining the histopathological features of the polyps with colonoscopy precisely is quite challenging. This can only be achieved with the removal of the polyp followed by the histopathological examination. APs which includes dysplasia is the most common type detected with colonoscopy. While these polyps can be found in 5-10% of the general population, this rate increases up to 60% in the ninth decade.[20] APs constituted 78.1% of our cases and among them tubular polyps were the most common type (56.8%), compared to other studies.[21]

Risk for developing CRC is associated with histological type and localisation of the polyp. The present study has shown that polyps were more frequently located in the left colon and the rectum (60.5%), a finding that is in agreement with previous studies[22,23] and left sided polyp had more tendency to show HGD and intra-mucosal carcinoma. In a study by Patel et al, it was demonstrated that the prevalence of right-sided lesions increased with advanced aged.[24] Therefore, that study indicates the importance of evaluating the entire colon segments in elderly population. However, complete colonoscopy may not always be achieved in this patient group due to increased risk of complications, poorer bowel preparation and higher incidence of comorbidities.

Study Limitations

This study had several limitations: 1) Study was performed in a single academic centre with limited numbers of sample and 2) It was a retrospective study where the sizes of all adenomas were not found.

Conclusion

Age is an independent risk factor for histopathology of colorectal polyps. We therefore believe that screening programs should be disseminated, the quality of endoscopic interventions should be inspected and improved.

Ethics

Ethics Committee Approval: The study protocol was approved by the institutional Ethics Committee (date: 12.08.2019; number: 618).

Informed Consent: Written informed consent was obtained from the patient for the publication of this report and any accompanying images.

Peer-review: Internally peer reviewed.

Authorship Contributions

Concept: T.A., N.A., Design: T.A., N.A., F.C., Supervision: N.E., M.B.G., M.H., Materials: T.A., N.A., Data Collection and/or Processing: T.A., N.A., Analysis and/or Interpretation: F.C., N.E., M.B.G., M.H., Literature Search: T.A., N.A., Writing: T.A., N.A.

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RESEARCH ARTICLE

First Clinical Experience of FiLaC™ in Hidradenitis Suppurativa: Is it a Safe and Feasible Treatment Modality?

Hidraenitis Supprativa'da FiLaC TM'nin İlk Klinik Deneyimi: Güvenli ve Uygulanabilir Bir Tedavi Mi?

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ABSTRACT

Aim: Hidradenitis suppurativa (HS) is a disabling and suppurative disease affecting primarily the apocrine-bearing areas. Although wide surgical excision can be performed in later stages, minimally invasive surgical techniques have been developed to limit tissue loss.
Fistula-tract Laser Closure (FiLaC™) has been used to shrink the fistulous tracts of perianal fistula, pilonidal sinus and urethroperineal fistula. However, its usefulness in HS is not yet established.
Method: A retrospective analysis of 14 consecutive patients with HS located at the perianal/perineal and axillary regions was performed. All patients underwent surgery with the FiLaC™ technique. After treatment, patients were evaluated for the type of clinical response as complete, partial and no response. At the 3rd month control, wound healing without drainage and closure of all external orifices was considered complete response, slight drainage with minimal symptoms was regarded as partial response and persistent and painful symptomatic drainage was evaluated as no response.
Results: There were 12 (85.7%) male and two female patients (14.3%) with a mean age of 40.3±8.4 years. Perianal/perineal and axillary HS was detected in 12 (85.7%) and two (14.3%) patients, respectively. No intra- and post-operative complications were recorded. Complete and partial responses were seen in four (28.6%) and eight (57.1%) patients, respectively. No clinical response was observed in two patients (14.3%).
Conclusion: The FiLaC™ technique for the treatment of HS is shown to be safe and feasible. Given the complete and partial responses in most patients, this technique may be used as an adjunctive step in patients with HS with the previous failure of medical and surgical treatments.
Keywords: Hidradenitis suppurativa, laser, fistula-tract laser closure, minimally invasive surgery

ÖZ

Amaç: Hidradenitis supurativa, öncelikle apokrin bez içeren alanları etkileyen, engelleyici ve akıntılı bir hastalıktır. Daha sonraki aşamalarda geniş cerrahi eksizyon yapılabilmekle birlikte, doku kaybını sınırlamak için minimal invaziv cerrahi teknikler geliştirilmiştir. FiLaC (Fistula-tract Laser Closure) perianal fistül, pilonidal sinüs ve üretroperineal fistülün fistül yollarını küçültmek için kullanılmıştır. Ancak hidradenitis suppurativa'da kullanımı eksiktir.
Yöntem: Perianal/perineal ve aksiller bölgeye lokalize ardışık 14 hidradenitis supurativa hastanın retrospektif analizi yapıldı. Tüm hastalar FiLaC tekniği ile ameliyat edildi. Tedaviden sonra hastalar, klinik yanıt türü açısından tam yanıt, kısmi yanıt ve yanıt yok olarak değerlendirildi. Üçüncü ay kontrolünde akıntısız yara iyileşmesi ve tüm dış ağızların kapanması tam yanıt olarak kabul edildi. Minimal semptomlu hafif akıntı, kısmi yanıt olarak kabul edildi. Kalıcı ve ağrılı semptomatik drenaj ise yanıt yok olarak değerlendirildi.
Bulgular: Hastaların 12'si erkek (%85,7) ve ikisi (%14,3) kadındı. Ortalama yaş 40,3±8,4 yıldı. Perianal/perineal ve aksiller hidradenitis supurativa, sırasıyla 12 (%85,7) ve iki (%14,3) hastada mevcuttu. İntraoperatif veya postoperatif bir komplikasyon görülmedi. Tam ve kısmi yanıt, sırasıyla dört (%28,6) ve sekiz (%57,1) hastada görüldü. İki (%14,3) hastada ise klinik olarak yanıt yoktu.
Sonuç: Hidradenitis supurativa tedavisinde, FiLaC tekniğinin güvenli ve uygulanabilir olduğu gösterilmiştir. Hastaların çoğunda tam ve kısmi yanıtların varlığından dolayı, bu teknik daha önce tıbbi ve cerrahi tedavilerde başarısız olan hidradenitis supurativa hastalarında yardımcı bir adım olarak kullanılabilir.
Anahtar Kelimeler: Hidradenitis supurativa, lazer, FiLaC, minimal invaziv cerrahi

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Introduction

Hidradenitis suppurativa (HS) is a chronic, suppurative skin disease characterised by the formation of subcutaneous nodules, cysts, abscesses and sinuses especially in apocrine gland-bearing areas such as the axilla, groin and perineum. In advanced and chronic stages of HS, uncontrolled infections with the subcutaneous tracts usually lead to fistula formation.[1,2]

Its treatment modality varies depending on severity. Deroofing, excision, carbon dioxide laser vaporisation and electrosurgery are usually recommended when all conservative treatments failed; besides, all these techniques are invasive and painful methods with significant recurrence rates. Endoscopic or less invasive techniques using laser technology have been reported in deep and subcutaneous lesions recently with variable success rates.[3-5]

Fistula-tract Laser Closure (FiLaC™, Biolitec, Germany), a novel technique, has been used in the treatment of perianal fistula, pilonidal sinus and urethroperineal fistula.[1,6,7] In this technique, a laser probe is introduced from the openings to destroy the fistulous epithelium and obliterate it by shrinking the tissues around the fistula at 360° continuously.[1,6] However, to our knowledge, no study has focused on the effect of the FiLaC technique on HS. Thus, in this paper, we reported the first clinical use of the FiLaC technique in patients with HS.

Material and Methods

This study retrospectively analysed data of 14 consecutive patients with HS located in the perianal/perineal and axillary regions between January 2016 and December 2019. All patients underwent surgery with the FiLaC technique after the failure of previous medical therapies including topical and systemic antibiotics, anti-inflammatory medicines, topical retinoids and surgical therapy including seton placement and abscess drainage.

This retrospective study was approved by the local institutional ethical committee (approval number: 2020/32). All patients gave their written consent.

Hurley classification system was used for identifying the severity of HS. Patients with abscess formation without sinus tracts and cicatrisation were considered as stage 1. Patients with recurrent abscesses with tract formation and cicatrisation were evaluated as stage 2 and those with diffuse or near-diffuse involvement or multiple interconnected tracts and abscesses across the entire area were regarded as stage 3.

Surgical technique

A radial-emitting laser probe (Leonardo®, dual 45-diode laser, wavelength of 1470 nm, continuous energy of 10 W) was used for the FiLaC technique. The patients were positioned in lithotomy under general anaesthesia. After widening and debridement of the external orifices of the fistula tract by curettage, a stylet was used to determine the length and direction of the tracts. The laser probe was inserted into the fistula tract (Figure 1) based on the measurements obtained by using the stylet. In the presence of multiple external orifices, more than one stylet was used (Figure 2a) before the probe insertion (Figure 2b). For axillary lesions, the same steps were followed (Figure 3a, b). Then, the activated probe was pulled back at a speed of 1 mm/s until its evacuation from the external orifice. The orifice was left open behind.

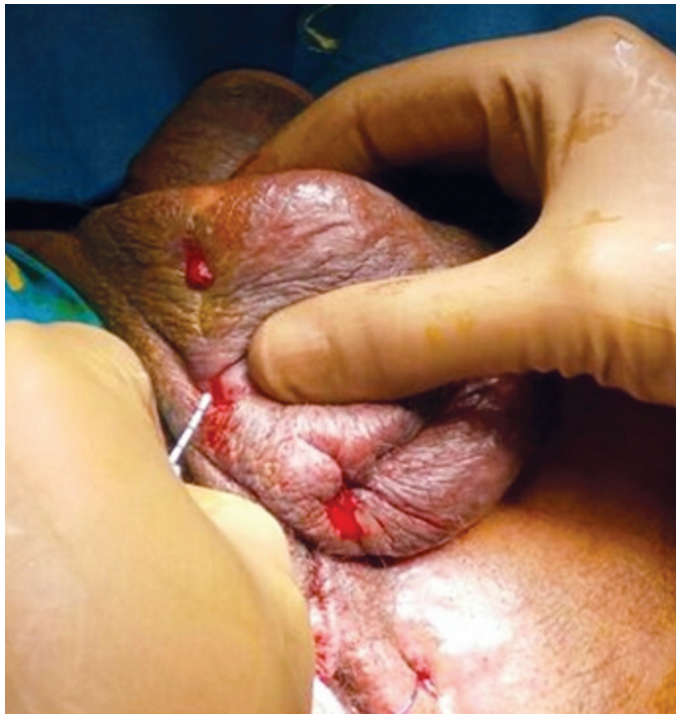

Figure 1. Fistulous openings extending into the scrotum. Application of the laser probe from one of the openings

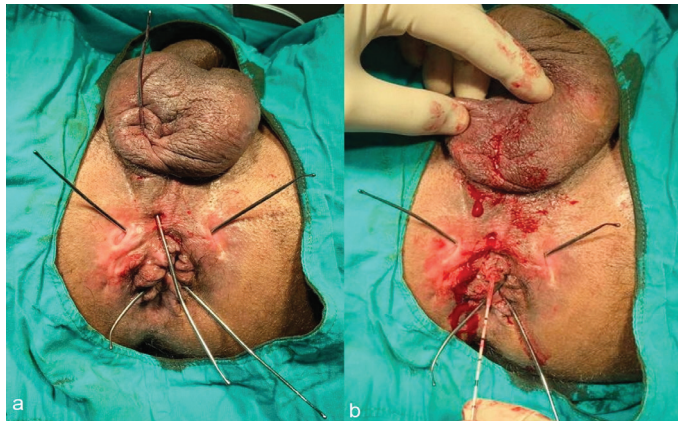

Figure 2. a) Fistulous openings at the perianal region and the scrotum. b) Application of the laser probe from one of the openings

All patients were discharged on the same day of surgery with antibiotics (ciprofloxacin plus metronidazole). Wound management was recommended by applying wet gauzes once a day for at least 4 weeks postoperatively. For perianal/perineal HS, sitz baths with warm water once a day was recommended.

After discharge, patients were followed for complications, treatment outcomes such as wound healing and drainage from the orifices and recurrences in the post-operative 1st and 3rd months. Then, follow-up examinations were performed annually.

"Complete response", i.e. wound healing without drainage and closure of all external orifices at the 3rd month control, was regarded as the primary outcome (Figure 4). Slight drainage with minimal symptoms was regarded as "partial response". Persistent and painful symptomatic drainage requiring additional surgical treatment was evaluated as "no response".[7]

Demographic data (i.e. age and sex), clinical features (i.e. disease location, treatment outcomes and follow-up duration in months) and operative findings (i.e. operative time in minutes) were recorded using the patients' medical files.

Normally distributed continuous variables were expressed as mean ± standard deviation. Median with ranges was used for continuous variables without normal distribution. Categorical variables were expressed as frequencies and percentages.

