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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, British Library, ProQuest, CINAHL, IdealOnline, EBSCO, Embase, Gale/Cengage Learning, Index Copernicus, Turkish Citation Index, Hinari, GOALI, ARDI, OARE, AGORA, 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, British Library, ProQuest, CINAHL, IdealOnline, EBSCO, Embase, Gale/Cengage Learning, Index Copernicus, Turkish Citation Index, Hinari, GOALI, ARDI, OARE, AGORA, 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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Cover Letter

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

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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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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.

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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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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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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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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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Açıklama bildirimi

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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.

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- 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.

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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.

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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.

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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.

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RESEARCH ARTICLE

Early-Onset Colorectal Cancer in Younger Patients with a More Advanced Stage and Worse Postoperative Results: A Retrospective Review

Daha İleri Evre ve Daha Kötü Postoperatif Sonuçlara Sahip Genç Hastalarda Erken Başlangıçlı Kolorektal Kanser: Retrospektif Bir İnceleme

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ABSTRACT

Aim: The incidence of colorectal tumors in young patients has been rising lately, and current investigations focus on the causes and prognosis in these patients. The objective of this publication is to analyze the results of the surgical treatment and tumor stages in young patients and compare them to those in older individuals.

Method: A retrospective analysis of patients undergoing surgery for colorectal adenocarcinoma during 2015-2020 in a single institution was performed. Patients were divided into two categories, early-onset colorectal cancer (EOCRC) (younger than 50 years old) and average-onset CRC (AOCRC) (those on age for CRC screening), focusing on disease stage and postoperative outcomes.

Results: Two hundred and seven patients were included: 32 in the EOCRC group and 175 in the AOCRC group. The median age was 42.10 years [standard deviation (SD) =5.74] and 65.38 years (SD =7.19), respectively. Dyslipidemia was more prevalent in the AOCRC group. The EOCRC group had more tumors in the upper rectum (28.13% vs. 8%; p=0.001) and transverse colon (21.88% vs. 10.29%; p=0.06) and higher rates of complications (43.75% vs. 28%; p=0.07) and reoperations (18.75 vs. 7.43%; p=0.04). Moreover, major complications were more frequent in younger patients. The EOCRC group had significantly more stage IV tumors (18.75% vs. 5.13%; p=0.01), and 46.86% of patients in this group had an advanced disease at the time of surgery.

Conclusion: Patients in the EOCRC group are diagnosed at more advanced stages and show differences in tumor location. Complications including the need for reoperation are more frequent in this group.

Keywords: Colorectal adenocarcinoma, early onset, screening strategies, colonoscopy, advanced stage

ÖZ

Amaç: Son zamanlarda genç hastalarda kolorektal tümör insidansı artmakta olup, güncel araştırmalar bunun nedenlerini ve prognozunu belirlemeye yöneliktir. Bu derlemenin amacı, genç hastalarda cerrahi tedavi sonuçlarını ve tümör evrelerini analiz etmek ve bunları yaşlı bireylerle karşılaştırmaktır.

Yöntem: Bu derlemede, 2015-2020 yılları arasında tek bir kurumda kolorektal adenokarsinom ameliyatı geçiren hastaların retrospektif bir analizi yapıldı. Hastalar iki kategoriye ayrılarak hastalık evresine ve ameliyat sonrası sonuçlara odaklanıldı: Elli yaşından genç hastalardaki erken başlangıçlı kolorektal kanserler (EOCRC) ve kolorektal kanser taramasının yapıldığı yaştaki hastalarda ortaya çıkan ortalama başlangıçlı kolorektal kanserler (AOCRC).

Bulgular: Otuz ikisi EOCRC grubunda olmak üzere 207 hasta dahil edildi. Ortanca yaş sırasıyla 42,10 [standart sapma (SS) =5,74] ve 65,38 (SS =7,19) idi. AOCRC grubunda dislipidemi daha yaygındı. EOCRC grubunda daha fazla üst rektum (%28,13'e karşı %8, p=0,001) ve transvers kolon (%21,88'e karşı %10,29, p=0,06) tümörleri vardı, komplikasyon oranları (%43,75'e karşı %28, p=0,07) ve yeniden operasyon oranları (18,75'e karşı %7,43, p=0,04) daha yüksekti. Ayrıca, majör komplikasyonlar genç hastalarda daha sıktı. EOCRC grubu önemli ölçüde daha fazla evre IV tümör ile ilişkili idi (%18,75'e karşı %5,13, p=0,01) ve bu hastaların %46,86'sında ameliyat sırasında ilerlemiş hastalık mevcuttu.

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Sonuç: Erken başlangıçlı kolorektal kanserler hastalığın daha ileri evrelerinde teşhis edilir ve tümör yerleşiminde farklılıklar gösterir. Bu grupta tekrar ameliyat gereksinimi gibi komplikasyonlar daha sık görülmektedir.
Anahtar Kelimeler: Kolorektal adenokarsinom, erken başlangıç, tarama stratejileri, kolonoskopi, ileri evre

Introduction

Worldwide, colorectal cancer (CRC) is the third most common cancer in both males and females, preceded by breast and lung tumors. It is also the second cause of cancer-related deaths.[1]

Significant advances have been made in the early diagnosis of CRC due to population-based screening strategies, which detect potentially neoplastic polyps at an early stage.[2] Colonoscopy is the most widely used screening procedure, and its implementation is associated with a significant reduction in CRC incidence.[3,4] According to the current guidelines, colonoscopy is recommended for patients between 50 and 75 years old[5] [average-onset CRC (AOCRC)].

However, the increase in CRC among younger patients, a trend formerly addressed as "early-onset CRC" (EOCRC), has caused a rising concern.[6] Screening in patients aged 45 to 49 years is considered a grade B recommendation by the US Preventive Service Task Force, although no definitive recommendation has been published since 2016.

Early diagnosis and treatment of these patients remain challenging, as they are excluded from the screening strategies. Consequently, they may consult at an advanced stage, usually when they are overtly symptomatic. It has been estimated that, by 2030, in patients younger than 34 years old, the CRC incidence rate will rise by 90% to 124%.[7,8] Although some guidelines recommend early CRC screening[9], the impact of this new tendency and the way to prevent tumor development in this population remain unclear.

There is a paucity of studies comparing postoperative outcomes between patients with EOCRC and AOCRC, which could be explained by the assumption that patients with AOCRC would have worse results due to their age. In this study, we sought to compare the postoperative outcomes and tumor stage at the time of diagnosis between patients with EOCRC and AOCRC.

Materials and Methods

Study Design and Population

We undertook a cross-sectional study at an academic hospital in Buenos Aires, Argentina. The study protocol was approved by our local ethics committee. The surgery department's database was reviewed from January 2015 to May 2020. Patients who underwent colorectal surgery were identified. We excluded patients who received surgery for benign colorectal tumors and malignant tumors other than colorectal adenocarcinoma and those diagnosed with colorectal adenocarcinoma beyond 75 years of age.

Data Extraction

Patients who fulfilled the inclusion criteria were further classified into two groups according to the age of CRC diagnosis: the EOCRC group included patients younger than 50 years, and the AOCRC group included patients aged between 50 and 75 years. The medical history of each patient was reviewed, and the following clinical comorbidity data were collected: hypertension, dyslipidemia, diabetes mellitus, smoking, chronic obstructive pulmonary disease, chronic kidney disease, and history of abdominal surgeries. The tumor's location and stage were recorded according to the American Joint Committee on Cancer guidelines.[10] Surgery charts were also reviewed, and information on whether the surgery was urgent was retrieved for further analysis. Urgent surgery was defined as any surgical procedure that had to be performed secondary to a critical clinical condition of the patient, due to acute tumor complications: intestinal obstruction, hemorrhage, or tumor perforation.

The laparoscopic approach, length of stay after surgery, and minor (Clavien-Dindo score I or II) or major (Clavien-Dindo score IIIb or higher) postoperative complications[11], assigned by one of the authors (AC) and confirmed by the surgery department's Mortality and Morbidity Review Meeting, held on a weekly basis; need for reoperation; need for rehospitalization 30 days after discharge; 30-day mortality were retrieved for each patient.

Statistical Analysis

Analyses were conducted using STATA (v11.1, StataCorp, College Station, Texas USA). The categorical variables are described as percentages, whereas numerical variables are described as median with 25%-75% interquartile range. Chi-square and Mann-Whitney U tests were used for comparing the categorical variables and continuous numerical variables, respectively. Odds ratio with 95% confidence intervals were calculated. A multivariable analysis using a logistic regression model was performed including all the variables compared with a p value less than 0.1. A p value less than 0.05 was considered statistically significant. Our primary outcome variable was overall complication prevalence. Other variables comparing between EOCRC and AOCRC groups (p value <0.1) were also included in the logistic regression analysis.

Results

We reviewed the medical records of 545 patients who underwent colorectal surgery during the study period, of which 207 patients were included in the analysis (Figure 1).

Table 1 shows the main clinical characteristics of the included patients. The median age was 42.10 [standard deviation (SD): 5.74] in the EOCRC group and 65.38 (SD: 7.19) in the AOCRC group. 28% (9/32) of the patients included in the EOCRC group were younger than 40 years. No differences were found regarding gender proportion in each group.

Moreover, symptomatic presentation varied in both groups (Table 2). In the EOCRC group, 6% of the patients (2/32) were diagnosed using screening methods, whereas 94% were diagnosed based on symptomatic presentations. Five patients (15.6%) had an acute complication, which required urgent surgery. However, in the AOCRC group, 36.5% of the patients were diagnosed using screening methods, and only 6.8% underwent urgent surgery for acute complications.

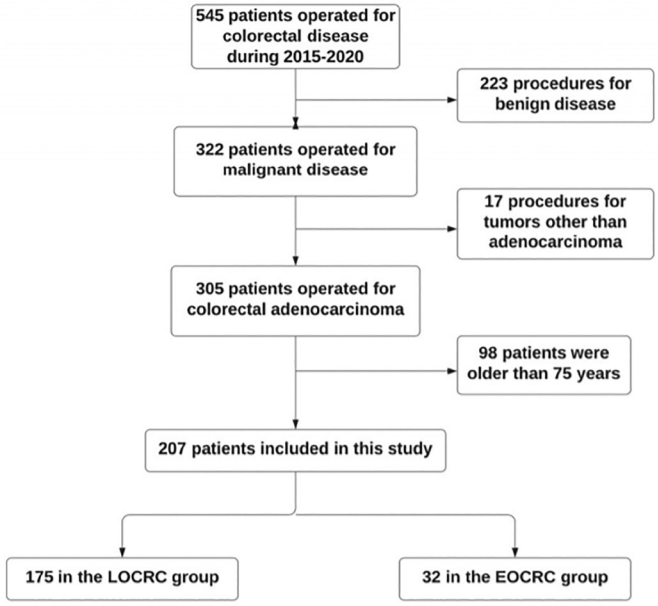

Figure 1. Patient selection

Table 1. Patient characteristics

	EOCRC (N=32) (%, n)	AOCRC (N=175) (%, n)	OR (CI 95%)	P
Age (median, range)	42.10 (28-49)	65.38 (50-75)	N/A	0.20
Gender (% male)	50 (16)	48 (84)	1.08 (0.51-2.30)	0.83
Location				
Right colon	15.63 (5)	25.71 (45)	0.57 (0.20-1.57)	
Hepatic flexure	3.13 (1)	5.71 (10)	0.53 (0.06-4.33)	
Transverse colon	21.88 (7)	10.29 (18)	2.44 (0.92-6.51)	
Splenic flexure	3.13 (1)	3.43 (6)	0.91 (0.10-7.85)	
Left colon	6.25 (2)	8 (14)	0.76 (0.16-3.56)	
Sigmoid colon	18.75 (6)	29.71 (52)	0.55 (0.21-1.41)	
Upper rectum	28.13 (9)	8 (14)	4.50 (1.70-11.91)	
Middle rectum	0	6.29 (11)	N/A	
Lower rectum	3.13 (1)	2.86 (5)	1.38 (0.15-12.82)	
Comorbidities				
Hypertension	31.25 (10)	49.14 (86)	0.47 (0.21-1.06)	0.06
Diabetes	3.13 (1)	14.86 (26)	0.18 (0.02-1.44)	0.07
Dyslipidemia	9.38 (3)	33.71 (59)	0.20 (0.05-0.71)	0.006
Smoking	40.63 (13)	41.71 (73)	0.95 (0.44-2.06)	0.91
Chronic pulmonary obstructive disease	6.25 (2)	7.43 (13)	0.83 (0.17-3.88)	0.81
Chronic kidney disease	0 (0)	1.71 (3)	N/A	0.45
Neoadjuvant therapy	15.63 (5)	4.57 (8)	3.86 (1.15-12.94)	0.01
Previous abdominal surgery	46.88 (15)	56.57 (99)	0.67 (0.31-1.44)	0.31

EOCRC: Early-onset colorectal cancer, AOCRC: Average-onset colorectal cancer, OR: Odds ratio

Overall, 6.25% of the patients (2/32) in the EOCRC cohort had a history of a first-degree family member with CRC. The two patients were diagnosed at an early stage following early screening colonoscopy.

Table 3 shows the comparison of the main surgical features. Postoperative complications were numerically more frequent among EOCRC patients (43.75% vs. 28%; p=0.07), with a significantly higher need for reintervention among these subjects (18.75% vs. 7.43%; p=0.04). Furthermore, most of these events in younger patients were major complications (64.29%). Six patients required reoperation for surgery-related complications: two patients due to hemoperitoneum, one due to evisceration, one due to bowel obstruction, and two patients due to major anastomotic leaks. Three patients with anastomotic leakage were managed successfully with percutaneous drainage. In the AOCRC group, most of the complications were minor (62.27%), mainly urinary infection and postoperative ileus.

There were no deaths in the EOCRC group within the first three months. In the AOCRC group, five patients (2.8%) died within 30 days of surgery: one had postoperative myocardial infarction; two had pneumonia; two had a metastatic disease a month after surgery.

The EOCRC group received more urgent procedures for complicated tumors. No differences were found regarding the surgical approach.

Table 4 describes the comparison of tumor stage between the two groups: EOCRC showed a significantly higher proportion of patients diagnosed with a stage IV CRC (18.75% vs. 5.13%; p=0.01). Moreover, 64% of patients in

Table 2. Presenting symptoms

	EOCRC (%, n/N)	AOCRC (%, n/N)
Screening (n, %)	6 (2/32)	36.5 (64/175)
Nonspecific abdominal pain	18 (6/32)	13.7 (24/175)
Symptomatic anemia	15.6 (5/32)	8.5 (15/175)
Change in bowel habit	31.2 (10/32)	19.4 (34/175)
Hematochezia	3.1 (1/32)	3.6 (6/175)
Late symptoms (asthenia and weight loss)	9.3 (3/32)	11.4 (20/175)
Acute complications (hemorrhage, bowel obstruction, and perforated tumor)	15.6 (5/32)	6.8 (12/175)

EOCRC: Early-onset colorectal cancer, AOCRC: Average-onset colorectal cancer

Table 3. Operative data

	EOCRC (%, n/N)	AOCRC (%, n/N)	OR (CI 95%)	P
Urgent procedure (ostomy)	15.63 (5/32)	6.86 (12/175)	2.51 (0.81-7.78)	0.09
Non-urgent surgery	84.38 (27/32)	85.71 (150/175)	0.90 (0.31-2.56)	
Procedure				
Open	28.13 (9/32)	22.86 (40/175)	1.32 (0.56-3.09)	0.55
Laparoscopic	62.50 (20/32)	67.43 (118/175)	0.80 (0.36-1.76)	
Laparoscopic converted to open	9.38 (3/32)	9.71 (17/175)	0.90 (0.24-3.27)	
Hospitalization (days)	6 (4-16)	5 (3-29)	N/A	0.39
Complications	43.75 (14/32)	28 (49/175)	2 (0.91-4.36)	0.07
Minor complications	35.71 (5/14)	63.27 (31/49)	3.10 (0.86-11.18)	
Major complications	64.29 (9/14)	36.73 (18/49)	0.32 (0.09-1.16)	
Surgical site infection	12.50 (4/32)	12 (21/175)	1.04 (0.33-3.29)	0.93
Anastomotic fistula	0 (0/27)	6.13 (10/163)	N/A	0.16
Reoperation rate	18.75 (6/32)	7.43 (13/175)	2.87 (1-8.34)	0.04

EOCRC: Early-onset colorectal cancer, AOCRC: Average-onset colorectal cancer, OR: Odds ratio

the AOCRC group were operated for early-onset tumors (stage 0, I, or IIA of the AJCC classification), whereas 46.86% of the EOCRC group had advanced diseases (stages IIB or more of the AJCC classification) at the time of the operation.

On multivariable analysis, the location of the tumor at the upper rectum and its stage were significantly different between patients with EOCRC and AOCRC (Table 5).

We found a higher proportion of patients with upper rectum tumors in the EOCRC group (28.13% vs. 8%; p=0.001). There were also more tumors in the transverse colon among these patients. We did not find significant differences in terms of comorbidities among the two groups, except for dyslipidemia, which was more frequent in the AOCRC group (33.71% vs. 9.38%; p=0.006). The need for neoadjuvant therapy was significantly higher in the EOCRC group (15.63% vs. 4.57%; p=0.01), which is consistent with the fact that this group presented with more advanced tumors.

Discussion

Despite the current efforts to understand the causes underlying EOCRC, most reasons for this new presentation remain unclear.[12] Many of these patients do not show the traditional risk factors for CRC (e.g., smoking).[13,14] Although familial predisposition is detected in up to 25% of these patients, most of the tumors seem sporadic.[15,16] These findings are similar to those described in our cohort, where no significant differences were found related to comorbidities.

Irrespective of the underlying cause, this new tendency of CRC affecting younger individuals represents a major concern for the medical community, because, lately, the incidence of colon and rectum tumors has significantly decreased in older patients, whereas it has been rising in patients younger than 50 years old.[17]

This study found some interesting results related to the differences between the EOCRC and AOCRC groups. First,

Table 4. Tumor stage

Stage	EOCRC (%, n/N)	AOCRC (%, n/N)	OR (CI 95%)	P
0	9.38 (3/32)	10.86 (19/175)	1.18 (0.33-4.25)	0.80
I	31.25 (10/32)	20.57 (36/175)	0.57 (0.25-1.32)	0.182
IIA	12.5 (4/32)	32.57 (57/175)	3.38 (1.11-10.27)	0.02
IIB	3.12 (1/32)	2.86 (5/175)	0.91 (0.10-8.11)	0.934
IIC	3.12 (1/32)	0 (0/175)	N.A	0.02
IIIA	6.25 (2/32)	6.29 (11/175)	1.00 (0.21-4.79)	0.99
IIIB	12.5 (4/32)	14.86 (26/175)	1.22 (0.39-3.78)	0.728
IIIC	3.12 (1/32)	6.86 (12/175)	2.28 (0.28-18.34)	0.424
IVA	6.25 (2/32)	3.42 (6/175)	0.53 (0.10-2.78)	0.44
IVB	12.50 (4/32)	1.71 (3/175)	0.12 (0.02-0.60)	0.002

EOCRC: Early-onset colorectal cancer, AOCRC: Average-onset colorectal cancer, OR: Odds ratio, N/A: Not applicable, CI: Confidence interval

Table 5. Multivariable analysis

Transverse colon location	1.63 (1-8.74)
Upper rectum location	4.48 (1.55-12.93)
Neoadjuvant therapy	2.54 (0.60-10.74)
Postoperative complications	1.23 (0.43-3.48)
Reoperation rate	1.53 (0.38-6.17)
AJCC stage IIA	0.33 (0.10-1)
AJCC stage IVB	5.15 (1.02-28.39)
Hypertension	0.32 (0.09-1.02)
Type II diabetes	0.22 (0.1-1.13)

AJCC: The American Joint Committee on Cancer

young patients have tumors predominantly in the upper rectum and transverse colon. Previous studies found that CRC was more frequent in the distal colon and rectum.[18,19] This finding led to suggesting sigmoidoscopy as a screening strategy for these patients. However, such a diagnostic method would not be useful for patients with transverse and right colon tumors, which, in our cohort, account for approximately 50% of all patients.

The proportion of young patients with EOCRC (15% of all patients with CRC tumors) is similar to that presented by other authors[20], although other studies found a significantly lower incidence of EOCRC compared with elder patients.[21]

Our EOCRC group showed a higher proportion of postoperative complications, and consequently, a higher proportion of patients required reoperation. Publications on comparing CRC surgery-associated morbidities in young and older patients are scarce, and the results are controversial. The study by Hanna et al.[22] including 15,957 patients (10% were classified as EOCRC, which is similar to our group) compared the surgical results. They found that although young patients had a more advanced disease, this group had better surgical outcomes, including less short-term complications, shorter hospital length of stay, and lower 30-day mortality.

Another study, including 7,538 patients, compared between the differences in young and elderly patients operated for rectal cancer.[23] Although they found that young patients had a lower 30-day complication rate and shorter hospital stay, these differences lacked statistical significance on the multivariate analysis.

Another study including 162 patients with rectal cancer failed to show different postoperative outcomes between the two groups.[24] In our study, young patients had worse postoperative results, which can be partially explained by the fact that they had more advanced tumors.

The diagnosis of advanced stage CRC among younger patients has already been extensively described in many papers addressing EOCRC.[12,15,25,26] Furthermore, the American Cancer Society screening guidelines have suggested that young people are 58% more likely to get diagnosed too late. The American Gastroenterological Association has recently submitted new guidelines addressing EOCRC and the importance of performing diagnostic procedures in young patients presenting with symptoms that could suggest colorectal neoplasia (e.g., rectal bleeding and weight loss).[27] It has also stated the importance of handling certain aspects in these young patients differently than the elderly (e.g., the necessity of preserving fertility in young women subjected to neoadjuvant therapy for advanced rectal cancer). However, we believe that studying the symptomatic patients only might prove insufficient because symptoms usually appear when the disease is advanced, and therefore, these patients have a worse prognosis, with an overall five-year survival higher than 90% when diagnosed with localized disease, but less than 12% when they have distant metastases.[28]

Other authors have linked the impact of family history-based screening strategies for the early detection of EOCRC.[29] However, as previously mentioned, this will probably be of little help, as most tumors in this population are sporadic. In our study, two patients had a history of a direct relative with colorectal tumors, and both were diagnosed at an early stage of the disease.

A further study of this cohort should be focused on analyzing the molecular features of tumors in young patients. A recent publication by Willauer et al.[30] found that tumors in patients with EOCRC seem molecularly different from those found in the elderly population, and even more, differences might be found between different age ranges in the younger population. Similar findings were published by other authors as well.[31,32] Putting these tumor characteristics into consideration, in addition to our results regarding the surgery, might help us better understand the behavior of the disease and, consequently, find answers to the current questions.

Study Limitations

This study has limitations. First, it is a retrospective study, conducted in a single academic center. Additionally, it may be underpowered due to the relatively small number of patients with EOCRC. However, the differences between patients with EOCRC and AOCRC in terms of the distribution of the disease, tumor stages, and postoperative complications have not been fully described. Consequently, these findings are relevant and encourage further studies on these subjects. To our knowledge, this is the first study on this matter in Latin-American patients, which may show a distinct behavior in terms of CRC natural history.

Conclusion

In conclusion, patients with EOCRC showed some distinct features in terms of disease location, tumor stage, and postoperative complications compared with patients with AOCRC. Further studies on the behavior and natural history of CRC among young patients are needed.

Ethics

Ethics Committee Approval: This paper was approved by the ethics committee of the institution, and written consent was provided by all patients.

Informed Consent: Obtained.

Peer-review: Externally and internally peer reviewed.

Authorship Contributions

Surgical and Medical Practices: N.L.A., M.S., P.O.S., Concept: N.L.A., M.S., P.O.S., Design: N.L.A., R.O., A.C., M.S., P.O.S., Data Collection or Processing: N.L.A., R.O., A.C., J.L., F.V., A.H., Analysis or Interpretation: N.L.A., R.O., A.C., J.L., F.V., A.H., Literature Search: N.L.A., J.L., F.V., A.H., Writing: N.L.A.

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RESEARCH ARTICLE

The Effects of NT and Adjuvant Treatments on Anastomotic Leakage in Rectal Cancer

Neoadjuvan ve Adjuvan Tedavinin Rektum Kanseri Üzerindeki Etkileri

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ABSTRACT

Aim: Anastomosis leakage (AL) is a major complication following colorectal surgery. The present study aims to investigate the effects of adjuvant (AT) and neoadjuvant (NT) treatments on AL in surgical patients with rectal cancer.

Method: The study followed 319 patients (age >18 years) who were diagnosed with rectal cancer and underwent surgery with AT or NT treatment between January 1, 2010 and December 31, 2018. We evaluated demographic data, tumor stage, metastasis status, organ and lymph node involvement, surgery type, use of AT and NT, the presence of AL, mortality status, and serum carcinoembryonic antigen levels.

Results: A total of 179 (56.1%) patients were male, 140 (43.9%) were female (mean age =58.6±13.2 years). In terms of additional treatment, 48.6% (n=155) received AT and 51.4% (n=164) received NT. Data revealed that 13.1% (n=42) of the patients received only radiotherapy (RT), 10.6% (n=34) received only chemotherapy (CT), and 76.2% (n=243) received both RT and CT (CRT). Additionally, 23.5% (n=75) of the patients had AL. In terms of AL frequency, we found no difference between the patients receiving AT or NT (p=0.758). Additionally, RT and CT had no effect on the development of AL (p=0.827 and p=0.1, respectively). Finally, mortality was not higher in patients with AL.

Conclusion: In terms of AL development, we found no differences between patients receiving NT or AT and those using RT or CT alone or together. We recommend that these rectal cancer treatments should be continued because of their better local control, overall survival rate, and sphincter function preservation rates.

Keywords: Rectum cancer, radiotherapy, chemotherapy, anastomotic leakage

ÖZ

Amaç: Anastomoz kaçağı (AK) kolorektal cerrahi sonrası görülen önemli bir komplikasyondur. Bu çalışmada, rektum kanseri tanısıyla ameliyat edilen hastalarda, neoadjuvan (NT) ve adjuvan tedavinin (AT) AK üzerine etkilerini araştırmayı amaçladık.

Yöntem: Çalışmaya, 1 Ocak 2010 ve 31 Aralık 2018 tarihleri arasında, 18 yaşından büyük, rektum kanseri tanısı alan ve cerrahi operasyon ile birlikte AT veya NT tedavisi alan 319 hasta dahil edildi. Çalışmaya katılan hastaların demografik verileri, tümör evrelemesi, metastaz durumu, organ ve lenf nodu tutulumları, cerrahi tipi, aldıkları AT ve NT, AK varlığı, mortalite durumu ve serum karsinoembriyonik antijen düzeyleri değerlendirildi.

Bulgular: Hastaların 179'u (%56,1) erkek, 140'ı (%43,9) kadın ve yaş ortalaması 58,6±13,2 yıl idi. Çalışmaya dahil edilen hastaların %48,6'sının (n=155) AT, %51,4'ünün (n=164) ise NT aldığı saptandı. Hastaların %13,1'i (n=42) sadece radyoterapi (RT) aldığı, %10,6'sının (n=34) sadece kemoterapi (KT) aldığı, %76,1'inin (n=243) ise hem RT hem de KT (KRT) aldığı görüldü. Çalışmaya katılan hastaların %23,5'inde (n=75) AK tespit edildi. AT ve NT alan hastalar arasında AK sıklığı açısından fark görülmedi (p=0,758). Ayrıca RT ve KT'ninde AK gelişimi üzerine etkisi olmadığı belirlendi (sırasıyla; p=0,827 ve p=0,1). AK olan hastalarda mortalitenin artmadığı görülmüştür.

Sonuç: NT veya AT alan hastalar ve RT veya KT'nin tek başına veya birlikte kullanımı arasında AK gelişimi açısından fark bulunmamaktadır. Daha iyi lokal kontrol, genel sağkalım ve sfinkter fonksiyonu koruma oranları nedeniyle rektum kanseri tedavisinde bu tedavilerden vazgeçilmemelidir.

Anahtar Kelimeler: Rektum kanseri, radyoterapi, kemoterapi, anastomoz kaçağı

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Introduction

Colorectal cancer (CRC) is one of the most common and life-threatening cancers worldwide. Since the treatment for stage II and stage III CRC now involves a multidisciplinary structure of combined therapy rather than surgery alone, combined chemotherapy (CT) has become the preferred adjuvant (AT) therapy for stage III colon cancer.[1] Similarly, combined radiotherapy (RT) is also recommended for rectal cancer. Previous studies have shown reductions of local recurrence and improvement in survivability in locally advanced rectal cancer using combined AT RT and CT[2], while others report decreased recurrence rates using total mesorectal excision (TME).[3,4] Neoadjuvant (NT) chemoradiotherapy (CRT) has become the preferred treatment method in all stage II and III rectal cancers because of better outcomes compared with AT CRT, better patient tolerance, and downstaging in many cases, thus preventing permanent ostomy.[5]

Anastomotic leakage (AL) is defined as a defect of the intestinal wall in the anastomosis region (including the sutures and staple lines of the neorectal reservoirs), leading to transition between the intra- and extraluminal compartments.[6] It is a crucial and potentially life-threatening postoperative complication following colorectal surgery, causing around one-third of deaths after surgery.[7] Although AL mortality can be prevented if managed well [8], patients with AL who undergo treatment and survive have increased perioperative morbidity and lower survival in the long term.[9,10,11]

Based on numerous studies focusing on the predisposing factors for AL, the leak is thought to be caused by a large spectrum of both preventable and unavoidable factors.[12] Even with perioperative management (Enhanced Recovery After Surgery) and the improvement and optimization of surgical techniques (minimally invasive surgery), AL frequency has remained high (8%-20%) over time.[12,13,14,15] Among many local and general factors causing AL[16] is the patient's exposure to CT and/or RT. While some studies showed that NT RT or CRT did not increase AL development.[17,18,19,20,21,22] A study with a five-year follow-up period comparing the use of AT and NT CRT detected AL in 11% of the NT CRT arm and 12% of the AT CRT arm, with no differences found between the two groups.[5] Thus, the present study aims to investigate the effects of NT and AT therapies on AL in patients with rectal cancer who underwent surgery.

Materials and Methods

Patient Selection

We conducted retrospective file scans of patients with rectal cancer who underwent surgery between January 1, 2010 and December 31, 2018, in Trakya University General Surgery Department. The study included patients who were older than 18 years, were diagnosed with rectal cancer, underwent surgery in our clinic, and were given AT or NT by the radiation oncology and medical oncology clinics. We obtained patient data from the central and oncology clinic archives. Patients were grouped according to AT or NT status. We recorded demographic data, tumor stage, metastasis status, organ and lymph node involvement, surgery type, use of AT and NT, the presence of AL, mortality, and serum carcinoembryonic antigen (CEA) levels from patient files. The patients had 2-8 years of follow-up.

Chemotherapy and Radiotherapy Protocols

Surgery was performed according to TME principles. While RT and CT were generally applied together as AT or NT, RT or CT was administered alone in some patients. A total of 50.4 Gy (single dose of 1.8 Gy) RT was applied to the tumor and pelvic lymph nodes for five weeks as per protocol.[23] For CT, 5-fluorouracil (5-FU) was administered in a 120-hour continuous infusion at a dose of 1,000 mg/m^2/day in the first and fifth weeks of RT. Four cycles of 5-FU were additionally administered as bolus injection at a dose of 500 mg/m^2/day in 5 consecutive days for 4 weeks. Unlike in NT, an additional 5.4 Gy of RT was administered to the tumor bed for 3 days in AT. Surgical treatment was performed 4-6 weeks after completing the concurrent use of NT CT and RT, while the remaining four cycles of 5-FU were started 3-4 weeks after surgery. Alternatively, surgical treatment was performed first and AT started 1-2 weeks after surgery.

Approach to Anastomotic Leaks

We used the following AL grading system recommended by Rahbari et al.[6]: grade A does not require a therapeutic intervention, grade B requires active intervention without laparotomy, and grade C requires laparotomy. Based on literature, CT scan was performed for diagnosis when a leak was suspected, followed by contrast enema and endoscopy, then reoperation.[24] where the anastomosis was usually removed, and a permanent stoma was created. If possible, anastomosis was fixed in grade A and B leaks, with or without drainage and/or antibiotic treatments.[25,26]

Statistical Analysis

We used the Statistical Package for the Social Sciences (SPSS) package program version 22 for data analysis. We investigated the normality of the distribution of the data using the Kolmogorov-Smirnov and Shapiro-Wilk tests. Mean ± standard deviation or median (minimum-maximum) was used for continuous variables, and frequency and percentage (%) were used for categorical variables. We used the Mann-Whitney U test to compare categorical

variables that were not normally distributed as well as continuous variables obtained in laboratory measurements. We used Pearson's chi-square test for comparisons between categorical variables. We used the McNemar test for comparisons between dependent categorical variables. The level of statistical significance was accepted as $p \leq 0.05$.

Results

The average age of the patients was 58.6±13.2 (range: 27-85) years. In total 179 (56.1%) patients were male. The mean body weight of the patients was 74.52±13.7 kg.

We found that 48.6% (n=155) of the patients received AT while 51.4% (n=164) received NT. Furthermore, 13.2% (n=42) received only RT, 10.7% (n=34) received only CT, and 76.2% (n=243) received both. In terms of NT use (n=164), 18 (11.0%) received only RT, 21 (12.8%) received only CT, and 125 (76.2%) received both. In terms of AT use (n=155), 25 (16.1%) received only RT, 12 (7.7%) receivd only CT, and 118 (76.1%) received both (Table 1).

We found that 16.3% (n=52) of the patients underwent anterior resection, 73.0% (n=233) had low anterior resection, and 10.7% (n=34) received a very low anterior resection.

We investigated perineural invasion in 83.1% (n=265) of the patients and detected it in 16.6% (n=44). We also investigated lymphatic invasion in 84.9% (n=271) and found it in 16.6% (n=44). Meanwhile, we detected AL in 23.5% (n=75) of the patients. Unfortunately, 90 (28.2%) patients died.

The average age of the deceased patients was 58.68±0.87 years, while the average age of survivors was 58.4±1.39 years. We found no significant differences between the ages of survivors and those who died (p=0.871). Likewise, we found no statistically significant difference in terms of body weight between the survivors and those who died (p=0.822). A total of 50 (55.6%) male patients and 40 (44.4%) female patients died. Still, we found no significant differences between the sexes of the survivors and those who died (p=0.900).

Among the survivors and deceased patients, there were no differences in terms of TNM stage, surgery type, preoperative and postoperative CEA levels, anastomosis leaks, RT and/or CT use, and perineural and lymphatic invasions (Table 2).

Similarly, there were no differences in terms TNM stage, surgery type, preoperative and postoperative CEA levels, anastomosis leak, mortality, and perineural and lymphatic invasions among patients receiving AT or NT (Table 3).

When the average age and body weight of the patients were compared in terms of the presence of AL, we found no significant difference between the ages of those with and without AL (p=0.227). However, the average body weight of patients with AL was lower than that of patients without AL (p=0.042). Similarly, when sex distribution of the patients was compared, we found no significant difference between those with and without AL.

Table 4 shows the predictive factors to AL development. In univariate analysis, the relationship between gender, age, weight, surgery type, laparoscopic surgery, tumor size, lymph node involvement, NT or AT use, perineural involvement, lymphatic invasion, RT or CT use, and AL were examined. We found a relationship (p=0.021) between N2 lymph node involvement and AL. Also, we observed that RT, CT, or CRT did not have statistically significant effects on AL development.

Finally, we found no significant differences between postoperative and preoperative serum CEA levels in patients receiving AT and NT, in patients who survived and died, and in patients with and without AL (p>0.001) (Table 5).

Discussion

Based on our findings, we found no difference in terms of AL development between patients receiving NT and AT. We also found no difference between the uses of CRT and either RT or CT alone as NT or AT in terms of AL development. However, in patients with AL, we observed more frequent N2 lymph node involvement and lower body weight. Development of AL did not affect mortality in patients.

Presently, colorectal cancer accounts for approximately 10% of cancer-related mortality in Western countries.[27] New treatments for primary and metastatic colorectal cancer include laparoscopic surgery, radiotherapy, and NT, and palliative CT. Every method used in cancer treatments has its own side effects and complications, and these are additive in combined therapy. The appearance of AL at the suture line of the bowel folds after tumor removal is one of the most feared surgical complications. The AL incidence is 1%-19% and complications cause 6%-22% of postoperative

Table 1. The treatment options applied as adjuvant and NT therapy

	AT (n=155)	NT (n=164)
Only chemotherapy	7.7% (n=12)	12.8% (n=21)
Only radiotherapy	16.1% (n=25)	10.9% (n=18)
Chemotherapy + radiotherapy	76.1% (n=118)	76.2% (n=125)

AT: Adjuvant therapy, NT: Neoadjuvant therapy

Table 2. The comparison between patients who survived and patients who died in terms of TNM staging, type of surgery, preoperative and postoperative CEA levels, anastomosis leak, radiotherapy and/or chemotherapy, perineural invasion, and lymphatic invasion

Variables	Survival (n=229)	Mortality (n=90)	p
AL			
No (n=244)	76.0% (n=174)	77.8% (n=70)	0.734
Yes (n=75)	24.0% (n=55)	22.2% (n=20)	
CEA			
Preoperative >10 (n=238)	73.8% (n=169)	76.7% (n=69)	0.045
Preoperative <10 (n=81)	26.2% (n=60)	23.3% (n=21)	
Postoperative >10 (n=133)	41.9% (n=96)	41.1% (n=37)	
Postoperative <10 (n=186)	58.1% (n=133)	58.9% (n=53)	0.946
T1 (n=22)	7.4% (n=17)	5.6% (n=5)	
T2 (n=16)	5.7% (n=13)	3.3% (n=3)	0.578
T3 (n=112)	33.2% (n=76)	40.0% (n=36)	
T4 (n=169)	53.7% (n=123)	51.1% (n=46)	
N0 (n=120)	37.6% (n=86)	37.8% (n=34)	
N1 (n=93)	29.3% (n=67)	28.9% (n=26)	
N2 (n=60)	19.7% (n=45)	16.7% (n=15)	0.862
Nx (n=46)	13.5% (n=31)	16.7% (n=15)	
M0 (n=289)	90.8% (n=208)	90% (n=81)	
M1 (n=30)	9.2% (n=21)	10% (n=9)	0.819
Anterior resection (n=52)	15.7% (n=36)	17.8% (n=16)	
Low anterior resection (n=233)	73.8% (n=169)	71.1% (n=64)	0.880
Very low anterior resection (n=34)	10.5% (n=24)	11.1% (n=10)	
Perineural invasion (n=44)	14.4% (n=33)	12.2% (n=11)	0.679
Lymphatic invasion (n=72)	23.6% (n=54)	20.0% (n=18)	0.655
Radiotherapy	89.1% (n=204)	90% (n=81)	0.811
Yes (n=285)	10.9% (n=25)	10% (n=9)	
No (n=34)			
Chemotherapy	85.6% (n=196)	90% (n=81)	0.294
Yes (n=86)	14.4% (n=33)	10% (n=9)	
No (n=14)			

CEA: Carcinoembryonic antigen, AL: Anastomosis leakage

mortality[28,29,30,31,32] or about one-third of deaths after colorectal surgery.[7] Gessler et al.[33] reported that the AL rate was 10% in patients operated on for colorectal cancer and 18.8% in rectal resections. Additionally, other studies have observed that mortality is higher in AL after rectal resection with rates reaching up to 22%-50%.[7,34,35] Therefore, the risk factors causing AL should be well defined in order to treat it effectively once it develops.