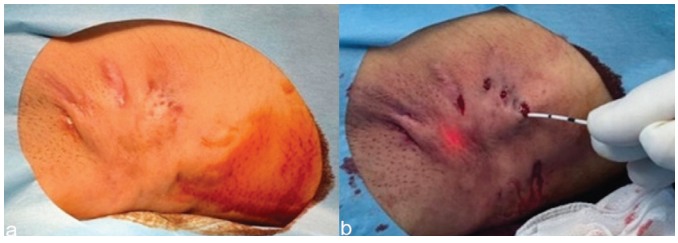

Figure 3. a) Multiple sinuses and corresponding fistulas at the axilla. b) Application of the laser probe from one of the openings

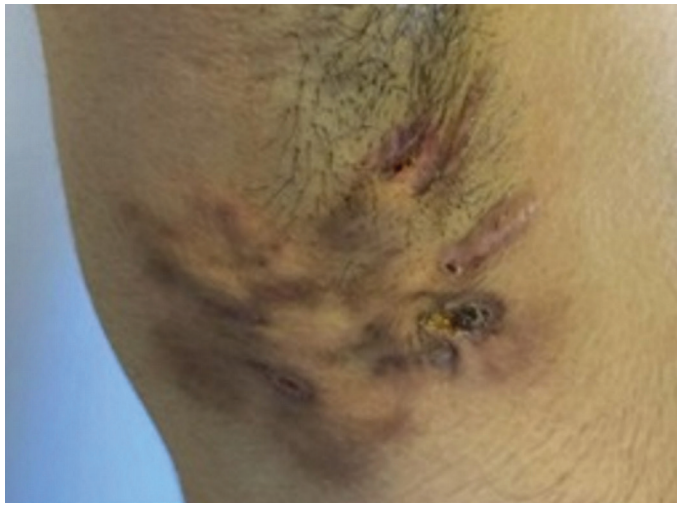

Figure 4. Final appearance of the axilla at the first month of follow-up

Results

Of the 14 patients, 12 (85.7%) were male and two were female (14.3%), with a mean age of 40.3±8.4 years. Demographic and clinical characteristics are shown in the Table 1.

Twelve (85.7%) patients had perianal/perineal HS, and the remaining two (14.3%) presented axillary HS. Nine patients (64.2%) were at Hurley stage 2 and five patients (35.8%) were at stage 3. No intraoperative or postoperative complications were observed in our patient series. The mean operation time and median follow-up duration were 32.6±7.3 min and 13.5 (range 3-26) months, respectively. The total healing rate was 28.6%, as four patients demonstrated "complete response", eight (57.1%) patients showed "partial response" and two (14.3%) patients did not benefit from the treatment ("no response").

Discussion

To the best of our knowledge, this is the first case series of FiLaC in patients with HS. The present results showed that FiLaC, as a minimally invasive surgery, may be used for the treatment of HS. Although nearly half of the patients showed partial benefit from the FiLaC technique, complete response in one-quarter of the patients may support its use in chronic fistulous diseases such as HS.

Table 1. Demographic and clinical characteristics of the patients (n=14)

No	Age (year)	Sex	Location	Hurley classification	Clinical response
1	43	M	PP	2	Partial
2	35	M	PP	3	Partial
3	54	M	PP	2	No response
4	51	M	PP	2	Complete
5	27	M	PP	3	Partial
6	26	M	PP	2	Partial
7	29	F	A	2	Partial
8	33	M	PP	2	Partial
9	50	M	PP	3	No response
10	48	M	PP	3	Partial
11	44	M	PP	2	Complete
12	37	F	PP	3	Complete
13	41	M	PP	2	Partial
14	46	M	A	2	Complete

M: Male, F: Female, PP: Perianal/perineal, A: Axilla

The energy radiating from the laser probe induces destruction of the epithelium and the shrinkage of the tract within the depth of 2-3 mm of the surrounding tissues. This action mechanism has been thought to be the major advantage of electrocoagulation.[6] All these mechanisms of the FiLaC technique support its use in several fistulous diseases.

At present, no surgical technique meets the ideal standard for HS; therefore, we tried to adopt the FiLaC technique that has been used for chronic fistulous diseases such as fistula-in-ano and pilonidal sinus disease for HS.[1] As less invasive approaches including intralesional radiofrequency ablation, endoscopic cauterisation via a monopolar electrode or laser energy and carbon dioxide laser have been used for the surgical treatment of HS recently,[3-5] we aimed to obtain the possible benefits of the FiLaC technique to obliterate sinuses as in other diseases. In studies using 1064-nm Nd:YAG laser for the treatment of HS, this type of laser causes selective photothermolysis of follicular units and destruction of organised inflammatory lesions.[8] The FiLaC technique has used a 1070-nm diode laser. Given the almost similar technical features, both techniques may function by using the same action mechanisms. However, controlled studies are needed to reach more meaningful conclusions.

Higher complications and recurrences have been implied in patients with HS undergoing surgery. In a systematic review, Bouazzi[9] reported that the overall mean complication and recurrence rates were 24% and 20.1%, respectively. In addition to resection of healthy tissues for the reconstruction of surgical defects, restrictions in the mobility of the upper extremities have been also mentioned after the surgical treatment of axillary HS.[10] Although two-thirds of the patients were satisfied with the surgical treatment of HS, the recurrence rate was 35% after one-stage surgical closure.[11] Post-operative recurrences were seen in 54.2% of 48 patients who had undergone 91 wide excisions.[12] Therefore, multiple surgical interventions with reconstructions may be needed for complete healing in patients with HS. Considering this issue, the FiLaC technique may be regarded as an adjunct to surgical treatments because of its benefits, such as less invasiveness and absence of tissue loss.

However, the FiLaC technique has some drawbacks when used in HS. Exploration of the communicating tracts and destruction of all epithelialised tissues have been reported as the mainstay for the successful surgical treatment of HS.[4] We and other researchers used blunt probing to identify the exact anatomy of the tracts contrary to Grimstad's study[5] who used methylene blue.[3] Thus, the use of methylene blue in association with the FiLaC technique can be tried in future studies. Although we did not evaluate the cost of the technique, such technology has been known to require more expensive equipment.[7] In addition to the complications and cost concerns, the speed of probe removal and amount of delivered energy are also associated with the use of the FiLaC technique in HS. Thus, prospective studies are needed to clarify these issues.

The retrospective design and small sample size were the main limitations of the study. The short follow-up period to collect data about recurrences and the lack of clinical data about previous dermatological treatments were other limiting factors. As a clinical policy, we did not perform presurgical mapping either by methylene blue or by imaging techniques. This issue can be a weak study point. However, being the first to report the clinical use of the FiLaC technique in patients with HS was the major strength of our study.

In conclusion, the FiLaC technique for treatment of HS was shown to be safe and feasible. In addition, complete healing in nearly one-quarter of the patients, partial symptomatic relief in more than half of the patients and the lack of aggressive tissue destruction leading to daycare surgery were other advantages. The findings of this small case series study suggest that this technique may be used as an adjunctive step in patients with HS in whom previous medical and surgical treatments failed. However, prospective randomised large-scale studies are needed to clarify its clinical efficiency and potential issues.

Ethics

Ethics Committee Approval: This retrospective study was approved by the local institutional ethical committee (approval number: 2020/32).

Informed Consent: All patients gave their written consent.

Peer-review: Internally and externally peer reviewed.

Authorship Contributions

Surgical and Medical Practices: Ö.K., K.R.S, N.A.H., M.C.T., Concept: Ö.K., K.R.S, M.C.T., Design: Ö.K., N.A.H., M.C.T., Data Collection or Processing: K.R.S., N.A.H., Analysis or Interpretation: Ö.K., M.C.T., Literature Search: Ö.K., N.A.H., Writing: Ö.K., K.R.S., N.A.H, M.C.T.

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

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RESEARCH ARTICLE

Is Complete Mesocolic Excision Technique Superior to Conventional Hemicolectomy Technique for Patients with Right-Sided Colon Cancer? Preliminary Findings from a Single-Center Retrospective Analysis

Sağ Kolon Kanserinde Tam Mezokolik Eksizyon Tekniği Standart Hemikolektomi Tekniğinden Üstün Müdür? Tek Merkez Erken Dönem Retrospektif Analiz Sonuçları

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ABSTRACT

Aim: To evaluate the surgical and oncological outcomes of complete mesocolic excision versus conventional hemicolectomy in patients with right-sided colon cancer.

Method: A total of 87 patients with stage I-III cancer disease who underwent conventional hemicolectomy (n=39) or complete mesocolic excision (n=48) in a tertiary center were included. Data on patient demographics, tumor characteristics, treatment, and outcomes were assessed and compared between groups.

Results: No significant difference was noted between conventional hemicolectomy and complete mesocolic excision groups in terms of patient and tumor characteristics, chemotherapy, surgical morbidity, recurrence rates and apical node metastasis rates. The median total (58.0 vs 31.0, p<0.001) and apical lymph node yield (3.0 vs 2.0, p=0.034) were significantly higher with complete mesocolic excision than with conventional hemicolectomy, while there was a non-significant tendency toward a higher apical lymph node metastasis rate in the conventional hemicolectomy group (7.7% vs 2.1%). No significant difference was noted between the conventional hemicolectomy and complete mesocolic excision groups in terms of morbidity, length of hospital stay, recurrence, overall survival (66.7 vs 93.8% and 113.1 vs 74.9 months, respectively) and disease-free survival (64.1% vs 85.4% and 107.9 vs 68.7 months, respectively) at a median of 87.3 months and 25.1 months of follow-up, respectively.

Conclusion: Complete mesocolic excision was not associated with an increased risk of surgical morbidity or mortality compared to conventional hemicolectomy. Our findings emphasise the likelihood of residual metastatic apical lymph nodes in nearly 5.6% of cases in which complete mesocolic excision is not used. There may also be a potential longer term survival benefit for complete mesocolic excision vs conventional hemicolectomy.

Keywords: Colon cancer, morbidity, complete mesocolic excision, conventional hemicolectomy, lymph node yield, recurrence

ÖZ

Amaç: Sağ kolon kanserinde tam mezokolik eksizyon ile standart hemikolektomi tekniklerinin cerrahi ve onkolojik sonuçlarını karşılaştırmak.

Yöntem: Tam mezokolik eksizyon (n=48) ve standart teknik ile (n=39) sağ hemikolektomi yapılan toplam 87 evre 1-3 sağ kolon kanseri olgusu çalışmaya dahil edildi. Hastaların demografik yapıları, tümor özellikleri, yapılan tedaviler ve sonuçları gruplar arasında karşılaştırıldı.

Bulgular: Gruplar arasında hasta, tümör ve kemoterapi tedavi özellikleri, cerrahi morbidite, nüks oranları ve apikal lenf nodu metastaz oranları açısından farklılık saptanmadı. Tam mezokolik eksizyon grubunda ortalama total lenf nodu sayısı (58,0 vs 31,0, p<0,001) ve apikal lenf nodu sayısı (3,0 vs 2,0, p=0,034) anlamlı olarak yüksek saptandı. Standart teknik grubunda apikal lenf nodu metastaz oranının anlamlı fark oluşturmasa da

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yüksek olduğu gözlendi (%7,7 vs %2,1). Tam mezokolik eksizyon ve standart teknik grupları arasında ortalama 25,1 ve 87,3 ay takip süresinde morbidite, hastanede kalış süresi, nüks, genel sağkalım oranları (%93,8 vs %66,7) ve süreleri (74,9 vs 113,1 ay) ile hastalıksız sağkalım oranları (%85,4 vs %64,1) ve süreleri (68,7 vs 107,9 ay) açısından anlamlı farklılık saptanmadı.

Sonuç: Standart teknik ile karşılaştırıldığında tam mezokolik eksizyon tekniğinin cerrahi morbidite veya mortalite riskini arttırmadığı ve standart hemikolektomi yapılan olgularda %5,6 oranında rezidüel metastazik apikal lenf nodu kalabileceği gözlenmiştir. Bulgularımız erken dönemde tam mezokolik eksizyon tekniğinin sağkalım açısından anlamlı bir faydasını ortaya koyamasa da uzun dönemde potansiyel olarak faydalı olabileceğini düşündürmektedir.

Anahtar Kelimeler: Kolon kanseri, morbidite, tam mezokolik eksizyon, standart hemikolektomi, lenf nodu sayısı, nüks

Introduction

Complete mesocolic excision (CME) is a surgical technique first described by Hohenberger in 2009 which includes sharp dissection along embryological planes involving an intact envelope of mesentery together with high vascular ligation and resection of a sufficient length of bowel.[1,2] This technique adopts similar principles to that for total mesorectal excision in order to reach similar favorable outcomes in treating patients with rectal cancer.[1,2,3] Thus, CME may become the standard method for right-sided colon cancer resection, as promising oncological outcomes have reported previous reports and comparative studies.[2,3,4]

CME, however, is a more technically demanding procedure than conventional resections, especially when considering the complex vascular anatomy of the right colon and the poorer oncological outcomes for patients with right-sided vs left-sided colon cancers.[5] The utility of CME also presents a challenge in terms of continuously improving minimally invasive surgery and new adjuvant chemotherapies. Some of its other challenges include lack of level 1 evidence, the paucity of long-term results demonstrating improved oncological outcome to justify the higher risk of potentially catastrophic complications and the efforts required to overcome the extensive learning curve.[2,3,6,7]

The present study was therefore designed to comparatively evaluate the surgical and oncological outcomes of patients with right-sided colon cancer operated on with CME vs conventional hemicolectomy (CON) in terms of lymph node yield, surgical morbidity, survival and recurrence.

Material and Methods

This study has been conducted in accordance with the principles set forth in the Helsinki Declaration and current legislation. Permission was obtained from our institute for the use of patient data for publication purposes (date of approval: 05/12/2019, reference number/protocol number: 2019-19/23).

Study Population

A total of 87 patients [mean standard deviation (SD) age: 63.8 (14.3) years, 57.5% female] with stage I-III right-sided colon cancer were enrolled in this retrospective comparative study. The patients were divided into two groups according to surgical technique and timeline, including patients who underwent CON (n=39, February 2006-December 2012) and those who underwent CME (n=48, January 2013-June 2019). The CON group served as the historical comparison group for patients who underwent CME following the implementation of this technique in our clinic in 2013. Patients lost to follow-up as well as those with stage IV cancer or synchronous tumors were excluded from the study.

Study Parameters

Data were recorded for each patient on criteria such as patient demographics (age, gender), ASA Physical Status Classification System score (Class I-IV), surgery type and chemotherapy use. Tumor characteristics were also included, such as pathological stage (pT, pTNM), histological differentiation, tumor invasion (perineural, venous, lymphatic and extra-nodal) and the presence of mucinous components or signet-ring cells. Tumor staging was performed according to the American Joint Committee on Cancer-TNM (AJCC-8th) staging system.[8] Surgical morbidity, recurrence rate, presence of apical node metastasis, lymph node yield (total, metastatic, apical), length of hospital stay (LOS, day) and duration of follow-up (month) were also recorded. Complications that developed within the postoperative 30 days or during the entire postoperative LOS in patients with prolonged periods of hospitalization were considered as surgical morbidity and scored using the Clavien-Dindo Classification.[9] Overall survival (OS) and disease-free survival (DFS) for the study population were compared between the CON vs CME groups.

Histopathological Examination

Following the fixation of surgical samples in 10% neutral buffered formalin for a minimum of 36 hours, only the tumors were stained with Indian ink, while the mesenteric regions were not stained to allow for superior identification of lymph nodes. Tissue sections were taken from different regions of the tumors along with additional sections for assessment of the radial borders if necessary. Lymph node retrieval was conducted based on inspections and manual

identification, which was followed by the histological assessment. The lymph node sections were cut at 4 µm and stained with hematoxylin-eosin (H-E) for routine histology. Pathological evaluation was performed by the same team who carried out the study, composed of a gastrointestinal subspecialized pathologist and two pathology assistants. Local recurrence was defined as identification of the clinical or pathological disease evidence at lymphatic drainage site of the tumor or intestinal wall anastomosis line. DFS was considered the time (months) from R0 resection to identification of clinical or pathological local recurrence or distant metastasis. Survival status, survival time and follow up duration were calculated based on June 2019.

Surgery

The surgical procedures included right hemicolectomy, extended right hemicolectomy and laparoscopic right hemicolectomy. Mechanical bowel preparation was not performed; however, preoperative enemas were performed twice. Parenteral cefazolin 2x1 g and metronidazole 3x500 mg were initiated intraoperatively and continued 48 hours postoperatively. Conventional right hemicolectomy and extended right hemicolectomy were performed for tumors located up to or at the level of the hepatic flexure, respectively by colorectal surgeons. For both techniques, 10 cm of uninvolved surgical margins proximal and distal to the tumor with a wide resection were targeted. For patients at the T4 stage, invaded tissue was removed to enable R0 resection; this was one of the steps implemented as an additional intervention as shown in Table 2. Anastomoses were performed using the stapler or were done manually. For the CON technique, vascular ligation ensuring no observable or palpable residual lymph nodes was performed. For the CME technique, as described by Hohenberger, dissections were done in conformity with embryological planes and avoidance of any visceral fascial layer breaches; the procedure also involved central vascular ligation (CVL).[1] The operations were performed by the senior surgeon in majority of cases, while a few operations were performed by two surgeons with EBSQ-CP (2016 , Milan) board certificate and under supervision of the senior surgeon.

Follow-up

In accordance with postoperative National Comprehensive Cancer Network (NCCN) guidelines, patients were followed up in 3-month intervals in the first 2 years and in 6 months intervals in the following 3 years.[10] Blood biochemistry and tumor markers (CEA and CA19-9) were analyzed at each visit, while thoracoabdominopelvic CT and colonoscopy were performed once yearly. PET CT was optional. For the purpose of this study, patients or relatives were contacted to confirm survival status.

Statistical Analysis

Statistical analysis was performed using IBM SPSS Statistics for Windows, version 22.0 (IBM Corp., Armonk, NY). Categorical data were analyzed using Pearson Chi-Square test, Fisher's exact test, Linear-by-Linear Association and Mantel Haenzsel test, while Mann-Whitney U test was used for analysis of the numeric variables. Survival analysis was performed via Kaplan-Meier analysis and comparisons were made via Log-Rank test. Data were expressed as means (and SD), medians (minimum-maximum), 95% confidence intervals (CI) and percentages (%) where appropriate.

Results

Baseline Patient and Tumor Characteristics

Overall, mean patient age was 63.8 (SD 14.3, range 23 to 103) years and females composed 57.5% of the study population. Most of patients were American Society of Anesthesiologists (ASA) Class I-II (78.2%) status. The tumor histology revealed poor-moderate differentiation in 88.5% of tumors. Mucinous and signet-ring cell components were noted in 47.1% (pure mucinous in 18.4%) and 9.2% (pure signet-ring in 4.6%) of tumors. Perineural, venous, lymphatic and extra-nodal tumor invasion was noted in 39.1%, 20.7%, 34.5% and 29.9% of patients, respectively (Table 1). No significant difference was noted between CON and CME groups in terms of patient and tumor characteristics (Table 1).

Surgery, Chemotherapy and Staging

Chemotherapy was not administered in 43.7% of patients, while 56.3% did receive adjuvant chemotherapy. Locally advanced disease was noted in 75 (86.2%) patients, while additional interventions were performed in 12 (13.85%) patients at pT4b stage including small intestinal resection (n=7), partial abdominal wall resection (n=4) and cholecystectomy (n=1). In comparing the two surgery techniques, the laparoscopic approach was preferred in CON surgery (33.3 vs 2.1%, p<0.001) (Table 2).

Lymph Node Yield, Surgical Morbidity and Recurrence

Overall, postoperative complications were noted in 29 (33.3%) patients with a Clavien-Dindo Score (CDS) of ≥3 in 10 (11.5%) patients. Median total (58.0 vs 31.0, p<0.001) and apical (3.0 vs 2.0, p=0.034) lymph node yield were significantly higher in those who underwent CME compared to those who underwent CON, while there was a non-significant tendency for a higher rate of apical lymph node metastasis in the CON group (7.7 vs 2.1%) (Table 3). Median overall duration of follow up was 37.5 months (range: 3.5 to 156.3), and 87.3 months (range: 3.5 to 156.3) and 25.1 months (6.7 to 84.8) in the CON and

Table 1. Baseline patient and tumor characteristics

		Total (n=87)	Conventional hemicolectomy (n=39)	Complete mesocolic excision (n=48)	p value
Patient characteristics					
Age (year)	Mean (SD)	63.8 (14.3)	65.4 (12.5)	62.6 (15.6)	0.374[1]
	Median (min-max)	66.0 (23.0-103.0)	67.0 (41.0-87.0)	63.0 (23.0-103.0)	
Gender, n (%)					
Female		50 (57.5)	22 (56.4)	28 (58.3)	0.857[2]
Male		37 (42.5)	17 (43.6)	20 (41.7)	
ASA class, n (%)					
1		48 (55.2)	22 (56.4)	26 (54.2)	0.961[3]
2		20 (23.0)	9 (23.1)	11 (22.9)	
3		15 (17.2)	5 (12.8)	10 (20.8)	
4		4 (4.6)	3 (7.7)	1 (2.1)	
Tumor characteristics					
Mucinous component, n (%)					
None		46 (52.9)	25 (64.1)	21 (43.8)	0.205[3]
<50%		25 (28.7)	7 (17.9)	18 (37.5)	
>50%		16 (18.4)	7 (17.9)	9 (18.8)	
Signet-ring cell component, n (%)					
None		79 (90.8)	36 (92.3)	43 (89.6)	0.520[3]
<50%		4 (4.6)	2 (5.1)	2 (4.2)	
>50%		4 (4.6)	1 (2.6)	3 (6.3)	
Differentiation, n (%)					
Poor		34 (39.1)	17 (43.6)	17 (35.4)	0.532[2]
Moderate		43 (49.4)	19 (48.7)	24 (50.0)	
Well		10 (11.5)	3 (7.7)	7 (14.6)	
Tumor invasion, n (%)					
Perineural	Yes	34 (39.1)	14 (35.9)	20 (41.7)	0.583[2]
	No	53 (60.9)	25 (64.1)	28 (58.3)	
Venous	Yes	18 (20.7)	8 (20.5)	10 (20.8)	0.971[2]
	No	69 (79.3)	31 (79.5)	38 (79.2)	
Lymphatic	Yes	30 (34.5)	11 (28.2)	19 (39.6)	0.267[2]
	No	57 (65.5)	28 (71.8)	29 (60.4)	
Extra-nodal	Yes	26 (29.9)	14 (35.9)	12 (25.0)	0.269[2]
	No	61 (70.1)	25 (64.1)	36 (75.0)	

[1]Mann-Whitney U test, [2]Pearson chi-square, [3]Linear-by-Linear Association, [4]Fisher's exact test, SD: Standard deviation

Table 2. Surgery, chemotherapy and stage distribution

	Total (n=87)	Conventional hemicolectomy (n=39)	Complete mesocolic excision (n=48)	p value
Surgery characteristics				
Type, n (%)				
Emergency	4 (4.6)	2 (5.1)	2 (4.2)	0.610[1]
Elective	83 (95.4)	37 (94.9)	46 (95.8)	
Procedure, n (%)				
Right hemicolectomy	68 (78.2)	25 (64.1)	43 (89.6)	
Extended right hemicolectomy	5 (5.7)	1 (2.6)	4 (8.3)	<0.001[2]
Laparoscopic right hemicolectomy	14 (16.1)	13 (33.3)	1 (2.1)	
Additional intervention, n (%)				
Yes	12 (13.8)	5 (12.8)	7 (14.6)	0.813[2]
No	75 (86.2)	34 (87.2)	41 (85.4)	
Treatment characteristics				
Chemotherapy, n (%)				
None	38 (43.7)	18 (46.2)	20 (41.7)	0.907[2]
Adjuvant	49 (56.3)	21 (53.8)	28 (58.3)	
Stage distribution				
T-Stage, n (%)				
1	6 (6.9)	2 (5.1)	4 (8.3)	
2	6 (6.9)	2 (5.1)	4 (8.3)	0.855[2]
3	42 (48.3)	20 (51.3)	22 (45.8)	
4	33 (37.9)	15 (38.5)	18 (37.6)	
TNM-Stage, n (%)				
1	12 (13.8)	4 (10.3)	8 (16.7)	
2	35 (40.2)	17 (43.6)	18 (37.5)	0.657[2]
3	40 (46.0)	18 (46.2)	22 (45.8)	

[1]Fisher's exact test, [2]Pearson chi-square

CME groups, respectively. Overall, recurrence was noted in 16 (18.4%) of patients including systemic recurrence in 11 (12.6%) patients and local recurrence in 5 (5.7%) patients. Total, systemic and local recurrences occurred in 7 (14.6%), 6 (12.5%) and 1 (2.1%) patients in the CME group and in 9 (23.1%), 5 (12.8%) and 4 (10.3%) patients in the CON group, respectively. Local recurrence was seen in 1 patient with pT4b stage cancer in the CME group, while 3 patients with pT4a stage and 1 patient with pT4b stage were observed in the CON group. Median time to recurrence development was 6.0 months (range: 2.2 to 18.5 months) in the CME group and 13.2 months (range: 4.7 to 43.0 months) in the CON group (Table 3). Peritonitis carcinomatosa was evident in 4 overall, including 3 patients with pT4a stage and 1 with pT3c stage. No significant difference was noted between the CON and CME groups in terms of CDS, LOS, or recurrence (Table 3).

Survival Data

In total, OS and DFS rates were 81.6% and 75.9%, respectively with average OS and DFS of 119.0 months and 112.5 months duration, respectively (Table 4). No significant difference was noted between the CON and CME groups in terms of OS (66.7 vs 93.8% and 113.1 vs 74.9 months, respectively, log rank p=0.216) (Figure 1) and DFS (64.1% vs 85.4% and 107.9 vs 68.7 months, respectively, log rank p=0.446) (Figure 2) at a median 87.3 months and 25.1 months of follow up, respectively (Table 4).