Previous studies have associated AL with male sex, advanced age, lower anastomosis, malignant disease, high American Society of Anesthesiologists (ASA) score, long surgical time, emergency surgery, preoperative RT, perioperative blood loss, and transfusion.[30,36,37,38,39,40,41,42,43] One study showed that male sex and rectal cancer were independent risk factors for both early and late AL. For early AL, younger age, increased body mass index (BMI), laparoscopic surgery, emergency surgery, and lack of guided ileostomy were deemed risk factors, while the Charlson Comorbidity Index, high ASA scores, additional resection due to tumor growth, and preoperative RT were deemed risk factors for late AL. Several studies have discovered higher AL frequency in males than in females, probably due to differences in pelvic anatomy[29,44,45], while others found no difference between the sexes in terms of AL.[46,47,48] Many of the surgical-related risk factors for early AL reflect surgical difficulty. One study showed that laparoscopic surgery was an independent risk factor for early AL.[22] whereas others found no difference in terms of AL between laparoscopic surgery and open

Table 3. The comparison between patients who were treated with adjuvant therapy and patients who were treated with NT therapy in terms of TNM staging, type of surgery, preoperative and postoperative CEA levels, anastomosis leak, mortality, perineural invasion, and lymphatic invasion

Variables	AT (n=155)	NT (n=164)	p
AL (n=70)	42.8% (n=30)	57.2% (n=40)	0.758
CEA			
Preoperative >10 (n=238)	76.8% (n=119)	72.5% (n=119)	0.999
Preoperative <10 (n=81)	23.2% (n=36)	27.4% (n=45)	
Postoperative >10 (n=133)	36.8% (n=57)	46.3% (n=76)	
Postoperative <10 (n=186)	63.2% (n=98)	53.6% (n=88)	0.206
T1 (n=22)	54.5% (n=12)	45.5% (n=10)	
T2 (n=16)	56.3% (n=9)	43.8% (n=7)	0.758
T3 (n=112)	50% (n=56)	50% (n=56)	
T4 (n=169)	46.2% (n=78)	53.8% (n=91)	
N0 (n=120)	48.3% (n=58)	51.7% (n=62)	
N1 (n=93)	45.2% (n=42)	54.8% (n=51)	0.208
N2 (n=60)	60.0% (n=36)	40.0% (n=24)	
Nx (n=46)	41.3% (n=19)	58.7% (n=27)	
M0 (n=289)	47.8% (n=138)	52.2% (n=151)	0.352
M1 (n=30)	56.7% (n=17)	43.3% (n=13)	
Anterior resection (n=52)	51.9% (n=27)	48.1% (n=25)	
Low anterior resection (n=233)	48.1% (n=112)	51.9% (n=121)	0.866
Very low anterior resection (n=34)	47.1% (n=16)	52.9% (n=18)	
Perineural invasion (n=44)	18% (n=28)	9.7% (n=16)	0.758
Lymphatic invasion (n=72)	51.4% (n=37)	48.6% (n=35)	0.700
Survival (n=229)	48.9% (n=112)	51.1% (n=117)	0.856
Mortality (n=90)	47.8% (n=43)	52.2% (n=47)	

CEA: Carcinoembryonic antigen, AL: Anastomosis leakage, AT: Adjuvant therapy, NT: Neoadjuvant therapy

surgery.[49,50] In two separate studies, AL frequencies in patients with low anterior resection were 10%[8] and 11%.[51] Those studies that included patients who underwent anterior resection, low anterior resection, or very low anterior resection found no difference between these types of surgeries in terms of AL development. However, AL was detected in 23.5% of our patients, which was slightly higher than the rates in the literature. Mortality rate in AL patients was 28.2%, suggesting that AL development did not increase mortality. In addition, our univariate analysis showed that sex, age, tumor size, perineural involvement, and lymphatic invasion did not have significant effects on AL development. Although stage 3-4 rectal cancer and poorly differentiated or mucinous adenocarcinoma were shown as independent risk factors for early AL in one study[21], this was not the case in another study.[22] In fact, we observed a relationship between N2 lymph node involvement (stage 3C and 4 rectal cancer) and AL, similar to the study by Shin et al.[21]

The effects of NT RT or CRT on AL development are controversial. A prospective study showed that short-term NT RT does not increase AL risks.[17] In while another prospective study showed that NT CRT therapy was a risk factor for AL in patients undergoing laparoscopic surgery with change in the direction of stoma. However, the same study could not demonstrate NT CRT therapy as a risk factor for AL in all patients undergoing low anterior resection due to cancer.[18] Similarly, other studies showed that preoperative RT or CRT are a risk factor for late AL.[19,20,21,22] However, in a study comparing AT and NT CRT, no difference was found between the two groups in terms of AL development[5] Likewise, our study found no difference in AL between patients who received CRT and patients who received CT or RT as NT. We also found no difference in AL between patients who received CT and RT as CRT and AT.

Although serum CEA increased in 17%-47% of patients with colorectal cancer[52,53], its sensitivity is not high enough to be

Table 4. The comparison between patients who had anastomosis leakage and those who did not have in terms of TNM staging, laparoscopic surgery, tumor size, lymph node involvement, type of surgery, RT and/or CT, NT or AT, perineural invasion, and lymphatic invasion.

Variables	No AL (n=244)	AL (n=75)	p
CEA			
Preoperative >10 (n=238)	77.7% (n=185)	22.3% (n=53)	0.111
Preoperative <10 (n=81)	72.8% (n=59)	27.2% (n=22)	
Postoperative >10 (n=133)	84.2% (n=112)	15.8% (n=21)	0.589
Postoperative <10 (n=186)	71.0% (n=132)	29.0% (n=54)	
T1 (n=22)	86.4% (n=19)	13.6% (n=3)	0.057
T2 (n=16)	81.2% (n=13)	18.8% (n=3)	
T3 (n=112)	83.0% (n=93)	17.0% (n=19)	
T4 (n=169)	70.4% (n=119)	29.6% (n=50)	
N0 (n=120)	84.2% (n=101)	15.8% (n=19)	0.021
N1 (n=93)	72.0% (n=67)	28.0% (n=26)	
N2 (n=60)	65.0% (n=39)	35.0% (n=21)	
Nx (n=46)	80.4% (n=37)	19.6% (n=9)	
M0 (n=289)	77.2% (n=223)	22.8% (n=66)	0.379
M1 (n=30)	70.0% (n=21)	30.0% (n=9)	
Anterior resection (n=52)	73.1% (n=38)	26.9% (n=14)	0.774
Low anterior resection (n=233)	76.8% (n=179)	23.2% (n=54)	
Very low anterior resection (n=34)	79.4% (n=27)	20.6% (n=7)	
Laparoscopic surgery			
Yes (282)	75.5% (n=213)	24.5% (n=69)	0.266
No (37)	83.8% (n=31)	16.2% (n=6)	
Perineural invasion (n=44)	75.0% (n=33)	25.0% (n=11)	0.633
Lymphatic invasion (n=72)	75.0% (n=54)	25.0% (n=18)	0.555
Radiotherapy			
Yes (n=285)	77.2% (n=220)	22.8% (n=65)	0.391
No (n=34)	70.6% (n=24)	29.4% (n=10)	
Chemotherapy			
Yes (n=277)	87.3% (n=213)	85.3% (n=64)	0.660
No (n=42)	12.7% (n=31)	14.7% (n=11)	
NT with RT and CT (n=125)	75.8% (n=94)	77.5% (n=31)	0.827
NT with either RT or CT (n=39)	24.2% (n=30)	22.5% (n=9)	
AT with RT and CT (n=118)	79.2% (n=95)	65.7% (n=23)	0.1
AT with either RT or CT (n=37)	20.8% (n=25)	34.3% (n=12)	

CEA: Carcinoembryonic antigen, AL: Anastomosis leakage, AT: Adjuvant therapy, NT: Neoadjuvant therapy

used as a screening test. Nevertheless, serum CEA levels may have a prognostic value for rectal cancer as prognosis worsens in patients with the same stage of the disease but with CEA values higher than 5 ng/mL.[54] In our study, the CEA cut-off value was accepted as 10 ng/mL since our biochemistry laboratory used different reference values. Our data on high mortality rate in patients with higher CEA levels are consistent with the literature. The absence of relationships between preoperative and postoperative CEA levels, as well as postoperative CEA levels and survival, confirms that serum CEA levels cannot be used as a screening test because of the lack sensitivity.

Study Limitations

Our study has some limitations due to its single-centered and retrospective nature. We also excluded patients

Table 5. Change in serum CEA levels in the postoperative period compared with the preoperative period in patients with and without anastomosis leakage, in patients who survived and who died, and in patients receiving adjuvant therapy and patients receiving NT therapy

		Postoperative CEA <10	Postoperative CEA >10	p
AL	**Preoperative CEA <10 (n=59)**	54.2% (n=32)	45.8% (n=27)	0.111
Yes	**Preoperative CEA >10 (n=185)**	54.0% (n=100)	46.0% (n=85)	
No	**Preoperative CEA <10 (n=22)**	63.6% (n=14)	36.4% (n=8)	0.589
	Preoperative CEA >10 (n=53)	75.5% (n=40)	24.5% (n=13)	
Survival	**Preoperative CEA <10 (n=60)**	10.0% (n=6)	90.0% (n=54)	0.045
	Preoperative CEA >10 (n=169)	53.2% (n=90)	46.7% (n=79)	
Mortality	**Preoperative CEA <10 (n=69)**	65.2% (n=45)	34.8% (n=24)	0.946
	Preoperative CEA >10 (n=21)	38.1% (n=8)	61.9% (n=13)	
AT	**Preoperative CEA <10 (n=36)**	27.8% (n=10)	72.2% (n=26)	0.999
	Preoperative CEA >10 (n=119)	73.9% (n=88)	26.0% (n=31)	
NT	**Preoperative CEA <10 (n=45)**	17.8% (n=8)	82.2% (n=37)	0.206
	Preoperative CEA >10 (n=119)	57.1% (n=68)	42.9% (n=51)	

CEA: Carcinoembryonic antigen, AL: Anastomosis leakage, AT: Adjuvant therapy, NT: NT therapy

undergoing abdominopelvic resection and those undergoing emergency surgery from the study. Additionally, early and late AL discrimination was not performed in patients with AL. Furthermore, we had no data regarding interventions performed on patients who developed AL. On the other hand, our study's strength lies in its high number of patients (n=319), reflecting 10-year clinical data with 2-8 years of follow-up.

Conclusion

In conclusion, we found no difference in terms of AL development between patients receiving NT and patients receiving AT. The use of RT, CT, or CRT as NT or AT did not increase the risk of AL. Additionally, mortality did not increase in patients with AL. We recommend the continued use of these treatments for rectal cancer because of better local control, overall survival, and sphincter function protection rates.

Ethics

Ethics Committee Approval: Trakya University Faculty of Medicine Scientific Research Ethics Committee (no: 18/13, date: 06.11.2019)

Peer-review: Internally peer reviewed.

Authorship Contributions

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

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RESEARCH ARTICLE

Diagnostic Performance of Diffusion-Weighted and Conventional MR Imaging in Staging of Rectal Cancer

Rektal Kanserin Evrelemesinde Difüzyon Ağırlıklı ve Konvansiyonel MR Görüntülemenin Tanısal Performansı

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ABSTRACT

Aim: To determine the diagnostic accuracy of preoperative T2-weighted (T2W) and diffusion-weighted (DWI) magnetic resonance imaging (MRI) in tumor/node (T/N) staging of rectal cancer and impact of MRI in clinical decision-making.

Method: This retrospective study included 43 patients with rectal cancer who were admitted to our institution between January 2019 and December 2020. MRI was performed within 2 weeks before surgery. The diagnostic accuracy of MRI was assessed using the postoperative histopathologic results as a reference. Accuracy, sensitivity, specificity, positive predictive value, negative predictive value, and Kappa values were determined. The impact of preoperative MRI for appropriate treatment decision-making was also assessed.

Results: Overall, the diagnostic accuracy and Kappa value of T2W-MRI for T staging were 62.8% and 0.266, respectively. The diagnostic accuracy and Kappa value of combined use of T2W and DWI for T staging were 65.1% and 0.251 and 41.9% and 0.011 for N staging, respectively. The diagnostic accuracy of MRI for treatment decision-making was 72.5% and 74.5% for T2W and T2W+DWI, respectively.

Conclusion: In rectal cancer, T2W-MRI enables a highly accurate preoperative assessment for the T stage but has moderate accuracy for the N stage.

Keywords: Diffusion, MR, rectal cancer

ÖZ

Amaç: Rektal kanserin tümör/node (T/N) evrelemesinde preoperatif T2 ağırlıklı (T2W) ve difüzyon ağırlıklı (DWI) manyetik rezonans görüntülemenin (MRG) tanısal doğruluğunu ve MRG'nin klinik karar verme üzerindeki etkisini belirlemek.

Yöntem: Bu retrospektif çalışmaya Ocak 2019-Aralık 2020 tarihleri arasında kurumumuza başvuran 43 rektal kanserli hasta dahil edildi. MRG ameliyattan 2 hafta önce yapıldı. MRG'nin tanısal doğruluğu, postoperatif histopatolojik sonuçlar referans alınarak değerlendirildi. Doğruluk, duyarlılık, özgüllük, pozitif öngörü değeri, negatif öngörü değeri ve Kappa değerleri belirlendi. Preoperatif MRG'nin uygun tedavi yaklaşımını seçmedeki etkisi de değerlendirildi.

Bulgular: T evrelemesi için T2W-MRG'nin genel tanısal doğruluğu ve Kappa değeri sırasıyla %62,8 ve 0,266 idi. T evrelemesi için T2W ve DWI'nın kombine kullanımının tanısal doğruluğu ve Kappa değeri sırasıyla %65,1 ve 0,251 ve N evreleme için %41,9 ve 0,011 idi. Tedaviye karar vermede MRG'nin tanısal doğruluğu T2W ve T2W/DWI için sırasıyla %72,5 ve %74,5 idi.

Sonuç: T2W MRG, rektal kanserin ameliyat öncesi değerlendirmesinde T evresi için iyi, N evresi için ise orta derece tanısal doğruluk sağlamaktadır. DWI'nın T2W görüntülemeye eklenmesi tanısal doğruluğu artırmamaktadır. Tedaviye karar vermede MRG'nin evreleme doğruluğu umut vericidir.

Anahtar Kelimeler: Difüzyon, MR, rektal kanser

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Introduction

Colorectal cancer ranks third in terms of incidence but second in terms of mortality worldwide.[1] Patient with rectal cancer undergoes imaging examinations to assess the disease extent and decide on optimal treatment method. The tumor/node/metastasis (TNM) system adopted by the American Joint Committee on Cancer (AJCC) is used to stage the tumor extent.[2] T staging in rectal cancer has a greater impact on the prognostic outcome than N staging. Several studies reported that patients with stage IIIA tumors as defined by the latest AJCC edition as a T1/T2 N + M0 tumor have a more favorable prognosis compared to patients with Stage IIA (T3/T4N0M0).[3,4] Accurate clinical staging is also important for clinicians to select the appropriate treatment strategy, including surgery alone for patients with low-risk tumors (pT2, N0, and no risk factors) or neoadjuvant chemoradiotherapy (CRT) followed by surgery for those with locally advanced rectal cancer (i.e., ≥T3 and/or N+ stage and/or other risk factors).[5]

Endorectal ultrasonography, computed tomography, and magnetic resonance imaging (MRI) are used to evaluate the T stage of the primary tumor and the N stage of the surrounding lymph nodes prior treatment.[6] Among these, high-resolution MRI is a widely used modality to detect and stage rectal cancer with high accuracy.[7] The addition of diffusion-weighted (DWI) MR increased the diagnostic accuracy in detecting early tumors; however, its incremental role in increasing the TN stage accuracy remained controversial. Clinical misinterpretation of TN stages may result in overtreatment or undertreatment based on the current National Comprehensive Cancer Network (NCCN) guidelines (available at: https://www.nccn.org/professionals/physician_gls/pdf/rectal.pdf).

This study aimed to evaluate the accuracy of MRI and the added diagnostic value of DWI for preoperative TN staging in patients with rectal cancer with the postoperative histopathological staging taken as a reference.

Materials and Methods

Patients

This retrospective study population consisted of patients with nonmetastatic rectal cancer who underwent surgery at Haydarpaşa Numune Training and Research Hospital between January 2019 and December 2020. The inclusion criteria were as follows: (1) confirmed pathological diagnosis of rectal cancer by endoscopy-guided biopsy before surgery; (2) tumor located between the rectosigmoid junctions, 2 cm proximal from the anal verge; (3) preoperative MRI within 2 weeks before surgery; and (4) postoperative pathological TN staging. Exclusion criteria are as follows: (1) recurrent rectal tumor; (2) neoadjuvant treatment before surgery; (2) tumor extending into the sigmoid colon beyond the rectosigmoid junction; and (3) patients without preoperative MRI.

The present study was performed in accordance with the ethical standards of the World Medical Association Declaration of Helsinki, and the study was approved by the Ethics Committee of our Institution. Informed consent was waived due to the retrospective nature of the study. Patient characteristics are shown in Table 1.

MR Examination

MRI was performed using a 1.5 T GE Optima 460 w (GE Healthcare, Milwaukee, USA) with a phased-array multi-coil. Patients were scanned in a supine position with their feet entering the MR gantry. Following the scout scan, sagittal T2-weighted turbo spin-echo (T2W-TSE) images were obtained. These sagittal images were used to plan the high-resolution axial T2W-TSE scans, which were perpendicular to the long axis of the tumor. For DWI, echo planar imaging sequences were used with b values of 0, 400, and 800 s/mm^2. Parameters of the scan protocol were as follows: Repetition Time (TR), 3500 ms; Echo Time (TE), 80 ms; Field of View (FOV), 28x32 cm; Matrix, 276x384; Slice Thickness, 5 mm; and Gap, 1 mm. For DWI, TR: 2,500 ms, TE: 65 ms, Slice Thickness: 6.0 mm, Gap: 1.0 mm, FOV: 35x35 cm, and Matrix: 192x192.

An additional oblique coronal scan along the long axis of the anal canal was also acquired, which is important especially for low rectal tumor evaluation. The scan time was approximately 30 min.

Interpretation of MR Images

Images were interpreted by two radiologists with 4 and 15 years of experience in gastrointestinal radiology, respectively. The radiologists knew the history of all patients but were unaware of their histopathological results. For image analysis, they first located the tumor using only the T2WI on the sagittal and axial planes. Then they staged the tumor using the axial T2W and restaged it using the combination of T2W and DWI. The final decision on staging was reached by consensus for each case.

TN Stage Assessment Criteria

The criteria used to determine the T stage were based on the AJCC seventh TNM classification.[3] Staging was done on T2W axial images. T1 tumor was defined as a tumor contained within the hyperintense submucosal level of the rectal wall without hypointense muscle layer disruption. T2 tumor was defined as a loss of interface between the submucosa and muscle layer and a discontinuous muscularis propria. However, the integrity of the outermost hypointense muscular layer remains undisrupted. T3 tumor was defined

as an infiltration of the adjacent mesorectal fat tissue. T4 tumor was defined as a tumor invasion of nearby organs or pelvic wall with loss of fat planes in between (Figure 1). Pelvic and mesorectal lymph nodes were identified on axial T2W and verified as structures with an increased DWI signal. The presence of nodal metastasis was considered in the mesorectal or pelvic nodes with a short axis of >8 mm.

Postoperative Histopathological Examination

Surgery with mesorectal excision was performed in all patients. Following the postoperative formalin fixation for 24 h, the resected specimens were transversely sliced at 5-mm intervals. Slices were embedded in paraffin, sectioned, and examined histologically after hematoxylin and eosin staining. The size and location of the tumor were noted and the depth of tumor invasion was evaluated based on the TNM classification.[3] The pathologist was unaware of the MRI findings.

Statistical Analysis

The diagnostic accuracy, sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) were calculated for each T stage and N0 vs. N+. As the number in each subset of T stages was small, patients were combined as T1 + T2 and T3 + T4, and the respective diagnostic performances were calculated as such. Receiver operator characteristics curve analyses were performed and the area under the curve (AUC) was calculated. A $p<0.05$ indicated a statistically significant difference. Consistencies between T2W-MRI and T2W+DWI and pathological staging were tested using the Kappa coefficients. A weighted Kappa value of <0.20 indicated poor agreement, 0.21-0.40 indicated fair agreement, 0.41-0.60 indicated moderate agreement, 0.61-0.80 indicated substantial agreement, and 0.81-1.0 indicated almost perfect agreement. Statistical analyses were performed using the Statistical Package for the Social Sciences version 19.0 (SPSS Inc., IBM Corp., Armonk, NY, USA).

Results

Patient Demographics and Clinical Data

A total of 43 patients (27 male and 16 female) with a mean age of 59.23±9.16 years, range 38-76 years were included in the final analysis (Table 1).

T Staging of Rectal Cancer by T2W and T2W + DWI

After histopathologic examination, 7 (16.3%) patients were staged as pT1, 8 (18.6%) as pT2, 23 (53.5%) as pT3, and 5 (11.6%) as pT4. The accuracy by T2W and T2W+DWI of each T stage was 83.7% and 86.1% for T1, 67.4% and 75% for T2, 60.5% and 53.5% for T3, and 81.4% and 86.1% for T4, respectively. The sensitivity of each T stage was 0% and 14.3% for T1, 75.0% and 60% for T2, 52.2% and 43.5 for T3, and 40.0% and 40% for T4, respectively. The specificity of each T stage was 100% and 100% for T1, 65.7% and 30% for T2, 70.0% and 65% for T3, and 86.8% and 92.1 for T4, respectively. The PPV of each T stage was 0% and 85.7% for T1, 33.3% and 91.3% for T2, 66.7% and 58.9% for T3, and 28.6% and 40% for T4, respectively. The NPV for each T stage was 83.7% and 86.1% for T1, 92.0% and 62.8% for T2, 56.0% and 50% for T3, and 91.7% and 92.1 % for T4, respectively (Table 2). The Kappa value for T staging was 0.213.

After combining T1 and T2 as T1-2 and combining T3 and T4 as T3-4, the staging of patients by T2W and T2W+DWI were as follows: 15 (34.9%) were staged as pT1-2 and 28 (65.1%) as pT3-4 (Table 2).

The AUC of T staging with conventional MR was 0.630 ($p=0.165$; $p>0.05$), whereas the AUC of T staging with conventional MR with DWI was 0.680 ($p=0.054$; $p>0.05$). The confidence level was 0.9%.

N Staging of Rectal Cancer

N staging (N0 vs. N+) was determined using the T2W+DWI with histopathological findings as reference. The Kappa value for N positivity was 0.011 (Table 3).

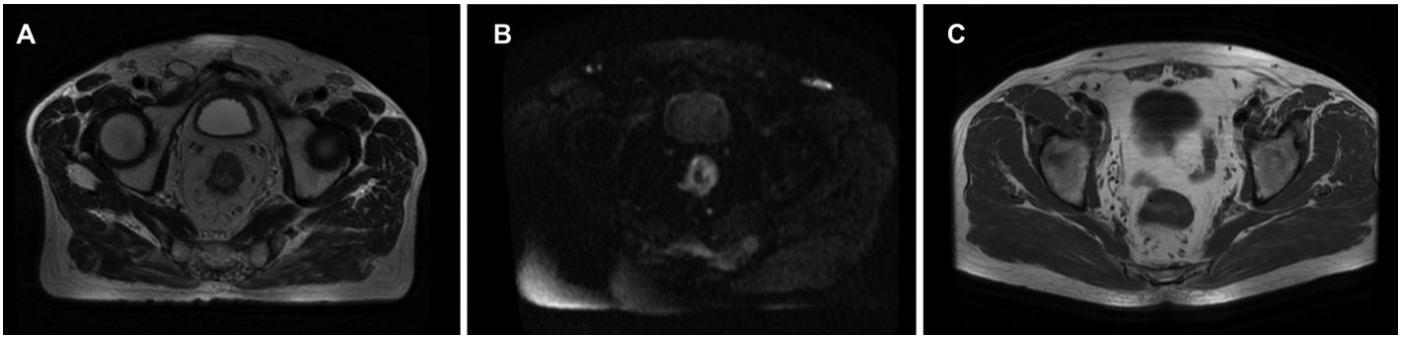

Figure 1. (A). T3 rectal tumor with specular extensions into the mesorectal fat tissue on T2W **(B).** DWI of T3 tumor with high signal on the tumorous rectal wall showing restricted diffusion **(C).** T2W of a T2 rectal cancer with maintained integrity of outer rectal wall but a loss of interface between mucosa and submucosa

Table 1. Patient characteristics

		Mean ± SD
Age (years) total		59.23±9.16
Men		59.19 ±7.98
Women		59.29 ±10.99
		n (%)
Sex	Men	26 (60.5%)
	Women	17 (39.5%)
Tumor location in rectum	Low	15 (34.9%)
	Middle	19 (44.2%)
	Upper	9 (20.9%)
Tumor histopathological differentiation Grade	Well	10 (23.3%)
	Moderate	25 (58.1%)
	Poor	8 (18.6%)
Tumor size (cm) on pathology	≤3	29 (67.4%)
	4-5	13 (30.2%)
	≥6	1 (2.3%)
Tumor histology	Adenocarcinoma	38 (88.4%)
	Mucinous adenocarcinoma	4 (9.3%)
	Signet ring cell carcinoma	1 (2.3%)

SD: Standard deviation

Table 2. Comparison of MRI with histopathology in T staging

		Histopathological T stage				
		T1+T2	T3+T4		T1+T2	T3+T4
T2W	T1+T2	9	9	T2W+DWI	10	11
	T3+T4	6	19		5	17
	Accuracy (%)	62.79			65.1	
	Sensitivity (%)	60	67.86		66.67	60.71
	Specificity (%)	67.86	76		60.71	66.67
	PPV	50	65.71		47.62	77.27
	NPV	76	50		77.27	47.62

PPV: Positive predictive value, NPV: Negative predictive value, Kappa for T2W=0.266, P=0.078, p>0.05, Kappa for T2W/DWI=0.251, p=0.087, p>0.05

Effects of MR Staging on Treatment Strategy

The accuracy rate of T2W and T2W+DWI MRI for treatment decision-making was 72.5% and 74.5%, respectively. The accuracy of these MR sequences to identify patients for upfront surgery was 63.3% and 65.2%, respectively. The accuracy to identify patients for neoadjuvant therapy was 81.2% and 85.5% for respective sequences. The probability of understaging was 40% and overstaging was 27.10%.

Discussion

The accurate T staging assessment in rectal cancer is important to identify patients who can benefit from perioperative neoadjuvant CRT and patients who can directly proceed to surgery. NCCN guidelines recommend neoadjuvant CRT for suspected or proven T3/T4 tumors (locally advanced rectal cancer) and/or regional node involvement.[5] The decision for neoadjuvant therapy is

Table 3. Comparison of MRI with histopathology in N staging

N staging with T2W+DWI	Histopathological N stage	
	Positive	Negative
Positive	12	22
Negative	3	6
Accuracy (%)	41.86	
Sensitivity (%)	80.00	21.43
Specificity (%)	21.43	80.00
PPV	35.29	66.67
NPV	66.67	35.29

PPV: Positive predictive value, NPV: Negative predictive value, MRI: Magnetic resonance imaging

reached by multidisciplinary consensus at our hospital and is tailored on a patient basis. However, only T3 and T4 tumors without neoadjuvant treatment were included, either because the tumor extended above the peritoneal reflection or caused bowel obstruction rendering the case a medical emergency for urgent surgery since we aimed to investigate the diagnostic performance of MR in rectal cancer without intervening neoadjuvant effects. Preoperative CRT was reported to reduce the tumor burden, increase the rate of sphincter preservation, downstage the tumor by 50%-60%, and result in a pathologic complete response in 10%-30% of patients.[8,9] Tumor overstaging may lead to unnecessarily extensive surgery for T1 or T2 tumors with increased risk of morbidity and mortality, whereas understaging may result in disease spread that would be otherwise curatively resected with an appropriate surgical approach. Our study revealed a diagnostic accuracy of MR examination using T2W and T2W+DWI in T staging of 65.1% and 62.8%, respectively.

The accuracy of conventional MRI for T staging of rectal cancer was reported in the literature to range between 67% and 100%.[7,10,11,12,13,14,15,16,17] The sensitivity and specificity of MRI for tumor T staging also vary considerably, with the sensitivity ranging from 29% to 57% and specificity ranging from 50% to 83%.[10,11,12,13] The main limiting diagnostic difficulty of MR appears to be in differentiating T1 from T2 tumors and in the misinterpretation of some T2 tumors with an excessive desmoplastic response as T3 tumors.[14] High diagnostic accuracy of MR for T1 and T2 tumors in our study should not be generalized as the accuracy would likely decrease in a study conducted with larger numbers of participants with T1/T2 tumors. For T1N0 tumors, NCCN guidelines suggest an endorectal ultrasound as a useful alternative.[3]

Brown et al.[15] found a 100% accuracy in T staging of 28 primary rectal cancers using high-resolution MR images, whereas Poon et al.[16] and Rao et al.[17] reported an overall accuracy of 74% and 85.1% for T staging using similar techniques, respectively. Xu et al.[18] studied 354 cases of middle and lower rectal cancer and found a 78.2% overall accuracy. Compared to other studies, a lower overall MR accuracy (62.3%-65.1%) in T staging was found in our study.

The use of DWI which reflects the restricted microdiffusion process of water molecules in malignant tissues was studied in the rectal tumor staging as it increases the accuracy of staging. Lu found that the DWI+T2W sequences did not result in a statistically significant increase in diagnostic performance.[19] Feng et al.[20] compared the diagnostic accuracies of DWI and T2W in T staging and found similar accuracies of both sequences. Our study revealed no added value of DWI to the conventional T2W in the overall diagnostic accuracy. However, Li reported that additional DWI examination to conventional MR sequences increased the diagnosis accordance rate from 71.42% to 92.85%.[21] They suggested that combined use of DWI and conventional sequences were especially useful for early T stages detection.[21]

Overall, MR tended to be less accurate for rectal cancer N staging than for T staging. The overall reported sensitivities and specificities of T2W for nodal staging ranged 55%-78%[18,22], and additional DWI was reported to result in an increase of 10%-83% in the overall number of detected lymph nodes compared to T2W-MRI.[23] However, the addition of DWI to T2W did not increase the accuracy of nodal staging achieved by T2W alone.[23] In our study, the overall MR accuracy for N positivity was 41.9% with a Kappa value of 0.323, indicating a fair agreement with histopathologic results. The reported relatively low accuracy in nodal staging lies in the fact that micrometastases in nodes cannot be detected by any current imaging modality. Moreover, approximately 20% of all resected perirectal lymph nodes, which can harbor metastatic foci were not identified on MRI due to their small size. NCCN guidelines recommend a preoperative CRT for patients with cT3N0 to avoid undertreatment as MRI may underestimate nodal staging.[3,24]

In our study, the diagnostic accuracy rate of MRI for treatment decision-making was 72.5-74.5%. The understaging rate was 40% and the overstaging rate was 27.10%, which was comparable to the results from previous studies (15-30%)[17] Maas et al.[25] found a mean overstaging rate of 43% at 1.5 T. Such regrouping would be better correlated with prognostic outcomes.

Study Limitations

Some limitations were encountered in this study. First, this retrospective study included a limited number of patients

from a single institution. Second, circumferential resection margin involvement was not assessed, which is taken into account for making a therapeutical decision, especially in Europe. Third, slices in the oblique transverse plane were thicker (5 mm) and the FOV size (28x32 cm) was also larger than suggested in guidelines (3 mm and 32x22 cm, respectively). This resulted in a lower spatial resolution and contributed to a lower diagnostic performance due to the retrospective nature of the study. Fourth, only the size criterion was taken into account when evaluating the metastatic involvement of lymph nodes, whereas morphologic changes like irregular borders were ignored. Finally, all patients with T3 in our study were combined with patients with T4. However, T3 patients have different prognostic subgroups depending on the extent of the extramural tumor invasion from the muscularis propria. Thus, our combined T3/T4 grouping has a heterogenous prognostic spectrum. This limitation can be overcome in a future study with a larger number of patients in each T stage, where patients with T3 are divided into T3ab and T3cd and the study population is regrouped into T1/T2/T3ab and T3cd/T4. Such regrouping is better correlated with prognostic outcomes.

Conclusion

In conclusion, conventional MRI combined with DWI allows a highly accurate preoperative assessment of T stages and moderately accurate preoperative assessment of N stage for rectal cancer and can help identify patients who benefit from neoadjuvant therapy and those who can proceed directly to surgery.

Ethics

Ethics Committee Approval: The present study was performed in accordance with the ethical standards of the World Medical Association Declaration of Helsinki, and the study was approved by the Ethics Committee of our Institution.

Informed Consent: Informed consent was waived due to the retrospective nature of the study.

Peer-review: Internally and externally peer reviewed.

Authorship Contributions

Surgical and Medical Practices: L.S., M.T., Concept: L.S., İ.E.S., Design: LS., M.T., K.C., U.K., T.Ö., H.Ö., Data Collection or Processing: LS., K.C., U.K., T.Ö., H.Ö., İ.E.S., Analysis or Interpretation: LS., M.T., K.C., U.K., T.Ö., H.Ö., Literature Search: L.S., T.Ö., H.Ö., İ.E.S., Writing: L.S., M.T., H.Ö.

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RESEARCH ARTICLE

Does the Preoperative Platelet-to-Lymphocyte Ratio Affect the Conversion from Laparoscopic Appendectomy to Open Surgery?

Laparaskopik Apendektomide Açığa Geçişte Preoperatif Platelet Lenfosit Oranının Etkisi var mı?

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ABSTRACT

Aim: Acute appendicitis (AA) is the most common cause of acute abdominal pain and emergency surgery worldwide. This study aimed to evaluate the effect of the preoperative platelet-to-lymphocyte ratio (PLR) on the conversion from laparoscopic to open appendectomy.

Method: This study retrospectively evaluated patients with AA who were hospitalized in the general surgery clinic between September 2015 and September 2020. The study included patients who underwent laparoscopic appendectomy under the same surgical team and those who required conversion to open surgery.

Results: During the study period, a total of 389 patients were followed and treated for AA in our clinic. Laparoscopy was initiated in 117 patients. While laparoscopic exploration alone was performed in four patients, conversion was done in 13 patients (11%), and laparoscopy was successfully completed in 100 patients (89%). Although increased preoperative white blood cell count was not a predictive factor for the conversion (p= 0.605), sex, age, elevated C-reactive protein levels, increased preoperative appendix diameter, higher body mass index, complicated AA, and increased preoperative PLR and neutrophil-to-lymphocyte ratio values were predictive factors affecting the conversion to open appendectomy (p values were 0.042, <0.001, 0.02, 0.014, 0.008, 0.011, <0.001, and 0.001, respectively). The sensitivity and specificity of PLR values for determining the conversion in the preoperative period were 76.9% and 84%, respectively, with a cutoff value of ≥190.56 (area under the curve: 0.853; confidence interval: 0.728-0.928).

Conclusion: Results showed that the preoperative PLR values, when evaluated together with other predictive parameters, are predictive factors for patients who will undergo laparoscopic appendectomy.

Keywords: Emergent surgery, acute appendicitis, laparoscopic appendectomy, conversion, platelet-to-lymphocyte ratio

ÖZ

Amaç: Akut apandisit (AA) dünyada akut abdominal ağrının en sık nedeni ve en sık acil cerrahi durumu AA'dır. Bu çalışmada preoperatif çalışılan platelet-lenfosit oranının (PLR) laparaskopik cerrahiden açığa geçiş üzerindeki etkisi araştırıldı.

Yöntem: Ekim 2015 ila Ekim 2020 tarihleri arasında genel cerrahi kliniğine AA tanısı ile yatırılan hastalar retropektif olarak değerlendirildi. Çalışmaya aynı cerrahi ekip tarafından laparoskopik cerrahi uygulanan ve açığa geçilme ihtiyacı olan hastalar dahil edildi.

Bulgular: Çalışma sürecinde kliniğimizde AA tanısı ile 389 hasta takip ve tedavi aldı. Yüz on yedi hastada cerrahiye laparoskopik başlandı. Dört hastaya sadece laparoskopik eksplorasyon uygulandı. On üç hastada (%11) açık cerrahiye geçilirken 100 hastada (%89) cerrahi laparoskopik olarak tamamlandı. Preoperatif dönemde artmış beyaz küre değerleri açığa geçiş için prediktif bir faktör olarak bulunmazken (p=0,605), cinsiyet, yaş, artmış preoperatif C-reaktif protein, artmış apendiks çapı, yüksek vücut kitle indeksi değerleri, komplike AA olguları ve artmış preoperatif PLR ve nötrofil lenfosit oranları değerleri açık apendektomiye geçişte etkili prediktif faktörler olarak bulundu (sırasıyla p değerleri: 0,042;<0,001;0,02;0,014;0,008;0,011;<0,001 ve 0,001). Laparoskopik cerrahiden açık cerrahiye geçişin tespit edilmesinde PLR'nin cut-off değeri ≥190,56 iken duyarlılığı ve özgüllüğü sırasıyla %76,9 ve %84'tü (eğri altında kalan alan: 0,853; konfidens interval: 0,728-0,928).

Sonuç: Preoperatif dönemde bakılan kan parametrelerinden hesaplanan PLR değerleri, diğer prediktif faktörlerle beraber incelendiği zaman laparoskopik cerrahiye gidecek hastalarda açığa geçişte prediktif faktördür.

Anahtar Kelimeler: Acil cerrahi, akut apandisit, laparoskopik apendektomi, açığa geçiş, platelet-lenfosit oranı

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Introduction

Acute appendicitis (AA) is the most common cause of acute abdominal pain and emergency surgery worldwide. Presently, surgery is the most effective treatment for AA.[1,2,3] Compared with traditional open appendectomy as described by McBurney, laparoscopic appendectomy has started to come to the forefront and become a basic laparoscopic surgical intervention since Semm first described it in 1983.[2,4,5] Its advantages include shorter hospital stay, less postoperative pain, diagnosis of other causes of acute abdomen, and faster recovery.[1,6]

While the rate of conversion to open surgery ranges from 0% to 17%[7], the increasing experience of surgeons in laparoscopic surgery has decreased this range further. However, the need for conversion from laparoscopic to open surgery is still an important concern for surgeons[5] because of the following reasons: prolonged operation time and hospital stay, the emergence of the need for additional incisions, and increased rates of developing postoperative wound infections.[1] The most important factors for conversion include age, male sex, obesity, intra-abdominal abscess formation, the presence of perforation, and presence of adhesions from previous surgeries.[1] Additionally, the surgeon's experience is also an important consideration for conversion.[8]

A wide variety of blood parameters, such as neutrophil-to-lymphocyte ratio (NLR), mean platelet volume, platelet count, and platelet-to-lymphocyte ratio (PLR)[9,10], have been used to diagnose AA and identify complications. Similarly, blood parameters, such as preoperative white blood cell (WBC), C-reactive protein (CRP), and NLR values, have also been used to determine the need for conversion.[1,7]

This study aims to evaluate the effect of preoperative patient characteristics on the conversion and the weight of preoperative NLR and PLR in identifying patients with a high probability of conversion.

Materials and Methods

This study was approved by Kahramanmaraş Sütçü İmam University, Faculty of Medicine Human Research Ethical Committee (protocol number: 356, date: 14/10/2020, session number: 2020/19, decision no: 01). The study evaluated the records of patients admitted to the emergency department due to acute abdomen and those hospitalized in the general surgery clinic with a diagnosis of AA between September 2015 and September 2020. AA cases who underwent laparoscopic surgery (successfully completed laparoscopy and converted to open surgery) performed by the same surgical team in Kahramanmaraş Sütçü İmam University, Department of General Surgery and those who required conversion to open surgery were included. Contrarily, we excluded from this study patients who directly underwent open appendectomy, who were not operated and followed with medical treatment, who did not have AA and were undergoing only laparoscopic exploration, and who had missing data.

We categorized the patients in the study into two groups: those whose procedures were completed laparoscopically (Group LA) and those who required conversion to open surgery (Group Con). We then retrospectively evaluated the demographic data of the patients (age, height, weight, manually calculated body mass index [BMI], and sex), preoperative routine blood count parameters (PLR and NLR values manually calculated from WBC, platelet, neutrophil, and lymphocyte values), CRP levels among preoperative routine biochemical parameters, the presence of complicated AA, and the number of laparoscopic appendectomy cases (Group LA and Group Con). We obtained patient data from epicrisis forms and computer records of preoperative laboratory and postoperative pathology results.

Statistical Analysis

We calculated the study's power analysis using the G-power 3.0.10 software. The total number of patients in the two independent groups was 102, with a statistical power size of 0.8 and an effect size of 0.5 in a single preoperative measurement.