Table 3. Lymph node yield, surgical morbidity and recurrence

		Total (n=87)	Conventional hemicolectomy (n=39)	Complete mesocolic excision (n=48)	p value
Clavien–Dindo Score, n (%)					
1		5 (5.7)	1 (2.6)	4 (8.3)	0.388[3]
2		14 (15.7)	8 (20.5)	6 (12.5)	
3		8 (9.2)	5 (12.8)	3 (6.3)	
4		2 (2.3)	0 (0.0)	2 (4.2)	
Recurrence, n (%)					
Yes		16 (18.4)	9 (23.1)	7 (14.6)	0.194[2]
No		71 (81.6)	30 (76.9)	41 (85.4)	
Apical node metastasis, n (%)					
Yes		4 (4.6)	3 (7.7)	1 (2.1)	0.321[1]
No		83 (95.4)	36 (92.3)	47 (97.9)	
Follow up (month)	Median(min-max)	37.5 (3.5-156.3)	87.3 (3.5-156.3)	25.1 (6.7-84.8)	<0.001[4]
	Mean (SD)	55.4 (42.8)	84.4 (45.4)	31.8 (20.2)	
Time to recurrence (month)	Median (min-max)	10.4 (2.2-43.0)	13.2 (4.7-43.0)	6.0 (2.2-18.5)	0.071[4]
	Mean (SD)	12.1 (9.6)	15.3 (11.0)	7.9 (5.9)	
Lymph node yield (count)					
Total	Mean (SD)		33.6(16.7)	57.9 (24.5)	<0.001[4]
	Median (min-max)		31.0(4.0-74.0)	58.0 (14.0-118.0)	
Metastatic	Mean (SD)		3.7(9.5)	1.8 (4.2)	0.561[4]
	Median (min-max)		0.0(0.0-49.0)	0.0 (0.0-23.0)	
Apical	Mean (SD)		2.4(1.7)	3.3 (2.0)	0.034[4]
	Median (min-max)		2.0(1.0-9.0)	3.0 (1.0-10.0)	
Length of hospital stay (day), Median (min-max)			6.0(4.0-38.0)	7.0 (5.0-41.0)	0.526[4]

[1]Fisher's exact test, [2]Pearson chi-square, [3]Mantel Haenzsel test, [4]Mann-Whitney U test, min: Minimum, max: Maximum, SD: Standard deviation

Table 4. Survival data for each group

	Total (n=87)	Conventional hemicolectomy (n=39)	Complete mesocolic excision (n=48)	p value
Overall survival				
Rate, %	81.6	66.7	93.8	0.216
Time (months), mean (SE, 95% CI LB-UB)	119.0 (8.1, 103.2-134.8)	113.1 (9.7, 94.1-132.1)	74.9 (3.5,68.1-81.8)	
Disease-free survival				
Rate, %	75.9	64.1	85.4	0.446
Time (months), mean (SE, 95% CI LB-UB)	112.5 (8.2, 96.5-128.5)	107.9 (10.3, 87.6-128.2)	68.7 (4.4, 60.1-77.2)	

CI: Confidence interval, LB: lower bound; UB: upper bound. Log Rank (Mantel cox)

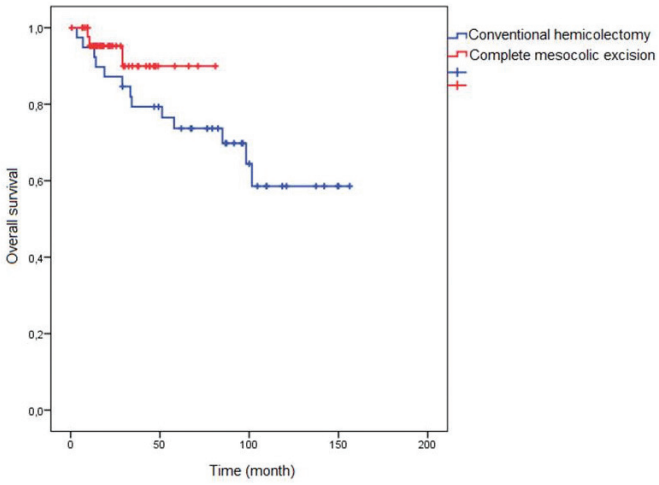

Figure 1. Kaplan-Meier analysis for overall survival according to surgery technique

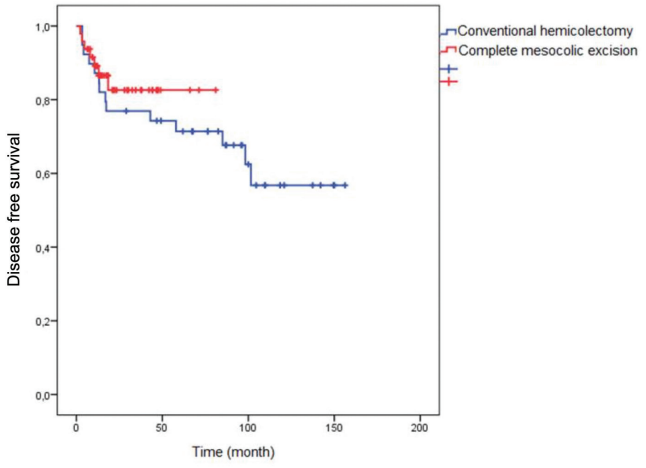

Figure 2. Kaplan-Meier analysis for disease-free survival according to surgery technique

Discussion

The current study revealed superiority of CME over the CON technique in terms of providing a more radical dissection of apical lymph nodes for patients with right-sided colon cancer. However, this was not associated with a significant survival advantage for CME-operated patients during a median follow up of 37.5 (range: 3.5 to 156.3) months. While CME is technically more difficult than CON, no significant increase was noted in surgical morbidity.

CME differs from conventional surgery in two major ways: it achieves a more radical excision of the lymphovascular pedicle and the mesocolon and achieves resection with an intact visceral peritoneum along with near and distal resection margins of at least 10 cm. Bertelsen and colleagues have generated strong evidence that improving colonic surgery can potentially improve survival to an equivalent or greater extent than adjuvant chemotherapy.[11] Quirke and West commented in their article that the findings of Bertelsen et al.[12] cannot be ignored and must be explored further.

In the current study, CON and CME groups were homogenous in terms of patient demographics, tumor characteristics, chemotherapy administration and surgical morbidity. This is important given the heterogeneity of historical comparison in terms of factors with the potential to influence on the outcome to change between the two periods may potentially cause bias in the interpretation of results.[7,13]

Patients with apical lymph node involvement were reported to have a poor prognosis similar to those with metastatic disease.[14] The authors also emphasized the likelihood of incomplete resection risk in many patients with occult apical lymph node metastasis. This pre-cognition is in fact refers to the rationale behind the CME technique development. The increased total (median: 58.0 vs 31.0) and apical (3.0 vs 2.0) lymph node yield for CME vs. CON in our study supports the reported benefits of CME for increasing lymph node yield.[2] This appears to be in accordance with CVL or "high-tie" that is often performed with CME to ensure apical lymph node resection (for more accurate lymph node staging), minimize the risk of leaving residual disease and to reduce the risk of future metastasis.[2,15,16,17] In our series, the apical lymph node yield (2.0 vs 3.0) was lower in the CON vs the CME groups, respectively, despite the higher apical lymph node metastasis rate (7.7 vs 2.1%). This higher rate reflects the likelihood of residual metastatic apical lymph nodes seen in approximately 5.6% of patients without radical clearance. In addition, given the association between a lymph node yield ≥22 with an improved 5-year OS[18,19,20] and a lymph node yield ≥28 with an improved 5-year cancer related survival[1], the lymph node yield advantage of CME in our cohort appears to demonstrate the beneficial implications for local disease control and survival.[2]

CME is a technically more challenging procedure compared to CON with a potentially higher risk of damaging critical structures during dissection due to greater anatomical variability in the right colon than that in the left colon or rectum.[2,4,21] Notably, in a meta-analysis of 12 studies with 8586 patients that compared the safety, quality and effect of CME vs non-CME in patients with colon cancer, CME was reported to be associated with greater intraoperative blood loss, more postoperative surgical complications, longer large bowel resection, larger area of mesentery and higher rate of lymph nodes resection. In addition, CME has positive effects on 5-year survival [hazard ratio (HR)

0.33], 3-year OS (HR 0.58) and 3-year survival for Stage III disease (HR 0.69) as compared with survival rates for those in the non-CME group.[4] Use of a standardized assessment method proposed by Dindo et al.[9] in assessing the surgical morbidity in our patients was also important given that this approach can assess morbidity in a more objective manner.[3] In our series, surgical morbidity was evident in one-third of patients with a CDC score ≥3 which represented 10% of patients; furthermore there were no surgical mortalities. Hence, CME appears to offer benefits without adversely affecting the surgical morbidity in patients with right-sided colon cancer.

In a past study among 779 patients with colon cancer who underwent CME between 1996 and 2007, the authors reported that CME was associated with a median lymph node count of 15 (range: 0-113), few complications, a low recurrence rate (10.2%), high 5-year OS (76.2%) and 5-year cancer-specific survival (89.8%).[6] Other studies also reported favorable oncological outcomes in terms of 5-year survival rates (range, 63.7 to 76.2%)[6,15,22], cancer-specific survival rates (range: 76.6% to 89.9%)[1,6,22] and median lymph node count (range: 14.7 to 32.0).[1,6,15] In the current study, after a median follow up of 25.1 months (range: 6.7 to 84.8 months), OS and DFS rates were 93.8% and 85.4%, respectively in the CME group.

Data from comparative studies on non-CME vs CME resection studies revealed lower local 5-year recurrence rates[3,5,23] as well as improved 3-year survival rates (79.0% vs 88.1%), 5-year OS (by 16%)[3,23,24], DFS (75.9 vs 85.8%, 74.3 vs 82.1% and 82 vs 89%)[11,25,26] and cancer-specific survival (90.5% vs 95.2%).[25] In a systematic review of 22 studies, CME was found to be advantageous in terms of OS rate (58.7% vs 53.5%), DFS rate (77.4% vs 66.7%) and local recurrence rate (4.5% vs 7.8%).[27] Notably, in a retrospective study comparing oncological outcomes for CME (n=364) vs non-CME (n=1031) colectomies, no significant difference was noted between the two groups in terms of OS rates, despite higher 4-year DFS rates in the CME group.[11] To explain the lack of difference in OS, the authors considered the possible role of the short follow-up, improved surgical outcomes for recurrent disease resection, or advances in chemotherapy for patients with non-resectable recurrent disease.[11]

In the current study, total, systemic and local recurrence rates were 23.1%, 12.8% and 10.3% within a median occurrence time of 13.2 months in the CON group and 14.6%, 12.5% and 2.1% within median 6.0 months in the CME group, respectively with no significant difference between study groups. Notably, pT4 stage was evident in 8 of 16 patients who experienced disease, which suggests that the potential benefit of CME may be limited or unrecognized for those at this stage. The incidence of the T4 colorectal cancer among the advanced resected cases has been reported to be up to 21%-43%.[28,29,30] In this regard, the observed rate for locoregional recurrence in the current study seems to be associated with presence of T4 stage tumor, considered as a risk factor for locoregional recurrence, in 37.9% of our cases.[31,32] In fact, none of our patients received neoadjuvant chemotherapy, while much higher rates for local recurrence (15.7%) was reported in a study among patients with T4 stage locally advanced disease without neoadjuvant chemotherapy.[33]

Our findings suggest right-sided CME is not associated with increased short-term mortality or morbidity.[1,5,11,25] Although our preliminary data on the CME technique (used in our clinic since 2013), indicates no survival benefit of CME over CON, this finding should be interpreted considering the shorter follow up duration in the CME group. Nonetheless, CME appears to be associated with an increased lymph node yield without adversely affecting LOS or surgical morbidity. In addition, the Kaplan-Meier analysis appears to indicate a tendency in favor of a survival benefit when using CME for patients with colon cancer.

Study Limitations

Certain limitations to this study should be considered. First, due to the retrospective, single center design, establishing a cause and effect temporality as well as generalizing our findings to the overall colon cancer population may not be possible. Second, there was discordance between follow up duration among the studies. Third, while heterogeneity in the small patient group in terms of laparoscopic technique, number of surgeons, type of surgeries may be considered amongst the limitations of the study, their effect on outcomes seems minimal given a) proven similar oncological outcomes of open and laparoscopic techniques, b) the limited use of laparoscopic technique (only in 1 case with CME) ruling out the potential negative impact of learning curve on oncological outcome and c) implementation of majority of the operations by the same senior surgeon. Finally, the possibility that the number of lymph nodes harvested is higher in the extended right hemicolectomy vs right hemicolectomy can be criticized. Since dissection plans are the same, their effect on oncological outcomes will be minimal and their effect on the average of the lymph nodes removed will be limited due to the small number of cases. Nevertheless, despite these limitations, given the restricted amount of data available on utility of CME in patients with colon cancer, our findings represent a valuable contribution to the literature.

Conclusion

In conclusion, our findings suggest that CME is safe when performed by experienced surgeons and there appears to be no risk of increased morbidity. CME has potential to improve oncological outcomes and may offer a survival benefit. Although CME appears to offer no significant survival benefit over CON in terms of OS and DFS, the potential survival benefit seems likely based on the longer term follow up. Nonetheless there is a need for further statistically and clinically significant evidence on long-term benefits of CME in order for it to be adopted as a standard of care for patients with colon cancer.

Ethics

Ethics Committee Approval: ATADEK date of approval: 05/12/2019, reference number/protocol number: 2019-19/23

Informed Consent: Due to the retrospective design of the study, informed consent was waived

Peer-review: Internally peer reviewed.

Availability of data and material (data transparency): The dataset supporting the conclusions of this article will be public available after publication with the DOI: 10.6084/m9.figshare.12298856

Authorship Contributions

Surgical and Medical Practices: L.V.T., O.S.G., A.Z., Concept: L.V.T., O.S.G., İ.B.B., A.Z., Design: L.V.T., A.Z., Data Collection or Processing: L.V.T., İ.B.B., Analysis or Interpretation: L.V.T., O.S.G., A.Z., Literature Search: L.V.T., İ.B.B., Writing: L.V.T., O.S.G.

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CASE REPORT

Mechanical Small-Bowel Obstruction due to Ileal endometriosis

"İleal Endometriyozis Nedeniyle Oluşan Mekanik İnce Bağırsak Obstrüksiyonu" Olgu Sunumu

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ABSTRACT

Mechanical small-bowel obstruction is a very common surgical emergency, but obstruction due to endometriosis is very rare, and only a few cases have been reported in the literature. Herein, we present the case of a 28-year-old female who presented with abdominal pain, loss of appetite, nausea and vomiting. Plain abdominal X-ray showed multiple air-fluid images. Abdominal computed tomography revealed dilated ileal segments and air-fluid images. The patient underwent a partial ileum resection + ileo-ileostomy. In the histopathological examination, endometriosis was confirmed between the ileal segments.

Keywords: Endometriosis, mechanial ileus, mechanical small bowel obstruction

ÖZ

Mekanik ince bağırsak obstrüksiyonu çok yaygın bir cerrahi acil durumdur, fakat endometriyozise bağlı olanına çok nadir rastlanır. Literatürde birkaç olgu sunumu vardır. Buradaki olguda 28 yaşında bir kadın hasta karın ağrısı, iştahsızlık, bulantı ve kusma şikayetleri ile başvurdu. Abdominal bilgisayarlı tomografide multipl hava-sıvı seviyeleri vardı. Abdominal bilgisayarlı tomografide genişlemiş ileum segmentleri ve hava-sıvı seviyeleri vardı. Hastaya parsiyel ileum rezeksiyonu + ileo-ileostomi ameliyatı yapıldı. Histopatolojik incelemede ileal segmentler arasında endometriyozis varlığı rapor edildi.

Anahtar Kelimeler: Endometriyozis, mekanik ileus, mekanik ince bağırsak obstrüksiyonu

Introduction

Mechanical intestinal obstruction is one of the most common surgical emergencies with a very wide spectrum of causes. The possible causes include external compression (adhesions, hernia), changes in the bowel wall (tumour, inflammation/infection) and blockage of the lumen (coprostasis, intussusception). The passage of intestinal contents can be blocked either partially (sub-ileus, incomplete ileus) or totally (complete ileus). Mechanical ileus more often affects the small bowel than the large bowel, in a ratio of 4:1.[1]

Small-bowel ileus is usually caused by adhesions from prior surgery (65%) or hernia (15%), while large-bowel ileus is usually caused by cancer (70%) or by adhesions and stenoses after a recurrent diverticulitis (up to 10%).[1]

The clinical manifestations of ileus and their degree of severity depend to a large extent on the blockage site. Thus, the common manifestations of small-bowel ileus include nausea and vomiting, cramps, bloating and retention of stool and flatus. The more proximally located the pathological process is, the more rapidly the patient becomes symptomatic with the vomiting of undigested food. The diagnostic evaluation of mechanical ileus is as follows: In the physical examination, the abdomen is distended and intensified bowel sounds are a classic finding in the early

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phase. There is no specific laboratory test for the assessment of mechanical ileus in the early phase.[2] In the late phase, bowel ischaemia may occur and the levels of acute phase reactants increase. Procalcitonin concentration seems to be a potentially useful marker.[3] Abdominal ultrasonography in the emergency room is still a useful means of detecting free fluid or an incarcerated hernia. It plays a less important role in the evaluation of ileus, as its utility is limited by artefact from air in the distended abdomen.[4] An abdominal plain film in the standing or lateral position is inexpensive and can be readily obtained, but it is also relatively insensitive and nonspecific.[5] Abdominal computed tomography (CT) is more than 90% sensitive and specific for the diagnosis of mechanical ileus and is thus the gold standard.[6] It enables the assessment of the degree of severity (complete versus incomplete ileus), precise localisation (caliber difference) and determination of the cause (incarcerated hernia, tumour, inflammatory changes), along with the detection of potential complications (ischaemia, perforation).

Case Report

A 28-year-old female patient was admitted to the emergency service with complaints of abdominal pain, loss of appetite, nausea and vomiting. The abdominal pain started in the epigastric region one day ago and radiated to the whole abdomen in 6 h. The character of the pain was crampy and lasted for ~1 min, then gradually decreased. She had no remarkable past medical history. In the physical examination, abdominal tenderness in the whole abdomen and rebound tenderness were positive. The l ab test showed mild leukocytosis. Abdominal USG was inconclusive because of gas. Plain abdominal X-ray showed multiple air-fluid images (Figure 1). IV contrasted tomography showed dilatation and wall thickening of the whole ileum (Figure 2, 3). The patient's complaints, physical examination and abdominal CT findings were compatible with a diagnosis of mechanical small-bowel obstruction with an unknown etiology. The patient underwent a laparotomy, which revealed a big gato formation of the distal ileum that lead to a 15-cm complete obstruction and a proximal ileocecal valve. It was impossible to dissect the gato formation; therefore, we decided to perform a parietal ileum resection and primary anastomosis. Postoperative follow-up was uneventful, and the patient was discharged on the fourth postoperative day without any complications. Postoperative histopatological examination of the specimen was reported as fibrosis caused by endometriosis (Figure 4, 5)

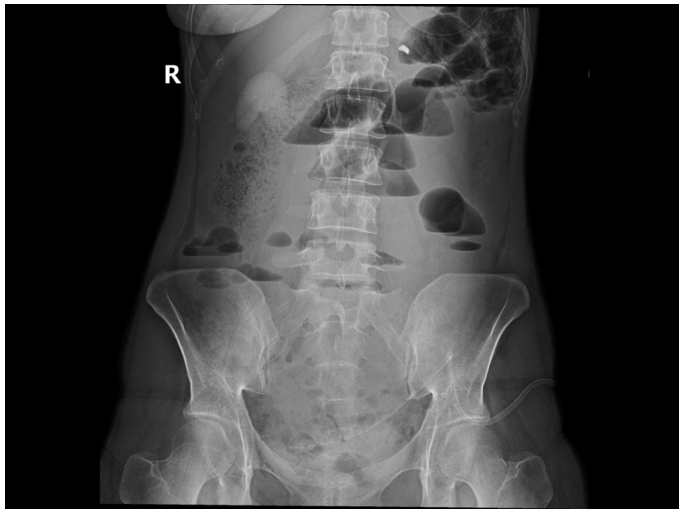

Figure 1. Plain Abdominal X-ray

Discussion

There are many causes of mechanical small-bowel obstruction. Ninety percent of obstructions without peritonitis resolve

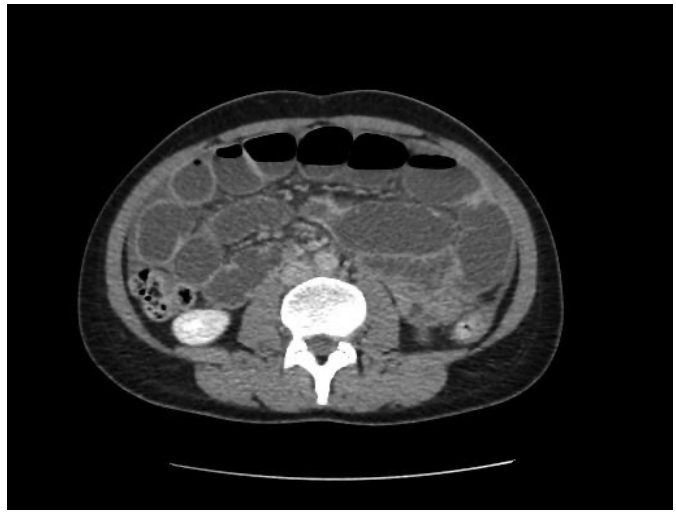

Figure 2. Abdominal CT
CT: Computed tomography

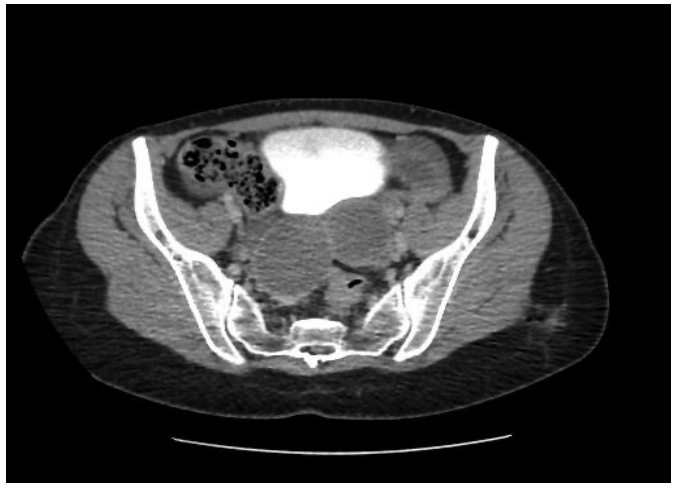

Figure 3. Abdominal CT
CT: Computed tomography

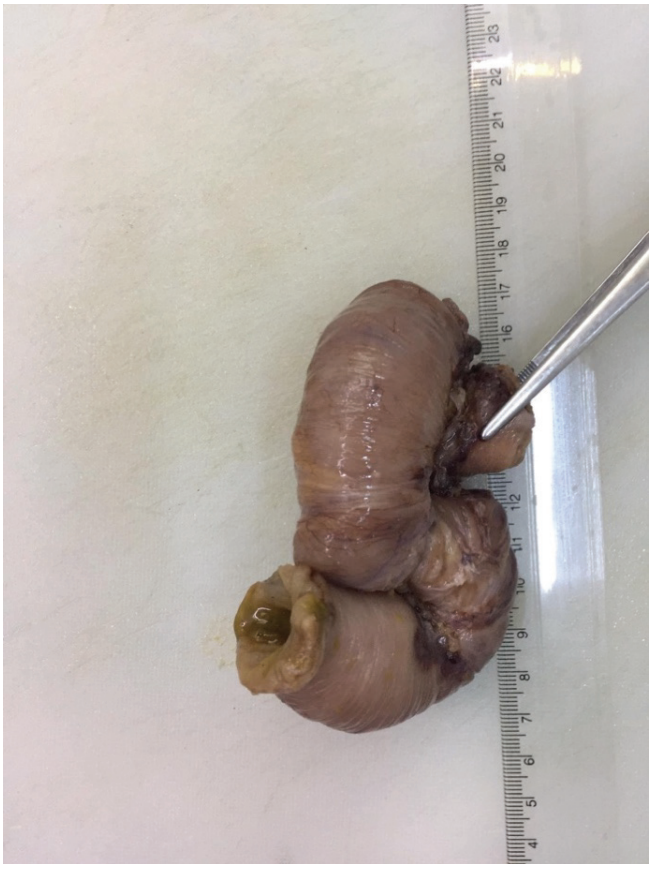

Figure 4. Macroscopic image of the Specimen

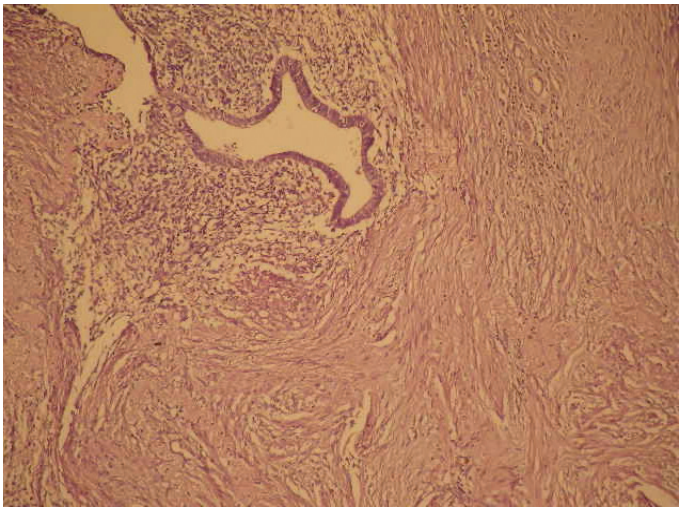

Figure 5. Microscopic image of the Specimen

spontaneously.[7] To avoid unnecessary laparotomies, an accurate anamnesis and physical examination, laboratory tests and radiological imaging studies should be done.