We performed statistical analysis using the IBM Statistical Package for Social Sciences (SPSS) version 20 software. We checked the normal distribution between independent groups using the Shapiro-Wilk test, whereas we used the Mann-Whitney U test to evaluate the numerical data according to data conformity to normal distribution and the chi-square test to evaluate categorical data. We performed receiver operating characteristic (ROC) analysis to evaluate the effect of PLR, WBC, NLR, and CRP values and univariate analysis to identify the factors that might affect the conversion to open surgery. Additionally, we performed multivariate analysis to determine predictive factors. We expressed numerical values as median (minimum-maximum values), and categorical values as number (n) and percentages (%). A p value of <0.05 was considered statistically significant.

Results

A total of 389 patients were followed and treated for AA in our clinic during the study period. Seventy-one of these patients had uncomplicated AA and received medical treatment. Of the patients included, 201 patients underwent open surgery, wherein 117 patients initially underwent laparoscopy. Four patients underwent only laparoscopic exploration. Contrarily, 13 patients were in Group Con

(11%) and 100 patients in Group LA (89%) (Figures 1 and 2). The conversion was due to colonic injury in two patients, bleeding in three patients, and difficulty in appendix exploration in eight patients. The number of open and laparoscopic appendectomies (those completed laparoscopically and those converted to open surgery) performed by years is shown in Figure 2.

Of the 113 patients who met the inclusion criteria, 66 (58.4%) were male and 47 (41.6%) female. The median age of male and female patients was 28 (18-75) and 31 (18-66) years, respectively (p=0.426). Conversion was recorded in four male patients and nine female patients (p=0.042) (Table 1).

Table 1 presents the demographic data of patients, the presence of complicated AA in the preoperative period, and laboratory results in Group LA and Group Con.

Although previous studies reported that preoperative WBC values affect the conversion, univariate and multivariate analyses revealed that increased preoperative WBC values were not a predictive factor in the conversion to open appendectomy (p value =0.605). Contrarily, sex, age, CRP values, preoperative appendix diameter, BMI values, complicated AA on preoperative radiological imaging, and increased preoperative PLR and NLR values were predictive factors significantly affecting the conversion (p values were

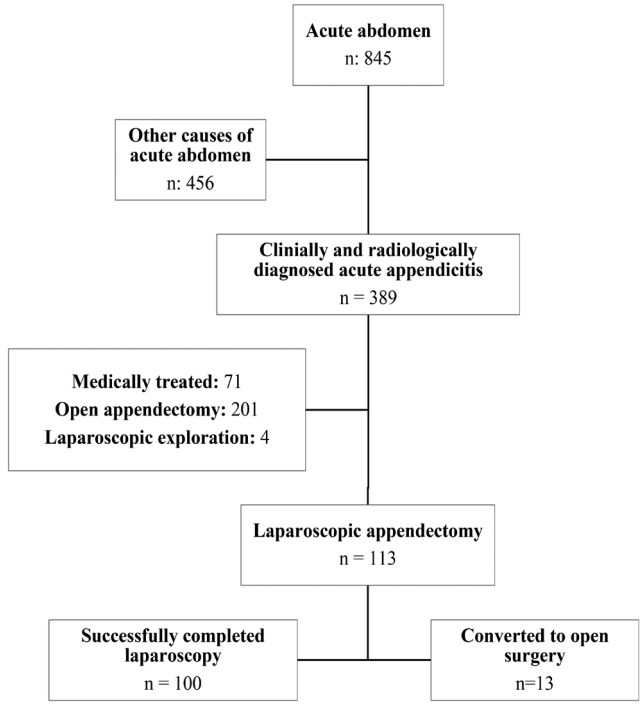

Figure 1. Flowchart of the study design

Table 1. Demographic characteristics (sex, age, BMI levels), cases characterized as either complicated or uncomplicated AA according to the preoperative imaging methods, and preoperative laboratory results

		Successfully completed laparoscopic appendectomy	Converted to open appendectomy	p values
Sex	Male	55 (55%)	11 (84.6%)	
	Female	45 (45%)	2 (15.4%)	0.042*
Total		100 (100%)	13 (100%)	
Preoperative imaging modalities	CAA	27 (27%)	8 (61.5%)	
	UAA	73 (73%)	5 (38.5%)	0.016*
Total		100 (100%)	13 (100%)	
Age (years)		28 (18-68)	52 (18-75)	0.014*
WBC count (/mm³)		13,160 (6,930-25,180)	14,980 (1,870-25780)	0.349
NLR		5.05 (1.06-62.79)	12.45 (2.33-62.79)	0.005*
PLR		141.54 (37.94-1,324.14)	331.58 (100.38-1,324.14)	<0.001*
CRP		17.9 (3.02-349)	59.8 (13-349)	0.008*
Preoperative appendix diameter (mm)		10 (6-18)	11 (6-18)	0.048*
Hospitalization (day)		1 (0-5)	4 (1-24)	<0.001*
BMI (kg/m²)		22.91 (15.62-35.26)	26.18 (19.02-30.85)	0.006*

*p<005; statistically significant

WBC: White blood cell count, CRP: C-reactive protein, PLR: Platelet-to-lymphocyte ratio, NLR: Neutrophil-to-lymphocyte ratio, BMI: Body mass index, CAA: Complicated acute appendicitis, UAA: Uncomplicated acute appendicitis

0.042, <0.001, 0.02, 0.014, 0.008, 0.011, <0.001, and 0.001, respectively).

ROC Curve Analysis of Preoperative WBC, CRP, PLR, and NLR values in Patients who Required Conversion from Laparoscopy to Open Appendectomy

Results showed that the sensitivity and specificity of preoperative PLR values for determining the conversion were 76.9% and 84%, respectively, with a cutoff value of ≥190.56 [area under the curve (ARUC): 0.853; confidence interval (CI): 0.728-0.928]. The sensitivity and specificity of preoperative NLR values were 69.2% and 65%, respectively, with a cutoff value of ≥6.61 (ARUC: 0.741; CI: 0.574-0.908) (Figure 3 and Table 2).

Discussion

The concept of laparoscopic surgery may be attributed to Ebu'l Kasım El-Zehravi who described vaginal examination by directing light to a straight imaging instrument. However, Kelling performed the first laparoscopy in 1901 and defined this technique as "coelioscopy" through an evaluation of the intra-abdominal organs of a dog.[11,12] Thanks to technological advancements, laparoscopic surgery or minimally invasive surgery has become the preferred treatment.[13] After Kurt Semm, a German gynecologist, performed laparoscopic appendectomy in 1983, the technique has taken its place as one of the most important laparoscopic surgical techniques.[6] Particularly during 2020 coronavirus disease-19 outbreak, there has been a significant decrease in surgical appendectomy cases. During this period, nonoperative treatment was preferred as the first-line treatment option, particularly in cases with uncomplicated AA.[14,15]

Laparoscopic surgery has many proven advantages over conventional open surgery, including a more acceptable aesthetic appearance thanks to smaller incisions[6], shorter hospital stay, and less need for analgesics.[1]

Although the rate of conversion from laparoscopic appendectomy to open surgery only ranges from 0% to

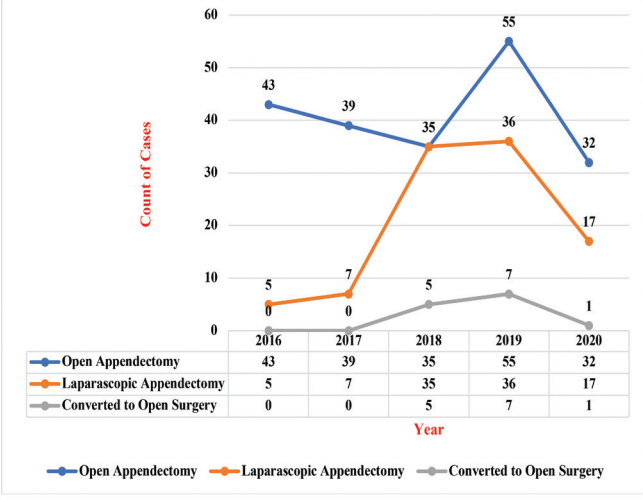

Figure 2. Distribution of the appendectomies according to the study period (October 2016-October 2020)

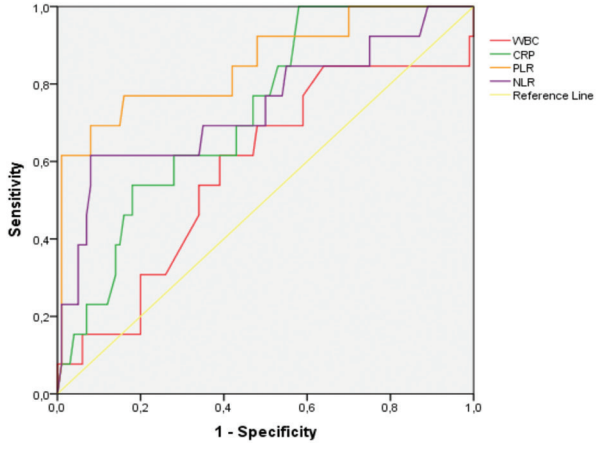

Figure 3. The receiver operating characteristic (ROC) curve of the CRP, NLR, PLR, and WBC levels for conversion cases

WBC: White blood cell count, CRP: C-reactive protein, PLR: Platelet-to-lymphocyte ratio, NLR: Neutrophil-to-lymphocyte ratio

Table 2. The receiver operating characteristic (ROC) curve analysis of the CRP, NLR, PLR, and WBC levels for conversion from laparoscopic to open appendectomy cases

	ARUC	Asymptotic 95% confidence interval		Sensitivity (%)	Specificity (%)	Cut off value	p value
		Lower bound	Upper bound				
WBC (/mm³)	0.580	0.407	0.753	69.2	52	13480	0.349
CRP	0.727	0.602	0.851	76.9	57	22.85	0.008*
PLR	0.853	0.728	0.978	76.9	84	190	<0.001*
NLR	0.741	0.574	0.908	69.2	65	6.61	0.005*

WBC: White blood cell count, CRP: C-reactive protein, PLR: Platelet-to-lymphocyte ratio, NLR: Neutrophil-to-lymphocyte ratio, ARUC: Area under curve

17%[16], the increase in treatment costs, need for additional incision, and prolonged duration of hospital stay for patients who require the conversion should still be noted.[17] Previous studies have identified many factors affecting the conversion to open surgery (e.g., preoperative high CRP levels, sex, obesity, abscess formation with AA, presence of complicated AA in the preoperative period, lack of experience in laparoscopic surgery, bleeding, and iatrogenic organ injury).[3,6,7,16,18,19,20,21] Consistent with previous findings, the present study has identified the presence of complicated AA, uncontrolled bleeding, and iatrogenic cecal perforation as the primary reasons in determining the need for conversion. Moreover, similar to previous studies, we observed that the length of stay in hospitals was longer in patients who required the conversion.

Because NLR is a more sensitive test compared to leukocyte count, our study suggests that other blood parameters can also be used in the preoperative diagnosis of infectious (e.g., AA) and non-infectious (e.g., malignancies) diseases.[9,22,23] Additionally, Pehlivanlı and Aydin[9] reported that PLR values were a valuable marker in the preoperative diagnosis of AA based on these inflammatory markers. They also suggested that the increase in PLR values were useful in differentiating normal appendix from an inflamed appendix and were a predictive factor in the preoperative diagnosis of uncomplicated and complicated AA.[9] Similarly, Yazar et al.[24] found that when used together with other blood parameters, NLR and PLR had a diagnostic value of 90.5%. Similarly, Çınar et al.[25] showed that NLR and PLR values were reported to be specific indicators in the diagnosis of AA.

Apart from the preoperative diagnosis, the use of blood parameters (such as CRP and NLR) as a predictive factor for conversion from laparoscopic to open surgery has formed the hypothesis of the present study that preoperative PLR values can also determine the need for conversion. The findings obtained from the study confirm this. Furthermore, when the cutoff value is taken as ≥190, the sensitivity and specificity of preoperative PLR as a new parameter in addition to previously reported predictive factors reached 72.9% and 84%, respectively, showing that PLR is an effective factor for conversion.

Study Limitations

The primary limitation of the present study is its retrospective design. Secondly, compared with hospitals providing secondary care, the number of appendectomies performed annually in our tertiary center is lesser than in other studies. However, power analysis has shown that our data is sufficient. Since our hospital provides tertiary general surgery specialization training, physicians with less surgical experience work in our hospital. Therefore, our rates of conversion to open surgery are relatively higher (10%) than other hospitals that have more experienced surgeons. Nevertheless, a review of PubMed and other databases has revealed that our study is the first to investigate preoperative PLR value as a predictive factor for the conversion from laparoscopic to open surgery. This is the most important advantage of our study. Therefore, we believe that surgeons who want to perform laparoscopic surgery, particularly in rural areas that lack of imaging methods, can use the PLR values from complete blood count in identifying patients for laparoscopic appendectomy.

Conclusion

In conclusion, when evaluated together with other predictive parameters, higher preoperative PLR value is a useful parameter in determining cases with a high possibility of conversion, anticipating possible complications that may occur because of the conversion, and deciding whether an open appendectomy before surgical administration is needed.

Ethics

Ethics Committee Approval: This study was approved by Kahramanmaraş Sütçü İmam University, Faculty of Medicine Human Research Ethical Committee (protocol number: 356, date: 14/10/2020, session number: 2020/19, decision no: 01).

Informed Consent: Taken form all patients for surgical intervention

Peer-review: Externally peer reviewed.

Authorship Contributions

Surgical and Medical Practices: M.B.B., F.M.Y., Concept: M.B.B., F.M.Y., Design: M.B.B., F.M.Y., Data Collection or Processing: M.B.B., Analysis or Interpretation: M.B.B., F.M.Y.,

Literature Search: M.B.B., Writing: M.B.B., F.M.Y.

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RESEARCH ARTICLE

Management of Rectal Foreign Bodies: A Case Series Analysis

Rektal Yabancı Cisimlerin Yönetimi: Olgu Serisi Analizi

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ABSTRACT

Aim: Rectal foreign bodies are rare cases encountered in the emergency department. Taking the correct history and applying the correct treatment algorithm is important in the management of these cases. The aim of this study was to evaluate the patients who presented at the emergency department (ED) with a rectal foreign body.

Method: The study included patients who were evaluated by the general surgery department for rectal foreign body in the ED of Ankara Training and Research Hospital between January 2016 and December 2020. The patients were evaluated in terms of age, gender, foreign body type, clinical findings, imaging method, whether the surgery was performed, how the foreign body was removed, perforation, and anesthesia method.

Results: Out of 12 cases, the foreign bodies removed from each of the cases were a shampoo bottle, a bottle of black seed, a plastic bowling pin, an enema cover, a roll-on deodorant bottle, a spray deodorant bottle, a plastic toy ball, a lubricant gel bottle, a face toner bottle, a piece of wood, an effervescent tablets tube, and a tea cup, all of which having (8.3%) each. The foreign body was used for sexual stimulation in 11 cases. Two of the cases had anorectal pain and two had abdominal pain. In six cases (50%), the foreign body was removed rectally with spinal anesthesia. Two patients underwent laparotomy under general anesthesia, and in one (8.3%) of these cases, colon perforation was determined, so Hartman colostomy was performed.

Conclusion: Patients presenting with rectal foreign bodies should be evaluated carefully, and acute abdominal perforation should be ruled out. Bodies causing distal lesions should be removed transanally with sedation or locoregional anesthesia. In cases with perforation, primary repair, segmental resection, or Hartman or loop colostomy should be performed according to the contamination status and perforation width.

Keywords: Rectal foreign body, management, anorectal trauma

ÖZ

Amaç: Rektal yabancı cisimler acil serviste nadir görülen bir durumlardır. Bu olguların yönetiminde doğru öykünün alınması ve doğru tedavi algoritmasının uygulanması önemlidir. Bu çalışmanın amacı rektal yabancı cisim ile acil servise (AS) başvuran hastaları değerlendirmektir.

Yöntem: Çalışmaya Ankara Eğitim ve Araştırma Hastanesi AS'sinde Ocak 2016-Aralık 2020 tarihleri arasında rektumda yabancı cisim nedeniyle genel cerrahi bölümü tarafından değerlendirilen hastalar dahil edildi. Hastalar yaş, cinsiyet, yabancı cisim tipi, klinik bulgular, görüntüleme yöntemi, ameliyatın yapılıp yapılmadığı, yabancı cismin nasıl çıkarıldığı, perforasyon ve anestezi yöntemi açısından değerlendirildi.

Bulgular: On iki olgudan her birinden (%8,3) bir şampuan şişesi, bir çörekotu yağı şişesi, plastik bowling labutu, lavman kapağı, roll-on deodorant şişesi, sprey deodorant şişesi, plastik oyuncak top, bir kayganlaştırıcı jel şişesi, bir yüz toner şişesi, bir tahta parçası, bir efervesan tablet tüpü, bir çay bardağı gibi yabancı cisimler çıkarıldı. Yabancı cisim 11 olguda cinsel uyarı amacıyla kullanıldı. Olguların ikisinde anorektal ağrı, ikisinde karın ağrısı vardı. Altı olguda (%50) yabancı cisim spinal anestezi ile rektal yolla çıkarıldı. İki hastaya genel anestezi altında laparotomi yapıldı ve bu olguların birinde (%8,3) kolon perforasyonu saptanarak Hartman tipi kolostomi yapıldı.

Sonuç: Rektal yabancı cisim ile başvuran hastalar dikkatle değerlendirilmeli ve akut karın perforasyonu ekarte edilmelidir. Distal lezyonlara neden olan cisimler sedasyon veya lokal anestezi ile transanal olarak çıkarılmalıdır. Perforasyonlu olgularda kontaminasyon durumuna ve perforasyon genişliğine göre primer onarım, segmental rezeksiyon veya Hartman veya loop kolostomi yapılmalıdır.

Anahtar Kelimeler: Rektal yabancı cisim, yönetim, anorektal travma

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Introduction

Rectal foreign bodies are difficult to diagnose and manage during the initial evaluation in the emergency department (ED) and continues after the removal too.[1] These cases, which were very rare in the past, have increased in number in recent years. The annual incidence was reported as 0.15 per 1,00,000 people.[2] However, the actual incidence of self-inserted rectal foreign bodies is unknown because patients only present at the ED if they cannot remove the foreign body or if acute abdominal pain develops.[3] In addition, patients may be reluctant to tell the truth about the emergency admission, which may lead to a delay in detailed comprehensive assessment and diagnosis.[4]

The aim of this study was to retrospectively evaluate the patients who were admitted to the ED with a rectal foreign body and discuss the findings according to the relevant literature.

Materials and Methods

The study included patients who presented with a foreign body in the rectum between January 2016 and December 2020 at the ED of Ankara Training and Research Hospital. Patient information was obtained retrospectively from computer records and patient files. Cases with incomplete data were excluded from the study. The patients were evaluated in terms of age, gender, foreign body type, clinical findings, imaging method, whether the surgery was performed, how the foreign body was removed, perforation, and anesthesia method. All cases were evaluated in terms of acute abdomen first in the ED. Subsequently, the cases were evaluated in terms of whether the foreign body could be removed in the ED. In cases where the foreign body could be reached by rectal touch but could not be removed in the ED, it was removed in the operating room under spinal anesthesia. Once patients were observed to have normal abdominal examination and laboratory findings, they were discharged.

Results

A total of 12 patients were evaluated, comprising 10 (83.3%) males and 2 (16.7%) females with a median age of 34 years (range, 21-70 years). Removed foreign bodies are shown in Table 1 (Figure 1, 2).

The foreign body was found to be used for sexual stimulation in 11 (91.6%) cases. In one case, the enema valve remained in the rectum after the enema application. Eight (66.6%) of the cases were asymptomatic, two (16.6%) had anorectal pain, and two (16.6%) had abdominal pain. Rectal examination revealed lacerations in the anal mucosa in four patients. For the diagnosis, direct radiography was used in seven (58.3%) cases, and computed tomography (CT) in four (33.3%).

Table 1. Demographic and clinical characteristics of the cases

Patient	Age	Gender	Foreign body	Circumstances of insertion	Clinical finding	Imaging method
1	25	Male	Shampoo bottle	Sexual stimulation	Asymptomatic	Abdominal radiography
2	44	Female	Bottle of black seed oil	Sexual stimulation	Abdominal pain	Abdominal radiography
3	40	Male	Plastic bowling pin	Sexual stimulation	Asymptomatic	Abdominal tomography
4	31	Female	Enema cover	Enema for constipation	Asymptomatic	-
5	21	Male	Roll-on deodorant bottle	Sexual stimulation	Asymptomatic	Abdominal radiography
6	31	Male	Spray deodorant bottle	Sexual stimulation	Asymptomatic	Abdominal radiography
7	24	Male	Plastic toy ball	Sexual stimulation	Asymptomatic	Abdominal radiography
8	36	Male	Lubricant gel bottle	Sexual stimulation	Abdominal pain	Abdominal tomography + colonoscopy
9	27	Male	Face toner bottle	Sexual stimulation	Anorectal pain	Abdominal tomography
10	70	Male	Wood piece	Sexual stimulation	Anorectal pain	Abdominal tomography
11	63	Male	Effervescent tablets tube	Sexual stimulation	Asymptomatic	Abdominal radiography
12	61	Male	Tea cup	Sexual stimulation	Asymptomatic	Abdominal radiography

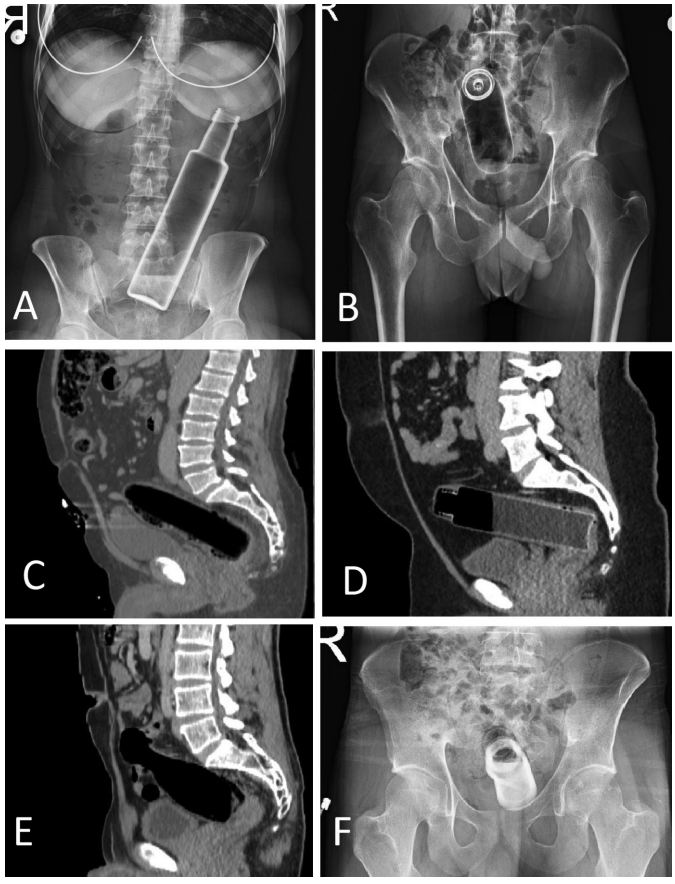

Figure 1. a) Bottle of black seed oil, **b)** Perfume bottle, **c)** Piece of wood, **d)** Shampoo bottle, **e)** Plastic bowling pin, and **f)** Roll-on deodorant bottle

Figure 2. a) Lubricant gel bottle, **b)** Perfume bottle, **c)** Plastic bowling pin, **d)** Piece of wood, **e)** Bottle of black seed oil, and **f)** Roll-on deodorant bottle

In two cases, the foreign body was beyond the rectal touch distance. No test was performed for diagnosis in one (8.3%) case (enema cover). In four (33.3%) cases, the rectal foreign body was removed in the ED without anesthesia, and in six cases (50%), it was removed rectally by administering spinal anesthesia. Two patients underwent laparotomy under general anesthesia. Colon perforation was present in one (8.3%) of these cases; hence, Hartmann colostomy was performed. In the other case who underwent laparotomy, an attempt to remove the foreign body by colonoscopy after the CT evaluation was made. When it could not be removed by colonoscopy, laparotomy was performed, and the rectal foreign body was removed by milking the object transanally (Table 2). All the patients were discharged after clinical improvement was observed. No morbidity or mortality was observed in any of the patients.

Discussion

Surgeons and emergency physicians frequently encounter foreign bodies in the rectum. These objects vary widely, but the vast majority are sex toys, bottles, vegetables and fruits, and similar household items.[1] In studies from other countries, rectal foreign bodies that were removed were predominantly sex toys.[3,5,6] In the current series and in other series originating in Turkey[4,7,8], the objects were of an ordinary domestic nature rather than sex toys. The reason for this may be the reluctance to shop in sex shops due to the social structure in Turkey. The rectal foreign bodies observed in the current study were a shampoo bottle, a bottle of black seed oil, a plastic bowling, an enema cover, a roll-on deodorant bottle, a spray deodorant bottle, a plastic toy ball, a lubricant gel bottle, a face toner bottle, a piece of wood (chipped shovel handle), an effervescent tablets tube, and a tea cup.

The most common reason for foreign body insertion is sexual stimulation.[3,9] Other reasons are sexual assault, drug trafficking, amateur self-medical treatment, and objects used for constipation treatment.[3] The most common cause of rectal foreign body in this series was autoeroticism and in one case, the reason was the enema valve remaining in the rectum after enema application.

In the literature, as in the current cases, the patients are mostly males between the ages of 11 and 80 years with a ratio of 6:1-37:1, and most commonly between the ages of 30 and 40 years.[1,3,10,11] Patients usually wait for a while

Table 2. Management of cases and complications

Patient	How it was removed	Was there a perforation?	Was surgery performed?	Methods of anesthesia
1	Transanally	-	-	Spinal anesthesia
2	Laparotomy + colostomy	+	+	General anesthesia
3	Transanally	-	-	Spinal anesthesia
4	Transanally	-	-	-
5	Transanally	-	-	Spinal anesthesia
6	Transanally	-	-	Spinal anesthesia
7	Transanally	-	-	Spinal anesthesia
8	Laparotomy + milking, transanally extraction	-	+	General anesthesia
9	Transanally	-	-	-
10	Transanally	-	-	Spinal anesthesia
11	Transanally	-	-	-
12	Transanally	-	-	-

before coming to the hospital and try to remove it by themselves.[12] A five-year pending case has been reported in the literature.[13] Cases come to the ED only if self-removal fails or if abdominal pain develops. Therefore, the true incidence is unknown.[3]

Clinicians must be friendly and respectful to ensure reliable communication with patients presenting with a rectal foreign body. A respectful and professional approach, without judgment, enables the anamnesis to be taken more accurately and to be managed more quickly by diagnosis.[2] The approach to rectal foreign bodies has been given in many articles. In these algorithms, the authors recommend starting with a detailed anamnesis from the patient before determining the treatment method.[14,15] The type and volume of the object, and the time elapsed from the event to inspection should be asked. Another issue that should be considered is that patients are evaluated in terms of colon perforation.[1,4] Detailed abdominal and rectal examinations should be performed in terms of the acute abdominal findings. Foreign bodies may be distinguished by digital rectal examination, which should be performed after abdominal radiography to avoid injury to the doctor with a sharp object. In addition, anal sphincters should be carefully evaluated for injury.[4] Although sphincter damage was not observed in the current cases, anal mucosal damage was observed in four cases. Radiologically, direct abdominal radiographs are sufficient in most cases, and abdominal tomography should be performed when perforation is suspected.

Various techniques have been described for rectal foreign body extraction. The extraction technique varies according to many factors, such as the type, size, location of the object, the time from the event to the examination, the patient's symptoms, and the surgeon's experience.[11] Most authors emphasize that in patients without acute abdominal findings, the foreign body may be removed in the emergency room without a surgery. The success rate of this procedure varies between 63%-74%.[11,16] Although anesthesia is not required when removing small, distally-located objects, locoregional or general anesthesia is required for highly located objects.[1,10,17] In four of the current cases, the rectal foreign body was removed in the emergency room without any anesthesia, but in six patients, it was removed in the operating room under spinal anesthesia, and in two patients, under general anesthesia. Perforation possibility and acute abdomen should be excluded in patients for whom transanal extraction is considered. The foreign body may be expected to emerge spontaneously by giving laxatives or an enema when the object is small without a perforation risk. However, it should be noted that there is a risk of impaction, hemorrhage, and perforation in the rectum when using this method.[18] When the case series in the literature are examined, many techniques have been described for transanal extraction other than manual extraction. In a previous series, the rectal foreign body was removed transanally in 81.9%-95.5% of the cases.[5,19] Surgical treatment performed by laparotomy has been reported at a rate of 8%-10%.[11,18] Transanally, the foreign body may be removed manually or by using forceps, a Kocher clamp, or similar surgical tools.[5,20] In addition, polypectomy snares, an inflated Foley catheter, a vacuum extractor, and endoscopic dilatation balloons have been used for extraction.[11,21,22,23] Apart from these methods, cases

in which a rectal foreign body was removed by placing a single incision laparoscopic surgery port in the anal canal have been reported.[24,25] Colonoscopic extraction may also be performed in appropriate cases.[26] In the current series, the rectal foreign body was removed manually in 4 cases, and in a total of 11 cases (91.6%), extraction was made transanally, of which 7 cases required the use of surgical instruments. Many authors recommend performing a control rectosigmoidoscopy after transanal removal of the rectal foreign body to rule out bowel injury and confirm the presence of multiple foreign bodies.[14,15,16]

Some patients require laparotomy or laparoscopy for rectal foreign body extraction. In particular, the possibility of laparotomy is high in patients where the foreign body has advanced to the sigmoid colon and proximally.[11] In addition, laparotomy is indicated in patients with perforation (free air on x-ray) and acute abdomen. In patients without signs of peritonitis, the foreign body is milked distally through laparotomy or the laparoscopic method and removed from the anal canal.[27,28] In early cases with perforation, laparoscopic or open primary repair may be performed after foreign body extraction.[29] A loop or Hartman colostomy should be performed in patients who develop signs of major intra-abdominal contamination, peritonitis, or sepsis.[17,30]

Conclusion

Rectal foreign body is a rare condition. Before choosing the extraction method, patients should be evaluated carefully. In cases without acute abdomen, transanal extraction should be the first choice, preferably under sedation, and locoregional anesthesia should be used for rectal foreign bodies located in the distal rectum. Control abdominal radiographs, 24-hour observation, and control with rectosigmoidoscopy are recommended in cases undergoing transanal extraction. It is essential to perform laparoscopy or laparotomy in cases where transanal extraction is unsuccessful or for high-located foreign bodies. If there is no perforation, transanal removal should be attempted by pushing distally through milking. When this method fails, a colostomy should be performed. In cases with perforation, primary repair, resection of the damaged segment, and loop colostomy or Hartman colostomy are performed, depending on the general condition of the patient, the patient's comorbidities, time after perforation, intra-abdominal contamination, and peritonitis.

Ethics

Ethics Committee Approval: All procedures performed involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Peer-review: Externally and internally peer reviewed.

Authorship Contributions

Surgical and Medical Practices: M.S., A.D., K.K., Concept: R.B., Design: A.D., K.K., Data Collection or Processing: R.B., Analysis or Interpretation: M.S., A.Ş., Literature Search: M.S., A.Ş., Writing: M.S., A.Ş.

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RESEARCH ARTICLE

Effect of Hospital Conditions on Short-Term Colorectal Cancer Outcomes: Experience of One Surgeon in Two Centers

Hastane Koşullarının Erken Dönem Kolorektal Kanser Sonuçlarına Etkisi: Tek Cerrah, İki Merkez

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ABSTRACT

Aim: Many factors can affect the outcomes of colorectal cancer (CRC) surgery. In addition to patient- and disease-related outcomes, factors such as surgeon volume and hospital conditions are thought to influence the results. However, only a few studies have compared the experience of a single surgeon from different centers. Thus, this study aimed to compare the short-term outcomes of CRC surgery performed by a single surgeon in secondary care (state hospital) and tertiary care (university/training research hospital) centers.

Method: Data of patients who received treatment for colon cancer between April 2018 and January 2020 by a single surgeon, who had completed gastroenterology surgery fellowship, in two different centers were retrospectively analyzed. Patients were divided into two groups as those treated in a secondary center and a tertiary center and compared in terms of demographic characteristics, application types, cancer stage, perioperative transfusion requirement, operation conditions, durations of hospital and intensive care stay, postoperative complications, and pathology results.

Results: Of the 39 patients included in the study, 13 (33.3%) were treated in a secondary state hospital and 26 (66.7%) in a tertiary training and research hospital. Moreover, 46.2% of the patients in the secondary center group and 11.5% of the patients in the tertiary center group underwent emergency surgery because of ileus. The transfusion rate was higher in the secondary center group than in the tertiary center group (76.9% vs 34.6%). The rate of laparoscopic surgery was higher in the tertiary center group than in the secondary center group (7.7% vs 69.2%). No significant difference was found between the two centers in terms of demographic characteristics, length of hospital stay, complications, and pathology results.

Conclusion: Although the application rates are higher in advanced disease stages and emergency conditions, provided that the experience and training of the surgeon is sufficient, colorectal cancer surgery can be performed in relatively small and low-volume centers, with oncological results, morbidity, and mortality rates similar to those of large centers.

Keywords: Colon cancer, postoperative outcomes, hospital volume

ÖZ

Amaç: Kolorektal kanser (KRK) cerrahisinin sonuçlarını etkileyen birçok faktör vardır. Hasta ve hastalık kaynaklı sonuçların yanı sıra cerrah volümü ve hastane koşulları gibi faktörlerin de sonuçlara etkisi olduğu düşünülmektedir. Ancak literatürde tek cerrahın farklı merkezlerdeki sonuçlarını karşılaştıran yeterince çalışma yoktur. Bu çalışmanın amacı tek cerrah tarafından 2. basamak (devlet hastanesi) ve 3. basamak (üniversite/eğitim araştırma hastanesi) merkezlerde yapılan KRK olgularının erken dönem sonuçlarını karşılaştırmaktır.

Yöntem: Çalışmada gastroenteroloji cerrahisi yan dal eğitimi alan tek cerrah tarafından koşulları farklı iki merkezde Nisan 2018-Ocak 2020 tarihleri arasında kolon kanseri nedeniyle tedavi edilen hastalar retrospektif olarak incelendi. Hastalar 2. ve 3. basamak merkezde tedavi olanlar olarak iki gruba ayrılarak demografik özellikleri, başvuru şekilleri, kanser evresi, perioperatif transfüzyon ihtiyacı, ameliyat şartları, hastane ve yoğun bakım yatış süreleri, postoperatif komplikasyonlar ve patoloji sonuçları açısından karşılaştırıldı.

Bulgular: Çalışmaya alınan 39 hastanın 13'ü (%33,3) 2. basamak devlet hastanesinde, 26'sı (%66,7) 3. basamak eğitim ve araştırma hastanesinde tedavi edildi. İkinci basamak merkezde opere edilen hastaların %46,2'si, 3. basamaktakilerin %11,5'i ileus nedeniyle acil şartlarda opere edildi.

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Transfüzyon oranı 2. basamak merkezde daha yüksek bulundu (%76,9'a karşı %34,6). Üçüncü basamak merkezde ise laparoskopik cerrahi oranı daha yüksekti (%7,7'ye karşı %69,2). Demografik özellikler, hastane yatış süreleri, komplikasyonlar ve patoloji sonuçları açısından iki merkez arasında anlamlı fark saptanmadı.

Sonuç: İleri evre ve acil şartlarda başvuru oranları daha yüksek olsa da cerrahın tecrübe ve eğitiminin yeterli olması durumunda kolorektal kanser cerrahisi, nispeten küçük ve volümü düşük merkezlerde de büyük merkezlere benzer onkolojik sonuçlar, morbidite ve mortalite oranları ile uygulanabilir.

Anahtar Kelimeler: Kolon kanseri, postoperatif sonuçlar, hastane volümü

Introduction

There are many factors that affect the results of colorectal cancer (CRC) surgery. In addition to patient and disease-related outcomes, factors such as surgeon volume and hospital conditions are thought to have an impact on the results. Depending on the annual number of patients, education, and branching, CRC-specific survival rates at 5 years following curative resection range from 53% to 85%.[1] Bilimoria et al.[2] investigated the effect of surgeon and hospital volumes on patient outcomes in various cancers in a study they designed. This study showed that patients operated in high-volume centers and by high-volume surgeons have better outcomes than patients operated in lower-volume centers and by surgeons with lower number of patients.[2,3] Evidence that CRC outcomes may depend on more than volume alone has come from research showing that hospitals designated by the National Cancer Institute have superior long-term survival compared to other hospitals.[4] Porter et al.[5] evaluated the results of lower anterior resection and abdominoperineal resection procedures performed in a period of approximately 8 years in their study which they designed as a multicenter study. They examined the surgeons in two groups as those who received additional training on CRC (surgical oncology, colorectal surgery subspecialty, etc.) and those who did not and as a result, they concluded that more experienced surgeons and specialized surgeons had positive effects on cancer-specific survival. In another study, a reduction in postoperative complications and long-term survival were found in patients who were operated by surgeons who had a special training for rectal cancer.[6] Billingsley et al.[7] argued that very high surgeon volume was associated with a reduction in surgical complications, but the relationship between increased hospital volume and postoperative mortality was mainly related to clinical services that could facilitate early recognition and treatment of complications.

In the literature, the effects of hospital volume, annual number of patients of the surgeon, whether the surgeon has received specific training on this subject, and even the age of the surgeon on the early and long-term outcomes of CRC surgery have been frequently investigated.[8] In these studies, although the details are not mentioned, the anesthesia, oncology, radiology and pathology teams that contribute to the patient's treatment process may be fixed for surgeons performing procedures. However, when evaluated specifically for the surgical treatment of CRC, studies comparing the results of a single surgeon in centers with different volumes are limited.

As it is known, surgeons, like all doctors, are assigned to hospitals with different volumes and facilities by the Ministry of Health in our country for various reasons such as state service obligation or spouse status. In this study, it was aimed to compare the results of patients who underwent surgical treatment for colon cancer in separate secondary and tertiary centers by a surgeon who completed his training in gastroenterology surgery, and to reveal the effect of the volume and facilities of the centers on these results.

Materials and Methods

The study was conducted in accordance with the principles of the Declaration of Helsinki and with the approval of the local ethics committee (ethics committee number: 2020/241). Written informed consent form was obtained from all patients included in the study at the time of admission. In the study, patients who were treated for colon cancer between April 2018 and January 2020 in two centers under different conditions by a single surgeon with subspecialty training in gastroenterology surgery were retrospectively analyzed.

The patients were divided into two groups according to the centers where their surgical treatment was performed: State hospital (2nd level) and training and research hospital (3rd level). Only adult patients were included in the study. Patients receiving neoadjuvant therapy and patients treated for rectal cancer were excluded from the study. Groups were compared in terms of demographic characteristics (such as age and gender), presence of preoperative obstruction, emergency or elective surgery, preoperative hemoglobin values, perioperative blood transfusion status, tumor localization, surgical technique applied, duration of surgery, postoperative complications, tumor stage, metastatic, total lymph node number, and postoperative hospitalization durations in intensive care unit and ward.

Surgical Technique

In all surgeries, total mesocolic excision was performed in accordance with oncological principles. The risk of anastomotic leakage of patients who were operated on with signs of obstruction in emergency conditions was evaluated intraoperatively, and in patients deemed necessary, anastomosis was not performed and stoma was created.

Statistical Analysis

SPSS version 15.0 (Statistical Package for the Social Sciences Inc., Chicago, IL, USA) was used to evaluate the data obtained from the study. Obtained values are shown as mean ± standard deviation and percentage (%) where appropriate. Chi-square test was used to compare categorical variables. In the comparison of two independent groups; Student's t-test was used when normal distribution was met, and Mann-Whitney U-Test was used when normal distribution was not met. In all statistical analyses, the level of significance was accepted as $p<0.05$.