Bowel endometriosis occurs in ~10% of all cases of endometriosis[8,9] and usually arises in the rectum and sigmoid colon in 80% of these cases.[10] It is usually asymptomatic, but may cause nonspecific symptoms, such as abdominal colic-like pains, nausea, vomiting and general symptoms of intestinal obstruction.[11] Obstruction due to small-bowel endometriosis does not spontaneously resolve. Since small bowel is totally intraperitonel and adhesions are very sticky and firm, the bowel can, therefore, be easily twisted. Bowel endometriosis cannot be easily diagnosed, and it should be suspected by the clinician if the patient has a history of endometriosis. In our patient, the USG and abdominal CT showed unperforated ovarian cysts, but this was not sufficient to confirm the endometriosis. Since there were no signs of peritonitis and sepsis, we decided to manage the patient conservatively.

The patient was hospitalised and medical treatment started (NG decompression, NPO, IV fluid and electrolyte replacement, antibiotics and analgesics). After 24 h of follow-up, the clinical status of the patient did not improve, and a laparotomy was then performed. We explored all the intestine and found the gato formation of the distal ileum measuring 15 cm and a proximal ileocecal valve. Due to the complex adherence of the affected ileum, we decided to perform a partial ileal resection (~30 cm) with a primary side-to-side anastomosis. During the surgery, we suspected an intestinal endometriosis, but found the real cause of the adhesion after the pathological investigation. In the literature, ileal mechanical obstruction due to endometriosis is a rear condition. In our case, we did not suspect endometriosis preoperatively. Bilateral ovarian cysts could be remarkable; however, we could do the same algorithm.

In conclusion: Mechanical small-bowel obstruction due to ileal endometriosis is a rare case, but should be in consideration. It does not resolve spontaneously and surgery is the treatment of choice.

Informed Consent: Obtained.

Peer-review: Internally peer reviewed.

Authorship Contributions

Surgical and Medical Practices: Ü.S., T.O., Concept: Ü.S., Design: Ü.S., Data Collection or Processing: Ü.S., B.G., Analysis or Interpretation: Ü.S., Literature Search: Ü.S., Writing: Ü.S.

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

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CASE REPORT

Massive Megacolon Due to Giant Faecaloma of the Sigmoid Colon in an Elderly Patient

Yaşlı Bir Hastada Sigmoid Kolondaki Dev Fekaloma Bağlı Gelişen Masif Megakolon

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ABSTRACT

Faecaloma is a mass of inspissated faeces, typically found in the rectosigmoid colon. Furthermore, faecalomas may cause intestinal obstruction, stercoral ulcer development and colon perforation, which may be due to the pressure effect of large faecal mass. We herein present a case of massive megacolon due to giant faecaloma in a 72-year-old man with symptoms of mechanical ileus. During surgery, there was a giant faecaloma, 10 cm in diameter, within the sigmoid colon, and a Hartmann left colon resection was performed. The purpose of this article is to provide a brief overview of this condition and discuss treatment options.

Keywords: Faecaloma, ileus, intestinal obstruction, mechanical bowel obstruction, megacolon

ÖZ

Fekalom, genellikle rektosigmoid kolonda yerleşen sertleşmiş bir gaita kütlesidir. Fekalomlar, bağırsak tıkanmasına, fekal muhteviyatın bası etkisiyle sterkoral ülser gelişimi ve kalın bağırsak perforasyonuna yol açabilir. Biz burada mekanik ileus semptomları ile başvuran 72 yaşındaki erkek bir hastada dev fekaloma bağlı gelişen masif megakolon olgusunu sunuyoruz. Operasyonda sigmoid kolonda 10 cm çaplı dev bir fekalom kütlesi olduğu görüldü ve hastaya Hartmann tipi sol kolon rezeksiyonu uygulandı. Bu çalışmanın amacı, bu klinik durumu kısaca gözden geçirmek ve tedavi seçeneklerini tartışmaktır.

Anahtar Kelimeler: Fekalom, ileus, bağırsak tıkanması, mekanik bağırsak tıkanması, megakolon

Introduction

Faecaloma is characterised as a mass of inspissated faeces accumulated in the colon and/or rectum that is much harder than impacted faeces. The faeces initially accumulate, then stagnate and get impacted by faecal stasis, expand and deform the intestine and develop into large tumour-like masses. Moreover, faecalomas are frequently seen in neglected elderly people, bed-dependent patients, nursing home residents, chronic psychiatric patients, Hirschsprung's disease, Chagas disease, colonic stenosis caused by chronic inflammation or tumours and patients with chronic constipation.[1]

We herein describe a case of massive megacolon due to giant faecaloma in a 72-year-old man with symptoms of mechanical colonic obstruction. During surgery, there was a giant faecaloma in the sigmoid colon, and a Hartmann left colon resection was performed. The purpose of this article is to provide a brief overview of this condition and discuss treatment alternatives for such cases.

Case Report

A 72-year-old male was admitted to our emergency department with complaints of abdominal pain, abdominal distension, nausea and vomiting and an absence of gas-faeces discharge for approximately 1 week. The patient was first admitted to

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another general hospital and was then hospitalised in the hospital's inpatient general surgery unit. Initially, the patient was diagnosed with ileus and managed conservatively with laxatives and enemas for about 5-6 days. Unfortunately, he did not benefit from the medical treatment used, and the patient's abdominal distension increased day by day. Since the patient was considered a poor surgical candidate due to his older age and underlying pulmonary disease, he was referred to our hospital for further examination and treatment.

The patient's previous medical history included colonic surgery of uncertain aetiology 9 years earlier. During the physical examination, the abdomen was markedly distended. A digital rectal examination revealed empty ampulla recti. Plain abdominal X-rays showed marked distension of the entire colon, which was full of faecal waste. In addition, computed tomography (CT) of the abdomen revealed markedly distended colonic segments filled with intraluminal faecal matter (Figure 1). The patient was admitted in the surgical intensive care unit of our hospital, and surgical intensive care team began rapid intravenous fluids and electrolyte replacement. A nasogastric tube was inserted and a large volume of liquid faecaloid content was emptied. Initially, we tried medical strategy, including enemas, but it was not effective in resolving mechanical ileus. Since our patient was unresponsive to conventional medical treatment for about 1 week and his abdomen was severely distended, leading to abdominal compartment syndrome, we agreed to perform a surgical intervention with a preliminary diagnosis of obstructive left colonic malignancy.

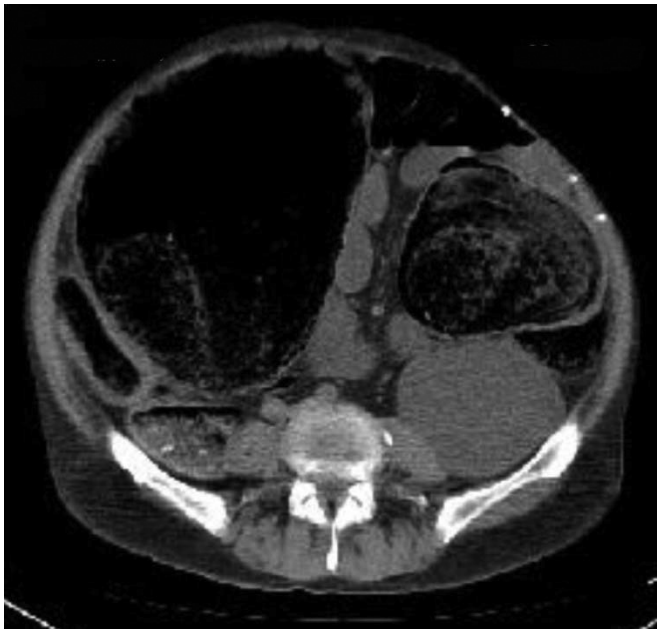

Figure 1. An axial CT section showing well-formed, large faecal ball in dilated sigmoid colon

CT: Computed tomography

An emergency laparotomy was conducted following haemodynamic stabilisation with adequate fluid and electrolyte resuscitation in the surgical intensive care unit. Furthermore, proximal colonic segments were extremely distended during exploration due to faecaloma obstruction. The maximum diameter of the transverse colon was 24 cm. At the previous anastomotic level, there was a giant faecaloma in the sigmoid colon (Figure 2). Surgical intervention was carried out with the Hartmann left hemicolectomy. On the section of the sigmoid colon, a large faecal mass, approximately 10 cm in diameter, was present within the lumen (Figure 3). The patient had a regular postoperative course. Additionally, histopathologic examination revealed oedematous and congested colonic mucosa. No stercoral ulcers were also detected. However, there were ganglion cells in the submucosa of the colon.

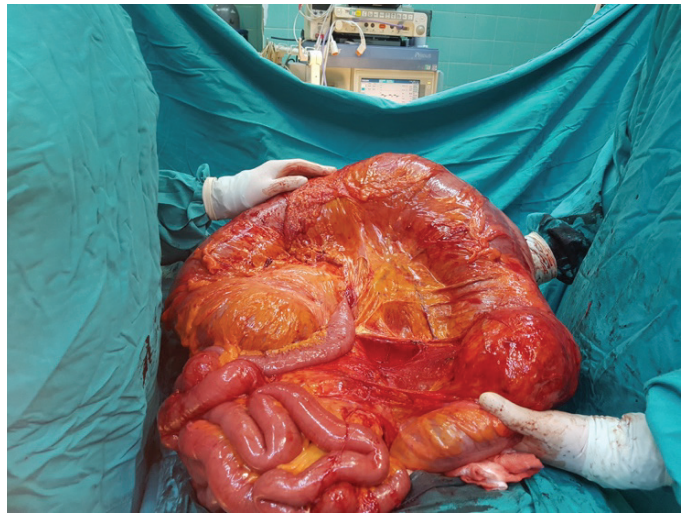

Figure 2. Giant faecaloma resided in the sigmoid colon and dilated proximal colonic segments

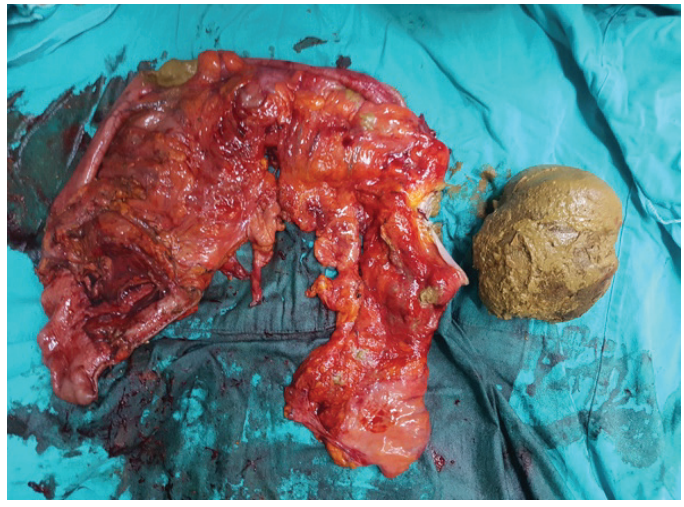

Figure 3. Resected colon specimen with giant faecaloma

Discussion

Faecal impaction is a common condition, and faecaloma is an extreme variety of impaction, which refers to an accumulation of faeces that forms a mass distinguishable from the rest of the bowel contents.[2] Faecalomas are hard, laminated and calcified faecal masses. This clinical condition is generally seen in elderly and chronically constipated patients and is usually caused by a dolichomegacolon. Moreover, the sigmoid colon and rectum are the most common localisations of this condition.[3] Chronic constipation is one of the most commonly recorded symptoms in these cases and is the primary cause of patient medical examinations.[4] Patients with faecaloma typically have non-specific symptoms such as diarrhoea overflow, chronic anaemia, weight loss or ambiguous postprandial abdominal discomfort.[5] Plain abdominal X-rays, barium enema studies and a colonoscopy can be diagnostic. Specific ultrasound and CT scan appearance have also been reported.[6,7] Despite all these investigations, faecalomas have been confused with colonic malignancy. Our patient was in his seventh decade and had chronic constipation, and we were only able to establish the diagnosis during surgery that revealed a giant faecaloma in the sigmoid colon.

Faecaloma can resemble a colorectal carcinoma due to its manifestation as an abdominal mass. The most frequently seen complications of a faecaloma result from direct obstruction of either small bowel or colon, which may lead to perforation, peritonitis and abscess formation. Other rare complications of faecaloma stem from the direct compression of adjacent anatomical structures, which may cause urinary retention, bladder compression, urinary bladder rupture, ureteral obstruction, hydronephrosis, nerve compression, sciatica or deep venous thrombosis.[5,8,9] On the other hand, faecaloma, which is complicated by stercoral ulceration may lead to rectal bleeding, chronic anaemia and perforation of the colon or rectum.[10] Although constipation with faecaloma is common, stercoral perforation is rare. A study of 175 consecutive autopsies reported a 4.6% incidence of stercoral ulcer.[11] In our patient, considering the enormous size of the faecaloma, there were no stercoral ulcers, presumably due to the associated megacolon. Most faecalomas are usually evacuated by conventional modalities, including bowel rest, laxatives, polyethylene glycol, suppositories and transrectal enemas. Manual disimpaction, finger fracture method and digital rectal evacuation are also necessary to dislodge hard stools. Rectosigmoidoscopic approach to the elimination of rectal faecaloma has also been reported.[12] In addition, water jets from dental clinics have been used in chronic faecalomas using a sigmoidoscope.[13] When conservative treatments are ineffective or when potentially serious complications appear, surgical removal is appropriate to avoid morbidity and mortality. Surgical intervention requires either explorative laparotomy or laparoscopic colectomy with faecaloma extraction or excision of the colonic segment involved where there is an underlying pathology.[14] Thus, partial resection has promising outcomes in patients with minimal disease, such as sigmoid megacolon.[15] More radical surgery, such as total abdominal colectomy with ileorectal anastomosis, may be necessary in patients with constipation due to total colonic inertia. Preferably, if the proximal colon is full of faecal matter, it should be washed by polyethylene glycol or by rapid on-table colonic lavage before resection. This patient was first treated conservatively with laxatives and enemas for around 5-6 days in another hospital. We also initially attempted a medical approach, including enemas, but it was unsuccessful in resolving mechanical ileus. Since our patient was unresponsive to conventional medical treatment and had abdominal compartment syndrome due to severely distended abdomen, we agreed to perform a surgical intervention with a preliminary diagnosis of obstructive left colonic malignancy. We performed a left-sided hemicolectomy with a temporary colostomy (Hartmann's procedure) to relieve mechanical intestinal obstruction in the emergency setting, and then the closure of colostomy was done in the second session.

Faecaloma should be taken into consideration in the differential diagnosis of any patient with a history of chronic constipation, particularly in elderly people, bed-dependent patients, nursing home residents and chronically ill psychiatric patients or even in patients with prior colorectal surgery. Chronically constipated patients should be extensively investigated and should be medically, endoscopically or surgically approached to prevent possible complications. However, management is tiresome in high-risk individuals and may require surgery.

Ethics

Informed Consent: Patient was informed about the study and written informed consent form was obtained.

Peer-review: Externally peer reviewed.

Authorship Contributions

Concept: Z.T., O.Y., O.E., İ.A., Design: Z.T., O.Y., O.E., İ.A., Data Collection or Processing: Z.T., O.Y., O.E., İ.A., Analysis or Interpretation: Z.T., O.Y., O.E., İ.A., Literature Search: Z.T., O.Y., O.E., İ.A., Writing: Z.T., O.Y., O.E., İ.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.

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CASE REPORT

Is a Total Colectomy a Better Surgical Treatment for Spontaneous Colonic Perforation that Developed during Bevacizumab Treatment for Extra-intestinal Cancers?

Total Kolektomi, Bağırsak Dışı Kanserlerde Bevacizumab Kullanımına Bağlı Spontan Kolonik Perforasyon Tedavisinde Daha İyi Bir Cerrahi Tedavi Olabilir Mi?

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ABSTRACT

Spontaneous colonic perforation (SCP) is a life-threatening complication of bevacizumab treatment, but data on its management is insufficient. We present five cases of SCP in patients who were receiving bevacizumab for extra-intestinal malignancies. Patients who underwent a partial colectomy at the perforation site (n=3) suffered from ongoing abdominal sepsis postoperatively and died within a month. In contrast, patients who underwent total colectomy (n=2) had a relatively prolonged survival and eventually died of primary disease progression. Considering the pathophysiology of bevacizumab-related SCP, a total colectomy can be a life-saving and definitive procedure when non-perforated segments of the colon appear unhealthy during intraoperative exploration.

Keywords: Bevacizumab, spontaneous colonic perforation, total colectomy

ÖZ

Spontan kolonik perforasyon, bevacizumab tedavisinin çok yüksek mortaliteyle seyreden bir komplikasyonu olmasına rağmen bu durumun yönetminine dair literatür verisi kısıtlıdır. Bu yazımızda, bağırsak dışı kanserler sebebiyle verilen Bevacizumab tedavisine sekonder gelişen beş spontan kolonik perforasyon vakası sunuyoruz. Sadece perfore segmenti içerecek şekilde parsiyel kolektomi uygulanan hastalar (n=3) ilerleyen abdominal sepsis nedeniyle postop birinci ay içerisinde kaybedilmişken, total kolektomi yapılan hastalar (n=2) görece daha uzun bir sağ kalım göstermiş olup nihai olarak primer hastalığın doğal seyri sonucu kaybedilmişlerdir. Bevacizumab tedavisine bağlı spontan kolonik perforasyonun patofizyolojisi de göz önünde bulundurulduğunda, total kolektomi, özellikle intraoperatif değerlendirmede kolonun perfore olmamış kısımlarının da sağlıksız görünmesi durumunda hayat kurtarıcı ve tek basamaklı bir tedavi olabilir.

Anahtar Kelimeler: Bevacizumab, spontan kolonik perforasyon, total kolektomi

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Introduction

Bevacizumab is a recombinant humanised monoclonal vascular endothelial growth factor (VEGF) inhibitor.[1] It inhibits neovascularisation by binding the VEGF in vascular endothelial cells of tumour tissue.[2] Anti-angiogenic effects of bevacizumab may cause various side effects, including haemorrhage, bowel perforation, wound healing complications, thromboembolism, congestive heart failure, hypertension and infusion-related hypersensitivity reactions. Spontaneous colonic perforation (SCP) is a life-threatening complication of bevacizumab when it is used for advanced colorectal cancer.[3] In addition, patients under treatment for extra-intestinal cancers, including ovarian, lung, kidney, cervical and brain cancers, are at risk of SCP.[4,5] However, data on clinical characteristics and management strategies for SCP in patients under bevacizumab treatment for extra-intestinal cancers are limited. In this report, the clinical characteristics and outcomes of management strategies of five patients who developed SCP while being under bevacizumab treatment for extra-intestinal cancers in our institution are reviewed.

Case Report

From 2016 to 2018, five patients underwent surgery for SCP while undergoing bevacizumab treatment for extra-intestinal cancers (Table 1). All patients had abdominal pain as their initial presentation with typical physical findings of acute abdomen, and abdominal computed tomography (CT) scans that revealed free fluid and intraperitoneal air densities. The perforation sites were the sigmoid colon (n=2), the caecum (n=2) and the transverse colon (n=1). In two patients with a caecal perforation, total colectomy with an end ileostomy was performed because of the inflamed and structurally weak appearance of the rest of the colon. These patients were discharged from the hospital with no further operative complications. In the other two patients with sigmoid colon perforation, a left colectomy with an end colostomy was performed. These patients suffered from ongoing abdominal sepsis and died within a month postoperatively. In the last patient with a transverse colon perforation, a transverse colectomy with an end-to-end anastomosis was performed. However, this patient developed another free perforation in the right colon. Thus, a right colectomy with an end ileostomy was performed during the reoperation. This patient died of systemic sepsis two weeks after the reoperation.

Overall, patients who underwent a total colectomy were discharged from the hospital and died of underlying disease progression after a comparably more extended period compared with those who underwent segmental colonic

Table 1. Patient characteristics

Patients	Age (y) & Gender	BMI (kg/m^2)	Primary tumour	Grade or Stage	Treatment regimen	Colonic perforation site	Operation	Pathology	Time to death after surgery
1	63, M	27.2	Glioblastoma multiforme	Grade 4	Bevacizumab + irinotecan	1-Transverse colon 2-Ascending colon	1- Segmental transverse colectomy + colocolonic anastomosis 2- Right hemicolectomy + end ileostomy	Transmural necrosis	2 weeks
2	40, F	17.3	Malign melanoma	Brain and lung metastases	Bevacizumab + vemurafenib	Cecum	Total colectomy + end ileostomy	Ulceration and multiple perforations in setting of enterocolitis	5 months
3	60, M	23	Glioblastoma multiforme	Grade 4	Bevacizumab + carboplatin	Sigmoid colon	Sigmoidectomy + end colostomy	Transmural necrosis	2 weeks
4	42, F	24.2	Cervical cancer	Liver and peritoneal metastases	Bevacizumab + carboplatin	Cecum	Total colectomy + end ileostomy	Transmural necrosis	5 months
5	58, F	21.6	Lung cancer	Brain metastasis	Bevacizumab + cisplatin	Sigmoid colon	Left hemicolectomy + end colostomy	Transmural necrosis	1 month

M: Male, F: Female, BMI: Body mass index

resections who died of either ongoing abdominal/systemic sepsis or second colonic perforation.

Discussion

Two histopathologic findings related to bowel perforations due to bevacizumab use were found in our cases. First, the necrosis of the metastatic lesion on the colonic wall. Second, wide, adjoining ulcerations or transmural necrosis of non-metastatic sites of the colon with haemorrhagic infarcts and thrombosed small- and medium-sized vessels that led to perforations. The first mechanism directly explains the pathophysiology of bevacizumab-related SCP due to necrosis of a primary or metastatic tumour on the colonic wall.[6,7] Removing the perforated segment of the colon should solve the problem when the remnant colon is considered healthy. However, VEGF inhibition causes regenerative capacity loss of the whole colon by diminishing the microcirculation and decreasing nitrous oxide and prostacyclin production.[6,7] Therefore, the whole colon may become prone to complications due to the systemic effects of bevacizumab treatment, since the adverse effects of this drug impair the micro-structure of the whole colon in addition to the perforation site.

Bevacizumab is a known inducer of colonic inflammation.[8] Colitis and accompanying stasis significantly increase bacterial translocation.[9] Total colectomy is the preferred surgical procedure for complicated ulcerative colitis. Therefore, removal by this procedure would also prevent further life-threatening complications of colonic perforation in patients under bevacizumab treatment. Following the segmental removal of the perforation site of the colon, increased bacterial translocation can occur from the remnant colon via the pathologic pathways related to VEGF inhibition. Of the five cases presented, patients who underwent a partial colectomy of the perforation site suffered from ongoing sepsis postoperatively. They died within a month after the index surgery, presumably due to this mechanism.

While non-operative treatment has been reported to be a safe option for patients with bevacizumab-related gastrointestinal perforations in general[4,10], colonic perforations require special attention because of their faecal load. In cases with acute abdomen and ongoing sepsis, a surgical approach is usually mandatory. Removal of the whole diseased colon may potentially prevent further septic complications and early mortality, as is the case in toxic colitis.

Considering these patients' poor life expectancy and fragile condition, total colectomy with an end ileostomy can be a life-saving, single-stage, definitive procedure for bevacizumab-induced colonic perforations. Further studies with larger numbers of patients will provide more reliable data for the management of this subset of patients.

Ethics

Informed Consent: Informed consents were obtained from all the patients.

Peer-review: Externally peer reviewed.

Authorship Contributions

Surgical and Medical Practices: E.B., B.B., G.D., İ.H., V.Ö., A.A., A.İ.B., B.O.B., E.A., T.K., Concept: E.B., B.B., V.Ö., A.A., A.İ.B., Design: A.D., B.B., Data Collection or Processing: E.B., A.D., B.B., Analysis or Interpretation: E.B., A.D., B.B., G.D., Literature Search: A.D., B.B., G.D., Writing: E.B., A.D., B.B.

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

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LETTER TO THE EDITOR

A Letter to the Editor on "Anatomical Planes in Rectal Cancer Surgery". The Surgical Plans Provided with a Perineal Ischioanal Fossa Access, Used for Transsphincteric Rectal Resection Techniques, Should be Considered Especially in Lower Rectal Cancer Surgery

Transsfinkterik Rektal Rezeksiyon Teknikleri için Kullanılan, Perineal Iskioanal Fossa Erişimi ile Sağlanan Cerrahi Planlar, Özellikle Alt Rektal Kanser Cerrahisinde Göz Önünde Bulundurulmalıdır

Ali Naki Yücesoy

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Keywords: External anal sphincteric musculature, ischioanal fossa, pudendal nerve, transsphincteric rectal resection

Anahtar Kelimeler: Dış anal sfinkter kası, iskioanal fossa, pudendal sinir, transsfinkterik rektum rezeksiyonu

Dear Editor,

I read the article entitled "Anatomical Planes in Rectal Cancer Surgery", which has spectacular and educational values related to the anatomical features of the abdominopelvic cavity in rectal cancer surgery written by Açar H.A. and Kuzu M.A. in your journal.[1] I would like to make some additions related to the anatomical features and anatomical planes of the rectum provided with perineal ischioanal fossa access. The rectum passes through three main anatomical cavities throughout its journey through the body: the abdominal, pelvic, and ischioanal cavities, respectively. A significant portion of the lower rectum passes through the ischioanal fossa as a part of the surgical anal canal, and fuses with the anatomical anal canal. Although abdomipelvic rectal anatomy and surgical plans are always considered in rectal cancer surgery, it is noteworthy that ischioanal surgical plans, which should be considered especially in transsphincteric rectal resection techniques for lower rectal cancer surgery, are ignored. One of the most important reasons for this condition is that the intersphincteric resection technique is the most commonly used surgical technique in lower rectal cancer surgery and the ishcioanal fossa access cannot be achieved with the intersphincteric technique (ISR). IRS techniques are performed by using perabdominal and peranal approaches.[1,2] Transanal total mesorectal excision is also performed in the intersphincteric dissection plane.[3] There is no doubt that the transsphincteric rectal resection techniques (TSR) could not get their deserved place in rectal cancer surgery, and should be taken into account as alternative surgical methods for lower rectal cancer.[4,5,6,7] Extrasphincteric rectal dissection, transsphincteric rectal resection and proximal segmental external sphincteric excision are surgical procedures

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performed in TSR. Unlike ISR, the main reason for the anatomical and surgical differences in TSR is the use of ischioanal approaches in addition to abdominal access.