Results

A total of 39 patients who were operated for colon cancer in a 22-month period were included in the study. While 13 of the patients (33.3%) were operated in the second level state hospital; 26 (66.7%) of them were operated by the same surgeon in a tertiary training and research hospital. Of the patients, 19 (48.7%) were male and 20 were female, and their mean age was 63.1±14.3. There was no difference between the two centers in terms of demographic characteristics. Compared to colon cancer procedures performed at the tertiary center, procedures performed at the secondary center were more performed in emergencies (46.2% vs 11.5%; p=0.024) and required more perioperative erythrocyte suspension (76.9% vs 34.6%; p=0.013). While laparoscopic procedures were mostly preferred in the tertiary center; the rate of open surgery was higher in the secondary center (p<0.001). There was no significant difference between the groups in terms of tumor localization and duration of surgery (Table 1). The pathology results of the groups were compared in Table 2. There was no difference between centers in terms of total number of lymph nodes resected (p=0.353), number of positive lymph nodes (p=0.627), T stage (p=0.068), N stage (p=0.639), M stage (p=0.337), and tumor stages (p=0.608). Although no significant difference was found, there was evidence showing that patients who were admitted to the secondary center were admitted at

Table 1. Demographic and clinical characteristics of the patients

	State hospital (n=13)	Training and research hospital (n=26)	p
Age (year)	64.1±16.4	62.6±13.5	0.769
Gender, n (%)			0.365
Female	8 (61.5)	12 (46.2)	
Male	5 (38.5)	14 (53.8)	
Type of surgery, n (%)			**0.024**
Emergency	6 (46.2)	3 (11.5)	
Elective	7 (53.8)	23 (88.5)	
Tumor location, n (%)			0.092
Cecum-ascending colon	2 (15.4)	6 (23.1)	
Transverse colon	4 (30.8)	2 (7.7)	
Descending colon	3 (23.1)	2 (7.7)	
Sigmoid colon	4 (30.8)	16 (61.5)	
Preoperative ileus, n (%)	6 (46.2)	3 (11.5)	**0.024**
Preoperative Hb <10 g/dL, n (%)	4 (30.8)	6 (23.1)	0.440
Laparoscopic surgery, n (%)	1 (7.7)	18 (69.2)	**<0.001**
Duration of surgery (min)	166 ± 30	211 ± 84	0.099
Perioperative blood transfusion, n (%)	10 (76.9)	9 (34.6)	**0.013**

Hb: Hemoglobin

a more advanced stage. Some of these evidences were as follows: Patients diagnosed as having colon cancer were statistically significantly more admitted with ileus (46.2% vs 11.5%; p=0.024), and although not statistically significant, more metastatic disease, and more stage 4 cancer were found. End colostomy was performed in three patients who were operated under emergency conditions in the secondary hospital. Again under emergency conditions, extended left hemicolectomy was performed in one patient and a loop ileostomy was created by simultaneous anastomosis with subtotal colectomy in another patient. In the tertiary center, resection anastomosis was performed in all surgeries. There was no difference between centers in terms of complications evaluated with the Clavien-Dindo classification (p=0.325). Wound infection in one patient and intra-abdominal abscess in one patient in the state hospital were treated with medication. In the training and research hospital, 3 intra-abdominal abscesses and wound infection, anastomotic leakage, prolonged ileus and bleeding were detected in one patient. While no statistically significant difference was observed in hospitalization times and 30-day reoperation rates, the duration of intensive care unit stay was longer in the tertiary care center (1.6 vs. 3.1; p=0.047).

Discussion

The period in which the study was carried out was a total of 22 months, the first six months of which covered the secondary center and the remaining 16 months covered the process in the tertiary center. The secondary center was in Batman, located in the Southeastern Anatolia region of Turkey and the tertiary center was located in Ankara. Therefore, while the study reflects the difference between centers at different levels; on the other hand, it is important in terms

Table 2. Comparison of centers in terms of pathology results

	State hospital (n=13)	Training and research hospital (n=26)	p
Positive surgical margin, n (%)			NS
No	13 (100)	26 (100)	
Yes	0	0	
Total number of lymph nodes	19.0±8.3	23.6±13.1	0.353
Number of positive lymph nodes	2.7±3.6	2.4±3.6	0.627
T stage, n (%)			0.068
T1	0	0	
T2	3 (23.1)	2 (7.7)	
T3	4 (30.8)	18 (69.2)	
T4	6 (46.1)	6 (23.1)	
N stage, n (%)			0.639
N0	4 (30.8)	10 (38.4)	
N1	6 (46.1)	8 (30.8)	
N2	3 (23.1)	8 (30.8)	
M stage, n (%)			0.337
M0	9 (69.2)	21 (80.8)	
M1	4 (30.8)	5 (19.2)	
Tumor (TNM) stage, n (%)			0.608
Stage I	2 (15.4)	2 (7.7)	
Stage II	2 (15.4)	8 (30.8)	
Stage III	5 (38.4)	11 (42.3)	
Stage IV	4 (30.8)	5 (19.2)	

NS: Not significant

of presenting a perspective in terms of regional differences. In our study, the rate of patients who presented with ileus and therefore underwent emergency surgery was higher in the secondary center. Perioperative transfusion rate was statistically significantly higher in the secondary center. In addition, while the rate of T4 stage cancer in the secondary center was 46.1%; in the tertiary center, this rate was 23.1%. These findings can be interpreted as patients diagnosed as having colon cancer tend to prefer advanced centers more frequently after diagnosis, or it can be interpreted that the rate of emergency surgery may be due to diagnostic delays due to socioeconomic and cultural reasons. Because, according to the socioeconomic development ranking research (SEGE-2017) of the city where the secondary center was located in our study[9], it was in the sixth stage developed province groups; while the city where the tertiary center was located was in the first stage developed province group. In addition, considering the two regions where the study was conducted, it was inevitable that there would be differences in terms of CRC screening awareness. This was compatible with the fact that patients in the secondary center were admitted to the hospital in a more advanced stage. Aquina et al.[10] found a 62.8% variation in the use of minimally invasive methods in colon surgery suggesting that this was mostly due to surgeons (28.5%), followed by hospital characteristics (7%), and finally geographical features (1.6%). However, the approach of the same surgeon in different centers in this study was not clearly stated. When surgical procedures were evaluated in our study, the rate of laparoscopic surgery was statistically significantly higher in the tertiary center. The material facilities of the tertiary hospital, the experience of the assistant staff in minimally invasive surgery, the high rate of elective surgery and patient demands could be considered as the reasons why laparoscopic surgery was more preferred. In a single-center study conducted by Barbas et al.[11] in which the results of CRC surgery performed by the surgeons with and without surgical oncology training were compared; the rate of lymph node dissection unsuitable for oncologic surgery (less than 12) was found to be statistically higher in surgeons who did not receive appropriate training. In this study, they concluded that the training received by the surgeon was more important than the volume of the surgeon. Martínez-Ramos et al.[12] showed in a single-center study comparing the results of general surgeons and colorectal surgeons that the mean number of lymph nodes dissected by surgeons in both groups was below 12 and there was no difference in patient outcomes between the groups. Nathan et al.[13] reported that the rate of inadequate lymph node dissection was at a substantial level, which could be attributed to surgeons (8%), pathologists (19%), and hospitals (73%), respectively, after excluding patient characteristics. In our study comparing the results of different centers of the same surgeon, the number of dissected lymph nodes was found to be 19 and 23 in the secondary and tertiary level centers, respectively, and they were oncogically sufficient. In pathological examinations, there was no difference between centers in terms of factors

Table 3. Comparison of centers in terms of postoperative results

	State hospital (n=13)	Training and research hospital (n=26)	p
Clavien-Dindo classification, n (%)			0.325
None	11 (84.6)	19 (73.1)	
Grade I-II	2 (15.4)	3 (11.5)	
Grade III-V	0	4 (15.4)	
Complications, n (%)			NS
Anastomotic leak	-	1	
Intraabdominal abscess	1	3	
Prolonged postoperative ileus	-	1	
Bleeding	-	1	
Wound infection	1	1	
Length of intensive care unit stay (days)	1.6±1.9	3.1±3.7	**0.047**
Length of hospital stay (days)	10.4±4.8	10.8±8.1	0.187
30-day reoperation, n (%)	1 (7.7)	3 (11.5)	1.000

NS: Not significant

indicating compliance with oncological principles such as surgical margin, number of removed lymph nodes, and it was evaluated that the treatment applied in the two centers was similar in terms of oncological results. It was evaluated that the high T4 and metastatic disease rates in the secondary center may be related to the patients' preferences for admission or inadequacy in screening.

Brännström et al.[14] examined the effect of surgeon and hospital-related factors on the outcome of CRC surgery. They suggested that the results were not related to hospital category, surgeon volume, or the specialized training of the surgeon, and that the most important factor influencing outcomes in colon surgery was the stage of the disease. In a single-center study conducted by Barbas et al.[11], there was no effect of having surgical oncology training on 30, 60, and 90-day perioperative mortalities; while a statistically significant effect on overall survival was reported. This situation was associated with inadequate surgical oncology practice in the group who did not receive any training. Xu et al.[15] reported in their study that the rate of postoperative complications was related to the surgeon rather than the hospital. Billingsley et al.[7] found the postoperative 30-day morbidity and mortality rates similar and reported that the most effective factor in this regard was the volume of the surgeon, not the center. While no early mortality was found in our study; no significant difference was found in terms of complications, length of hospital stay, and, 30-day reoperation rate. In the current study, the difference in length of stay in intensive care unit might be due to the shorter post-operative intensive care unit stay in the secondary step center and the necessity of providing rapid circulation due to the low intensive care unit capacity in small centers. However, this situation does not have a negative effect on clinical patient outcomes and may contribute positively to the cost and faster psychological normalization of the patients.

Although the primary goal in this study was to evaluate the effects of centers on CRC surgery outcomes; on the other hand, we obtained data related to patient preferences and awareness in the peripheral and central regions of our country. In conclusion, there was no difference in terms of early results of CRC surgery between the secondary center located in the periphery of Turkey and the tertiary care center located at the central point. However, as discussed above, there were significant differences between centers in terms of patient presentation and disease stage, probably due to socioeconomic and cultural reasons or the tendency of patients to prefer advanced centers after cancer diagnosis.

Study Limitations

The main limitations of the study were that the evaluation was based on retrospective data, that the number of patients was relatively small due to the limited time in the institutions worked, and that only short-term results were evaluated. Our group continued the follow-up of the patients and planned to publish the long-term results. Since the study was planned to compare the results of the same surgeon in two centers with different volumes, capacities and facilities, we were not able to expand the parameters except for long-term results. In the tertiary center where the surgeon was still working, we will have the opportunity to increase the number of patients in the future. However, since it is not possible for the same surgeon to work again in the secondary center, it does not seem possible for us to increase the number of patients in this center. Although fewer colon cancer surgeries despite longer duration of working in the secondary center is considered as a limitation, we think that it can also be considered as one of the results showing the difference between the centers. The fact that the centers are located in different geographical regions can be considered as another limitation. However, since this is a regulation related to the health system in our country, it is almost impossible to optimize.

These limitations can be eliminated with studies that are prospectively designed with a larger number of patients and eliminate regional differences, and more reliable results can be obtained in this regard. The experience and education of the surgeon are among the most important factors affecting the results of CRC surgery. Although the admission rates are higher in advanced stages and in emergency conditions, CRC surgery can be safely performed in relatively small and low-volume centers with similar oncological results, postoperative morbidity and mortality rates with high-volume centers, if the surgeon's experience and training is sufficient. However, differences in regional awareness and inadequacies regarding CRC and screening still remain relevant for our country.

Ethics

Ethics Committee Approval: The study was conducted in accordance with the principles of the Declaration of Helsinki and with the approval of the local ethics committee (ethics committee number: 2020/241).

Informed Consent: Written informed consent form was obtained from all patients included in the study at the time of admission.

Peer-review: Externally and internally peer reviewed.

Authorship Contributions

Surgical and Medical Practices: Ü.A., Concept: Ü.A., S.U.Ç., Y.S.P., B.T., Design: Ü.A., S.U.Ç., B.T., Data Collection or Processing: Ü.A., Y.S.P., B.T., Analysis or Interpretation: Ü.A., S.U.Ç., Y.S.P., B.T., Literature Search: Ü.A., S.U.Ç., Y.S.P., B.T., Writing: Ü.A., S.U.Ç., Y.S.P., B.T.

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RESEARCH ARTICLE

The Relationship Between Smartphone Use in the Lavatory and Hemorrhoidal Disease

Lavaboda Akıllı Telefon Kullanımı ile Hemoroidal Hastalık Arasındaki İlişki

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ABSTRACT

Aim: Hemorrhoidal disease is a proctological problem that affects a large portion of the population at some point. Nowadays, excessive use of smartphones combined with evolving social media habits has resulted in the smartphone being used in the lavatory.

Method: The study group consisted of patients admitted to the general surgery outpatient clinic with hemorrhoids, and the control group consisted of healthy volunteers with no such complaints. All participants were given a questionnaire with questions about their smartphone usage habits. The degree of hemorrhoidal disease, if any, was determined by an experienced general surgeon who performed the physical examinations.

Results: The study group had 882 participants and the control group had 802. While 64.7% (571) patients of the former took their smartphones with them to the lavatory, only 38.4% (308) participants of the control group did (p<0.001). Of the study group, 49.9% actually used their smartphones while in the lavatory, whereas only 27.3% of the control group did (p<0.001). For every additional minute spent using a smartphone in the lavatory, the likelihood of being in the hemorrhoid group increased by 1.26 times (95% confidence interval =1.162-1.364).

Conclusion: Smartphones are now commonly used even in the lavatory, and this habit may be a risk factor for hemorrhoids. Therefore, to treat hemorrhoids, it is advisable for patients to abandon this habit.

Keywords: Hemorrhoidal disease, risk factors, smartphone

ÖZ

Amaç: Hemoroidal hastalık, nüfusun önemli bir bölümünün bir noktada karşılaştığı proktolojik bir sorundur. Günümüzde, cep telefonlarının aşırı sosyal medya alışkanlıkları ile birlikte aşırı kullanımı, birincisinin tuvalette kullanılmasına yol açmıştır. Bu çalışmanın amacı, lavaboda cep telefonu kullanımının hemoroidal hastalık ile ilişkili olup olmadığını araştırmaktır.

Yöntem: Genel cerrahi polikliniğine hemoroid şikayeti ile başvuran hastalar çalışma grubuna dahil edilirken, bu tür şikayeti olmayan sağlıklı gönüllüler kontrol grubunu oluşturdu. Tüm katılımcılara cep telefonu kullanım alışkanlıkları hakkında sorular içeren bir anket verildi. Hemoroid hastalığının derecesi, varsa, fizik muayeneleri bizzat yapan deneyimli bir genel cerrah tarafından belirlendi.

Bulgular: Çalışma grubu 882 katılımcı ve 802 kontrol grubundan oluşmaktaydı. Birincisinin %64,7'si (571 hasta) yanlarında cep telefonlarını lavaboya götürürken, bu oran kontrol grubu için sadece %38,4 (308 hasta) idi (p<0,001). Çalışma grubunun %49,9'u tuvaletteyken cep telefonlarında zaman geçirirken, kontrol grubunun sadece %27,3'ü bunu yapmıştı (p<0,001). Lavaboda bir cep telefonu kullanılarak geçirilen her ilave dakika için, hemoroit grubunda olma olasılığının 1,26 kat arttığı belirlendi (%95 güven aralığı =1,162-1,364).

Sonuç: Cep telefonları artık lavaboda bile yaygın olarak kullanılmaktadır, bu alışkanlık hemoroit için risk faktörü olabilir. Bu nedenle, hemoroid tedavisi için, hastaların bu alışkanlığı bırakmaları tavsiye edilebilir.

Anahtar Kelimeler: Hemoroidal hastalık, risk faktörleri, akıllı telefon

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Introduction

Hemorrhoidal disease is a common condition seen in general surgery polyclinics.[1] Currently, 45%-50% of the population has complained of hemorrhoidal disease at some point in their lives.[2] According to previous studies, the prevalence of hemorrhoids ranges from 4.4% to 36%.[3,4] This variation could be attributed to differences in the populations studied as well as differences in the diagnosis criteria used.

Despite numerous studies on the etiology and development mechanisms of hemorrhoidal disease, no consensus has been reached. Although it was previously thought that the expansion of varicosity in the venous blood vessels around the anus and an increase in pressure in the portal system influenced the development of hemorrhoidal disease, subsequent studies have indicated otherwise.[5,6] More recently, inflammation has been linked to the development of hemorrhoidal disease.[7] Increased pressure in the anal region leads to prolapsed hemorrhoids and also inhibits venous return.[8] Obstructed venous return further worsens hemorrhoid prolapse and makes it symptomatic.[9] Constipation was previously widely recognized as an important factor, but recent studies have indicated that diarrhea is more influential[3]. Although alcohol consumption along with consumption of spicy foods and low-fiber diet has not been shown to play a significant role in the etiology of hemorrhoidal disease, it is believed that strain during defecation aids in its development over time.[5,10]

Considering the accelerating factors in the development of hemorrhoids, the prevalence of the disease may be reasonably expected to be elevated in modern society. People now lead more sedentary lives than in the past eras, and they generally prefer high-calorie/high-fat low-fiber foods. In addition, smartphones have permeated every aspect of our daily lives. A number of studies have concluded that this situation has become a public health issue.[11]

Based on our clinical observations, we discovered that the use of smartphones in the lavatory, which is a fairly common occurrence in everyday life, has become a habit for some people. We believe that this habit, which results in long periods spent in the lavatory, will lead to an increase in the duration of straining and pressure in the anal region. However, there is a gap in the literature as we found no study investigating the relationship between the use of smartphones in the lavatory and the development of hemorrhoids. The goal of this study was to investigate the relationship between smartphone usage habits in the lavatory and hemorrhoidal disease.

Materials and Methods

Study Design/Setting

After receiving approval from the ethics committee of Yeni Yüzyıl University (İstanbul, Turkey), the study was carried out in collaboration with Van Yüzüncü Yıl University (Van, Turkey). The study was planned with a case-control design based on retrospective observations.

Participants and Variables

The study included patients admitted to the general surgery department with hemorrhoidal complaints between November 1, 2017, and May 31, 2018, as well as a control group of healthy volunteers with no hemorrhoidal complaints (Figure 1). The control group for the study was formed outside the target population. Care was taken

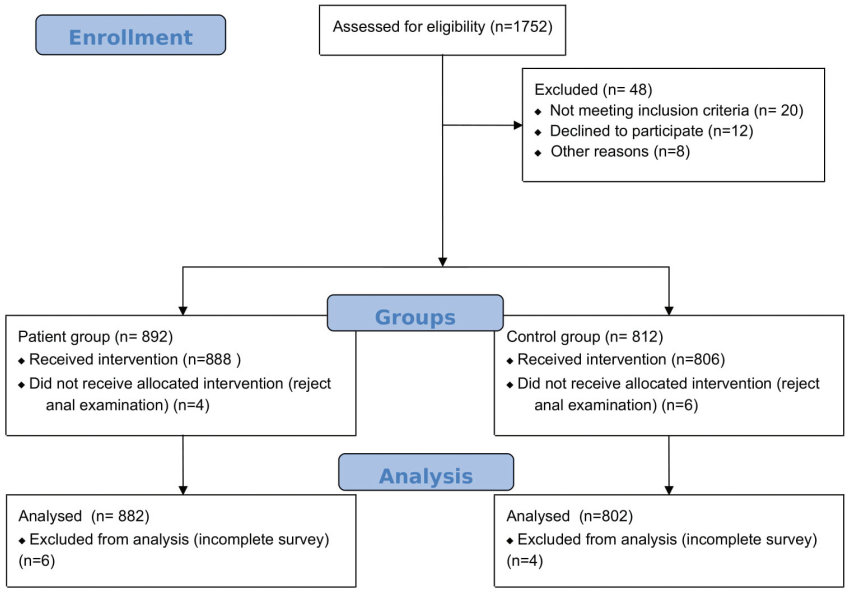

Figure 1. Flow diagram. The number of participants at each stage of the study

to ensure that the control group came from the same environment and social class as the study group, and in some cases, controls were selected from among close relatives or friends of patients.

Complaints of hemorrhoidal disease, consent to physical examination, and voluntary completion of the questionnaire were the main inclusion criteria. Patients with diseases such as cirrhosis, chronic obstructive pulmonary disease, ascites, or cancer, who refused to be examined or did not complete the questionnaire, were excluded from the study.

Furthermore, the control group had to be healthy and free of any health problems such as hearing or visual disturbances that could be affected by the risk factor (the use of smartphones). The participants in both the patient and control groups ranged in age from 16 to 65, and both sexes were recruited for the study. Informed consent was obtained from patients and control volunteers, and participants were requested to fill out the Likert-type questionnaire (Table 1).

The study was planned so that the doctor performing the proctological examinations would be unaware of the questionnaire results. After the participants completed the questionnaires, the general surgeon examined their anal regions and performed rectal palpations, and the results were added to the questionnaires (Table 1). At the first stage, the presence or absence of hemorrhoids was noted. If hemorrhoids were present, they were classified as either external or internal. Internal hemorrhoids were categorized as stage 1, 2, 3, or 4 based on standard textbook definitions, and the examining physician recorded this information.[12]

Study Size

Due to a gap in the literature regarding the prevalence of smartphone use in the lavatory, we conducted a pilot study to determine the approximate prevalence and event rate in the population and then calculated the sample size. According to the results of the pilot study, which included 100 patients and 100 controls, 36.4% of those with hemorrhoidal disease used a smartphone for 2 or more minutes while in the lavatory compared with 13.2% in the control group. Since our study was a case-control study, we calculated the necessary sample size to determine the prevalence in the patient group using the following formula:

$$n = \frac{Z^2 \times p\,(1-p)}{d^2} \text{ and } n = \frac{1.96^2 \times 0.364\,(1-0.364)}{0.05^2}, \text{ then } n = 355.7$$

We chose a target difference (d) of 5% and assumed a type 1 error of 5% with a power of 80%. Accordingly, with an event probability of 36.4%, the result obtained was a minimum of 356 patients.

However, because our goal in this study was to investigate the extent to which the use of smartphones (measured in minutes) in the lavatory (independent variable) increases the risk of hemorrhoids, we needed to perform a sample size calculation for binary logistic regression analysis. Based on the results of the pilot study, the rate of smartphone usage in the lavatory for at least 2 minutes was 26.9% in the whole population. For logistic regression analysis, the formula proposed by Peduzzi et al.[13] was used:

$$n = \frac{10 \times k}{p}$$

where k denotes the number of independent variables and p the probability of the event in the general population (the value for p observed in the pilot study was 26.9%). Thus:

$n = \frac{10 \times 19}{0.269}$, yielding n = 706.3

According to these calculations, a minimum of 706 patients and an equal number of controls were required to determine the prevalence of smartphone usage in the lavatory among the patient population (those with hemorrhoidal disease) and to measure the effect of this habit on the development of hemorrhoids. With a 10% loss due to missing or incorrect data on the questionnaires, we calculated the total number of participants initially necessary for each group (patient and control) to be 706+71=777.

Statistical Analysis

All data were analyzed using the statistical software SPSS version 22 (Statistics for Windows, Version 22.0. Armonk, NY, IBM) and Matlab R2015. Frequency and percentage rates were provided for categorical and nominal variables. After continuous numerical variables were checked for normal distribution, those that showed normal distribution were given as mean ± standard deviation, whereas those that did not were given as median and minimum-maximum values. To identify the variables associated with patient hemorrhoidal status (presence/absence), univariate analysis was performed using the following tests, as appropriate: chi-square, Fisher's exact test, analysis of variance, Mann-Whitney U, and Kruskal-Wallis. The probability of having hemorrhoidal disease was evaluated using Kernel density estimation (based on Bayesian classifier statistics). For multivariate analysis, the possible factors identified by univariate analysis were entered into logistic regression analysis to determine the independent predictors of patient hemorrhoidal status. The Hosmer-Lemeshow test was applied to assess the goodness of fit of the model. Multiple correspondence analysis was used to analyze the pattern of relationships of several categorical dependent variables. Moreover, a type 1 error level of 5% was used to determine statistical significance.

Results

A total of 1752 participants were evaluated for eligibility, with 1684 of them, including 882 (52.4%) patients and 802 (47.6%) controls, eventually being analyzed (Figure

Table 1. The questionnaire and physician's examination notes.

1Q	Do you own a smartphone (iphone, Samsung, etc.)? (if no leave the answers to questions concerning cell phone usage blank)								yes	no
2Q	How long have you been using a smartphone?					1-2 years	3-4 years	5-6 years	10-15 years	>20 years
3Q	Do you have accounts with social media platforms such as Facebook, Twitter, Instagram, etc.?								yes	no
4Q	How do you use your smartphone during the day?						For calling/ text messaging	For social media (social network-ing sites)	For internet (news, email, etc.)	All
5Q	How many times per day do you go to the bathroom to defecate?				1	2	3	4	5-10	>10
6Q	How many times per day do you go to the bathroom to urinate?				1	2	3	4	5 -10	>10
7Q	Approximately how many hours per day do you spend on social media platforms such as Facebook, Twitter, Instagram, etc.?				30 min.	1 hour	1-2 hours	2-3 hours	3-4 hours	>5 hours
8Q	Approximately how many minutes does it take you to defecate?	<1 min.	1-2 min.	3-5 min.	5-10 min.	10-15 min.	15-20 min.	20-30 min.	30-45 min.	>1 hour
9Q	Approximately how many minutes does it take you to urinate?	<1 min.	1-2 min.	3-5 min.	5-10 min.	10-15 min.	15-20 min.	20-30 min.	30-45 min.	>1 hour
10Q	How many times per day do you check your phone on average?					<10	20-30	30-40	40-60	>60
11Q	When using the lavatory do you take a book, newspaper, or magazine with you?						Never	Rarely	Some-times	Always
12Q	Do you take your cell phone with you when using the lavatory?						Never	Rarely	Some-times	Always
13Q	Do you check your cell phone in the lavatory?						Never	Rarely	Some-times	Always
14Q	Approximately how much time do you spend on your cell phone while in the lavatory?					None <2 min.	2- 5 min.	5-10 min.	10-20 min.	>30 min.
15Q	Checking my cell phone in the lavatory increases the amount of time I spend there. (mark the extent to which you agree) 1 2 3 4					Definitely agree 5				Definitely disagree
16Q	How much has the time you spend in the lavatory increased as a result of using your cell phone there? (please indicate the number of minutes)									
17Q	What is your age?									
18Q	Gender									
19Q	Weight									
20Q	Height									

Hemorrhoidal disease			present	absent
If present:			external	internal
Degree if internal	1	2	3	4
Additional notes				

1). The median and mean ages of the study group were 36 (19-64) and 38.1±10.7 years, respectively, and those of the control group were 36 (19-57) and 36.08±8.7 years (p=0.007). The patient group included 536 (60.8%) men and 346 (39.2%) women, whereas the control group had 417 (52%) men and 385 (48%) women (p<0.001). During the physical examination, all participants in the study group with complaints of hemorrhoidal disease were diagnosed with hemorrhoids, whereas 26 participants in the control group were diagnosed with hemorrhoids despite not having any hemorrhoidal complaints.

Table 2 shows the distributions of responses to questions about the use of smartphones by the patient and control groups. The percentage of the study group that reported taking their smartphones to the lavatory was 64.74%, with 49.9% actually using them; for the control group, these rates were 38.4% and 27.3%, respectively.

When the rates at which participants used their smartphones in the lavatory were compared with the development of hemorrhoids, a significant positive association was found (p<0.001). While 39.7% (73) participants who reported using their smartphones less than 30 minutes per day were in the patient group, 60.3% (111) were in the control group. Of those who reported using social media on their smartphones for more than 5 hours per day, 80% (36) participants were in the patient group and 20% (9) were in the control group. Regarding the effect of excessive smartphone use on the habit of taking the smartphone to the lavatory, 38.6% (311) participants who did not report such a habit were in the study group, whereas 61.4% (494) were in the control group. In contrast, 87% (141) participants who reported always taking their smartphones to the lavatory were in the study group and only 13% (21) were in the control group. Figure 2A depicts the probability of the disease being present when data from all participants, 47.8% of whom reported never using their smartphones in the lavatory, was analyzed using Kernel density estimation (Figures 2A and 2B). Because the probabilities of the presence or absence of hemorrhoids are nearly identical, the results presented in Figure 2A provide no useful insight. Figure 2B, on the other hand, only shows the data from patients in the study group who took their smartphones to the lavatory (the frequency of which was reported as "rarely," "sometimes," or "always"). In this case, the probability of the presence of the disease (YES) was nearly double that of its absence.

Taking into account the various reasons given for taking the smartphone into the lavatory (such as safety and concern about losing the smartphone), we asked the participants how much time (in minutes) they spent on their smartphones while in the lavatory. Further, 44.4% of those who did not report using their smartphones in the lavatory were in the study group and 55.6% were in the control group. A majority (66.4%) of the participants who used their smartphones in the lavatory for 5-10 minutes were in the study group,

Table 2. Smartphone usage-related survey questions and results by group

Question	Answer	Group		p
		Study (patient) group	Control group	
DO YOU HAVE A SMARTPHONE? (n, % in column)	YES	821 93.1%	738 92.0%	.406
	NO	61 6.9%	64 8.0%	
HOW MUCH TIME DO YOU SPEND USING SOCIAL MEDIA PER DAY? (n, % in column)	ABOUT 30 MIN	73 10.5%	111 19.0%	<.001
	1 HOUR	217 31.2%	120 20.5%	
	1 to 2 HOURS	263 37.8%	264 45.2%	
	3 to 4 HOURS	106 15.3%	80 13.7%	
	MORE THAN 5 HOURS	36 5.2%	9 1.5%	
DO YOU TAKE YOUR CELL PHONE WITH YOU TO THE LAVATORY? (n, % in column)	NEVER	311 35.3%	494 61.6%	<.001
	RARELY	219 24.8%	136 17.0%	
	SOMETIMES	211 23.9%	151 18.8%	
	ALWAYS	141 16.0%	21 2.6%	
HOW MANY MINUTES DO YOU SPEND ON YOUR PHONE IN THE LAVATORY? (n, % in column)	NONE	442 50.1%	553 68.9%	<.001
	< 2 MINUTES	154 17.5%	100 12.5%	
	2 - 5 MINUTES	129 14.6%	74 9.2%	
	5 - 10 MINUTES	148 16.8%	75 9.4%	
	10 - 20 MINUTES	9 1.0%	0 0.0%	

whereas 33.6% were in the control group, and the rates of those using their smartphones for more than 10 minutes were 100% and 0%, respectively.

According to the results of logistic regression analysis, the hemorrhoidal disease stage was not observed to be associated with the duration of smartphone use in the lavatory; however, an increase of 1 minute of usage did increase the incidence of hemorrhoidal disease by 1.26 units (p=0.041). A multidimensional analysis of the basic components of all the data revealed that smartphone use in the lavatory was associated with the development of hemorrhoidal disease (Figure 3). When considering two dimensions together (the right lower quadrant), defecation lasting for more than 10 minutes, use of the smartphone in the lavatory for more than 5 minutes, and "always" taking the smartphone to the lavatory were all associated with a diagnosis of hemorrhoidal disease.

Discussion

In the present study, we found that the habit of using smartphones in the lavatory resulted indirectly in an increase in the prevalence of hemorrhoidal disease. Although the habit of reading while in the lavatory was thought to be a facilitating factor in the development of hemorrhoidal disease, we were unable to find any clinical studies that supported this finding. To the best of our knowledge, the current study is the first to investigate the relationship between hemorrhoids and reading (books, magazines, or newspapers) or looking at a smartphone while in the lavatory.

With each passing day, technology infiltrates deeper into our daily lives. Naturally, the use of smartphones in the lavatory instead of reading books or magazines, as well as the use of smartphones in the lavatory even by those who were not in the habit of reading books there, has prompted us to investigate the use of smartphones. In recent years, studies have begun to investigate the direct and indirect effects of smartphones on individual and public health. The number of studies on behavioral and psychological changes related to smartphone use, especially among youth, as well as on its effects on public health issues such as depression, is increasing.[14] On the other hand, smartphone use is thought to have a direct impact on physical health. Frequent use of smartphones has been shown to cause median nerve damage due to excessive movement of the thumb, ultimately leading to impaired movement.[15] Another negative effect of frequent use is hearing loss. In fact, excessive smartphone use has been shown to cause hearing loss at high frequencies in the ear that is usually used when compared with the other ear.[16] Another study on the direct effects of excessive smartphone use on the eyes found that using the smartphone more than 4 hours per day affects the ocular surface disease index and causes tear disorders.[17]

As seen from our results, although the age range was 19-64 years for both the study and control groups, the median and mean ages were significantly higher for the former. This is also consistent with the fact that hemorrhoidal disease is more common in older people. Although both sexes had equal rates of hemorrhoidal disease, the rates in male and female patients were 60.87% and 39.2%, respectively, for the study group and 52% and 48%, respectively, for the control group. As a result, we observed that hemorrhoidal disease is more common in men than in women. However, there is no evidence in the literature to support this conclusion; the disease has been reported to affect both sexes equally.[18]

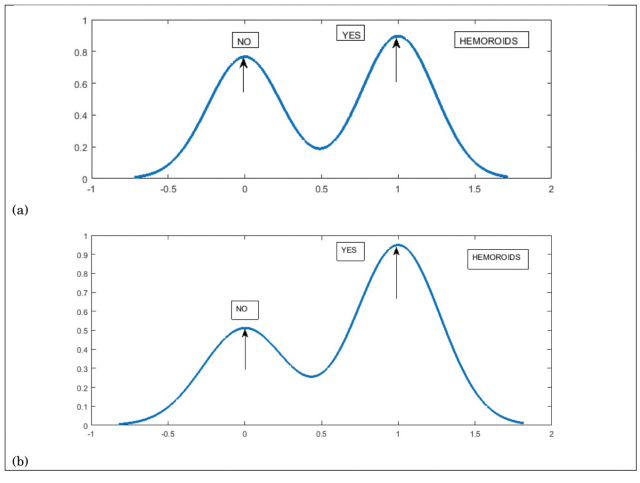

Figure 2. Figure 2A shows the Kernel density estimation of all participants (in both the patient and control groups) who reported taking their smartphones to the lavatory (reported as "rarely," "sometimes," or "always"). **Figure 2B** shows the Kernel density estimation of only the patients in the study group who reported taking their smartphones to the lavatory (reported as "rarely," "sometimes," or "always")

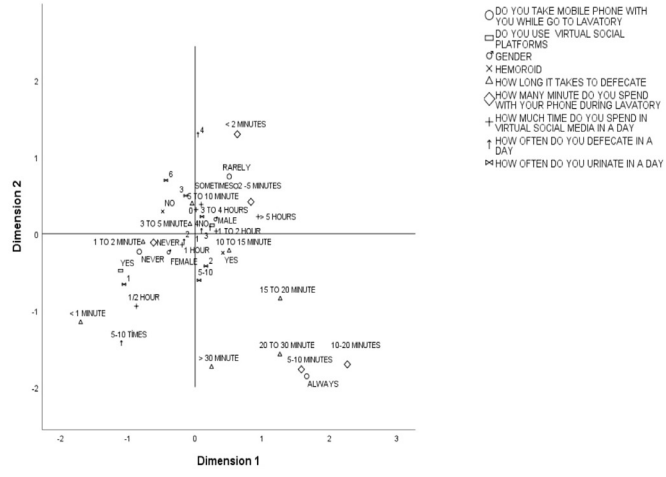

Figure 3. Multidimensional analysis of the basic components thought to be related to the development of hemorrhoids. When both dimensions are taken into account (see the right lower quadrant of the graph), a diagnosis of hemorrhoids (labeled "X") appears to be associated with "always" taking the smartphone to the lavatory, using the smartphone for more than 5 minutes in the lavatory, and defecation lasting more than 10 minutes

Upon examining the results of the questionnaires, three factors associated with the development of hemorrhoidal disease became apparent. These were the amount of time spent on social media using smartphones during the day, the act of taking the smartphone to the lavatory, and actually using the smartphone while there. Increasing the duration of social media usage on smartphones during the day led to increased use of smartphones in the lavatory, reflecting a kind of dependency. A comparison of the two graphs in Figure 2 shows that people who take their smartphones to the lavatory have a higher risk of developing hemorrhoidal disease.

Study Limitations

The most important limitation of this study is the potential for bias related to recall, especially since it involves patients' evaluation of their own past habits. Therefore, it is crucial to keep in mind that participants' information about the duration of their smartphone use while in the lavatory may be inaccurate to some extent.

A further limitation is the interobserver variation resulting from the subjective nature of the analysis of hemorrhoids. Although the diagnostic criteria are clearly defined, some variation in the evaluations is inevitable.

Conclusion

In conclusion, despite its limitations, the present study found a link between the use of smartphones in the lavatory and hemorrhoidal disease as a result of increased use of social media platforms, which was determined to result in longer times spent in the lavatory. Having established that relationship, the question of cause and effect remains. Does using smartphones in the lavatory increase the time spent sitting, naturally resulting in an increase in anal pressure, or is it that individuals with defecation issues, who consequently sit on the toilet for prolonged periods of time, thereby resulting in hemorrhoids, prefer to use their smartphones in the lavatory because they already spend so much time there? To find answers to these questions, we need to carefully conduct further studies using prospectively randomized controlled trials involving healthy adults with no existing signs of hemorrhoidal disease.

Ethics

Ethics Committee Approval: After receiving approval from the ethics committee of Yeni Yüzyıl University (İstanbul, Turkey), the study was carried out in collaboration with Van Yüzüncü Yıl University (Van, Turkey).

Informed Consent: Informed consent was obtained from patients and control volunteers, and participants were requested to fill out the Likert-type questionnaire (Table 1).

Peer-review: Externally and internally peer reviewed.

Authorship Contributions

Surgical and Medical Practices: E.Z., Concept: E.Z., A.Ö., S.Ç., M.Ç., Design: E.Z., A.Ö., S.Ç., M.Ç., Data Collection or Processing: E.Z., A.Ö., S.Ç., A.S., M.Ç., Analysis or Interpretation: E.Z., S.Ç., A.S., Literature Search: E.Z., S.Ç., M.Ç., Writing: E.Z., M.Ç.

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RESEARCH ARTICLE

An Evaluation of Colorectal Polyps by Size and Advanced Histological Features: In a Secondary Referral Centre

Kolorektal Poliplerin Boyut ve İleri Histolojik Özelliklerine Göre Değerlendirmesi: İkinci Basamak Sağlık Merkezimizin Sonuçları

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ABSTRACT

Aim: Advanced histological features, polyp size, and polyp count are factors known to increase the risk of adenomatous polyps' transformation into a malignancy. We aimed to analyze, in detail, the advanced histological features of a large number of polyps that are under the size of 1 cm, which we have identified, and to compare our findings with those of similar studies in literature.

Method: A total of 2,302 colonoscopy procedures that were performed for any reason in adult patients above the age of 18 years in our endoscopy unit of the department of gastroenterology between October 2016 and January 2020 were screened. The endoscopic and histological features of the identified procedures were analyzed retrospectively.

Results: In 401 (17.42%) of the 2,302 colonoscopy procedures, at least one polyp had been identified. Diminutive polyps (67.21%), small polyps (25.91%), and large polyps (6.88%) were detected. The most common histological diagnosis in the polyps was adenomas (61.13%) and, among all adenomas, tubular adenoma (88.08%) was the most frequent type. Low-grade and high-grade dysplasia was detected in 58.91% and 2.63% of the polyps, respectively. Advanced histological features were detected in 2.41% of the diminutive polyps, 13.28% of the small polyps, and 47.06% of the large polyps. As the polyp size increased, the frequency of the advanced histological features also increased.

Conclusion: The number of diminutive polyps and small polyps as well as the frequency of advanced histological features in our study were slightly higher when compared to those in similar studies.

Keywords: Polyp, advanced histological features, size

ÖZ

Amaç: İleri histolojik özellikler, polip boyutu ve polip sayısının adenomatöz poliplerin maligniteye dönüşümünde önemli risk faktörleri olduğu bilinmektedir. Çalışmamızda 1 cm boyutun altındaki çok sayıda kolorektal polibin ileri histolojik özelliklerini ayrıntılı olarak analiz etmeyi ve bulgularımızı literatürdeki benzer çalışmalarla karşılaştırmayı amaçladık.

Yöntem: Ekim 2016-Ocak 2020 tarihleri arasında hastanemiz gastroenteroloji kliniği endoskopi ünitesinde 18 yaş üstü erişkin hastalara herhangi bir nedenle yapılmış olan toplam 2302 kolonoskopik işlem tarandı. Bu işlemlerde belirlenen poliplerin endoskopik ve histolojik özellikleri retrospektif olarak analiz edildi.

Bulgular: 2302 kolonoskopik işlemin 401'inde (%17,42) en az bir polip tespit edildi. Diminutif polip, küçük polip ve büyük polip (%6,88) oranları sırasıyla %67,21, %25,91 ve %6,88 olarak tespit edildi. Poliplerde en sık histolojik tanı adenomlardı (%61,13) ve tüm adenomlar arasında tübüler adenom (%88,08) en sık görülen adenoma tipiydi. Poliplerin %2,63'ünde düşük dereceli, %58,91'inde yüksek dereceli displazi saptandı. Diminutif poliplerin %2,41'inde, küçük poliplerin %13,28'inde ve büyük poliplerin %47,06'sında ileri histolojik özellikler tespit edildi. Polip boyutu arttıkça ileri histolojik özelliklerin görülme sıklığı da artmaktaydı.

Sonuç: Çalışmamızda diminutif ve küçük poliplerin sayısı ve bu poliplerdeki ileri histolojik özelliklerin sıklığı literatürdeki benzer çalışmalara göre bir miktar daha yüksek oranda saptandı.

Anahtar Kelimeler: Polip, ileri histolojik özellikler, boyut

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Introduction

Colorectal cancer (CRC) is among the most common cancers in the world. It is among the leading causes of mortality and morbidity associated with cancer in western countries. According to the American Cancer Society's (ACS) statistics on CRC (revised on January 2020), in the United States, CRC is the third most common cause of cancer-related deaths in both men and women and the second most common cause of cancer-related deaths among the entire populace. It is expected to cause around 53,200 deaths during the course of 2020.[1,2,3] In general, CRC originates from polyps. The term polyp refers to a protuberance into the lumen from the normally flat colonic mucosa.[4] Colorectal polyps are usually asymptomatic; however, when they increase in size, they can cause tenesmus, rectal bleeding, and bowel obstruction. The malignant potential to transform into CRC is the most significant feature of polyps. Cancers resulting from adenomas are called adenoma carcinomas and 95% of all CRC result from adenomatous polyps (APS).[5,6] A number of studies have demonstrated that removing adenomas through endoscopic polypectomy or surgical resection reduces the risk of cancer.[7,8,9,10] For this reason, polyps detected during colonoscopy should be removed and histologically diagnosed, since such polyps may serve as the precursor lesion of CRC. In general, polyps are classified as either neoplastic [benign: adenomas (APS); malign: carcinomas] or non-neoplastic (hyperplastic and inflammatory) based on their histological features.[11,12] The clinically most significant colon polyps are APS, which are the main elements of the neoplastic polyps that pose a risk of transforming into cancer. APS account for two-thirds of all colonic polyps and more than 95% of all CRCs originate from APS. The resulting tumor is suggested to be formed by a carcinogenesis pathway starting from the transformation of APS into dysplasia and finally reaching the carcinoma stage. Such transformation may be completed in a 7- to 10-year period, but fortunately, most APS cannot reach the carcinoma stage.[13] APS are divided into three types: tubular adenomas, tubulovillous adenomas, and villous adenomas.[14] The factors known to increase the risk of developing CRC include advanced histological features (AHF: ≥25% villous features, high-grade dysplasia, or cancer), polyp size (especially >1 cm), polyp count, high-grade dysplasia (HGD), and a significant villous component. Therefore, the identification and excision of APS decreases the mortality associated with CRC and increases survival.[15,16,17] In spite of some geographical differences, APS are more common at older ages; therefore, a colonoscopy follow-up is recommended before in such older cohorts. In the ACS guideline published in 2018, a routine screening is recommended at age 45 in people at average risk of CRC.[18] Polyps have been divided according to size into three groups: dimunitive polyps [(DPS); ≤5 mm], small polyps [(SPS); 6-9 mm], and large polyps [(LPS; ≥10 mm]. Majority of the polyps detected in the course of colonoscopy comprise DPS and SPS. In such polyps, the risk of developing a tumor is considered very low, given their small sizes. However, the American College of Gastroenterology 2012 guidelines for colonoscopy surveillance after screening and polypectomy posits that 10.10% of SPS adenomas and 1.70% of DPS adenomas involve an advanced histology, including carcinoma.[19] In this study, we aimed to analyze, in detail, the AHF and size of polyps that we have identified and compare our findings with those of similar studies in literature.

Materials and Methods

In this study, a total of 2,068 colonoscopy procedures performed for any reason in adult patients in the endoscopy unit of Zeynep Kamil Gynecology and Pediatrics Training and Research Hospital secondary referral state hospital between October 2016 and January 2020 were analyzed retrospectively. Any procedures in which a colonoscopic polypectomy had been performed were sorted out and thoroughly examined. Patients undergoing the procedure had a one-day long colon cleanse and had not eaten anything for in the last 8 hours before commencement of the procedure. During the procedure, sedoanalgesia had been administered by an anesthesiologist. All colonoscopic procedures had reached the caecum. Polyps identified during the course of the procedure had been excised by means of a forcep or snare and transferred to the pathology laboratory in a 10% formaldehyde solution. Polyps had been divided according size into three groups: DPS (≤5 mm), SPS (6-9 mm), and LPS (≥10 mm). We identified the AHF of the polyps that we have divided according to size into three groups, such as ≥25% villous features, HGD, or cancer. We identified the villous histology feature based on the respective classification of the World Health Organization's, which states that tubular adenomas are those bearing <20% villous component, tubulovillous adenomas are those bearing 20%-80% villous component, and villous adenomas are those bearing >80% villous component. In this manner, we included all tubulovillous and villous adenomas into the group having ≥25% villous features.[20] In this study, we compared the identified AHF based on size. Approval for this study was obtained from the Ethics committee (Zeynep Kamil Gynecology and Pediatrics Training and Research Hospital, 22.05.2019, 53).

Statistical Analysis

Statistical analysis was performed using IBM SPSS Statistics for Windows, Version 23.0 (IBM Corp., Armonk, N.Y., USA). In addition to descriptive statistics (mean, standard deviation,

median, frequency, and ratio), Shapiro-Wilk test was used to determine the variables that had normal distribution and boxplot graphics were used for such variables. Student t-test was used to compare normally distributed variables between groups, while 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 applied. P value <0.05 was considered statistically significant.

Results

We determined that, in 401out of the 2302 colonoscopy procedures performed in our endoscopy unit, at least one or more polyps were detected. A total of 494 polyps were detected in these 401 procedures, revealing that at least one polyp was found in 17.42% of all colonoscopy procedures. Mean age of patients with a polyp was 60.32±12 (range: 18-92) years. Mean age of men was 61.06±14 (range: 18-90) years and mean age of women was 59.86±11 (range: 19-92) years. Of all cases, 251 (62.60%) were men and 150 (37.40%) were women. The distribution of polyps according size was as follows: 332 DPS (67.21%), 128 SPS (25.91%), and 34 LPS (6.88%). In this study, polyps were mostly localized in the sigmoid colon and least frequent in the caecum (Table 1). Sixteen different histological diagnoses had been reported for the polyps. The most common diagnosis was APS [detected in 302 (61.13%) cases], which constitute the largest neoplastic polyp group. On the other hand, the distribution of APS types detected in the polyps was as follows: tubular APS [266 (88.08%) polyps], tubulovillous APS [30 (9.94%) polyps], and villous APS [6 (1.99%) polyps]. When dysplasia/cancer features of polyps were reviewed, low-grade dysplasia (LGD) in 291 (58.91%) polyps, HGD in 13 (2.63%) polyps, and an intramucosal adenocarcinoma in 2 (0.40%) polyps was identified. When the presence of dysplasia/cancer was reviewed based on polyp size, LGD and HGD was found in 171 (51.51%) and 2 (0.60%) of the 332 DPS, respectively. Of the total of 128 SPS, 103 (80.47%) and 3 (2.34%) involved LGD and HGD, respectively. Of the total of 34 LPS, 17 (50.00%) and 8 (23.53%) involved LGD and HGD, respectively; whereas 2 (0.40%) involved intramucosal adenocarcinoma (Table 2). When the AHF was examined based on polyp size, no polyp was found to include two or more villous histology, HGD, and cancer. However, 6 DPS with villous histology and 2 DPS with HGD were detected, suggesting that an AHF was identified in 8 (2.41%) of the 332 DPS. Fourteen SPS with villous histology and 3 SPS with HGD were detected, suggesting that AHF was identified in 17 (13.28%) of the 128 SPS. In the case of LPS, which were already advanced in size, 8 LPS with villous histology, 6 LPS with HGD, and 2 LPS with intramucosal adenocarcinoma were detected, suggesting that AHF was identified in 16 (47.06%) of the 34 LPS (Graphic 1).

Discussion

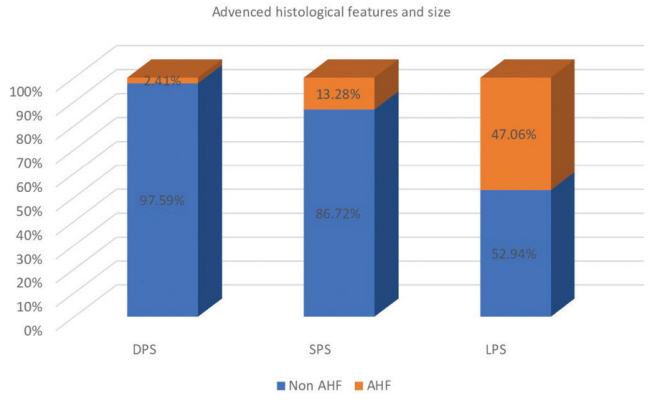
CRCs resulting from adenomas are called an adenomacarcinomas and 95% of all CRCs result from APS.

Table 1. Distribution of polyps by localization and size

Localizati	Size (mm)			Total
	1-5 mm	6-9 mm	≥10 mm	
Rectum	58 (11.74%)	10 (2.02%)	2 (0.40%)	70 (14.17%)
Sigmoid colon	114 (23.08%)	40 (8.10%)	13 (2.63%)	167 (33.81%)
Descending colon	50 (10.12%)	21 (4.25%)	5 (1.01%)	76 (15.38)
Transvers colon	79 (16.00%)	35 (7.09%)	11 (2.23%)	125 (25.30%)
Ascending colon	22 (4.45%)	18 (3.64%)	2 (0.40%)	42 (8.50%)
Caecum	9 (1.82%)	4 (0.81%)	1 (0.20%)	14 (2.83%)
Total	332 (67.21%)	117 (25.91%)	31 (6.88%)	494 (100.00%)

Table 2. Presence of dysplasia and cancer (adenocarcinoma) according to size and histological diagnoses of polyps

Histological features	Size	Dysplasia degree	
		Low-grade dysplasia n (%)	High-grade dysplasia n (%)
Tubular	1-5 mm	165 (56.70)	0 (0.00)
	6-9 mm	89 (30.58)	2 (15.38)
	≥10 mm	9 (3.09)	1 (7.70)
Tubulovillous	1-5 mm	6 (2.06)	1 (7.70)
	6-9 mm	13 (4.47)	0 (0.00)
	≥10 mm	8 (2.75)	2 (15.38)
Villous	1-5 mm	0 (0.00)	1 (7.70)
	6-9 mm	1 (0.34)	1 (7.70)
	≥10 mm	0 (0.00)	3 (23.08)
Intramucosal adenocarcinoma	1-5 mm	0 (0.00)	0 (0.00)
	6-9 mm	0 (0.00)	0 (0.00)
	≥10 mm	0 (0.00)	2 (15.38)



Graphic 1. Advanced histological features (AHF) and polyp size
DPS: diminutive polyps, SPS: small polyps, LPS: large polyps

A report by the National Polyp Study Workgroup stated that colonoscopic polypectomy reduced the incidence of CRC by 76%-90%.[21] Investigators have suggested "predict-resect-and-discard" strategies for DPS and SPS in order to decrease the costs of screening colonoscopy.[22] Polyp size (adenoma ≥10 mm), increased number of polyps, and AHF are critical criteria for the development of malignancies from polyps. According to autopsy studies, generally, 10%-15% of polyps are over 1 cm in size and majority of polyps are under the size of 1 cm. For localization of polyps in the colon, the average polyp size increases toward the proximal.[23] In the studies by Korkmaz et al.[24], Butterly et al.[25], Eminler et al.[10], and Suna et al.[26], the frequencies of polyps under the size of 1 cm were reported as 75.00%, 58.70%, 69.50%, and 87.50%, respectively. In this study, the rate of polyps under the size of 1 cm is 93.12%, which is higher than that in literature (67.21% DPS, 25.91% SPS, and 6.88% LPS). The suggested reason for such difference in numbers of cases with LPS and cancer in our study might be that the number of colonoscopy procedures performed today has increased compared to the previous times, possibly because of the obsessive behavior of clinicians due to the increased incidence of CRC. In addition, people's increased awareness of CRC polyp screening, ease of access to colonoscopy, and increased number of diseases leading to increased polyp formation, such as obesity, may lead to more polyps identification at the DPS or SPS stage. APS from neoplastic polyps account for approximately two-thirds of all colorectal polyps. In literature, it is stated that tubular adenomas, villous adenomas, and tubulovillous adenomas constitute 80%-86%, 3%-16%, and 8%-16% of all APS, respectively.[27,28,29] While the risk of developing a malignancy in tubular adenomas is lower, there are studies reporting such risk to be 33% for villous and tubulovillous adenomas.[30] Regarding the polyp histology, in the studies by Korkmaz et al.[24], Eminler et al.[10], and Solakoğlu et al.[31], the frequencies of neoplastic polyps were found to be 74.4%,

75.5%, and 81.7%, respectively, tubular adenomas were found to be 67.20%, 68.00%, and 71.00%, respectively, tubulovillous adenomas were found to be 6.40%, 7.20%, and 6.60%, respectively, and villous adenomas were found to be 0.80%, 0.50%, and 2.90%, respectively. In our study, the frequencies of neoplastic polyps, tubular adenomas, tubulovillous adenomas, and villous adenomas were 61.13%, 53.85%, 6.07%, and 1.21%, respectively, which are close to the respective prevalence recorded in other studies in our country. Serrated polyps are contrastingly categorized by different studies under adenomas, hyperplastic polyps, or an intermediate form.[10,31] In our study, we did not find it appropriate to classify serrated polyps under neoplastic polyps, because villous histology or dysplasia had not been detected in the histological examinations of serrated polyps we have examined. The frequency of any AHF in DPS and SPS was lower compared to that of LPS.[22,27,32] The very high combined frequency (93.12%) of DPS and SPS we detected in our study, unlike similar studies in literature, has channeled our focus to the importance of such smaller polyps, in spite of their low malignant potential. These findings indicated that the increase in the AHF with increase in the polyp size is compatible with the data in literature Graphic 1). The surprising aspect of our study was that we detected higher frequencies of AHF for all sizes of polyps compared to similar studies in literature. In comparison to similar studies in literature, we found the frequency of AHF for DPS to be 2.41%, while the value was found to be 1.70%, 1.70%, 3.40%, and 1.30% in the study by Lieberman et al.[34], Butterly et al.[25], Gschwantler et al.[33], and Suna et al.[26], respectively.[22] The frequency of AHF for the SPS we reported was 13,28%, whereas the value had been reported as 6.60%, 10.10%, 13.50%, 13.50%, 15.00%, and 5.20% in the study by Lieberman et al.[34], Butterly et al.[25], Gschwantler et al.[33], and Suna et al.[26], respectively.[22,35] In other words, the number of AHF of DPS and SPS in our study is close to and slightly higher than that in similar studies in literature.

Study Limitations

Our study is a retrospective study conducted in a secondary hospital. In addition, the existence of other prospective studies examining more cases and polyps in tertiary hospitals is a limitation for our study.

Conclusion

In our study, a positive correlation was observed between AHF characteristics according to polyp size. The most important conclusion in our study is that slightly higher frequency of polyps under the size of 1 cm and slightly higher rate of AHF in such polyps may cause investigators to give more attention to these polyps. This finding may encourage investigators to perform CRC screening and prevalence studies involving a greater number of cases more often.

Ethics

Ethics Committee Approval: Approval for this study was obtained from the Ethics committee (Zeynep Kamil Gynecology and Pediatrics Training and Research Hospital, 22.05.2019, 53).

Peer-review: Internally peer reviewed.

Authorship Contributions

Surgical and Medical Practices: A.B., A.S.Ç, Concept: A.B., Design: A.B., Data Collection or Processing: A.B., A.S.Ç., Analysis or Interpretation: A.B., Literature Search: A.B., A.S.Ç., Writing: A.B.

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

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RESEARCH ARTICLE

Comparison of Colonoscopy Results of Turkish and Syrian Patients, Frequency of Incomplete Colonoscopy and Causes of Incomplete Colonoscopy

Türk ve Suriyeli Hastaların Kolonoskopi Sonuçları, İnkomplet Kolonoskopi Sıklığı ve İnkomplet Kolonoskopi Nedenlerinin Karşılaştırılması

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ABSTRACT

Aim: Colonoscopy is a frequently used procedure for the diagnosis of the colorectal diseases. In this study, we aimed to present demographic, endoscopic, and histopathological characteristics, the frequency of incomplete colonoscopy, and causes of incomplete colonoscopy of Turkish and Syrian patients who had undergone colonoscopy in our hospital.

Method: The demographic, clinical, and histopathological characteristics of Turkish and Syrian patients who had undergone colonoscopy in our hospital between August 2017 and March 2020 were compared.

Results: A total of 2,285 patients were included in the study, of which 1,175 (51.4%) were female, 1,110 (48.6%) were male, and the mean age was 46.30±15.33 years. The rate of incomplete colonoscopy was 18.3%. It was observed that the male gender, incomplete colonoscopy rate, insufficient bowel cleansing rate, and patients with Boston bowel cleansing score of zero and one were higher in the Syrian patient group (p<0.001). The polyp detection rate was 14.6% in the Turkish patient group and 8.8% in the Syrian patient group (p=0.035). Advanced age (p=0.002), ethnicity (p<0.001), and insufficient bowel cleansing (p<0.001) were significant factors for incomplete colonoscopy.

Conclusion: In our study, the higher rate of incomplete colonoscopy and insufficient bowel cleansing and the low rate of polyp detection in the Syrian patient group remained below the current literature recommendations. We think that insufficient information about bowel cleansing preparation is responsible for this finding due to the current socio-economic conditions and communication problem (language disability) in our region.

Keywords: Colonoscopy, incomplete colonoscopy, Syrian patients

ÖZ

Amaç: Kolonoskopi kolorektal hastalıkların tanısında sıklıkla kullanılan bir işlemdir. Bu çalışmamızda endoskopi ünitemizde kolonoskopi yapılan Türk ve Suriyeli hastaların demografik, endoskopik ve histopatolojik özelliklerini, inkomplet kolonoskopi sıklığını ve inkomplet kolonoskopi nedenlerini sunmayı amaçladık.

Yöntem: Ağustos 2017-Mart 2020 tarihleri arasında hastanemizde kolonoskopi yapılan Türk ve Suriyeli hastaların demografik, klinik ve histopatolojik özellikleri karşılaştırıldı. İnkomplet kolonoskopi nedenleri ve inkomplet kolonoskopiye etki eden faktörler incelendi.

Bulgular: Çalışmaya dahil edilen 2.285 hastanın 1.175'i (%51,4) kadın, 1.110'u (%48,6) erkek olup, yaş ortalaması 46,30±15,33 idi. İnkomplet kolonoskopi oranı %18,3 idi. Erkek cinsiyetin, inkomplet kolonoskopi oranının, yetersiz barsak temizliği oranının ve Boston barsak temizliği skoru 0 ve 1 olan hastaların Suriyeli hasta grubunda daha yüksek olduğu görüldü (p<0,001). Polip saptanma oranı Türk hasta grubunda %14,6, Suriyeli hasta grubunda ise %8,8 idi (p=0,035). İleri yaş (p=0,002), etnik köken (p<0,001) ve yetersiz barsak temizliği (p<0,001) inkomplet kolonoskopi lehine anlamlı bulundu.

Sonuç: Çalışmamızda Suriyeli hasta grubunda yüksek inkomplet kolonoskopi ve yetersiz barsak temizliği oranı ile düşük polip saptama oranı güncel literatür önerilerinin altında kalmıştır. Bu durumun bölgemizdeki mevcut sosyoekonomik şartlar ve iletişim probleminden (dil engeli) dolayı işlem öncesi barsak temizliği hazırlık bilgilendirmelerine uyumsuzluktan kaynaklandığını düşünmekteyiz.

Anahtar Kelimeler: Kolonoskopi, inkomplet kolonoskopi, Suriyeli hastalar

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Introduction

Colonoscopy (CS) is a reliable method with high diagnostic accuracy and good patient tolerance under sedation. It is frequently used in daily practice for the diagnosis and treatment of colorectal diseases. It is the gold-standard method for detecting colorectal pathologies.[1] CS is a procedure performed for both diagnostic and therapeutic indications. In addition to its diagnostic properties, since it may be used therapeutically, it is also used frequently for the treatment purposes in cases such as colon polyps, lower gastrointestinal bleeding, stenosis lesions, and volvulus.[2,3] CS is recommended for the assessment of lower gastrointestinal system diseases such as colorectal cancer screenings, colorectal polyps, colorectal cancer, and inflammatory bowel disease.[4,5,6] The purpose of a CS is to examine the entire colon to the caecum. A successful CS provides precise imaging of the mucosal surface of the colon. However, this is not always possible. Incomplete CS rates are reported at a rate of 4%-25%.[2,7,8,9,10] The success of the CS procedure is affected by many factors such as age, gender, comorbid disease, history of abdominal surgery, and sufficient bowel cleansing. Sufficient bowel preparation is the most critical factor affecting complete CS rates. Insufficient bowel cleansing rate in all CS procedures is around 20%-25%.[7,10] In this study, we aimed to present the demographic, endoscopic, and histopathological characteristics, the frequency of incomplete colonoscopy, and the causes of incomplete colonoscopy of Turkish and Syrian patients who had undergone colonoscopy in our endoscopy unit.

Materials and Methods

Study Design and Data

The records of patients who had undergone colonoscopy at Şanlıurfa Training and Research Hospital endoscopy unit between August 2017 and March 2020 were reviewed retrospectively. The study was designed according to the Helsinki Declaration. The study was approved by the Harran University Clinical Studies Ethics Committee (approval no: HRU/20.11.37). Written informed consent was obtained from all patients before the procedure. Patients who had undergone diagnostic and therapeutic procedures due to gastrointestinal bleeding, volvulus, sub-ileus, and ileus under emergency conditions, patients who had recto-sigmoidoscopy procedures for emergency and elective necessities, cases with polyposis syndrome, cases with more than three polyps, and cases for whom the pathology result were not reached were excluded from the study. Age, gender, nationality, procedure indications, complete/incomplete CS number, optimal/suboptimal CS number, incomplete CS reasons, Boston bowel preparation scale score, presence of polyp, previous colorectal surgery, benign and malignant colorectal diseases detected, benign perianal diseases detected, and complications related to the procedure were recorded. Turkish patients who had undergone CS constituted Group 1, and Syrian patients constituted Group 2. The demographic and clinical characteristics of the two groups were compared. Demographic data and bowel preparation scores of incomplete and complete CS cases were compared.

Mechanical Bowel Preparation

Patients who were scheduled for the CS procedure were recommended a pulpless liquid food regimen three days before the procedure and were given an informative form describing the diet and mechanical bowel cleansing before the procedure. One day before the procedure, 2 X-M diet solutions® 150 mL (300 mg) (Senoside-A+B-calcium solution) or Phospho soda® and/or Fleet phospho soda® 90 mL (Dibasic-sodium-phosphate+monophasic-sodium-phosphate) laxative solution were given orally. Intestinal cleansing was performed one day before the procedure and on the morning of the procedure, by giving a total of two BT enema ®210 mL (Dibasic-sodium-phosphate+monophasic-sodium-phosphate) rectally. Polyethylene glycol solution (Pegdin® and/or Golytely®) was given to patients whose sodium phosphate usage was inappropriate (e.g., kidney disease.). Colon cleansing was evaluated in four categories according to the Boston bowel preparation scale score[11,12] as follows: "Score 0, Unprepared colon segment with mucosa was not visible because of solid stool that cannot be cleared; Score 1, Portion of the mucosa of the colon segment seen, but other areas of the colon segment are not seen well because of staining, residual stool, and/or opaque liquid; Score 2, Minor amount of residual staining, small fragments of stool, and/or opaque liquid, but mucosa of colon segment is seen well; and Score 3, Entire mucosa of colon segment seen well, with no residual staining, small fragments of stool, or opaque liquid".

Colonoscopy and Anesthesia Procedure

All procedures were performed by a gastroenterologist, gastroenterology surgeon, or general surgery specialist having performed at least 500 CS experiences. Patients were positioned in the left lateral decubitus position. Before the procedure, sedation was performed using a combination of midazolam, propofol, and fentanyl under the observation of an anesthesiologist. All endoscopic procedures were performed with Fujinon® (Fujinon, Willich, Germany) video colonoscopy devices. Complete colonoscopy was defined as visualization of the ileocecal valve and appendix mouth or the terminal ileum. Forceps polypectomy was applied to polyps detected during the procedure that were

<5 mm in size, and snare polypectomy was applied to polyps >10 mm. Forceps polypectomy or snare polypectomy was applied to polyps 5-10 mm in size. Polypectomy procedures were performed either en-block or piecemeal.

Statistical Analysis

The Statistical Package for the Social Sciences (SPSS 25 Inc., Chicago, IL, USA) software was used for biostatistical analyses. The data obtained from the patients participating in the study were expressed as the mean, standard deviation values, and as a percentage where necessary. The Kolmogorov-Smirnov test checked the distribution of the data. Data with normal distribution were analyzed by the student t-test. Group analysis of non-parametric data was made with Mann-Whitney U test. Categorical groups were compared with the chi-square test. A p-value of <0.05 was considered statistically significant.

Results

A total of 2,285 patients who met the study criteria were included in the study. 1,175 (51.4%) of the patients were female, and 1,110 (48.6%) were male, and the mean age was 46.30±15.33 years. There were 2,114 (92.5%) patients in Group 1 and 171 (7.5%) patients in Group 2. CS was completed in 1867 (81.7%) patients and performed most frequently due to rectal bleeding and/or anal burning-pain (23.2%). The CS procedure was not completed in 418 (18.3%) of the patients. The most seen cause of incomplete CS was insufficient bowel cleansing at a rate of 85.2%. The rate of incomplete CS in Turkish patients was 17.2%, and the rate of incomplete colonoscopy in Syrian patients was 31.6%. Insufficient bowel cleansing rate was found as 14.5% in Turkish patients and 28.7% in Syrian patients. Looping with a rate of 7.7% (32/418) was the most common cause of the incomplete CS in patients who had adequate bowel cleansing. It was observed that the male gender, incomplete CS rate, insufficient bowel cleansing rate, and the patients with Boston bowel cleansing score of zero and one were higher in the Syrian group (p<0.001). The ileum intubation rate was higher in the Turkish group and was found to be statistically significant (p=0.022). Complications were seen in four (0.17%) patients after colonoscopy. Bleeding was observed in two (0.08%) patients after colonoscopic polypectomy, and perforation was observed in two (0.08%) patients. Hemostasis was achieved with sclerotherapy and endoscopic clips in patients who developed bleeding due to the procedure. In one case that developed colon perforation, laparotomy was performed upon the development of peritoneal irritation findings, and the perforated area was sutured with primary closure. The other case that had perforation was followed up conservatively due to the absence of peritoneal irritation findings. All patients who developed complications were discharged without any problems. When the clinical and histopathological characteristics of the colonoscopy findings of both groups were compared, the normal colonoscopy number was 732 (34.6%) in the Turkish patient group and 51 (29.8%) in the Syrian patient group. This difference was statistically significant (p<0.001). The polyp detection rate was 14.6% in the Turkish patient group and 8.8% in the Syrian patient group, and this result was statistically significant (p=0.035). The most common colonoscopically detected pathology was hemorrhoids in 616 (27%) patients. No statistically significant difference was found in either group in terms of colorectal tumor or colitis detection rates. When the histopathological characteristics of cases with colorectal tumor and colitis were compared, it was found that the rate of adenocarcinoma was higher in the Syrian patient group, and the rates of other colitis subtypes other than diversion colitis were higher in the Turkish patient group; these findings were statistically significant (p=0.002 and p<0.001). A total of 440 polyps were detected in 324 (14.2%) out of 2285 patients. The mean age of the patients in which a polyp was found was 52.62 ±12.92 years. Among them, 179 (55.2%) were male, and 145 (44.8%) were female. While a single polyp was found in 237 patients (73.1%) during colonoscopy, 58 patients (17.9%) had two polyps, and 29 patients had three polyps (9%). Colon polyps were most frequently detected in the sigmoid colon (27.5%), followed by the rectum (25.9%), and descending colon (12.3%). When the histopathological characteristics of colon polyps were examined, it was seen that the vast majority were tubular adenoma (50.9%) and hyperplastic polyps (33.4%). Data comparing demographic, clinical, endoscopic characteristics, and histopathological characteristics of the patients are presented in Tables 1, 2, and 3. When the data obtained from the comparison of the complete and incomplete CS groups were examined, among incomplete CS patients, 206 (49.3%) were male, and 212 (50.7%) were female. The mean age of the complete CS patients was 45.81±14.95 years, and the mean age of incomplete CS patients was 48.48±16.79 years. Age (p=0.002), ethnicity (p<0.001), and insufficient bowel cleansing (p<0.001) were statistically significant in favor of incomplete CS (Table 4).

Discussion

CS is a frequently used method in daily practice in the diagnosis of colorectal diseases. Since it may be used therapeutically, it is accepted as the gold-standard method in the examination of the colon and terminal ileum.[1] Most patients undergo lower gastrointestinal endoscopy due to rectal bleeding and constipation. These complaints may be due to benign anorectal diseases or may be seen in colorectal cancers.

Table 1. Demographic, clinical, endoscopic features, incomplete colonoscopy rate and causes of incomplete colonoscopy in patients undergoing colonoscopy

Variables		Group 1 (Turkish patients) (n, %) (n=2114)	Group 2 (Syrian patients) (n, %) (n=171)	Numeric and percentage value (n=2285) (100%)	p value
Age (mean ± SD) (median)		46.28±15.24 46 (17-95)	46.55±16.49 45 (19-88)	46.30±15.33 46 (17-95)	0.969
Sex	Female	1116 (52.8%)	59 (34.5%)	1175 (51.4%)	**<0.001***
	Male	998 (47.2%)	112 (65.5%)	1110 (48.6%)	
Indications for colonoscopy	Rectal bleeding and/or anal burning-pain	485 (22.9%)	46 (26.9%)	531 (23.2%)	0.187
	Constipation	447 (21.1%)	42 (24.6%)	489 (21.4%)	
	Abdominal pain	357 (16.9%)	32 (18.7%)	389 (17%)	
	Anemia	180 (8.5%)	13 (7.6%)	193 (8.4%)	
	Diarrhea	128 (6.1%)	5 (2.9%)	133 (5.8%)	
	Screening	110 (5.2%)	6 (3.5%)	116 (5.1%)	
	Fecal occult blood positive	89 (4.2%)	6 (3.5%)	95 (4.2%)	
	Change in defecation habits	67 (3.2%)	5 (2.9%)	72 (3.2%)	
	Follow-up after polipectomy	69 (3.3%)	1 (0.6%)	70 (3.1%)	
	Family history of CRC	63 (3%)	2 (1.2%)	65 (2.8%)	
	Operated colon/rectum tumor follow-up	38 (1.8%)	3 (1.8%)	41 (1.8%)	
	Increased colon or ileum wall thickness in CT	30 (1.4%)	6 (3.5%)	36 (1.6%)	
	Other reasons	51 (2.4%)	4 (2.3%)	55 (2.4%)	
Colonoscopy completion status	Complete colonoscopy	1750 (82.8%)	117 (68.4%)	1867 (81.7%)	**<0.001***
	Incomplete colonoscopy	364 (17.2%)	54 (31.6%)	418 (18.3%)	
Causes of incomplete colonoscopy	İnadequate bowel preparation	307 (14.5%)	49 (28.7%)	356 (15.6%)	**<0.001***
	Looping and/or redundancy	31 (1.5%)	1 (0.6%)	32 (1.4%)	
	Tumor obstruction	12 (0.6%)	3 (1.8%)	15 (0.7%)	
	Discomfort and intolerance	11 (0.5%)	1 (0.6%)	12 (0.5%)	
	Angulation	3 (0.1%)	0 (0%)	3 (0.1%)	
Ileum intubation status	Yes	513 (24.3%)	27 (15.8%)	540 (23.6%)	**0.012***
	No	1601 (75.7%)	144 (84.2%)	1745 (76.4%)	
Bowel preparation score	0	307 (14.5%)	49 (28.7%)	356 (15.6%)	**<0.001***
	1	151 (7.1%)	20 (11.7%)	171 (7.5%)	
	2	401 (19%)	34 (19.9%)	435 (19%)	
	3	1255 (59.4%)	68 (39.8%)	1323 (57.9%)	
Complication	Bleeding	2 (0.09%)	0 (0%)	2 (0.08%)	0.850
	Perforation	2 (0.09%)	0 (0%)	2 (0.08%)	

SD: Standard deviation, CRC: Colorectal cancer, CT: Computed tomography

Table 2. Clinical and histopathological features, colon localizations of findings detected in colonoscopies

Variables		Group-1 (Turkish patients) (n, %) (n=2.114)	Group-2 (Syrian patients) (n, %) (n=171)	Numeric and percentage value (n=2.285) (100%)	p value
Normal findings		732 (34.6%)	51 (29.8%)	783 (34.3 %)	**<0.001***
Polyp		309 (14.6%)	15 (8.8%)	324 (14.2%)	**0.035***
Hemorrhoids		572 (27.1%)	44 (25.7%)	616 (27%)	0.707
Anal fissure		146 (6.9%)	6 (3.5%)	152 (6.7%)	0.086
Perianal fistula		15 (0.7%)	1 (0.6%)	16 (0.7%)	0.851
Diverticulum		66 (3.1%)	1 (0.6%)	67 (2.9%)	0.059
Previous operation and anastomosis status		35 (1.7%)	5 (2.9%)	40 (1.8%)	0.224
Solitary rectal ulcer		8 (0.4%)	1 (0.6%)	9 (0.4%)	0.679
Lipoma		25 (1.2%)	3 (1.8%)	28 (1.2%)	0.513
Colorectal tumor		32 (1.5%)	6 (3.5%)	38 (1.7%)	0.050
Colorectal tumor localizations	Caecum	3 (0.1%)	2 (1.2%)	38 (1.7%)	0.068
	Ascending colon	2 (0.09%)	0 (0%)		
	Hepatic flexure	3 (0.1%)	0 (0%)		
	Transverse colon	1 (0.04%)	0 (0%)		
	Descending colon	1 (0.04%)	0 (0%)		
	Sigmoid	5 (0.2%)	0 (0%)		
	Rectosigmoid	3 (0.14 %)	0 (0%)		
	Rectum	14 (0.7%)	4 (2.3 %)		
Histopathological features of colorectal tumor cases	Adenocarcinoma	31 (1.5%)	5 (2.9%)	38 (1.7 %)	**0.002***
	Malign epithelial tumor	1 (0.04%)	0 (0%)		
	Neuroendocrine tumor	0 (0%)	1 (0.6%)		
Colitis and/or ileit		141 (6.7%)	12 (7%)	153 (6.7 %)	0.861
Localization of cases with colitis and/or ileitis	Terminal ileit	42 (2%)	1 (0.6%)	153 (6.7 %)	0.587
	Right colon involvement	3 (0.1%)	0 (0%)		
	Left colon involvement	54 (2.6%)	5 (2.9%)		
	Proctitis	22 (%)	3 (1.8%)		
	Pancolitis	20 (0.9%)	3 (1.8%)		
Histopathological features of colitis and/or ileitis	Ulcerative colitis	55 (2.6%)	2 (1.2%)	153 (6.7 %)	**<0.001***
	Crohn's disease	24 (1.1%)	1 (0.6%)		
	Nonspecific colitis	25 (1.2 %)	1 (0.6 %)		
	Infectious colitis	8 (0.4 %)	2 (1.2 %)		
	Eosinophilic colitis	2 (0.09 %)	0 (0 %)		
	Collagenous colitis	1 (0.04 %)	0 (0 %)		
	Diversion colitis	0 (0 %)	5 (2.9 %)		
	Radiation colitis	1 (0.04 %)	0 (0 %)		
	Actinomyces infection	1 (0.04 %)	0 (0 %)		
	Non-specific ileitis	13 (0.6 %)	1 (0.6 %)		
	Nodular lymphoid hyperplasia	7 (0.3 %)	0 (0 %)		
	Eosinophilic ileitis	1 (0.04 %)	0 (0 %)		
	Normal ileum mucosa	3 (0.1 %)	0 (0 %)		
Anjiodysplasia		2 (0.09 %)	1 (0.6 %)	3 (0.1 %)	0.089
Rectovaginal fistula		2 (0.09 %)	0 (0 %)	2 (0.1 %)	0.687
Foreign body in the rectum		1 (0.04 %)	0 (0 %)	1 (0.04 %)	0.776

Table 3. Demographic, clinical and histopathological features of patients with polyp and polypectomy

Variables		Numeric (n)	Percentage value (%)
Age (mean ± SD)		52.62±12.92	
Sex	Female	145/324	44.8%
	Male	179/324	55.2%
Nationality	Turkish patients	309/324	95.4%
	Syrian patients	15/324	4.6%
Number of polyp	1	237/440	73.1%
	2	58/440	17.9%
	3	29/440	9%
Polyp diameter (median, min-max)		6 mm (min:3 mm-max:40 mm)	
Polyp diameter	≤5 mm	198/440	45%
	5-10 mm	170/440	38.6%
	10-20 mm	62/440	14.1%
	≥20 mm	10/440	2.3%
Polyp localization	Caecum	29/440	6.6%
	Ascending colon	38/440	8.6%
	Hepatic flexure	19/440	4.3%
	Transverse colon	52/440	11.8%
	Splenic flexure	5/440	1.1%
	Descending colon	54/440	12.3%
	Sigmoid	121/440	27.5%
	Rectosigmoid	8/440	1.8%
	Rectum	114/440	25.9%
Polyp type	Diminutive	198/440	45%
	Sesil	161/440	36.6%
	Pedicellate	81/440	18.4%
Type of polypectomy	Forceps	343/440	78%
	Snare	97/440	22%
Histopathological diagnosis	Tubular adenoma	224/440	50.9%
	Tubuloillous adenoma	24/440	5.5%
	Villous adenoma	2/440	0.5%
	Intramucosal carcinoma	2/440	0.5%
	Hyperplastic polyp	147/440	33.4%
	Inflammatory polyp	22/440	5%
	Hamartomatous polyp	3/440	0.7%
	Juvenile polyp	3/440	0.7%
	Mucosal tissue	12/440	2.7%
	Serrated adenoma	1/440	0.2%
Presence of dysplasia	None	380/440	86.4%
	Low grade dysplasia	49/440	11.1%
	High grade dysplasia	11/440	2.5%

SD: Standard deviation

Table 4. Comparison of complete and incomplete colonoscopy patients

Variables		Complete colonoscopy (n, %) total: 1,867 (81.7%)	Incomplete colonoscopy (n, %) total: 418 (18.3%)	p value
Age (mean ± SD) (median)		45.81±14.95 45 (17-95)	48.48±16.79 48.5 (17-93)	**0.002***
Sex	Female	963 (51.6%)	212 (50.7%)	0.750
	Male	904 (48.4%)	206 (49.3%)	
Nationality	Turkish patients	1750 (82.8%)	364 (17.2%)	**<0.001***
	Syrian patients	117 (68.4%)	54 (31.6%)	
Bowel preparation score	3	1281 (68.6%)	42 (10%)	**<0.001***
	2	419 (22.4%)	16 (3.8%)	
	1	167 (8.9%)	4 (1%)	
	0	0 (0%)	356 (85.2%)	

SD: Standard deviation

Individuals <50 years of age are recommended to have a test for fecal occult blood and recto-sigmoidoscopy every 3-5 years by the American Cancer Society.[13] It was found that the most frequent cause of CS performed in our endoscopy unit was rectal bleeding and/or anal burning-pain at a rate of 23.2%.