The ischioanal fossa has a inverted manner truncated prism shape between the levator ani muscle and perineum, filled with lipmatous tissue. It is covered with the obtrator fascia, and does not contain mesorectal tissue. Ischianal fossa hosts to the external anal sphincteric musculature, including the distal two-third part of the lower rectum, and this structure is named as the surgical anal canal. In this manner, the surgical anal canal is formed by two intertwined cylindrical muscular tubes, and the intersphincteric dissection plan is a potential space between both muscular tubes.[8]

Another important anatomical structure in the ischioanal fossa is the pudendal nerve. The pudendal nerves originate from the sacral 2,3, and 4 roots, advance through the posterior wall of the ischianal fossa as pudendal neurovascular bundles after exiting from the Alcock's canal, and give their branches to the external anal sphincteric musculature following a hook formation at its base (Figure 1). Besides the abdominopelvic anatomical features and surgical plans, the ischioanal fossa should be taken into consideration, especially in lower rectal cancer, due to the elements it contains.

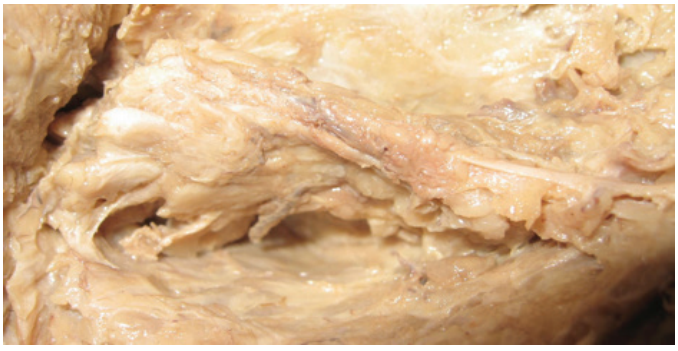

Figure 1. Posterior ischioanal cadaveric view showing the pudendal neurovascular branches of the external anal sphincteric musculature

Informed Consent: Since the photograph used in the article belongs to the cadaver, patient approval information was not required.

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

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VİDEO ARTICLE

Laparoscopic Dorsal Rectopexy with Pelvic Peritoneal Sac Excision for Rectal Prolapse: Video Vignette

Rektal Prolapsusta Pelvik Peritoneal Kese Eksizyonu ile Laparoskopik Dorsal Rektopeksi: Video Vinyet

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ABSTRACT

Rectal prolapse is a pelvic floor disorder characterised by the protrusion of the rectum through the anal canal. Although its definite treatment is via surgery, an ideal surgical technique has not yet been introduced. Laparoscopic mesh rectopexy has been reported to provide a low recurrence rate and better functional outcomes. This technique can be performed with both the anterior or posterior fixation of the mesh.

Herein, we present a video demonstrating the procedure of laparoscopic dorsal rectopexy and peritoneal sac excision in a 62-year-old male with RP.

Keywords: Dorsal mesh rectopexy, posterior rectopexy, rectal prolapse

ÖZ

Rektal prolapsus, rektumun anal kanaldan dışarı çıkması ile karakterize bir pelvik taban hastalığıdır. Kesin tedavisi cerrahi olmakla birlikte, ideal cerrahi teknik henüz tanımlanmamıştır. Laparoskopik yama rektopeksinin, düşük rekürrens oranı ve daha iyi fonksiyonel sonuçlar sağladığı bildirilmiştir. Bu teknik, yamanın hem anterior hem de posterior tespiti ile gerçekleştirilebilir.

Burada, rektal prolapsus tanılı 62 yaşındaki bir erkek hastada, laparoskopik dorsal rektopeksi ve peritoneal kesenin eksizyonu prosedürünü gösteren bir video sunulmaktadır.

Anahtar Kelimeler: Dorsal yama rektopeksi, posterior rektopeksi, rektal prolapsus

Introduction

Rectal prolapse (RP) is a pelvic floor disorder characterised by the protrusion of the rectum through the anal canal. Its definite treatment is by surgery, which can be implemented either through the perineal or abdominal approach. Several procedures regarding the abdominal approach have been introduced in the literature. Rectopexy as an abdominal approach is performed using sutures and mesh, with or without colonic resection. The ideal treatment approach varies according to patient's age, gender, grade of the prolapse, anal tonus, presence of other accompanying pelvic floor disorders and the operative conditions.[1,2] Mesh rectopexy provides a low recurrence rate, but may also lead to some complications (i.e. pelvic infection, erosion to the luminal organs and dislodgement) related to the foreign body.[3] The outcomes and advantages of anterior and posterior fixation of the mesh are also comparable. Although their recurrence rates were similar, posterior rectopexy is considered to have a lower rate of stricture and postoperative constipation than anterior rectopexy.[4]

Herein, we present a video demonstrating the procedure of laparoscopic dorsal rectopexy and peritoneal sac excision in a 62-year-old male with RP. The patient was admitted with the complaint of bowel prolapse outside the anus, occurring after defecation and requiring manual reduction. Physical examination revealed a normal anal tonus and

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Oxford Grade V RP. Colonoscopic examination was normal. Magnetic resonance defaecography showed oedema in the rectosigmoid colon, moderate rectal descensus, pelvic floor dysfunction and dyssynergic defaecation. The decision to perform a laparoscopic rectopexy for this patient was made based on these findings. The four-trocar technique was applied. During the laparoscopic exploration, the pelvic peritoneal sac was found to be elongated and significantly thickened than usual due to chronic prolapse. The rectum was mobilized to the pelvic floor, and the lateral ligaments were preserved in order to avoid postoperative constipation. A rectangular polypropylene mesh of 15 X 5 cm was prepared and secured to the sacral promontory with a tacker. The elongated peritoneal sac was excised using an energy device in order to provide fibrosis and stabilization of the rectum. Then, a dorsal rectopexy was performed by fixing the mesh to the posterior wall of the rectum using separate polydioxanone (PDS) sutures (**Video**). The procedure was completed uneventfully, and the patient was discharged on the fourth postoperative day. In the first year of follow-up, there was no evidence of recurrence or any long-term complication.

Laparoscopic dorsal rectopexy is a safe and feasible technique in the treatment of RP, but a tailored approach for each patient should be adopted as in all techniques. Excision of the peritoneal sac, especially in cases where it is significantly loose and elongated, can be performed when its benefits are considered.

Informed Consent: Obtained.

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Authorship Contributions

Surgical and Medical Practices: F.C., N.A., Concept: F.C., N.A., T.A., E.K., Design: N.A., E.K., Data Collection or Processing: F.C., T.A., F.G., Analysis or Interpretation: N.A., F.G., Literature Search: F.C., N.A., F.G., Writing: F.C., N.A., E.K.

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

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Video 1.
https://www.doi.org/10.4274/tjcd.galenos.2020.2020-6-10.video1

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VIDEO ARTICLE

Laparoscopic Diverting Sigmoid Loop Colostomy for Rectovesical Fistüla: A Video Vignette

Rektovezikal Fistül için Laparoskopik Saptırıcı Sigmoid Loop Kolostomi: Video Sunum

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ABSTRACT

Ileostomy and colostomy procedures are useful in treating patients suffering from complications associated with intra-abdominal diseases, complicated infections, faecal incontinence, rectovesical fistula, perianal fistula, perianal Crohn's disease, radiation proctitis or advanced colorectal cancers. In recent decades, laparoscopic stoma formation is gaining popularity as an alternative to conventional open abdominal surgery. Conventional surgery is associated with a higher rate of morbidity and mortality. Trephine colostomy technique has the disadvantage that it does not allow exploration and is inadequate to detect proximal and distal bowel loops, and the immobilised sigmoid colon does not allow mobilisation of the bowel. Because of these disadvantages laparoscopic ostomy technique is a better choice in patients who are found to be suitable.

In this video, we present a patient who underwent laparoscopic loop sigmoid colostomy for rectovesical fistula.

Keywords: Laparoscopic, loop colostomy, rectovesical fistula

ÖZ

İleostomi ve kolostomi; abdominal patolojiler, komplike enfeksiyonlar, fekal inkontinas, rektovezikal fistül, perianal fistül, perineal Chron hastalığı, radyasyon proktiti ve ileri kolorektal kanserler ile ilgili komplikasyonları olan hastalarda terapötik faydaları vardır. Konvensiyonel cerrahi daha fazla morbidite ve mortalite ile ilişkilidir. Trephine kolostomi tekniğinin eksprolasyona izin vermemesi, proksimal ve distal barsak anslarının belirlenmesinde yetersiz olması ve immobil sigmoid kolonun mobilizasyona izin vermemesi gibi dezavantajları vardır. Bu dezavantajlar nedeniyle laparoskopik ostomi tekniği uygun hastalarda daha iyi bir tercihdir. Bu videoda; rektovezikal fistül nedeniyle laparoskopik saptırıcı sigmoid loop kolostomi açılan bir olguyu sunuyoruz.

Anahtar Kelimeler: Laparoskopik, loop kolostomi, rektovezikal fistül

Introduction

Ileostomy and colostomy procedures are useful in treating patients with complications related to intra-abdominal diseases, complicated infections, faecal incontinence, rectovesical fistula, perianal fistula, perineal Crohn's disease, radiation proctitis or advanced colorectal cancers. In recent decades, laparoscopic stoma formation is gaining popularity as an alternative to conventional open abdominal surgery.[1] Conventional surgery is associated with a higher rate of morbidity and mortality. Trephine colostomy technique has the disadvantage that it does not allow exploration, is inadequate to determine proximal and distal bowel loops, and the immobilised sigmoid colon does not allow mobilisation of the bowel.[2] Because of these disadvantages laparoscopic ostomy technique might be a better choice in suitable patients. In this video, we present a patient who underwent laparoscopic loop sigmoid colostomy for rectovesical fistula. Informed consent was obtained from the patient. In the

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preoperative period, the patient met with stoma nurses to mark the stoma site and to receive information about stoma care and management.

During the procedure, a pneumoperitoneum was created, an 11 mm trocar was placed over the umbilicus and a 5 mm trocar was placed lateral to the right rectus muscle. No other intraperitoneal pathology was detected during exploration. The sigmoid colon was found to be mobile. Afferent and efferent bowel loops were identified. A circular incision was made on the skin at the previously marked stoma site and excised. The anterior fascia of the musculus rectus abdominis was opened diagonally, and after the muscle fibres were separated with a retractor, the posterior fascia, preperitoneal cavity and peritoneum were passed and the abdominal cavity was entered. The sigmoid colon was taken out of the abdomen and the afferent and efferent loops were re-evaluated, and the laparoscopy was terminated. A window was created for loop colostomy in the mesocolon. Following this, ostomy maturation was achieved in the standard manner with Vicryl suture.

In conclusion, our case demonstrates that laparoscopic loop sigmoid colostomy is a better choice than conventional methods in certain patients who are considered suitable.

Informed Consent: Informed consent was obtained from the patient.

Peer-review: Externally peer reviewed.

Authorship Contributions

Surgical and Medical Practices: F.G., E.K., Concept: F.G., E.K., Y.A., M.P., Design: E.K., M.P., Data Collection or Processing: F.G., Y.A., M.P., Analysis or Interpretation: E.K., M.P., Literature Search: F.G., E.K., M.P., Writing: F.G., E.K., M.P.

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

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

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Video 2.

https://www.doi.org/10.4274/tjcd.galenos.2020.2020-10-1.video2

2020 REFEREE INDEX - 2020 HAKEM DİZİNİ

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2020 AUTHOR INDEX - 2020 YAZAR DİZİNİ

2020 AUTHOR INDEX - 2020 YAZAR DİZİNİ

2020 SUBJECT INDEX - 2020 KONU DİZİNİ

2020 SUBJECT INDEX - 2020 KONU DİZİNİ