CS targets to examine the entire colon to the caecum. The success of the CS is defined as the intubation of the caecum. It is suggested that the caecum intubation rate should be around 90%-95%. Socio-economic factors and language barriers in some patient populations may require further educational effort before the procedure to reach the recommended caecum intubation rate.[2] Certainly, sufficient bowel cleansing is essential for a standard evaluation. Sufficient bowel cleansing reduces caecum intubation time and allows the entire colonic mucosa to be examined, increasing the rate of polyp detection.[10,14] Incomplete CS rates are reported to be 4%-25%, and insufficient bowel cleansing rate as 20%-25%.[7,8,9,10,15] In the study of Hendry et al.[16] which included 10,571 patients, insufficient bowel preparation was reported at a rate of 16.9%. In the study by Bowles et al.[17], the rate of reaching the caecum was 76.9%, and the insufficient bowel cleansing rate was 19.6%. Koido et al.[7] reported an insufficient bowel cleansing rate of 5% in their study involving 11,812 patients. It is suggested that the sufficient bowel cleansing rate should be ≥85%.[10] Our success in reaching the caecum was 81.7% (1,867/2,285), which is below the recommended level. Incomplete colonoscopy incidence was 18.3%, and insufficient bowel cleansing was found to be the most important reason among 356 (15.6%) cases. The rate of incomplete colonoscopy in Turkish patients was 17.2% and 31.6% in Syrian patients. The insufficient bowel cleansing rate was 14.5% in Turkish patients and 28.7% in Syrian patients. Both the incomplete CS rate and inadequate bowel cleansing rate were higher in the Syrian patient group. Colonoscopy could not be completed in 18.3% of the patients in this study, in which we examined the frequency and reasons of incomplete colonoscopy. A significant relationship was determined between advanced age, ethnicity (Syrian), and insufficient bowel cleansing (Boston score 0) with incomplete CS. We think that our results are due to the existing socio-economic factors and language disability in our region. Incompatibility of the patients with information regarding bowel cleansing before the procedure causes unsatisfactory results.

One of the most common pathologies detected in the patients who underwent lower gastrointestinal system endoscopy is benign diseases of the anorectal region. It was reported that hemorrhoidal disease is found in the United States at a frequency of 50% and in our country at 15%-30%.[13,18,19] In our study, hemorrhoids were present in 27%, anal fissures in 6.7%, and perianal fistulas in 0.7% patients. In a study by Bowles et al.[17], it was reported that the normal CS rate was 42.1%, polyps were present in 22.5%, diverticula were seen in 22%, and inflammatory bowel disease was present in 13.9% of the cases. In a study conducted by Özsoy et al.[18], it was reported that 34.4% of the patients had normal CS findings, 4.2% had diverticulum, 3.1% had inflammatory bowel disease, 0.7% had a solitary rectal ulcer, and 0.5% had angiodysplasia. The normal CS rate was 34.3% (783/2,285) in our study. The normal colonoscopy count was 732 (34.6%) in the Turkish patient group and 51 (29.8%) in the Syrian patient group; this difference was statistically significant. In addition, diverticulum was detected in 2.9% and solitary rectal ulcer in 0.4% of our patients.

Among the diseases that cause lower gastrointestinal symptoms, the most feared pathology is colorectal cancer. Colorectal cancers, the most common malignancy of the

gastrointestinal tract, are the fourth most common cancer type to cause deaths worldwide.[20] Colorectal cancers are among the top five cancers in both women and men in our country.[21] CS is the most reliable diagnostic method for screening and diagnosis of colorectal cancer. The rate of colorectal carcinoma was 1.7% in our study. This rate was found to be significantly lower than the literature findings, which may be due to differences in socio-economic status, nutritional habits, and CS indications between regions. The prevalence of inflammatory bowel disease varies with age, gender, geographic region, ethnicity, and socio-economic level. In a study on clinical populations of the Western Black Sea region of Turkey, the prevalence of ulcerative colitis and Crohn's disease were reported as 31.83/100,000 and 12.53/100,000, respectively, and their average annual incidence was 4.87/100,000 and 2.09/100,000, respectively.[22] The rate of inflammatory bowel disease detection was 3.6% in our study.

Tissue masses protruding from the intestinal mucosa toward the lumen are called polyps. Most colorectal polyps are asymptomatic and are found incidentally. They are often seen in the left colon and rectum. Polyps are classified histologically as neoplastic or non-neoplastic. Neoplastic polyps, which has a group of colon polyps, constitute approximately 2/3 of all colon polyps. Adenomatous polyps are classified histologically as tubular, tubulovillous, or villous.[23] Colorectal cancers may develop from the adenoma level. Therefore, it is recommended that the polyps detected during colonoscopy should be completely removed regardless of the size for histopathological diagnosis. In two large-scale studies in the literature, the rate of polyp detection was reported as between 20.1% and 32.5%.[24,25] In various studies conducted in our country, the prevalence of polyps was reported as between 11.1% and 34.9%.[18,26,27,28] In our study, we detected polyps in 324 patients throughout 2285 CSs in total, and our polyp detection rate was 14.2%. The polyp detection rate was 14.6% in the Turkish patient group and 8.8% in the Syrian patient group. These rates were lower than the data reported in the literature.

The most common complications associated with CS are bleeding and perforation. In a large-scale study conducted by Laanani et al.[24], bleeding at a rate of 0.065%-0.23% and perforation at a rate of 0.035%-0.073% were reported after CS. In our study, complications were seen in four (0.17%) patients after the CS. Bleeding was observed in two (0.08%) patients after colonoscopic polypectomy, and perforation was observed in two (0.08%) patients.

Study Limitations

Our study had some significant limitations. Our study was a retrospective observational study. The number of patients was limited in number compared to the single-center and incomplete CS studies in the literature. There were no data on the factors such as adherence to the bowel cleansing protocol affecting the insufficient bowel cleansing and bowel cleansing solutions used. The most important limitation was the numerical difference between the patient groups compared. Our study's most important advantage is that two different patient groups were compared demographically and socio-culturally, which is different from the design of many other CS studies in the literature.

Conclusion

Our study resulted in a high rate of incomplete CS and insufficient bowel cleansing and a low rate of polyp detection in the Syrian patient group, which did not achieve the literature recommendations. We think that this might have been due to the incompatibility of bowel cleansing preparation information before the procedure, which is caused by the current socio-economic conditions and communication problem (language disability) in our region. Therefore, we believe that the preparation of informed consent forms and bowel cleansing forms translated from Turkish to Arabic and increasing the number of qualified interpreters may reduce this problem, especially in centers where the Syrian patient population is intense, such as in our region.

Ethic

Ethics Committee Approval: The study was approved by the Harran University Clinical Studies Ethics Committee (approval no: HRU/20.11.37).

Informed Consent: Since the study was designed retrospectively, data were collected from the clinical archive.

Peer-review: Externally peer reviewed.

Authorship Contributions

Surgical and Medical Practices: D.A.Ç., M.P., Concept: D.A.Ç., M.P., Design: D.A.Ç., Data Collection or Processing: D.A.Ç., Analysis or Interpretation: D.A.Ç., M.P., Literature Search: M.P., Writing: D.A.Ç.

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RESEARCH ARTICLE

Evaluation of Colorectal Cancers in Terms of Diagnosis and Treatment Processes

Kolorektal Kanserlerin Tanı ve Tedavi Süreçleri Açısından Değerlendirilmesi

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ABSTRACT

Aim: In this study, it was aimed to compare the results of preoperative clinical staging with pathological staging determined in postoperative resection material in colorectal cancers.

Method: The medical data of 86 patients who were operated for colorectal tumor between January 2013 and October 2020 were retrospectively evaluated. Demographic characteristics of the patients, American Society of Anesthesiology score, presence of comorbidity, tumor location, whether preoperative endoscopy was performed, emergency or elective operation, open or laparoscopic surgery, type of surgery, presence of ostomy, morbidity and mortality, pathological diagnosis, radiological and pathological staging informations were recorded and analyzed.

Results: The most common comorbidity in the study was hypertension, and most of the tumors (36.0%) were located in the sigmoid region. Elective surgery was performed in 66.3% of the patients, resection and primary anastomosis were performed in 76.8% of the patients. Ostomy was created in 85% of the patients over the age of 65. In 82.5 of the patients, the pathological diagnosis was non-mucinous low-grade adenocarcinoma, however, according to the pathological and radiological tumor stage at diagnosis staging, 9 out of every 10 patients were in Stage 2 and Stage 3.

Conclusion: Radiological staging in the preoperative period is compatible with the pathological staging in the postoperative period.

Keywords: Colon, colorectal cancer, surgery, tumor stage, pathological staging, laparoscopy

ÖZ

Amaç: Kolorektal kanserlerde preoperatif klinik tanı ve postoperatif rezeksiyon piyesinde belirlenen patolojik evreleme sonuçlarının karşılaştırılması amaçlanmıştır.

Yöntem: Ocak 2013-Ekim 2020 yılları arasında kolorektal tümör tanısı nedeniyle opere edilen 86 hastanın medikal verileri retrospektif olarak değerlendirildi. Hastaların demografik özellikleri, Amerikan Anesteziyoloji Derneği skoru, komorbidite varlığı, tümör lokalizasyonu, preoperatif endoskopi yapılıp yapılmama durumu, operasyonun acil veya elektif yapılması, operasyonun açık veya laparoskopik yöntemle oluşu, operasyon şekli, ostomi varlığı, morbidite ve mortalite, patolojik tanı, radyolojik ve patolojik evrelemesi bilgileri kaydedilip incelendi.

Bulgular: Araştırmada en sık komorbidite hipertansiyon olup, tümörlerin büyük kısmı (%36,0) sigmoid bölgede yerleşmiştir. Olguların %66,3'üne elektif operasyon uygulanmış, hastaların %76,8'ine rezeksiyon ve primer anastomoz yapılmıştır. Altmış beş yaş üzerindeki olguların %85'ine ostomi açılmıştır. Olguların %82,5'inde patolojik tanı non-müsinöz düşük derece adenokarsinom olup, yaklaşık her 10 olgudan 9'u patolojik ve radyolojik TNM evrelemesine göre Evre 2 ve Evre 3'te idi.

Sonuç: Preoperatif dönemde radyolojik evreleme, postoperatif dönemdeki patolojik evreleme ile uyumludur.

Anahtar Kelimeler: Kolon, kolorektal kanser, cerrahi, tümör evresi, patolojik evreleme, laparoskopi

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Introduction

Colorectal cancers (CRCs) are among the most common tumors in the gastrointestinal tract and are common in Turkey as well as in the rest of the world. In Turkey, it is the most common type of cancer in women and the fourth most common in men.[1]

The majority of CRCs are distally located, and the incidence is higher in men.[2,3] Anamnesis, physical examination (rectal examination), radiology and endoscopic evaluation (such as localization, passage) are important in the diagnosis process and clinical staging of the disease. Tumor stage at diagnosis (TNM) is one of the most important prognostic factors in CRC.[3,4,5] Regional lymph node metastasis is one of the most important parameters in determining treatment and prognosis in CRC. Presence of involvement of lymph nodes affects CRC staging, scope of operation and choice of postoperative oncological treatment. Computed tomography of the abdomen is frequently used in the diagnosis and radiological staging of CRC, and it is seen that computed tomography has a sensitivity of 13-92%, especially in liver metastasis.[5,6] Presence of comorbidity, whether the operation is urgent or elective, tumor localization, and preoperatively detected tumor stage may affect treatment methods and postoperative follow-up period.[2,3,4,5,6]

In our study, it was aimed to compare the radiological staging in the preoperative period with the pathological staging in the resection specimen in CRC.

Materials and Methods

Medical data of 86 patients who were diagnosed as having CRC and operated between January 2013 and October 2020 were evaluated retrospectively. Demographic characteristics of the patients, ASA score, comorbidity, tumor localization, whether or not endoscopy was performed, whether the operation was performed emergency or elective, whether the operation was open or laparoscopic, operation type, presence of ostomy, complication status, postoperative pathological diagnosis, preoperative radiological staging and postoperative pathological staging were recorded. and examined.

Computed tomography images were available in all patients included in the study, and radiological evaluation was obtained with tomography images. In all patients included in the study, oral + IV Dynamic-triphasic sections were obtained by giving contrast material and examination was performed in axial, coronal and sagittal planes.

Ethics committee approval was obtained for the study with the date 24.12.2020 and number 286.

Statistical Analysis

The SPSS version 20 for Windows software package program was used for statistical analysis. Frequencies and percentages were used for descriptive statistics. Chi-square test (Yates correction) was performed in binary comparisons. P value <0.05 was accepted as statistically significant.

Results

In the study, the mean age of our patients who were operated for colorectal tumor was 61.7 (±13.5). Of the patients 53.7% were female and 46.3% were male.

Comorbidity was present in 51.2% of the patients, and ASA2 score was found in 51.2%. It was observed that endoscopic examination was performed in 66.3% of the patients in the preoperative period. During the treatment process, 33.7% of the patients were operated under emergency conditions. Open approach was used in 88.4% of the patients as the surgical method. The rate of ostomy opening was 23.3%. Postoperative complications occurred in 4.7% of patients (anastomotic leakage in two patients, evisceration in one patient, and ureteral injury in one patient). Mortality developed in two patients due to pneumonia and sepsis (Table 1).

When evaluated in terms of age, there was a statistically significant difference between patients with ASA2 and patients with ASA3 (p=0.001), between patients with comorbidity and without comorbidity (p=0.001), and between patients with ostomy and without ostomy (p=0.001). There was no statistically significant difference between patients in whom endoscopy was performed and in whom not performed (p=0.358), between patients who underwent elective surgery and who underwent emergency surgery (p=0.251), between patients who underwent open surgery and who underwent closed surgery (p=0.814), and between patients with complication and without complication (p=0.886) (Table 1).

When evaluated in terms of gender, there was no difference between patients with ASA2 and patients with ASA3 (p=0.679), between patients with comorbidity and without comorbidity (p=0.679), patients in whom endoscopy was performed and in whom not performed (p=0.765), between patients who underwent elective surgery and who underwent emergency surgery (p=0.598), between patients who underwent open surgery and who underwent closed surgery (p=0.300), between patients with ostomy and without ostomy (p=0.289), and between patients with complication and without complication (p=0.402) (Table 1).

The most common comorbidity in our patients was hypertension (15.7%). Type 2 diabetes mellitus was observed

Table 1. Distribution of some interventions by age and gender in patients with colon tumors

Variables		Age			Gender			
		≤64	≥65	P***	Women	Men	Total	P***
		Number (%)*	Number (%)*		Number (%)*	Number (%)*	Number (%)**	
ASA	ASA2	37 (84.1)	7 (15.9)	**0.001**	25 (56.8)	19 (43.2)	44 (51.2)	0.679
	ASA3	9 (21.4)	43 (78.6)		22 (52.4)	20 (47.6)	42 (48.8)	
Comorbidity	Yes	10 (22.7)	34 (77.3)	**0.001**	25 (56.8)	19 (43.2)	44 (51.2)	0.679
	No	36 (85.7)	6 (14.3)		22 (52.4)	20 (47.6)	42 (48.8)	
Endoscopy	Yes	33 (57.9)	24 (42.1)	0.358	30 (52.6)	27 (47.4)	57 (66.3)	0.765
	No	13 (44.8)	16 (55.2)		17 (58.6)	12 (41.4)	29 (33.7)	
Surgery	Emergency	13 (44.8)	16 (55.2)	0.251	17 (58.6)	12 (41.4)	29 (33.7)	0.598
	Elective	33 (57.9)	24 (42.1)		30 (52.6)	27 (47.4)	57 (66.3)	
Surgery type	Open	41 (53.9)	35 (46.1)	0.814	40 (52.6)	36 (47.4)	76 (88.4)	0.300
	Laparoscopic	5 (50.0)	5 (50.0)		7 (70.0)	3 (30.0)	10 (11.6)	
Ostomy	Yes	3 (15.0)	17 (85.0)	**0.001**	13 (65.0)	7 (35.0)	20 (23.3)	0.289
	No	43 (65.2)	23 (34.8)		34 (51.5)	32 (48.5)	66 (76.7)	
Complication	Yes	2 (50.0)	2 (50.0)	0.886	3 (75.0)	1 (25.0)	4 (4.7)	0.402
	No	44 (53.7)	38 (46.3)		44 (53.7)	38 (46.3)	82 (95.3)	
Total *		**46 (53.5)**	**40 (46.5)**		**47 (54.7)**	**39 (45.3)**	**86 (100.0)**	

*row percent, **column percent,***chi-square (yates correction), ASA: American Society of Anesthesiology

in 9.3% of the patients, and the coexistence of hypertension and type 2 diabetes mellitus was observed in 7.0% of the patients (Table 2).

The most common tumor localization was in the left colon and among which the most common was in the sigmoid colon (36%). Of the tumors 12.8% were in the splenic flexure, 10.5% in the rectosigmoid junction, and 10.5% in the rectum (Table 3).

When evaluated in terms of surgery types, 25.6% of the patients underwent anterior resection (AR), 24.4% right hemicolectomy, 20.9% low AR (LAR), and 17.4% Hartmann process (Table 4).

After examining the postoperative resection materials, 82.5% of them were found to be low-differentiated non-mucinous adenocarcinoma, 7.0% moderately differentiated non-mucinous adenocarcinoma, and 10.5% mucinous adenocarcinoma (Table 5).

In terms of pathological staging, 47.7% of the patients were determined as Stage 3, 40.7% as Stage 2, 8.1% as Stage 1, and 3.5% as Stage 4. When evaluated radiologically, 47.7% of the patients were determined as Stage 3, 39.5% as Stage 2, 10.5% as Stage 1, and 2.3% as Stage 4. On the other hand,

Table 2. Distribution of comorbidities in patients with colon tumor

Comorbidity	Number (%)
No comorbidity	42 (48.8)
Hypertension (HT)	15 (17.4)
Diabetes mellitus (DM)	8 (9.3)
Heart failure (HF)	2 (2.3)
DM + HF	2 (2.3)
COPD	1 (1.2)
HF + COPD	1 (1.2)
HT + COPD	3 (3.5)
HT + DM	6 (7.0)
HF + HT	2 (2.3)
Guatr	1 (1.2)
HT +CVA + COPD	1 (1.2)
BPH	2 (2.3)

COPD: Chronic obstructive pulmonary disease, CVA: Cerebrovascular accident, BPH: Benign prostatic hyperplasia

when pathological staging and radiological staging were compared in terms of TNM staging, the similarity was found to be 94.2% (Table 5).

Discussion

Although the incidence and mortality of CRC vary around the world, its incidence is increasing in relation to obesity, low-fiber and high-fat diet, prolongation of life expectancy, and environmental factors. CRCs are ranked 2nd in cancer-related deaths worldwide (1).

One of the important risk factors for the development of CRC is age. It has been shown that 90% of CRCs occur at the age of 50 years or above. In large case series, it was found that CRC peaked around the age of 70.[7,8] In our study, the mean age of patients with CRC was found to be 61.7 (±13.5), which was similar to many other studies.[9,10,11,12]

The majority of the patients in our study were women. Studies have not shown a significant difference between the frequency of CRC and gender, and it has been shown that the risk increases slightly in men as age progresses.[13,14] However, contrary to our study, there are also studies showing that it is more common in males.[15,16]

Comorbidity was present in 51.2% of the patients in our study, and hypertension was the most common comorbidity. However, 48.8% of the patients were scored as ASA 3 in terms of ASA score. In our study, patients who died had an ASA score of 3 and they had comorbidity. The presence of comorbidities and a high ASA score have been shown to increase morbidity and mortality as an independent risk factor.[17,18]

Considering the distribution of tumor localization; it was observed that 36% of the tumors were located in the sigmoid region, 21% in the rectum and rectosigmoid, 12.8% in the splenic flexure, and 11.6% in the cecum. In studies, CRC is most commonly detected in the rectosigmoid region, followed by the left and right colon, respectively.[16,19] However, it has been observed that the incidence of tumors

Table 3. Distribution of tumor localization

Tumor localization		Number (%)
Right colon	Cecum	10 (11.6)
	Ascending colon	2 (2.3)
	Hepatic flexure	8 (9.3)
Left colon	Splenic flexure	11 (12.8)
	Descending colon	6 (7.0)
	Sigmoid	31 (36.0)
Rectum	Rectosigmoid	9 (10.5)
	Rectum	9 (10.5)
Total		86 (100.0)

Table 4. Distribution of surgeries performed in patients with colon tumors (Kars, 2021)

Surgery type	Number (%)
Right hemicolectomy	18 (20.9)
Right hemicolectomy-End ileostomy	3 (3.5)
Anterior resection (AR)	20 (23.2)
AR - ureteroureterostomy	1 (1.2)
AR - protective loop ileostomy	1 (1.2)
Low anterior resection (LAR)	18 (20.9)
Hartmann procedure	12 (13.9)
Hartmann procedure - total abdominal hysterectomy (TAH)	2 (2.3)
Hartmann procedure - liver metastasectomy	1 (1.2)
Subtotal colectomy	6 (7.0)
Subtotal colectomy - end ileostomy	1 (1.2)
Subtotal colectomy - liver metastasectomy	2 (2.3)
Total colectomy - ileoanal J pouch anastomosis	1 (1.2)
Total	86 (100.0)

Table 5. Pathological diagnosis, pathological and radiological TNM staging of patients with colon tumors (Kars, 2021)

	Number (%)
Pathological diagnosis	
Low grade non-mucinous adenocarcinoma	71 (82.5)
Non-mucinous adenocarcinoma moderate	6 (7.0)
Mucinous adenocarcinoma	9 (10.5)
Pathological staging	
Stage 1	7 (8.1)
Stage 2	35 (40.7)
Stage 3	41 (47.7)
Stage 4	3 (%3.5)
Radiological staging	
Stage 1	9 (10.5)
Stage 2	34 (39.5)
Stage 3	41 (47.7)
Stage 4	2 (2.3)
Pathological and radiological staging	
Same phase	81 (94.2)
Radiological stage low, pathological stage high	4 (4.6)
Radiological stage high, pathological stage low	1 (1.2)

located in the proximal colon has increased in recent years.[19,20]

Colonoscopic examination is important in diagnosis of CRC and therapeutic procedures. In our study, endoscopy was performed in 66.3% of all patients and in all elective patients. Preoperative radiological imaging methods are also important because there is a direct relationship between the prognosis and stage of the disease. All patients in the study underwent imaging with computed tomography in the preoperative period and staging was done according to the preoperative TNM staging protocol. As in other gastrointestinal tumors, lymph node detection and staging of the disease by imaging methods are guiding in the treatment of CRCs.[21,22]

Of the surgeries 66.3% were elective and 33.78% were emergency. CRCs constitute an important part of emergency interventions related to the colon. Although debates continue about the fact that laparoscopic resections have better results than open procedures, they are being performed with increasing frequency.[23,24] Laparoscopic resection rates in CRC range from 27.7 to 51.1%.[25] In our study, 11.6% of the patients underwent surgery with laparoscopic method, and we attributed the high number of open surgeries to the high number of patients who were operated on urgently.

The treatment method differs according to the localization of the tumor. In many studies, the general approach in tumors located in the right colon is resection and primary anastomosis.[26,27] In our study, right hemicolectomy and primary anastomosis were most frequently performed in patients with right colon tumor.[26,27] In obstructive left colon tumors, since resection and primary anastomosis in a heavily dilated and dirty colon are considered to be highly risky in terms of anastomotic leakage, stepwise surgical treatment is recommended.[28,29] However, in most studies, it has been stated that resection and primary anastomosis can be performed in emergency left colon surgery if the surgery is performed by experienced surgeons with appropriate indications, and similar results in terms of postoperative mortality and complications are encountered among patients undergoing primary anastomosis with step-by-step surgical treatment.[30,31] In our study, mostly resection and primary anastomosis were preferred in patients with left colon tumors.

In our study, ostomy was created in 23.3% of the patients in the form of ileostomy (5.9%) and in the form of colostomy (17.4%). The presence of ostomy was higher in patients aged >80 (p=0.001). This situation was similar to the studies conducted.[27,8,29,30] In another study, 27.9% of the patients had ostomy in the form of ileostomy or colostomy.[32]

In our study, our complication rate was 4.7% and our mortality rate was 2.3%, which were acceptable when compared to the literature data. In our study, complications were anastomotic leakage in two of the 4 patients, evisceration in one and ureteral injury in one. Although anastomotic leakage is the most common complication after surgical treatment of CRC, especially due to cancer-specific immune system dysfunction and fecal transmission, many complications such as paralytic ileus, evisceration and surgical site infections may occur. In studies, morbidity and mortality rates were determined as 15-50% and 6-15%, respectively in patients who underwent emergency surgery. Morbidity and mortality rates were found 4-14% and 1-7%, respectively in patients who underwent elective surgery.[33,34,35,36] In studies, the postoperative morbidity rate may be up to 23% after laparoscopy and 11-20% after open surgery.[37] However, it was reported that anastomotic leakage was seen at a rate of 2.4-6.8% after open surgery and 2.7% after laparoscopy.[38]

Histological grades of tumors are important in the evaluation of tumor behavior, prognosis and treatment. Tumor stage and histological grade are prognostic factors affecting survival.[39,40,41] When the patients were evaluated in terms of pathological diagnosis in the study, 82.5% of the patients had histopathologically low grade non-mucinous adenocarcinoma. In a study by Kocakuşak et al.[42], it was histopathologically in the form of non-mucinous adenocarcinoma with a rate of 78%.

Study Limitations

In studies, when stages are evaluated in patients with CRC, it has been reported that Stage 3 is the most common.[25,43] In our study, the majority of patients had Stage 2 and 3 in terms of radiological and pathological staging. Similar to our study, in two studies conducted by Sarı et al.[44] and Küçüköner et al.[45], the most common stage was 2 and 3. Similar to studies, we think that the reason for the diagnosis of CRC in advanced stages is the lack of screening for colon cancer in our country.

Conclusion

In conclusion, tumors located in the left colon in Stage 2-3 were more common in our study. It was observed that the staging performed with preoperative radiological imaging during the diagnosis process was consistent with the staging determined after the pathological examination of the resection piece. In this case, it can be said that the staging is highly compatible in terms of both pathological and radiological diagnosis and the diagnostic processes are of high quality. It is thought that radiological staging is important in treatment planning in patients with CRC, and the success of treatment will increase with developing imaging studies.

Ethics

Ethics Committee Approval: Ethics committee approval was obtained for the study with the date 24.12.2020 and number 286.

Peer-review: Externally peer reviewed.

Authorship Contributions

Surgical and Medical Practices: H.Ç., T.A., T.Ç., H.E.Ö., B.S., K.B., T.A., D.G., Concept: H.Ç., K.B., Design: H.Ç., H.E.Ö., Data Collection or Processing: H.Ç., T.A.,

Analysis or Interpretation: H.Ç., T.A., D.G., Literature Search: H.Ç., Writing: H.Ç.

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RESEARCH ARTICLE

Quality of Life of Patients with a Stoma: A Descriptive Study

Stomalı Hastaların Yaşam Kalitesi: Tanımlayıcı Bir Çalışma

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ABSTRACT

Aim: Stoma opening causes patients to experience various problems in terms of physiological, social, psychological, and sexual aspects. All these problems negatively affect the quality of life (QoL) of patients; thus, this study aimed to evaluate the QoL of patients with a stoma.
Method: This descriptive cross-sectional study includes 115 patients with a stoma for at least 3 months. Data were collected using the City of Hope Ostomy QoL Questionnaire between March 2015 and June 2016. Approval from the ethics committee and informed consent from participants were obtained. Descriptive statistics, Kruskal-Wallis test, Student t-test, and Mann-Whitney U test were used.
Results: Of the 115 participants, the duration of stoma was 17.5±23.2 months. A colostomy is present in 54.8% of patients, ileostomy in 47.8%, and urostomy in 6.1%. The overall QoL score was 5.37±1.32, with subscale scores as follows: physical 4.42±2.78, psychological 5.33±1.45, social 5.37±1.32, and spiritual 6.97±1.70. A statistically significant difference was found between psychological, social subscale, and overall QoL scores of patients with a permanent and temporary stoma ($p<0.05$), and between psychological subscale score of patients receiving adjuvant chemotherapy and those who do not ($p<0.05$).
Conclusion: The overall QoL of patients was adversely affected, especially the physical aspect. Patient-centered nursing interventions should be planned to improve the QoL of patients in the context of holistic nursing care.
Keywords: Quality of life, stoma, ostomy, colorectal surgery

ÖZ

Amaç: Stomanın açılması hastaların fizyolojik, sosyal, psikolojik ve cinsel yönden çeşitli sorunlar yaşamasına neden olur. Yaşanan tüm bu sorunlar hastaların yaşam kalitesini olumsuz etkileyebilmektedir. Bu çalışma stomalı hastaların yaşam kalitesini değerlendirmeyi amaçlamaktadır.
Yöntem: Bu tanımlayıcı, kesitsel çalışma, en az üç aydır stoması olan 115 hastayı içermektedir. Veriler Mart 2015-Haziran 2016 tarihleri arasında Umut Merkezi Ostomi Yaşam Kalitesi Ölçeği (UMYKÖ) ile toplandı. Etik kurul onayı ve hastalardan bilgilendirilmiş onam alındı. Tanımlayıcı istatistikler, Kruskal-Wallis testi, Student t-testi ve Mann-Whitney U testi kullanıldı.
Bulgular: Yüz on beş hastanın ortalama stoma süresi 17,5±23,2 aydır. Hastaların %54,8'inde kolostomi, %47,8'inde ileostomi, %6,1'inde ürostomi vardır. Stomalı hastaların UMYKÖ genel puan ortalaması 5,37±1,324, alt boyut puan ortalamaları ise sırasıyla fiziksel 4,42±2,78, psikolojik 5,33±1,45, sosyal 5,37±1,32 ve manevi 6,97±1,70'dir. Ameliyat sonrası kemoterapi alan ve almayan hastaların psikolojik alt boyut puan ortalaması arasında istatiksel olarak anlamlı fark saptandı ($p<0,05$). Stoması kalıcı ile geçici olan hastaların psikolojik ve sosyal alt boyut ve genel ölçek puan ortalaması arasında istatiksel olarak anlamlı fark saptandı ($p<0,05$).
Sonuç: Hastaların genel yaşam kalitesi özellikle fiziksel alanda olumsuz etkilenmiştir. Bütüncül hemşirelik bakımı çerçevesinde hastaların yaşam kalitesini iyileştirmek için hasta merkezli hemşirelik girişimleri planlanmalıdır.
Anahtar Kelimeler: Yaşam kalitesi, stoma, ostomi, kolorektal cerrahi

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Introduction

Quality of life (QoL) is a complex concept involving social, psychological, spiritual, and physical wellbeing. It defines the prosperity related to an individual's life, level of gladness, and the extent to which disease, accidents, and treatments affect this level. The physical, social, psychological, and sexual problems that people with a stoma experience can be observed to adversely affect their QoL. As the QoL decrease, the adoption of patients to stoma decreases, the adoption period extends, body image disturbance and self-care need increases, and self-reliance decreases.[1,2,3,4] The stoma may cause some physical problems like irritation and rash around the stoma opening, gas, or foul odor.[1,5] As a consequence of having a stoma, patients may face clothing problems, such as wearing plus size t-shirts and pants or wearing suspenders instead of a belt.[1,6] The fear of stoma leakage causes difficulties while performing religious rituals.[1,2,7] The patient comes across some psychosocial problems like social isolation, stoma adjustment, negative body sense changes, decreased self-respect, and unwillingness to attend family meetings or social activities due to the foul odor.[1,5,6,7,8] The person encounters financial problems, such as affording an ostomy bag and other equipment due to quitting a job or changing job, and sexual problems also occur such as embarrassment, erectile dysfunction, diminished sexual desire, or dissatisfaction.[1,2,9,10] The whole physical, social, psychosocial, and sexual problems adversely affect the QoL of patients with a stoma;[1,2,3,4,11,12,13,14,15] therefore, interventions should be planned to improve the QoL of patients with a stoma by evaluating their QoL with specially developed QoL scales. The City of Hope QoL Ostomy Questionnaire (COH-QoL-Ostomy) is one of the scales developed to evaluate all subscales of the QoL of patients with a stoma (colostomy, ileostomy, and urostomy).[16,17] This study aimed to evaluate the QoL of patients with a stoma by using the COH-QoL-Ostomy, which was developed for all people with a stoma.

Materials and Methods

This cross-sectional descriptive study was composed of 115 patients with a stoma from the general surgery and urology wards and the stomatherapy unit of a university hospital. Data were collected from March 2015 to June 2016 via face-to-face and telephone interview methods. Inclusion criteria: having a stoma for at least 3 months and aged over 18 years. Exclusion criteria: patients with dementia and those who are unable to read and understand Turkish. Data were collected using The Patient Identification Form and the COH-QoL-Ostomy.

Patient Identification Form

The form comprises descriptive information about sociodemographic and stoma. For example, age, sex, education situation, chronic disease, stoma type, stoma indication, and surgical operation.

The COH-QoL-Ostomy

The COH-QoL-Ostomy measures QOL in terms of physical, social, sexual, and spiritual aspects. The validity and reliability of the scale developed by Grant and friends were detected.[17] Erol and Vural[16] investigated the Turkish validity and reliability of the scale.The internal consistency reliability coefficient of the four-dimensionally developed scale, especially for patients with a stoma, was 0.92, and the correlation between subscale item scores and subscale total score was between 0.21 and 0.79. The scale total score correlation was 0.82 in the test-retest reliability. Higher scores from subscales and overall scale mean better functions.[16,17] Power analyses were performed and reached 115 patients.

Statistical Analysis

Statistical analyses were performed using the Statistical Package for the Social Sciences 15 software. Descriptive analyses were performed using the mean and standard deviations for normal scattering variables. Categorical variables were stated as numbers and percentages. The homogeneity of variances was assessed using Levene test. The Kruskal-Wallis, Student t-test, and Mann-Whitney U test were used to determine the difference between mean scores among variables. $P<0.05$ was considered statistically significant.

Results

Of the 115 study participants, 39 were female and 76 were male, with an average age of 55.7±13.0 (18-83) years, and the mean duration of stoma was 17.5±23.2 (3-96) months. The sociodemographic and stoma characteristics of participants were shown in Table 1. Colostomy was performed in 54.8% (n=63) of participants, ileostomy in 47.8% (n=45), and urostomy in 6.1% (n=7), and stoma was applied in 77.4% of participants due to cancer. Characteristics of participants regarding stoma and treatment are presented in Table 2.

The overall score of COH-QoL-Ostomy for all participants is 5.37±1.324. The subscale mean scores were 4.42±2.78 in physical, 5.33±1.45 in psychological, 5.37±1.32 in social, and 6.97±1.70 in spiritual (Table 3). According to the COH-QoL-Ostomy mean score, the QoL of participants is moderate.

Characteristics related to sociodemographic, stoma, and treatment were compared with COH-QoL-Ostomy overall and subscale mean scores of participants. A statistically significant difference was observed between the psychological subscale mean scores of participants receiving

Table 1. Sociodemographic characteristics of patients with stoma (N=115)

	X	SD
Age (year)	55.7	13.0
Duration of stoma (month)	17.5	23.2
	n	**%**
Gender		
Female	39	33.9
Male	76	66.1
Education status		
Primary education	65	56.5
High school	31	27.0
College/university	19	16.5
Chronic disease		
No	43	37.4
Yes *	72	62.6
Drug use		
No	55	47.8
Yes ‡	60	52.2

*Diabetes mellitus, hypertension, hyperlipidemia, hyperthyroidism, epilepsy, asthma

‡ Antihypertensive, antidiabetic, antiepileptic, antiallergic, antipsychotic, statin group drugs

SD: Standard deviation

Table 2. Characteristics related to stoma and treatment of patients with stoma (N=115)

Stoma characteristics	**n**	**%**
Underlying disease		
Cancer (Colon, rectum, bladder)	89	77.4
Others (Crohn disease, Fournier gangrene etc.)	26	22.6
Stoma type		
Colostomy	63	54.8
Ileostomy	45	39.1
Urostomy	7	6.1
Stoma status		
Permanent	46	40.0
Temporary	69	60.0
Stoma care		
Self-care	43	37.4
Partner/spouse	35	30.4
Others	21	18.3
Self-care, if required receive help	16	13.9
Treatment characteristics	**n**	**%**
Operation status		
Planned	65	56.5
Emergency	50	43.5
Surgery type		
Abdominoperineal resection	15	13.0
Low anterior resection	27	23.5
Cystectomy + urinary diversion	7	5.2
Others *	67	58.3
Neoadjuvant chemotherapy		
Yes	42	36.5
No	73	63.5
Neoadjuvant radiotherapy		
Yes	38	33.0
No	77	67.0
Adjuvant chemotherapy		
Yes	61	53.0
No	54	47.0
Adjuvant radiotherapy		
Yes	27	23.5
No	88	76.5

*Hartman procedure, Total/right/left hemicolectomy, cytoreductive surgery, total pelvic exenteration, transanal excision, transanal endoscopic microsurgery etc.

adjuvant chemotherapy (5.66±1.55) and those without adjuvant chemotherapy (4.97±1.24) (Mann-Whitney U =1234, 00; p<0.05). The psychological subscale mean scores of patients receiving adjuvant chemotherapy are higher than those who do not.

A statistically significant difference was observed between participants with a permanent and temporary stoma in terms of psychological subscale mean scores (permanent 5.30±1.79, temporary 5.36±1.18; Mann-Whitney U =1523,00), social subscale mean scores (permanent 5.30±1.61, temporary 5.43±1.10; Mann-Whitney U =1399,50), and overall mean scores (permanent 5.30±1.61, temporary 5.43±1.10; Mann-Whitney U =1399.50) (p<0.05). The overall, psychological, and social subscale mean scores of participants with temporary stoma were found to be higher. The psychological, social, and overall QoL of participants with a temporary stoma is better than those with permanent.

No statistically significant differences were observed between the overall and subscale mean scores of participants according to the sociodemographic characteristics (e.g., sex, marital status, educational status, chronic illness/drug use status, working status, social security, and persons with whom they live together), stoma characteristics (cause of stoma opening, type of stoma, patients who take care of stoma), and treatment characteristics (e.g., emergency surgery/planned surgery, surgery type, neoadjuvant chemotherapy, and neoadjuvant and adjuvant radiotherapy) (p>0.05).

Table 3. The COH-QoL-Ostomy subscale mean scores of patients with stoma (N=115)

Subscales	Min-max	$\bar{X}$ ± SD
Physical	0.00-10.0	4.43±2.78
Psychological	0.92-9.69	5.33±1.45
Social	2.98-9.09	5.37±1.32
Spiritual	1.86-10.0	6.97±1.70
Overall QoL	2.98-9.09	5.37±1.32

Min: Minimum, Max: Maximum, SD: Standard deviation, COH-QoL: City of Hope QoL Ostomy Questionnaire

Discussion

In literature, opening a stoma was reported to cause various problems and adversely affect the patients' QoL in terms of physiological, social, psychological, and sexual aspects.[1,11,12,13,14,15] In this study, the QoL of participants was evaluated with COH-QoL-Ostomy. The mean scores of COH-QoL-Ostomy (5.37±1.32) revealed that QoL of participants was moderate and the QoL decreased after the stoma was opened. A study by Anaraki et al.[18] applied the same scale (n=102), and the overall QoL score was 7.48±0.9 (good level). In the study by Gomez et al.[15], QoL of patients with a stoma was found to be at moderate-good levels. In our study, the stoma was reported to affect QoL in terms of physical functions, whereas in the study of Anaraki et al.[18], social functions were more affected. Other studies revealed that stoma opening negatively affected QoL in different subscales. In our study, the physical subscale was most affected, and the QoL was adversely affected in all subscales. Similar to other studies, the QoL of all participants was negatively affected, and stomal opening decreased the QoL. No statistically significant difference was observed between the patients' QoL mean scores; first, according to the sociodemographic characteristics, such as sex, marital status, working status, educational status, chronic illness, and drug use; second, characteristics of stoma, such as the type of stoma (colostomy, ileostomy, and urostomy), stoma indication, the person caring for the stoma; and lastly, according to the treatment characteristics, such as the type of surgery and neoadjuvant or adjuvant radiotherapy. In the literature, unlike our results,[13,14,18,19] some studies determined the difference in the QoL mean scores between patients according to sociodemographic, stoma, and treatment characteristics. In the study of Liao and Qin[5] examining the factors affecting the QoL, (n=76) stoma duration and hopefulness of patients affected the general satisfaction, skills of caregivers impacted the sexual life, and gender, education status, hope, and care skills affected social life. Similarly, in the study by Pazar et al.[13], the marital and educational status did not affect the QoL of patients with a urostomy. In the studies by Anaraki et al.[18] and Karaveli Cakir and Ozbayir[14], no difference was found between the patients' QoL scores according to the stoma type and self-care status. Personal characteristics, social environment, and cultural factors influenced QoL, which is a multidimensional concept. Patient characteristics, coping mechanisms, family support, and self-care status affect the perception of QoL; thus, the stoma opening negatively affected the QoL of all participants in our study without any difference in sex, stoma type, and educational status.

Physical Functions

In our study, participants were determined to have the lowest score in the physical subscale (4.43±2.78) from the COH-QoL-Ostomy. Participants were found to have a lower mean score on the physical subscale than other subscales. In the study of Karaveli Cakir and Ozbayir[14] (n=60), unlike our study, patients with stoma scored the highest in the physical subscale. Patients with stoma experience physical problems, such as retraction, mucocutaneous separation, prolapse, granuloma, and peristomal complications (erythema, maceration, ulceration, irritation, erosion, and dermatitis) with physical limitations (reduced hand strength) with aging.[20,21,22,23] All these physical problems and restrictions reduce the QoL of patients. In our study, the lower mean score in the physical subscale was due to these physical problems mentioned in the literature. Patients' comorbid disease (e.g., diabetes mellitus, hypertension) may increase the development of physical problems; moreover, reduced QoL of patients with a stoma by suggesting that education given on stoma management is forgotten over time with aging and difficulties in performing stoma care are encountered.

Spiritual Functions

In our study, participants were determined to have the highest score in the spiritual subscale (6.97±1.70). The QoL in the spiritual subscale of participants decreased. In the study of Karaveli Cakir and Ozbayir[14] (n=60), unlike our study, participants scored the lowest in the spiritual subscale. It was reported that the existence of the stoma does not prevent religious worship. Nevertheless, patients may still be anxious about religious worship and abandoned praying. A decreased rate of attending religious worship of patients depending on the stoma surgery was observed.[7,24] In the study by Cavdar et al.[24], 74.9% of participants attended regular worship before surgery; however, this rate dropped to 53% after surgery. The fact that, in our study, the spiritual subscale was less affected than other studies suggests that patients do not attend religious worship regularly before surgery or they continue to worship in the same way, despite the opening of the stoma.

Social Functions

In our study, the QoL in the social subscale of participants decreased. Participants were afraid to participate in social activities because of fear of gas and foul odor from the stoma, leakage, not finding a suitable place to change the bags, and social isolation experience considering that they feel the stigma due to the stoma.[6,25] Participants experienced anxiety and embarrassment due to the fear of being unable to find a clean bathroom for stoma care, lack of napkins in public toilets, and too low and unclean toilets, and they travel less due to the troubles caused by the seat belt in the vehicle.[3,4,5] Patients with stoma were found to have fewer social meetings with their relatives and friends, with reduced leisure and social activities.[26] Leyk's study[27] revealed that the social support from family and friends increased; thus, the QoL increased in patients with a permanent stoma as time passed. In our study, the low QoL of participants depends on keeping them away from the social environment, as reported in the literature.

Psychological Functions

In our study, the QoL in the psychological subscale of participants decreased. In other studies, participants were found to feel the stigma due to the stoma, worries about living with a stoma and stoma closure, experienced loss of control, and change of self-perception from family members and spouses with difficulties in accepting and adjusting with the stoma.[6,8,25] Additionally, the body image of participants is negatively affected. Patients whose body image is impaired experience psychological anxiety and depression and avoid social activities.[6,19,28] Our study revealed that stoma status (permanent or temporary) affected the QoL of patients more than the type of stoma. The psychological and social QoL of patients with a temporary stoma were found to be better. In the study by Anaraki et al.[18], the QoL of patients with a temporary stoma was found to be higher in the psychological subscale. In our study, patients with a temporary stoma were thought to maintain their hope to regain their health and strength before surgery due to temporary stoma and stoma closure, and that the negative body image will disappear with stoma closure, therefore, psychologically gaining more positive thoughts. The QoL was better in the psychological subscale of patients receiving adjuvant chemotherapy. Adjuvant chemotherapy is applied after 5-12 weeks postoperatively to prevent recurrences and increase survival. In the study by Oliphant et al.[29], patients with loop ileostomy receiving adjuvant chemotherapy experienced more complications in the third postoperative month, and the side effects and complications of chemotherapy adversely affected the QoL of patients. In our study, the lower mean score of the psychological subscale of participants is due to the less favorable side effects of chemotherapy and its complications, as well as the belief that chemotherapy can achieve full recovery, disease-free survival, and more positive thoughts.

Study Limitations

Outcomes are limited in terms of patients with all types of stoma due to the small number of patients with a urostomy.

Conclusion

In our study, the QoL of all participants is adversely affected in all subscales and the stoma opening decreased overall QoL. Nurses should evaluate QoL of patients with stoma perioperatively. Patient-specific evidence-based nursing interventions should be planned in all affected subscales of QoL of a patient with a stoma in the context of holistic nursing care. Nursing interventions, such as giving perioperative education and counseling, planning support groups during follow-up, evaluation and management of postoperative stomal and peristomal complications, and acquiring self-confidence in the care of patients, are suggested to increase the QoL of patients with a stoma.

Ethics

Ethics Committee Approval: This study was approved by the Non-invasive Research Ethics Board (no:2153-GOA, decision number 2015/21-33). The permission was received from the hospital.

Informed Consent: The written and oral informed consent was obtained from all participants.

Peer-review: Externally peer reviewed.

Authorship Contributions

Concept: F.V., E.S., Design: F.V., E.S., Data Collection or Processing: E.S., Analysis or Interpretation: F.V., E.S., Literature Search: F.V., E.S., Writing: F.V., E.S.

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RESEARCH ARTICLE

Burnout Among General Surgeons in Turkey

Türkiye'deki Genel Cerrahlar Arasında Tükenmişlik

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ABSTRACT

Aim: Burnout is a syndrome that is very common among surgeons. It is defined by emotional exhaustion (EE), depersonalization (DP), and decreased personal success. This study aimed to investigate burnout in general surgeons in Turkey and to determine the risk factors for burnout.

Method: Of the total of 4,395 general surgeons in Turkey, 630 were included in this study. Each participant was asked to complete the Sociodemographic Data Form, Maslach Burnout Inventory, and Minnesota Satisfaction Questionnaire (MSQ) either by face-to-face interview or via electronic questionnaire.

Results: Of the 630 participants included in this study, 53 (8.4%) and 577 (91.6%) was female and male, respectively. The highest participation rate was from the Marmara region (36%), while the lowest participation rate was from the Eastern Anatolia region (3.13%). Attending physicians comprised the largest number of participants (72%). Those who perceived themselves as successful, with more work experience and higher academic titles, had decreased EE, personal accomplishment, and DP as well as increased general, external, and internal satisfaction.

Conclusion: We observed that most of the general surgeons in Turkey experienced burnout syndrome. To address this, we suggest that health systems and working conditions in Turkey should be reviewed and that the working standards and rights of the healthcare workers should be revised.

Keywords: General surgery, burnout, Maslach Burnout Inventory, Minnesota Satisfaction Questionnaire, Turkey

ÖZ

Amaç: Tükenmişlik, cerrahlar arasında çok yaygın olan ve duygusal tükenme, duyarsızlaşma ve azalmış kişisel başarı ile tanımlanan bir sendromdur. Bu çalışmanın amacı Türkiye'deki genel cerrahlarda tükenmişliği araştırmak ve tükenmişlik için risk faktörlerini belirlemektir.

Yöntem: Türkiye'deki 4.395 genel cerrahtan 630'u bu çalışmaya dahil edildi. Her bir katılımcıdan yüz yüze görüşme veya e-anket yoluyla "Sosyodemografik Veri Formu", "Maslach Tükenmişlik Envanteri" ve "Minnesota Memnuniyet Anketini" (MSQ) doldurmaları istenmiştir.

Bulgular: Altı yüz otuz katılımcının 53'ü kadın (%8,4) ve 577'si (%91,6) erkekti. En yüksek katılım oranı Marmara bölgesinden (%36), en düşük katılım oranı Doğu Anadolu bölgesinden (%3,13) oldu. Katılımcıların çoğu uzman hekimdi (%72). Kendini daha başarılı görenlerde, daha fazla iş tecrübesi olanlarda ve daha yüksek akademik unvanlara sahip olanlarda duygusal tükenme, kişisel başarı ve duyarsızlaşma daha azdı ve genel, dış ve iç tatmin artmıştı.

Sonuç: Türkiye'deki genel cerrahların çoğunun tükenmişlik sendromu yaşadığını gördük. Bu nedenle sağlık sisteminin ve çalışma koşullarının gözden geçirilmesi, sağlık çalışanlarının çalışma standartlarının ve haklarının iyileştirilmesi gerektiğine inanıyoruz.

Anahtar Kelimeler: Genel cerrahi, tükenmişlik, Maslach Tükenmişlik Envanteri, Minnesota Memnuniyet Anketi, Türkiye

Introduction

Burnout syndrome was first described in the 1960s and 1970s in volunteer staff working with drug addicts in city clinics, probation officers, lawyers serving vulnerable populations, and healthcare workers.[1,2] Burnout syndrome is different from work stress and depression, which are often confused in society. In burnout syndrome, individuals believe they are not given proper financial and emotional compensation for the energy they input at work, which leads to their loss of interest and enthusiasm for work. As a result, burnout

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syndrome impairs the balance between individuals' work and their feeling of being satisfied with their job. Maslach and Pines[2] described the following three key dimensions of burnout: Overwhelming emotional exhaustion (EE), feelings of cynicism and detachment from the job [depersonalization (DP), and a sense of ineffectiveness and lack of personal accomplishment (PA)].[1,3] Sub-concepts, such as EE, DP, and diminished personal skills, and accomplishments related to burnout syndrome are useful to understand the topic. EE is manifested by lack of energy and feeling that one's emotional resources have been exhausted.[3,4] A decrease in an individual's emotions of competence can cause a decrease in such individual's skills and accomplishments. The following two common signs of burnout were described by Balch and Shanafelt[5] for healthcare professionals: 1) treating patients and colleagues as objects rather than humans and 2) feeling emotionally exhausted.

The causes of burnout syndrome can be grouped into two main categories: environmental or individual. Environmental causes can include one's working environment, working hours, working conditions, insufficient wages, administrative pressure, a feeling of not being appreciated, inadequate training, and insufficient tools, among others.[6,7] Individual reasons include number of children, age, marriage, individual expectations, self-esteem, experience, and excessive attachment to work, among others.[6,8] People with similar working conditions may be subject to burnout or may be unaffected due to different individual characteristics.[9] Physical symptoms of burnout syndrome include fatigue, sensitivity to diseases, sleep disorders, headaches, and weight loss. Emotional and mental symptoms include depressive affect, skepticism, vulnerability, addiction problems, family conflicts, social isolation, feeling of failure, forgetfulness, and difficulty in focusing.

Burnout syndrome is more common in people with occupations that require face-to-face contact, such as physicians, nurses, physiotherapists, teachers, and social workers.[3] It is difficult to provide the exact figures regarding the prevalence of burnout, since it is related to many individual, environmental, and managerial factors. However, it has been suggested that burnout affects the performance of 30% to 40% of physicians.[10] However, it has been reported that more than 50% of practicing surgeons and approximately 70% of general surgery residents have symptoms of burnout.[11,12] The Maslach Burnout Inventory (MBI) is commonly used to assess burnout in healthcare workers.[13] In this study, the Sociodemographic Data Form, MBI, and Minnesota Satisfaction Questionnaire (MSQ) were used to identify burnout. This study aimed to determine the levels of burnout and job satisfaction in general surgeons in Turkey and to use these data to develop solutions.

Materials and Methods

All types of general surgeons in Turkey were represented in this cross-sectional descriptive study (i.e., those from university hospitals, education and research hospitals, state hospitals, and private health institutions). The research cohort comprised a total of 4,395 physicians working in general surgery in Turkey. Based on a 95% confidence interval, a 0.5 error level, and MBI average score, the number of participants that should be represented in this study was 627. This study utilized a simple random sampling method for its sample selection. This study included a total of 630 general surgeons who are currently working in Turkey. A total of 630 questionnaires were used in the study, of which 495 were conducted as face-to-face interviews, while the other 135 were electronic questionnaires. Data regarding the sociodemographic characteristics and occupational status of the participants were recorded and evaluated.

Maslach Burnout Inventory (MBI)

The MBI was developed by Maslach and Jackson[6] and it consists of 22 items on three subscales. The Turkish adaptation of the MBI was performed by Ergin.[14] The first subscale is the MBI EE subscale, which defines the feeling of excessive wear and tiredness of employees who are exhausted and overburdened by their profession. The second subscale is the DP (MBI DP) subscale, which defines the attitude of employees toward the people they meet, showing DP indicating a negative and cynical attitude that is devoid of emotion, without considering the uniqueness of each of the individuals. The third subscale is the PA (MBI PA) subscale, which defines the state in which individuals feels competent and successful in their job. The MBI EE and MBI DP subscales were scored as never "0" and always "4," whereas the MBI PA subscale was scored as never "4," and always "0" in order to obtain standard values. The three subscale scores were assessed independently of each other and the burnout level was determined by taking the average of all three scores. The level of burnout was considered to be directly proportional to the amount of points obtained on the MBI subscales.

Minnesota Satisfaction Questionnaire (MSQ)

MSQ, which measures the job satisfaction of employees, is a five-point likert-scale that consists of three subscales. The internal, external, and general satisfaction levels were determined with the 20 items used in the MSQ. For each subscale, "5" was the highest score and "1" was the lowest score. The total evaluation was done by taking the average of the three subscale scores. The first subscale is the Intrinsic Satisfaction (MSQ IS) subscale, which includes satisfaction elements related to the job, such as success, recognition, being appreciated, taking more responsibility

related to one's job, self-development, and being promoted. There are 12 questions in this subscale. Therefore, the sum of the score obtained is divided by 12 to obtain the IS score. The second subscale is the Extrinsic Satisfaction (MSQ ES) subscale, which includes elements of the working environment, such as business policy and management, type of supervision, director, working conditions, salary, and relations with subordinates. There are 8 questions in this subscale. Therefore, the sum of the score obtained is divided by 8 to determine the ES score. The third subscale is the general satisfaction (MSQ GS) subscale, which includes all 20 questions from the scale.

Statistical Analysis

Statistical analysis was done using the Statistical Package for Social Sciences for Windows, version 22.0 (IBM Corp., Armonk, NY, USA). Conformity of the data to normal distribution was determined by Kolmogorov-Smirnov and Shapiro-Wilk tests. Continuous variables were expressed as mean ± standard deviation (mean ± SD), while categorical variables were expressed as frequency (n) and percentage (%). Mann-Whitney U, Kruskal-Wallis, and Spearman Correlation tests were used to compare the scores of the scales used in this study. P values less than 0.05 were considered statistically significant.

Results

The 630 general surgeons who participated in this study were categorized according to the following criteria: gender, age, district, institution, academic title, work experience, material and emotional satisfaction, DP, intellectual and emotional burnout, negative criticism of work, choosing to work in general surgery again if given the chance, finding themselves successful in the profession, and departure from the work without meeting retirement criteria.

Demographic characteristics of the general surgeons participating in this study are shown in Table 1. Fifty-three of the participants were female (8.4%) and 577 were male (91.6%). The highest participation rate was from the Marmara region (36%), while the lowest participation rate was from the Eastern Anatolia region (5.1%). Attending physicians had the highest participation rate (72.4%).

Of the total participants included in this study, 70.8% were not materially satisfied, while 74.4% were emotionally satisfied. The scores of those who were emotionally dissatisfied had statistically higher MBI scores and statistically lower MSQ scores ($p<0.05$). This indicates that these participants had more EE, DP, decrease in PA levels, and less IS, ES, and GS (Table 2).

Based on MBI, the DP score was statistically lower for female participants ($p=0.047$). This result indicates that the rate of DP among women is lower compared to the DP among men (Table 3). When determining which participants saw themselves as successful and those that did not, the scores of those that said "No, I don't" (n=60) were significantly higher on MBI and significantly lower on MSQ ($p<0.05$)

Table 1. Demographic characteristics of the general surgeons

Variables	(n)	(%)
Location		
Marmara	227	36.0
Aegean	81	12.9
Mediterranean	65	10.3
Southeastern Anatolia	51	8.1
Eastern Anatolia	32	5.1
Black Sea	59	9.4
Central Anatolia	115	18.3
Gender		
Female	53	8.4
Male	577	91.6
Age		
30-40	303	48.1
41-50	219	34.8
51-60	93	14.8
≥61	15	2.4
Employment institute		
University hospital	148	23.5
Education research hospital	161	25.6
State hospital	213	33.8
Private hospital	108	17.1
Academic degree		
Professor	67	10.6
Associate professor	66	10.5
Assistant professor	41	6.5
Attending physician	456	72.4
Work experience (years)		
6-10	192	30.5
11-15	165	26.2
16-20	97	15.4
21-25	84	13.3
≥ 26	92	14.6
Emotionally satisfied		
Yes	469	74.4
No	161	25.6
Satisfied with salary		
Yes	184	29.2
No	446	70.8
I'm successful		
Yes	570	90.5
No	60	9.5

compared to the scores of participants who said "Yes, I do" (n=570). This result indicates that EE, DP, and decrease in PA were higher and that IS, ES, and GS were lower in the group that said "No, I don't" (Table 3).

In response to the question "If you can go back to the past, would you choose general surgery again?," 368 (58.4%) participants said "Yes, I would" and 262 (41.6%) said "No, I would not" (Table 4). When the relationship between the answer to this question and the burnout sub-dimensions was examined, the levels of burnout in the EE, DP, and PA sub-dimensions of the MBI were significantly higher among the physicians who said "No" (p<0.001).

When evaluating the thought of departing from the work without retirement, the MBI scores of the participants who said "Yes, I would" (191 participants) were significantly higher, while the MSQ scores were significantly lower compared to the participants who said "No, I would not" (439 participants) (Table 4).

The participants were grouped according to their titles and group scores were calculated statistically (Table 5). EE and DP were lower, while GS and ES were higher in group 1 (professor) compared to group 2 (associate professor) and group 3 (assistant professor). Further, EE, DP, and decrease in PA were lower and GS, IS, and ES were higher in group 1 compared to group 4 (attending physicians). In addition, GS, IS, and ES were higher in group 2 compared to group 4. EE was lower in group 3 compared to group 4. These findings were statistically significant (p<0.05)

When evaluating the ages (Table 6) and work experience (Table 7) of the participants, it was found that the MBI scores decreased, while the MSQ scores increased as the age and work experience increased. This result indicates that burnout, DP, and decrease in PA is lower and that GS, ES, and IS is higher in individuals who are older and have more work experience.

Table 2. Minnesota Satisfaction Questionnaire and Maslach Burnout Inventory values according to emotional satisfaction and salary satisfaction

	Emotionally satisfied			Satisfied with salary		
	Yes (n=469)	No (n=161)	p	Yes (n=184)	No (n=446)	p
MBI EE	1.60±0.77	2.45±0.68	0.001*	1.40±0.84	1.98±0.77	0.001*
MBI D	1.16±0.80	1.82±0.81	0.001*	1.07±0.84	1.43±0.83	0.001*
MBI PA	1.03±0.66	1.51±0.82	0.001*	0.94±0.74	1.24±0.71	0.001*
MSQ GS	3.56±0.63	2.91±0.63	0.001*	3.80±0.64	3.23±0.64	0.001*
MSQ IS	3.81±0.62	3.14±0.65	0.001*	3.96±0.66	3.51±0.66	0.001*
MSQ ES	3.18±0.80	2.57±0.78	0.001*	3.57±0.74	2.80±0.77	0.001*

MBI EE: Maslach Burnout Inventory Emotional Exhaustion, MBI D: Maslach Burnout Inventory Depersonalization, MBI PA: Maslach Burnout Inventory Personal Accomplishment, MSQ GS: Minnesota Satisfaction Questionnaire General Satisfaction, MSQ IS: Minnesota Satisfaction Questionnaire Intrinsic Satisfaction, MSQ ES: Minnesota Satisfaction Questionnaire Extrinsic Satisfaction, Data are expressed as Mean ± SD, ® Mann-Whitney U test *p<0.001

Table 3. Minnesota Satisfaction Questionnaire and Maslach Burnout Inventory values according to gender and opinion that "I'm successful or not". Data are given as Mean ± SD. ® Mann-Whitney U test

	Gender			I'm successful		
	Male (n=577)	Female (n=53)	p	Yes (n=570)	No (n=60)	p
MBI EE	1.93±0.83	1.93±0.85	0.470	1.75±0.81	2.41±0.73	0.001*
MBI D	1.34±0.84	1.12±0.86	0.047*	1.28±0.84	1.79±0.79	0.001*
MBI PA	1.15±0.68	1.23±1.16	0.687	1.09±0.67	1.74±0.98	0.001*
MSQ GS	3.39±0.70	3.35±0.65	0.640	3.44±0.68	2.96±0.73	0.001*
MSQ IS	3.63±0.70	3.66±0.63	0.889	3.69±0.68	3.13±0.69	0.001*
MSQ ES	3.04±0.84	2.89±0.82	0.252	3.06±0.82	2.70±0.89	0.001*

MBI EE: Maslach Burnout Inventory Emotional Exhaustion, MBI D: Maslach Burnout Inventory Depersonalization, MBI PA: Maslach Burnout Inventory Personal Accomplishment, MSQ GS: Minnesota Satisfaction Questionnaire General Satisfaction, MSQ IS: Minnesota Satisfaction Questionnaire Intrinsic Satisfaction, MSQ ES: Minnesota Satisfaction Questionnaire Extrinsic Satisfaction, Data are expressed as Mean ± SD. ® Mann-Whitney U test * p<0.001

Table 4. Minnesota Satisfaction Questionnaire and Maslach Burnout Inventory values according to answers given to the question "If you can return to the past, would you choose general surgery again?" and "Would you consider departure from the work without retirement?"

	If you can return to the past, would you choose general surgery again?			Would you consider departure from the work without retirement?		
	Yes (n=368)	No (n=262)	®p	Yes (n=191)	No (n=439)	®p
MBI EE	1.48±0.73	2.29±0.72	0.001 *	2.33±0.73	1.59±0.77	0.001 *
MBI D	1.09±0.78	1.66±0.84	0.001 *	1.73±0.81	1.15±0.81	0.001 *
MBI PA	0.99±0.74	1.38±0.65	0.001 *	1.44±0.63	1.03±0.73	0.001 *
MSQ GS	3.61±0.65	3.08±0.64	0.001 *	3.01±0.60	3.56±0.67	0.001 *
MSQ IS	3.86±0.65	3.32±0.65	0.001 *	3.25±0.62	3.80±0.66	0.001 *
MSQ ES	3.24±0.82	2.72±0.77	0.001 *	2.65±0.74	3.19±0.83	0.001 *

MBI EE: Maslach Burnout Inventory Emotional Exhaustion, MBI D: Maslach Burnout Inventory Depersonalization, MBI PA: Maslach Burnout Inventory Personal Accomplishment, MSQ GS: Minnesota Satisfaction Questionnaire General Satisfaction, MSQ IS: Minnesota Satisfaction Questionnaire Intrinsic Satisfaction, MSQ ES: Minnesota Satisfaction Questionnaire Extrinsic Satisfaction, Data are given as Mean ± SD. ® Mann-Whitney U test * p<0.001

Table 5. Minnesota Satisfaction Questionnaire and Maslach Burnout Inventory values according to the academic title of participants

Groups		MBI EE	MBI D	MBI PA	MSQ GS	MSQ IS	MSQ ES
Group 1	Professor (n=67)	1.31±0.78	0.82±0.71	0.90±0.75	3.78±0.75	3.98±0.75	3.98±0.75
Group 2	Associate professor (n=66)	1.58±0.79	1.13±0.82	0.98±0.61	3.52±0.77	3.76±0.80	3.16±0.87
Group 3	Assistant Professor (n=41)	1.57±0.70	1.18±0.68	1.05±0.6	3.45±0.513	3.75±0.51	3.00±0.74
Group 4	Attending physician (n=456)	1.95±0.81	1.44±0.85	1.23±0.74	3.31±0.67	3.55±0.67	2.94±0.81
p®	Group 1 Group 2	0.029*	0.031*	0.203	0.045*	0.089	0.030*
	Group 1 Group 3	0.027*	0.004*	0.099	0.003*	0.014*	0.003*
	Group1 Group 4	0.001*	0.001*	0.001*	0.001*	0.001*	0.001*
	Group 2 Group 3	0.867	0.530	0.478	0.309	0.432	0.231
	Group 2 Group 4	0.001*	0.008*	0.007*	0.007*	0.004*	0.025*
	Group3 Group 4	0.005*	0.077	0.164	0.127	0.054	0.645

MBI EE: Maslach Burnout Inventory Emotional Exhaustion, MBI D: Maslach Burnout Inventory Depersonalization, MBI PA: Maslach Burnout Inventory Personal Accomplishment, MSQ GS: Minnesota Satisfaction Questionnaire General Satisfaction. MSQ IS: Minnesota Satisfaction Questionnaire Intrinsic Satisfaction, MSQ ES: Minnesota Satisfaction Questionnaire Extrinsic Satisfaction, Data are given as Mean ± SD, ® Mann-Whitney U test *p<0.05

Table 6. Minnesota Satisfaction Questionnaire and Maslach Burnout Inventory values according to the age of the participants

Groups		MBI EE	MBI D	MBI PA	MSQ GS	MSQ IS	MSQ ES
Group 1	30-40 (n=303)	1.96±0.813	1.45±0.84	1.16±0.65	3.35±0.62	3.61±0.60	2.95±0.80
Group 2	41-50 (n=219)	1.80±0.81	1.30±0.83	1.27±0.82	3.32±0.75	3.54±0.77	2.99±0.85
Group 3	51-60 (n=93)	1.45±0.79	1.03±0.80	0.90±0.68	3.66±0.71	3.88±0.67	3.32±0.87
Group 4	≥61 (n=15)	1.33±0.84	0.89±0.91	0.90±0.87	3.64±0.86	3.96±1.00	3.17±0.81
p®	Group 1 Group 2	0.020*	0.056	0.136	0.765	0.498	0.583
	Group 1 Group 3	0.001*	0.001*	0.001*	0.001*	0.001*	0.001*
	Group1 Group 4	0.002*	0.005*	0.042*	0.055	0.016*	0.252
	Group 2 Group 3	0.001*	0.004*	0.001*	0.001*	0.001*	0.003*
	Group 2 Group 4	0.014*	0.031*	0.024*	0.068	0.018*	0.367
	Group3 Group 4	0.393	0.367	0.692	0.810	0.235	0.560

Data are given as Mean ± SD. ® Mann-Whitney U test *p<0.05, SD: Standard deviation

Discussion

General surgeons work intensely over a long period of time and make important personal sacrifices for their jobs. Some of these sacrifices include working for long hours, working at nights and weekends, complying with multiple time constraints, and refraining from complaining or allowing their emotions or personal problems affect their work. These sacrifices are indicative of a dedicated professional who should be appreciated and rewarded. However, there is a fine line between dedication and over-work. When general surgeons are over-worked, they can experience adverse effects on their own health and on the health of their patients. Studies have shown that a significant number of surgeons experience burnout or stress, which may cause negative consequences on the surgeons, including their families, colleagues, and/or patients.[10]

It is known that burnout is especially common in surgical specialties. In their large-scale study, Shanafelt et al.[15] reported that 40% of surgeons met the criteria for high burnout and that 31.7% of the participants had high EE, 26% had high DP, and 12.8% reported low PA. In another study including 521 general and orthopedic surgeons, 32% of the respondents had high EE, 13% had high DP, and 4% had low PA.[16] Kuerer et al. [17] reported that surgical oncologists had a burnout prevalence of 28% according to MBI criteria and 30% depression rate according to the Primary Care Evaluation of Mental Disorders (PRIME-MD) scale. Kuerer et al.[17] results are in accordance with those of Balch et al.[18] who surveyed 407 surgical oncologists, 36.1% of which reported burnout. Studies in most of the surgical sub-branches have reported overall burnout rates exceeding 30%.[15,18,19,20] It is pertinent to note that the prevalence of burnout among surgeons increases over time. In the recent Medscape Physician Lifestyle report, the burnout rate of general surgeons was near the top of the list at 50%.[21] In the study by Shanafelt et al.[22], the prevalence of burnout among doctors increased from 46% to 54% between 2011 and 2014 and the satisfaction with work-life balance decreased from 48% to 41%. The same study also reported that the prevalence of burnout among surgeons was 40% in 2009, which increased to 53% in 2015.[15,22]

In addition to the increasing prevalence of burnout across the world, increased hospital admissions caused by Turkish health care reforms caused the increase of physician workload, leading to a further deterioration in the patient-physician relationship, which has been reported in several studies.[23,24] However, to the best of our knowledge, there are no studies on general surgeons in Turkey in this regard. The current study is the first to investigate burnout in general surgeons in Turkey. In this study, 74.4% of the participants were emotionally satisfied, but 70.8% were not financially satisfied. The scores of those that were emotionally dissatisfied were significantly higher on the MBI and lower on the MSQ (p<0.05). These results indicate that these

Table 7. Minnesota Satisfaction Questionnaire and Maslach Burnout Inventory values according to the work experience of the participants

Groups		MBI EE	MBI D	MBI PA	MSQ GS	MSQ IS	MSQ ES
Group 1	**6-10 year (n=192)**	1.98±0.83	1.50±0.86	1.22±0.63	3.33±0.61	3.59±0.61	2.95±0.76
Group 2	**11-15 year (n=165)**	1.86±0.80	1.35±0.85	1.11±0.68	3.39±0.69	3.61±0.67	3.04±0.68
Group 3	**16-20 year (n=97)**	1.94±0.74	1.44±0.79	1.42±0.93	3.17±0.71	3.40±0.78	2.83±0.79
Group 4	**21-25 year (n=84)**	1.56±0.81	1.04±0.71	1.12±0.75	3.51±0.67	3.78±0.64	3.10±0.87
Group 5	**≥26 (n=92)**	1.48±0.82	1.05±0.87	0.84±0.65	3.65±0.79	3.89±0.78	3.29±0.92
p®	Group 1 Group 2	0.132	0.118	0.058	0.382	0.454	0.282
	Group 1 Group 3	0.625	0.741	0.074	0.068	0.106	0.257
	Group 1 Group 4	0.001*	0.001*	0.160	0.055	0.016*	0.191
	Group 1 Group 5	0.001*	0.001*	0.001*	0.001*	0.001*	0.001*
	Group 2 Group 3	0.388	0.333	0.002*	0.019*	0.030*	0.056
	Group 2 Group 4	0.008*	0.006*	0.950	0.272	0.083	0.747
	Group 2 Group 5	0.001*	0.002*	0.002*	0.003*	0.001*	0.027*
	Group 3 Group 4	0.021*	0.021*	0.012*	0.003*	0.001*	0.042*
	Group 3 Group 5	0.001*	0.001*	0.001*	0.001*	0.001*	0.001*
	Group 4 Group 5	0.409	0.562	0.013*	0.083	0.161	0.115

MBI EE: Maslach Burnout Inventory Emotional Exhaustion, MBI D: Maslach Burnout Inventory Depersonalization, MBI PA: Maslach Burnout Inventory Personal Accomplishment, MSQ GS: Minnesota Satisfaction Questionnaire General Satisfaction, MSQ IS: Minnesota Satisfaction Questionnaire Intrinsic Satisfaction, MSQ ES: Minnesota Satisfaction Questionnaire Extrinsic Satisfaction, Data are given as Mean ± SD. ® Mann-Whitney U test * p<0.05

people have greater EE and DP, decreased levels of PA, and less IS, ES, and GS.

Many studies have investigated the factors associated with burnout among surgeons.[17,25,26,27] The most common factor reported to contribute to burnout is difficulty with work-life balance.[11] Among the risk factors for difficulty with work-life balance are age, marital status, having children, working nights and long hours, gender, lack of administrative support, and legal problems.[11,13] When sociodemographic variables were examined in the current literature, it was found that MBI DP scores of the female general surgeons were lower than those of the male general surgeons. In this study, the female gender was a factor in reducing DP. There are contradictory studies reporting that intense work stress and burnout are more common among males or more common in females; however, some studies have reported no difference in terms of gender.[11,13,28]

Job satisfaction is the joy that employees feel when they perform their job. Job satisfaction is correlated with the degree of an employee's pleasure from work. The current study revealed that, as work experience increases, burnout syndrome diminishes and job satisfaction increases. These results indicate that it becomes easier to deal with burnout syndrome as work experience and age increases. It has been reported that burnout is more common in young and inexperienced employees compared to senior employees.[28] The reason for this may be that young employees have not yet developed a sense of dedication to their profession and

because the feelings of "being in control" of the job have not yet been developed. In addition, those who are relatively new in their profession may have a higher level of EE. This is because 1) they are not able to feel autonomous on the hierarchical level, 2) the authorities have more control over them, and 3) they are required to perform more routine practices.[11,16]

When the effects of academic title on burnout syndrome and job satisfaction were examined, it was found that burnout decreases and job satisfaction increases with increasing academic title. Those with higher academic titles often have reduced workload and less hierarchical oppression, greater work flexibility, and are often specialized in specific areas within general surgery, which may influence burnout and job satisfaction.

Material and emotional job satisfaction reduces burnout syndrome and increases pleasure from work.[6,7] According to data generated in this study, EE, DP, and decrease in PA were lower, while IS, ES, and GS were higher in general surgeons who were satisfied both financially and emotionally.

Data generated from this study indicate that the study participants did not receive appropriate compensation (both emotionally and financially) for their 11 years of education, hard working conditions, and intense stress, which are often required to become a general surgeon. Results from this study show that these feelings are present in those who would not choose to become a general surgeon again and in those who would consider departure from the work without retirement. For these groups, MBI subgroup scores were higher, while MSQ subgroup scores were lower. The reason for these scores was related to pessimism, tiredness, and dissatisfaction in both material and emotional terms about the profession. A study involving 582 general surgeons who graduated from the University of Michigan demonstrated a strong association between burnout and desire for early retirement.[29] Another study including 501 colorectal and vascular surgeons in the UK reported that 32% had a higher burnout rate according to, at least, 1 subgroup score of the MBI and those who planned for an early retirement had a higher burnout rate.[30]

Study Limitations

Participants who found themselves successful in this study had lower scores in the MBI subgroups and higher scores in the MSQ subgroups. EE, DP, and decrease in PA were lower and GS, ES, and IS were higher in general surgeons who described themselves as being successful. In this study, we did not determine whether the general surgeons found themselves unsuccessful. Therefore, we believe that more detailed studies should be conducted with groups of general surgeons who find themselves unsuccessful and desire early retirement.

Conclusion

The results of this study indicate that EE, PA, and DP decreased and that GS, ES, and IS increased among those who found themselves successful, had more work experience, and had increased academic titles. Considering the working conditions of general surgeons, the high rate of burnout syndrome can cause serious problems in terms of physician and patient health. To solve this problem, it is necessary to first recognize and discuss the phenomenon of burnout. Outside of surgery, a variety of programs should be designed and made available to teach physicians how to respond to the stress they experience on a daily basis, thereby promoting their well-being and preventing burnout.

Ethics

Ethics Committee Approval: Trakya University Faculty of Medicine Scientific Research Ethics Committee (no: 04/07, date: 27.02.2016)

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Authorship Contributions

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

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RESEARCH ARTICLE

Evaluation of the Quality of Videos on Hemorrhoidal Disease on YouTube™

Youtube™'da Hemoroidal Hastalık ile İlgili Videoların Kalitesinin Değerlendirilmesi

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ABSTRACT

Aim: Patients frequently use YouTube™ as a platform for obtaining information. Hemorrhoidal disease is considered as one of the common diseases in the general population. Currently, there exists no study evaluating the quality of YouTube™ videos regarding hemorrhoids. Our study aims to investigate the quality of videos on hemorrhoids on YouTube™.

Method: The term "Hemorrhoids" was searched on the YouTube™ portal on December 13, 2020. The 68 most clicked videos were analyzed in the study. Video durations; the number of clicks, likes, dislikes, comments; and published dates were noted. In addition, video uploaders and video contents were examined. The Video Power Index (VPI) was calculated. Video quality was evaluated using the DISCERN, JAMA, GQS, and modified DISCERN scoring systems.

Results: The average number of clicks on videos was 711,051,41. The daily view count was 603.63±1240.2. The average length of the videos was 327.69±324.17 s. The most common video uploaders were doctors [39 (57.3%)]. The average DISCERN, JAWA, GQB, modified DISCERN scores were low. Video length, daily clicks, VPI, and comments/year did not affect these scores. According to the groups, all quality values were better in the videos uploaded by the physicians. In addition, the groups with more than 200 views/day had statistically better GQS.

Conclusion: The quality of videos regarding hemorrhoids on YouTube™ was insufficient. Of all uploaded videos, those uploaded by the doctors were of high quality.

Keywords: YouTube™, hemorrhoid, quality, DISCERN, JAMA, GQS

ÖZ

Amaç: YouTube™, hastaların bilgi edinmesi için sıklıkla kullanılan bir platformdur. Hemoroidal hastalık, genel popülasyondaki yaygın hastalıklardan biri olarak kabul edilir. Literatürde hemoroidler için YouTube™ video kalitesini değerlendiren objektif bir çalışma yoktur. Bu çalışmamızda YouTube™'da hemoroidle ilgili videoların kalitesini incelemeyi amaçlamaktadır.

Yöntem: "Hemoroid" 13.12.2020 tarihinde YouTube tarama portalında tarandı. Araştırmaya en çok tıklanan 68 video dahil edildi. Videoların süresi, tıklama sayısı, beğenme, beğenmeme, yorum sayısı, yayınlanma tarihi ve videoların süresi not edildi. Video yükleyiciler, video içeriği incelendi. Video Güç İndeksi (VPI) hesaplandı. Video kalitesi DISCERN, JAMA, GQS ve değiştirilmiş DISCERN puanlama sistemleri ile değerlendirildi.

Bulgular: Videolar için ortalama tıklama sayısı 711.051.41 idi. Günlük izlenme sayısı 603,63±1240,2 idi. Videoların ortalama uzunluğu 327,69±324,17 saniyeydi. Video yükleyicileri genellikle doktorlardı [39 (%57,3)]. Ortalama DISCERN, JAWA, GQB, modifiye DISCERN puanları düşüktü. Araştırmamız sonucunda video uzunluğu, günlük tıklamalar, VPI ve yorumlar/yıl video kalite puanlarını etkilememişti. Gruplara göre değerlendirmede hekimler tarafından yüklenen videolarda tüm kalite değerlerinin daha iyi olduğu görüldü. Ayrıca, günde 200'den fazla izlenen gruplar istatistiksel olarak daha iyi GQS'ye sahipti.

Sonuç: YouTube™ video portalında videoların hemoroid video kalitesi yetersizdi. Doktorlar tarafından yüklenen videolar yüksek kalitedeydi.

Anahtar Kelimeler: YouTube™, hemoroid, kalite, DISCERN, JAMA, GQS

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Introduction

Globally, 63.2% of the population has access to the Internet. While the highest proportion of population with this access is in North America (90.3%), only 47.1% of people in Africa can access the Internet.[1] YouTube™ is a video publishing platform that is easily accessible to everyone. It garners approximately 2.1 billion views daily and is viewed by an average of 30 million people daily.[2] It is inevitable for people to use such a popular website for health-related searches and as a source of information.

Hemorrhoids occur in 14.4%-38.9% of general adult population.[3,4] According to Google trends, hemorrhoids have been a popular Internet search since 2004. This condition has also been popularly searched on YouTube™ since 2008.[5] This is because people are reluctant to go to a doctor when they have an anorectal disease and instead prefer to research on the subject online rather than consulting an expert. Unfortunately, the quality of information regarding hemorrhoid treatment on the Internet can vary widely, and half of the websites on this topic are of poor quality.[6] Thus, we aimed to investigate the current quality of hemorrhoids, which people hesitate to consult doctors and view as a taboo, on the popular video platform YouTube™. Although patients are currently using YouTube™ for obtaining information, many studies have shown that the videos on YouTube ™ are inappropriate and can be misleading.[7,8]

This study aimed to assess the quality of the educational and informative videos related to hemorrhoids on YouTube™ and their potential contributions to the viewers, using commonly used scoring systems. To the best of our knowledge, this is the first study in the literature to investigate this aspect using four different scoring systems.

Materials and Methods

The data used in this study were obtained from YouTube™ videos that are accessible to everyone and open to the public. The study was initiated by inspiring from the systematic examinations of similar studies.[9,10,11] The term "hemorrhoids" was searched using the YouTube™ search bar on December 13, 2020, and the results were ranked according to the number of views. Videos with over 100,000 views were included in the study. Duplicate videos, non-English videos, non-hemorrhoid-related videos, videos less than 1 min, and videos containing advertisements were excluded. A total of 68 videos with more than 100,000 views and those meeting the criteria were included.

Two independent general surgery examiners examined and analyzed all videos for their relevance to hemorrhoids and for the information they conveyed. The relationship between the two commentators was evaluated. Descriptive attributes of each video (upload date, number of views, likes, dislikes, and comments under the video) were recorded.

According to the DISCERN, JAMA, global quality score (GQS), and modified DISCERN scores, the quality of education in each video was evaluated. The DISCERN scoring system consists of 16 questions, in 2 parts.[12] The first eight questions are about reliability, and the next seven questions are regarding the quality of treatment choices (Table 1). The final question is a general assessment question. DISCERN scores are interpreted as follows: 16-26 indicates poor quality, 27-38 indicates low quality, 39-50 indicates average quality, 51-62 indicates good quality, and 6-75 indicates excellent quality.[13]

Video quality was also evaluated using the GQS. The GQS is a 5-point scale used to evaluate the overall quality of videos watched (Table 2).

Subsequently, the data were evaluated using the JAMA scoring system, which is used to assess the quality of health-related information available from websites (Table 3). It consists of four criteria: disclosure, currency, attribution, and authorship. Each item is scored as 0 or 1. A maximum of 4 and a minimum of 0 points are scored on this scale. A high score on this scale indicated that the information was of good quality.[8]

Singh et al. simplified the original DISCERN score, modified it, and defined it as the "modified DISCERN score".[14] This modified score (Table 4) evaluates credibility, clarity, bias, referencing, and uncertainty of information in YouTube™ videos.[8]

The Video Power Index (VPI) is used to assess the popularity of a video.[15] VPI scores were calculated using the following formula: (like count/dislike count + number of likes) X 100. Thus, the VPIs of all videos were calculated. To avoid bias owing to a video's duration on YouTube™, the video view ratio was calculated based on total views/time since upload.

Video content was grouped according to uploader (physicians/non-physicians), video length (<5, 5-10, >10 min), release date [<5 years (new videos) and >5 years (old videos)], view count first 34 videos and second 34 videos, daily view count (<200 or >200), VPI (<95 or >95), and comments/year (>50 and <50). The relationship between each group and video quality was evaluated.

Ethics committee approval was not required in this study.

Results

Of the 100 videos watched, 32 did not meet the inclusion criteria. Of all videos with over 100,000 views, 68 were included in our research. There were 48,351,496 views in total. The average video length was 327.69 s (standard deviation, 324 s). The minimum was length was 73 s, and

Table 1. Discern scoring system

Discern scoring system				
Section	**Questions**	**No**	**Partly**	**Yes**
Reliability of the publication	1. Explicit aims	1	2 3 4	5
	2. Aims achieved	1	2 3 4	5
	3. Relevance to patients	1	2 3 4	5
	4. Source of information	1	2 3 4	5
	5. Currency (date) of information	1	2 3 4	5
	6. Bias and balance	1	2 3 4	5
	7. Additional sources of information	1	2 3 4	5
	8. Reference to areas of uncertainty	1	2 3 4	5
Quality of information on treatment choices	9. How treatment works	1	2 3 4	5
	10. Benefits of treatment	1	2 3 4	5
	11. Risks of treatment	1	2 3 4	5
	12. No treatment options	1	2 3 4	5
	13. Quality of life	1	2 3 4	5
	14. Other treatment options	1	2 3 4	5
	15. Shared decision making	1	2 3 4	5

16. Based on the answers to all of these questions, rate the overall quality of the publication as a source of information about treatment choices
1 2 3 4 5

Table 2. Global quality scoring

GQS	
Score	**Global score description**
1	Poor quality, poor flow of the site, most information missing, not at all useful for patients
2	Generally poor quality and poor flow, some information listed but many important topics missing, of very limited use to patients
3	Moderate quality, suboptimal flow, some important information is adequately discussed but others poorly discussed, somewhat useful for patients
4	Good quality and generally good flow, most of the relevant information is listed, but some topics not covered, useful for patients
5	Excellent quality and excellent flow, very useful for patients

GQS: Global quality score

Table 3. JAMA scoring system

Jama scoring system	
Authorship	Authors and contributors, their affiliations, and relevant credentials should be provided
Attribution	References and sources for all content should be listed clearly, and all relevant copyright information should be noted
Disclosure	Website "ownership" should be prominently and fully disclosed, as should any sponsorship, advertising, underwriting, commercial funding arrangements or support, or potential conflicts of interest
Currency	Dates when content was posted and updated should be indicated

JAMA: Journal of the American Medical Association

the maximum length was 2353 s. The most-watched video was watched 6,873,891 times, whereas the least-watched video was watched 102,452 times. The average number of views was 711,051,41 (±1,167,321). The overall length of videos was 327.69 ± 324.17 s; other descriptive statistics are shown in Table 5. The mean DISCERN, JAMA, GQS, and modified DISCERN scores were 47.91 (±14.464), 2.22 (±0.944), 2.69 (±1.35), and 2.49 (±1.1310), respectively.

Of all video uploaders, 39 were physicians. In total, 15 videos were uploaded by medical websites, 10 by commercial websites, and 4 by patients. According to the DISCERN scoring, 13 videos were excellent, 20 were good, 11 were average, 16 were poor, and 8 were very poor.

Overall, 36 videos (52.9%) conveyed data on non-surgical treatment options for hemorrhoids, and 23 videos (33.8%) conveyed data on surgical treatment. In the remaining 9 videos (13.2%), both surgical and non-surgical treatments were explained. In four videos, patients mentioned their experiences with hemorrhoid treatments.

According to the linear regression analysis, video length, daily clicks, VPI, and comments/year did not affect GQS, DISCERN, and JAMA scores (p=0.054, p=0.773, p=0.308, p=0606). In addition, a negative correlation was noted between dislike numbers and DISCERN scores (p=0.02). A positive correlation was found between GQS score and the

Table 4. Modified discern scoring system

Modified discern scoring system
Reliability of information (1 point for every "Yes," 0 points for "No")
1. Are the aims clear and achieved?
2. Are reliable sources of information used? (i.e., publication cited, speaker is board-certified general surgeon)
3. Is the information presented balanced and unbiased?
4. Are additional sources of information listed for patient reference?
5. Are areas of uncertainty mentioned?

From Gabarron et al.[16]

Table 5. Data of YouTube™ videos

	Mean ± standard deviation	Minimum-maximum
Video length (sec)	327.69±324.17	73-2353
View count	711.051.41±1.167.321	102.452-6.873.891
Daily view count	603.63±1240.2	39.20-7235
Like	3022.57±4903.5	82-33000
Dislike	331.07±468.6	9-2700
Comments/year	112.46±200.4	0-836
VPI	87.66±8.5	50-99.1
DISCERN	47.91±14,464	20-72
JAMA	2.22±0.944	0-3
GQS	2.69±1.35	1-5
Modified DISCERN	2.49±1.310	1-4

Table 6. Correlation between quality scores

	DISCORN	JAWA	GQS	Modified DISCORN
DISCORN	1	0.862	0.825	0.859
JAMA	0.862	1	0.781	0.830
GQS	0.825	0.781	1	0.760
Modified DISCERN	0.859	0.830	0.760	1

GQS: Global quality score

number of clicks (p=0.011). Although there was a negative correlation between the modified DISCERN scores and the number of dislikes (p=0.007), there was a positive correlation between this score and the click counts (p=0.016).

Seven parameter groups were examined using homogeneity one-way ANOVA and non-homogeneity Mann-Whitney U test. The results revealed a difference (p<0.001) in the video quality (DISCERN, JAMA, GQB, and modified DISCERN scores) among the uploaders.

No difference was observed between the number of views, viewing lengths, daily views, VPI, comment/year, and upload date. According to the groups, all quality values were better in the videos uploaded by the physicians. The groups with more than 200 views/day had statistically better QBS (Table 7).

Discussion

In this study, we examined the quality of videos on hemorrhoids on a large media platform accessed by patients. We found that information completeness and reliability were weak, and the information was variable in terms of source and content. However, we found that the quality of videos made by the physicians and watched the most was statistically significantly better. This study aimed to evaluate the information on YouTube™ from the patients' perspective. Therefore, in our study, we used the keyword "hemorrhoids" as it is a more general disease term.

Our study is not the first study evaluating YouTube™ video quality.[8,16,17,18,19] However, this is the first study to evaluate videos regarding hemorrhoids that are available to patients objectively. A recent study concluded that almost half of YouTube™ videos about hemorrhoids are misleading or contain information. Although the results of this study and our study were similar, the previous study did not use JAMA, DISCERN, and GQS scores in the evaluation.[20] For this reason, we believe that our study is the first study on this subject.

Table 7. Relationship between seven categorical variables and video quality

	n	DISCERN	p	JAMA	p	GQS	p	Modified DISCERN	p
Video source									
Physicians	39	57.77±9,077	**<0.001***	2.82±0.556	**<0.001***	3.49±1.023	**<0.001***	3.38±0.935	**<0.001***
Non-physicians	29	33.59±8.87		1.41±0.7330		1.62±0.942		1.28±0.528	
Old videos (>5 years)	26	44.65±14.4	0.228	1.96±1.038	0.075	2.46±1.392	0.274	2.19±1.26	0.148
New videos (≤5 years)	42	49.19±15.25		2.38±0.854		2.83±1.324		2.67±1.319	
View count (first 34)	34	45.71±14.43	0.34	2.12±1.06	0.372	2.82±1.507	0.424	2.26±1.23	0.167
View count (second 34)	34	49.21±15,544		2.32±0.806		2.56±1.186		2.71±1.360	
Daily view count (>200)	33	47.61±15.42	0.937	2.18±1.04	0.745	3.12±1.38	0.010*	2.45±1.25	0.853
Daily view count (≤200)	35	47.3114.79		2.26±0.85		2.29±1.202		2.51±1.314	
Video length (>5 min)	26	47.69±15.49	0.919	2.01±1.1	0.213	2.65±1.49	0.859	2.54±1.44	0.795
Video length (≤5 min)	42	47.31±14,863		2.33±0.816		2.71±1.27		2.45±1.23	
VPI (>95)	33	48.09±16.32	0.737	2.21±0.893	0.943	2.70±1.334	0.973	2.52±1.326	0.857
VPI (≤95)	35	46.86±13.83		2.23±1.003		2.69±1.352		2.46±1.314	
Comments/year (>50)	27	44.37±14,716	0.17	2.04±1.091	0.195	2.75±1.34	0.672	2.30±1.295	0.338
Comments/year (≤50)	41	49.49±15,004		2.34±0.825		2.63±1.37		2.61±1.321	

Although the DISCERN and JAMA tools are not designed to evaluate videos such as YouTube™ videos[21], they have been used in most studies and have been used to frequently emphasize low video quality.[22,23] The study by Aydin and Akyol[24] evaluated the quality of information regarding thyroid cancer in YouTube™ videos using the DISCERN and JAMA scores as well as the calculated video strength index.

In our study, JAMA, modified DISCERN, GQS, and DISCERN scores were low. This implied that YouTube™ videos on hemorrhoids lacked accurate and reliable information. Poor quality information accessed through YouTube™ videos can provide inaccurate information and compel patients to make wrong decisions. It can also cause conflicts in the patient-physician relationship.[25,26] In a previous study, only 58% of the uploaded videos regarding kidney stones were deemed useful using criteria similar to those we used.[27] During the influenza A epidemic, 61% of the videos had useful information about the disease.[28] Information on hemorrhoids on YouTube™ may not be of perfect quality, but it is important to raise awareness about clinical characteristics, and it may become more beneficial with increasing treatment options and information provided by the physician.

Except for a few studies, about 50% of video uploaders were physicians. In line with this, we found that YouTube™ videos produced by physicians were of high quality. Recently, similar findings were noted for videos concerning erectile dysfunction.[18] Batar[29] showed that 74.6% of the videos uploaded on YouTube™ were from patients, 21.3% from physicians, 1% from dieticians, and 3.1% from advertisement agencies. In our study, the DISCERN, JAMA, GQS, and modified DISCERN scores for the physician videos were high, and the scores for videos by non-physicians were considerably low and were similar to those reported previously.[29]

In our study, there were no significant differences between the video quality (except who uploaded the video) and the seven variables (old or new, high or low views, daily views, video length, popularity, and comments/year). We found that GQS scores of videos viewed more than 200 times a day were significantly higher (p=0.01). Notably, there are studies reporting that poor quality videos are more popular than good quality videos.[30,31] In our study, a negative correlation was noted between dislike numbers and DISCERN scores. Moreover, a positive correlation was observed between GQS scores and the number of clicks. We found a negative correlation between the modified DISCERN scores and the number of dislikes but a positive correlation between this score and click counts.

A recently published article reported a negative association between JAMA and DISCERN scores and high popularity bariatric surgery videos reviews on YouTube™.[15] In our study, no significant difference was found between the quality scores of popular videos and unpopular videos. Contrary to the literature, this situation was evaluated as the more frequent hemorrhoidal disease occurrence and the more accessible information on the subject. Nevertheless, it should be noted that in our study, the information provided by the physicians was of higher quality.

Published studies support our result that the quality of videos uploaded by physicians is higher than of those uploaded by non-physicians. However, it has been stated that viewing rates of certain videos may be lower because their contents are difficult for patients to understand.[31,32]

Study Limitations

Our study has certain limitations. As there is limited English content on YouTube™, we did not study videos on health information websites other than YouTube™. The videos were analyzed by doctors with evidence-based knowledge of hemorrhoids instead of the general public, who would watch and learn from these videos. It would have been useful to obtain public opinion on this matter. Irrespective, the study has certain strengths. This is the first objective study on such a popular and common health problem in the literature, and the number of videos watched and evaluated was high.

Conclusion

The quality of information about hemorrhoids on YouTube™ is variable. We noted no difference in terms of viewing and popularity of useful and misleading videos. Physicians who upload videos should take this job more seriously and create better quality videos considering the target audience. In addition, it is more appropriate for patients to prefer these videos as a source of information. These findings indicate that physicians should advise their patients on the poor quality of information on YouTube™ when using this platform as a source of information on hemorrhoids.

Ethics

Ethics Committee Approval: Ethics committee approval was not required in this study.

Peer-review: Externally and internally peer reviewed.

Authorship Contributions

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

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CASE REPORT

Rare Case of Intestinal Mass: Ganglioneuroma

Nadir bir Bağırsak Kitlesi Olgusu: Ganglionöroma

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ABSTRACT

Ganglioneuroma (GN) is a rare, slow-growing, benign, neurogenic tumor that often originates from sympathetic ganglion cells and rarely from the adrenal medulla, sympathetic nerves, and peripheral nerves. Mediastinum and retroperitoneum are the most common locations, but they may occur in any part of the gastrointestinal system. This patient, who presented to our clinic with abdominal pain, had two hypodense lesions in the liver and pulmonary nodules in the lung, which caused invagination at the terminal ileum-ileocecal valve level. She underwent right colectomy, and the histopathological diagnosis was GN.

Keywords: Ganglioneuroma, intestinal mass, neurogenic tumor

ÖZ

Ganglionöroma (GN), sıklıkla sempatik ganglion hücrelerinden ve nadiren adrenal medulla, sempatik sinirler ve periferik sinirlerden kaynaklanan, nadir görülen, yavaş büyüyen, iyi huylu, nörojenik bir tümördür. Mediasten ve retroperiton en sık görülen yerlerdir, ancak gastrointestinal sistemin herhangi bir yerinde görülebilirler. Kliniğimize karın ağrısı ile başvuran ve ileri tetkikler sonucunda terminal ileum-ileoçekal kapak seviyesinde invajinasyona neden olan, karaciğerde hipodens iki lezyon ve akciğerde pulmoner nodüller bulunan hastaya sağ kolektomi ve histopatolojik tanı GN olarak rapor edildi.

Anahtar Kelimeler: Ganglionöroma, intestinal kitle, nörojenik tümör

Introduction

Intestinal ganglioneuromatosis (IGNM) is a rare, neoplastic condition characterized by marked proliferation of the ganglion cells, Schwann cells, and nerve fibers in the wall of the bowel.[1] Ganglioneuroma (GN) is very rare in the gastrointestinal (GI) system. Intestinal GN is divided into three groups, polypoid GN, ganglioneuromatosis, and diffuse ganglioneuromatosis, according to the degree of differentiation.[1] Polypoid ganglioneuromatosis may be seen together with intestinal polyposis, neurofibromatosis type 1, and Cowden syndrome.[2]

Its clinical expression is variable. The polypoid form of ganglioneuromatosis may be solitary, in which patients have single colonic polyps composed of spindle and ganglion cells or multiple polyps, most commonly in the terminal ileum and colon, also known as ganglioneuromatous polyposis. The diffuse form is characterized by hyperplasia of the myenteric plexus and transmural proliferation of ganglioneuromatous tissue in the bowel wall.[2] The clinical condition varies according to the location of the lesion and its spread and effect on intestinal motility. The most common symptoms are abdominal pain, signs of obstruction, and changes in bowel habits. This condition may affect any segment of the GI tract, but the ileum, colon, and appendix are most frequently involved.[3]

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Case Report

A 44-year-old female was evaluated in an external center for symptoms of abdominal pain, constipation, and invagination at the level of the terminal ileum and ileocecal valve, and two hypodense lesions in the liver and nodules in the lung were detected on abdominal tomography, for which she was referred to our center.

In the thoracoabdominal computed tomography (CT), 10-mm and 15-mm hypodense lesions in segment 7 of the liver, a 1-cm pulmonary nodule located in the lower lobe of the right lung, and cecal 10x5.5 cm conglomerated bowel loops were observed, which were initially interpreted as malignancy.

Double balloon enteroscopy was performed by the gastroenterologist, and a 5-cm ulcerated lesion protruding toward the lumen at the terminal ileum level was detected. The biopsy result was reported as fibrinoproplated exudate and active granulation tissue.

Diagnostic positron emission tomography CT was performed on the patient, who could not have been diagnosed with the result of the biopsy. Focal increased F-18 FDG uptake was noted in the right lower quadrant, possibly in the ileum (SUV_{max}: 5.5), and lesions in the lungs and liver were reported to be benign.

Figure 1. Conglomerated mass in the right lower quadrant

Figure 2. Hypodense lesion in segment 7 of the liver

The patient underwent right colectomy, including the terminal ileum, and its pathology was reported as GN.

On macroscopic examination of the small intestine resection material, in the small intestine segment with a length of 15 cm, an area with an appearance compatible with invagination was observed at one end, which was approximately 1.5 cm from the surgical margin. When the intestine was opened along the lumen, a 4.1x3x1-cm, gray-white, well-circumscribed lesion, which was thought to originate from under the mucosa, was observed on the wall of the 8-cm long invaginated bowel segment.

Microscopic examination revealed a nodular submucosal lesion with a well-circumscribed border (Figure 4). It was observed that this lesion comprised spindle cells and ganglion cells (Figure 5). Cytological atypia and mitotic activity were not observed in the cells forming the lesion. On immunohistochemical examination, staining was observed only with CD56 in ganglion cells. With the present morphological and immunohistochemical findings, the case was evaluated as a GN.

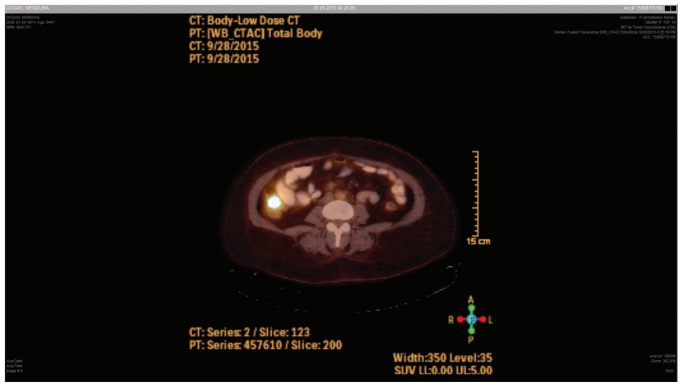

Figure 3. Focal increased F-18 FDG uptake was noted in the right lower quadrant, possibly in the ileum (SUV_{max}: 5.5)

FDG: Florodeoxyglucose

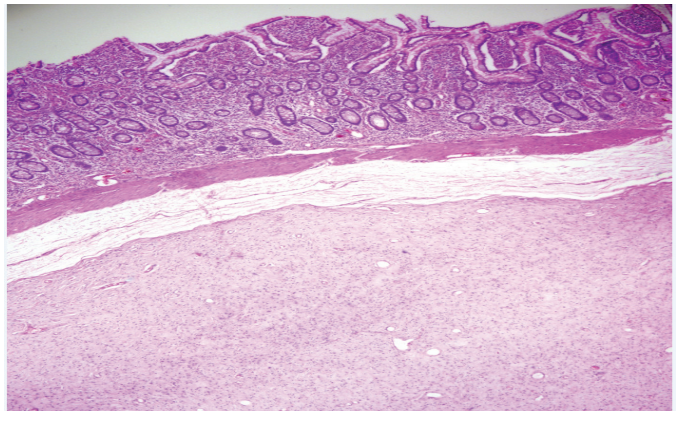

Figure 4. Well demarcated nodular lesion in the small intestine, located in the submucosa, x10, H&E

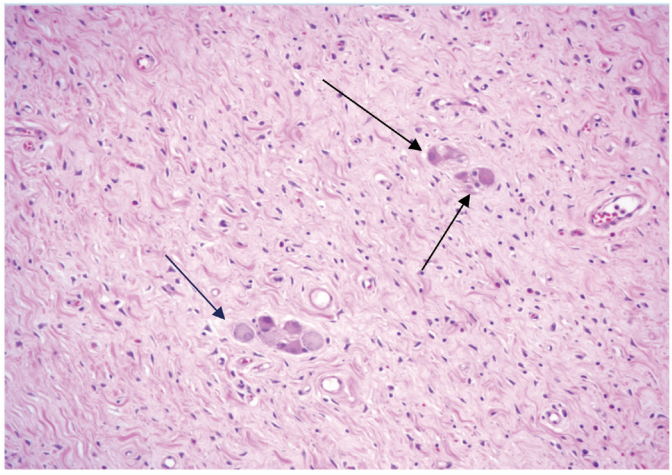

Figure 5. Spindle cell proliferation and lesion consisting of ganglion cells, x20, H&E

Discussion

GN is a subgroup of peripheral neurogenic tumors. It is defined as a tumor that originates from the neural crest and develops by migrating to the neuroectodermal cells.[4] Peripheral neurogenic tumors are divided into three subgroups, namely, neuroblastoma, ganglioneuroblastoma, and GN, according to the degree and type of neuroblastic differentiation, malignancy potential, and Schwann stroma development.[5] Among these, GN is a rare, slow-growing tumor with a benign character, often arising from sympathetic ganglion cells or adrenal medulla cells. It is composed histologically of ganglion cells and includes Schwann cells and fibrous tissue.

Although the most common regions are reported as the posterior mediastinum and retroperitoneal area, the adrenal gland is involved in 21%.[6] More rarely, they may be seen simultaneously in the mediastinum and retroperitoneal region or may be localized in the parapharyngeal area, bone, GI system, and supraclavicular region.[3] It is generally encountered in the pediatric age group, two third of the cases are under the age of 20 years.[7] Because of its slow growth, it is usually diagnosed in late adolescence. Its symptoms are usually caused by the compression of the tumor by the surrounding tissue. In these cases, clinical findings, such as persistent cough and shortness of breath, manifest themselves. In addition to neural compression, dorsal spinal scoliosis, increased catecholamine secretion due to the secretory activity, and metabolic problems may also be rarely encountered.[5]

Intestinal GNs are rare, benign neoplastic lesions characterized by certain pathological findings. In some patients, solitary lesions, such as colonic polyps, may occur as multiple polyposes, called ganglioneuromatosis, seen in the colon and the terminal ileum in others. In some patients, wall thickness increases in the form of proliferation in the myenteric plexus and infiltration of the IGNM cells in the intestinal wall. IGNM mostly involves the colon, terminal ileum, and the appendix.[8]

When IGNM affects the terminal ileum, it causes an increase in the thickness of the intestinal wall, submucosal nodular proliferation, and stricture formation. Its symptoms are abdominal pain and diarrhea. In our patient, due to abdominal tomography, an increase in the wall thickness at the ileocecal junction in the right lower quadrant and the interlocking of intestinal segments compatible with invagination at this level were observed.

Increased intestinal wall thickness, luminal narrowing, invagination, presence of mesenteric lymph nodes, and nodular hypodense lesions in the liver and lungs, which may be seen in abdominal tomography, may easily overlook the diagnosis of intestinal GN.

As a differential diagnosis, inflammatory bowel diseases, chronic ischemic changes, radiation effect, CMV infections, intestinal tuberculosis, lymphoma, GI stromal tumors, and amyloidosis may be considered.[9]

The treatment of intestinal GNs is by surgical resection since it responds poorly to medical therapy. GN are benign tumors that are cured after excision. Recurrence has not been reported. In very few cases, metastasis to surrounding lymph nodes was found. Intestinal GNs may be seen with diseases such as Cowden's syndrome, neurofibromatosis 1 and multiple endocrine neoplasia type 2B.

Ethics

Informed Consent: Obtained.

Peer-review: Internally peer reviewed.

Authorship Contributions

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

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

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CASE REPORT

A Rare Appendix Fibromatosis Mimicking a Gastrointestinal Stromal Tumor: A Case Report

Gastrointestinal Stromal Tümörü Taklit Eden Nadir Bir Apendiks Fibromatozisi: Bir Olgu Sunumu

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ABSTRACT

A 46-year-old male patient with an abdominal pain complaint and a palpable abdominal mass applied to our general surgery outpatient clinic. The computed tomography revealed a well-circumscribed solid mass, approximately 12 cm in diameter, which is thought to be a gastrointestinal stromal tumor originating from the cecum. The colonoscopy detected an external pressure on the cecum. No remarkable feature was noted in the patient's history. Right hemicolectomy was performed. Pathological examination revealed a collagen-rich hypocellular mesenchymal tumor originating from the appendiceal wall, which was negatively stained with CD117 and DOG-1 immunohistochemical antibodies. The histopathological diagnosis revealed a fibromatous lesion (desmoid tumor). The patient was discharged on postoperative day 6 and was transferred to the oncology service.

Keywords: Appendix tumor, desmoid tumor, intraperitoneal fibromatosis, intraabdominal mass

ÖZ

Kırk altı yaşında erkek hasta karın ağrısı ve karında ele gelen kitle şikayeti ile genel cerrahi polikliniğimize başvurdu. Çekilen bilgisayarlı tomografide çekumdan kaynaklanan gastrointestinal stromal olduğu düşünülen 12 cm çapında iyi sınırlı solid kitle saptandı. Kolonoskopi sonucunda çekumda dışdan bası olduğu söylendi. Hastanın öyküsünde herhangi bir özellik bulunmuyordu. Hastaya sağ hemikolektomi yapıldı. Patolojik inceleme sonucunda kitlenin apendiksten köken alan, CD117 ve S-100 ile negatif boyanan fibromatoz kitle (Desmoid tümör) olduğu görüldü. Postoperatif 6 gün sonra taburcu edildi ve onkoloji servisine devredildi.

Anahtar Kelimeler: Apendiks tümörü, desmoid tümör, intraperitoneal fibromatoz, karın içi kitle

Introduction

Desmoid tumors are fibromatous masses with an incidence of 2-4/1,000,000 per year, which are histologically composed of spindle cells abundantly surrounded by collagen.[1,2] Surrounding tissue invasion and after resection recurrence is seen but does not metastasize in desmoid tumors.[1,3] Desmoid tumors are seen in different parts of the body; however, intraperitoneal desmoid tumors are very rare. Thirty percent of the intraperitoneal desmoid tumors occur sporadically in the mesentery root or pelvis. These tumors develop in patients with familial adenomatous polyposis (FAP), Gardner syndrome, and adenomatous polyposis coli (APC) mutation.[1,2,4] Studies reported that desmoid tumors developed following gastrointestinal stromal tumors (GISTs) resection.[4] Other more common intraperitoneal masses should be considered in the differential diagnosis before desmoid tumors in patients with palpable mass and compression symptoms. Surgery is primarily preferred for intraperitoneal desmoid tumor treatment; however, resection is impossible in some cases.[5,6] Presented herein is a 46-year-old male patient who underwent right hemicolectomy with

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a preliminary diagnosis of GIST and had a pathological diagnosis of an appendiceal desmoid tumor.

Case Report

A 46-year-old male patient complained of a right lower quadrant mass. The intravenous contrast-enhanced abdominal computed tomography (CT) revealed a well-circumscribed mass, 12 cm in diameter, with smooth borders originating from the cecum. (Figure 1a). The patient's tumor markers were within normal limits. A colonoscopy was performed and no feature was observed in the cecum other than the external compression. A positron emission tomography (PET)/CT was performed with Fluorine-18 Fluorodeoxyglucose (F18-FDG). The Maximum standard unit value of the mass was 6.29. (Figure 1b). The patient applied to our clinic for surgery and was operated with a pre-diagnosis of GIST of cecal origin. During the surgery, the mass was observed to be localized in the ileocecal region, which caused traction to the right ureter (Figure 2). Right hemicolectomy and ileotransversostomy were performed. Pathological macroscopic examination revealed a mass originating from the appendiceal wall. Microscopic interpretation revealed a hypocellular mesenchymal collagen-rich tumor. The tumor was negative with CD117, CD34, desmin, calretinin (-), and S-100, and positive with cyclin D-1, β-catenin, and androgen receptor, immunohistochemically. Ki-67 proliferation index of the tumor was 3%-4%. The tumor was diagnosed as fibromatosis (desmoid tumor) (Figure 3). The patient was discharged without any complications on postoperative day 5.

Discussion

Desmoid tumor is a rare mesenteric neoplasm with fibromatous features.[1] It is a fibroblastic/myofibroblastic tumor, originating from the musculoaponeuroic structures, arising in deep soft tissues.[1,7] Desmoid tumors can be observed in different parts of the body.[1,8] Gardner syndrome, FAP, APC, unopposed estrogen, and previous surgeries are known risk factors.[6] Basic histological features of desmoid tumors are spindle cells and fibroblasts surrounded by abundant collagen. Its morphological features sometimes mimic GIST; however, it does not immunohistochemically express either CD117 or DOG-1.[1,3,9]

Extra-abdominal masses are detected earlier; however, desmoid tumors located intra-abdominally are later presented.[5] Intraperitoneal desmoid tumors without specific findings are usually detected due to signs of pressure on adjacent organs and as palpable masses. In our case, the patient's only complaint was a palpable mass at the time of admission. Desmoid tumors are the most common mesenteric primary tumor but are very rare in the gastrointestinal system. Cases located in the pancreas, stomach, small intestine, colon, and appendix with different findings were reported in the literature.[1,4,10] Intraperitoneal desmoid tumors are often confused with GIST before resection, and definitive diagnosis can only be made with tissue biopsies.[3] Desmoid tumors can mimic local recurrence after GIST resection.[4]

Desmoid tumors of the appendix are very rare and only a few cases were reported. These tumors, seen as masses in the cecal region, rarely cause acute appendicitis by occluding

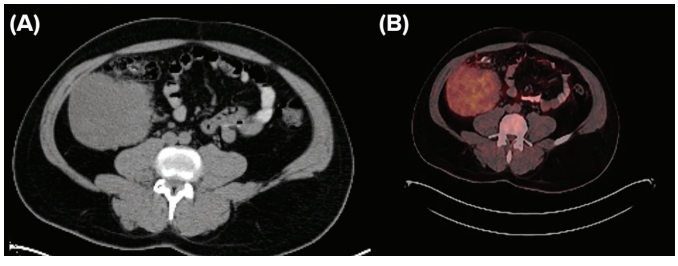

Figure 1. a) A well-circumscribed solid mass originating from the cecum on abdominal CT (red arrow), b) F18-FDG involvement determined by PET/CT

CT: Computed tomograhy, F18-FDG: Fluorine-18 Fluorodeoxyglucose, PET: Positron emission tomography

Figure 2. Mass originating from the cecum

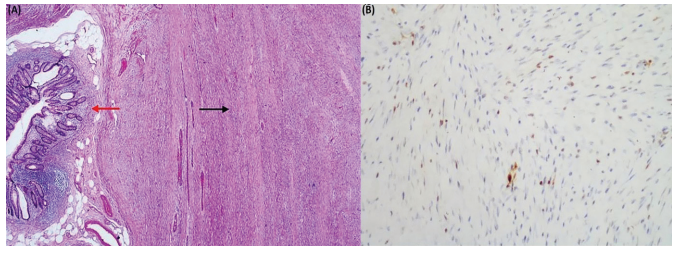

Figure 3. a) Spindle cell tumor originating from the appendiceal wall (H&E, 40 X). b) Tumor cells expressing focal beta-catenin immunohistochemically (anti-beta-catenin antibody, DAKO, USA, 200X)

the appendiceal lumen and are sometimes confused as periapendicular abscess.[11,12] GIST is often suspected since they present as well-circumscribed solid masses originating from the cecum in preoperative evaluations.[3,4] In our case, a similar pre-diagnosis was considered and the decision for surgery was made.

CT and magnetic resonance imaging are the preferred diagnostic imaging methods.[1,3] Endoscopy demonstrates compression from the outside or protrusion into the lumen due to the mass effect. Percutaneous tissue biopsy is performed for differential diagnosis in patients with unresectable tumors. PET/CT is rarely used to diagnose desmoid tumors and is generally recommended in patient follow-ups for recurrence.[6,13] In our case, F18-FDG involvement was determined by PET/CT.

A multidisciplinary approach is very important in desmoid tumor treatment originating from the gastrointestinal system. Active follow-up together with chemotherapy and radiotherapy (RT) provides a 5-year survival rate of 50% in desmoid tumors.[6] Resection is the first choice of treatment for intraperitoneal desmoid tumors.[1,2,4] Resection with negative surgical margins should be considered due to local recurrence possibility. The recurrence rates in intraperitoneal tumors are relatively low although 20% recurrence has been reported in desmoid tumors with negative surgical margins.[6] Chemotherapy is considered when tumor removal is impossible and as recurrence prevention after resection.[2,6] The use of RT together with surgical treatment was reported to be more successful than surgical treatment alone.[14] In our case, a right hemicolectomy was performed due to the presence of a cecum-derived tumoral mass. The patient was transferred to the oncology center for chemotherapy and RT.

In conclusion, desmoid tumors are rarely seen in the entire gastrointestinal system, including the appendix. Multidisciplinary treatment should be adopted and patients should be closely followed. These tumors mimicking GIST have high recurrence rates. Therefore, care should be taken in surgical treatment and negative surgical resection margins should be provided to prevent a recurrence.

Ethics

Informed Consent: Was obtained from the patient.

Peer-review: Externally peer reviewed.

Authorship Contributions

Surgical and Medical Practices: E.Z., M.Ç., Concept: E.Z., M.Ç., Design: E.Z., M.Ç., Data Collection or Processing: E.Z., M.S., P.H., S.B., M.Ç., Analysis or Interpretation: E.Z., M.S., P.H., S.B., M.Ç., Literature Search: E.Z., M.S., P.H., M.Ç., Writing: E.Z., P.H.

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

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VIDEO ARTICLE

Robotic Abdominoperineal Resection

Robotik Abdominoperineal Rezeksiyon

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ABSTRACT

In the surgical treatment of lower rectum and anal canal tumors, minimally invasive robotic abdominoperineal resection can be performed effectively and safely. Deep pelvic dissection can be facilitated by a three-dimensional view, a stable camera, the use of four arms, and the surgeon working in a comfortable position.

Keywords: Anal canal tumor, miles operation, robotic surgery

ÖZ

Alt rektum ve anal kanal tümörlerinin cerrahi tedavisinde minimal invaziv robotik abdominoperineal rezeksiyon etkili ve güvenli bir şekilde yapılabilir. Derin pelvik diseksiyon 3 boyutlu görünüm, sabit kamera, 4 kol kullanımı ve cerrahın rahat bir pozisyonda çalışması ile kolaylaştırılabilir.

Anahtar Kelimeler: Anal kanal tümör, mil operasyonu, robotik cerrahi

Introduction

When sphincters cannot be preserved or clear surgical margins cannot be obtained in cases of distal rectum and anal canal tumors, abdominoperineal resection (APR) is indicated.[1] APR is the excision of the rectum and anus by releasing the rectum with an adequate circumferential resection margin as per the principles of total mesorectal excision (TME). APR can be performed using the traditional open approach as well as minimally invasive methods, which have proven benefits like less pain, shorter hospital stays, and faster recovery of bowel functions.[2] Numerous studies have reported that robotic surgery is both effective and safe.[3,4,5]

Surgical robotic systems outperform traditional laparoscopic instruments with increased device stability, three-dimensional view, and 7-degree endo-wrist movement. The main advantage of the robotic system is that it provides a stable and high-quality image in the deep pelvis, where exposure is extremely difficult and the working area is limited. The full command of the surgeon on this stable platform with four arms enables advancement in a fine and accurate dissection plane in this area. Thus, a deeper plane closer to the skin level can be reached compared to the open and laparoscopic approaches, which reduces blind dissection. It might facilitate deep pelvic dissection, especially in men and patients with obesity.[1]

- Patient position, robotic system setup, trocar placement, and docking: We use the Da Vinci™ Xi™ robotic system. The patient is placed in the Lloyd Davies position. Four 8-mm trocars, with a margin of at least 8 cm between them, are placed on the line, starting from the left subcostal area, passing through the right side of the umbilicus, and extending to the spina iliaca anterior superior. In the lower-right quadrant, a 12-mm assistant trocar is placed for stapler use and assistance. Docking is completed once the robot arms are properly positioned so that they do not overlap.

APR is performed in two sections: abdominal and perineal. After the robotic system setup, port placement, and docking, the abdominal approach begins with the release of mesocolon

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from medial to lateral and inferior. This section contains six important steps.

- Inferior mesenteric artery (IMA) ligation: The IMA can be ligated at its origin from the aorta (high ligation) or after giving the left colic branch (low ligation). If a low ligation is to be performed, the lymph nodes in the IMA root should be dissected.

- Inferior mesenteric vein (IMV) ligation: The IMV is ligated at the lower border of the pancreatic body, near the Treitz ligament.

- Mobilization of mesocolon: After releasing the left colon and sigmoid colon with a medial to lateral approach, the left colon is mobilized from the lateral to include the splenic flexure.

- Protection of the ureter, gonadal vessels, and autonomic nerves: Following IMA ligation, a dissection plane is created from medial to lateral, which preserves the left ureter, gonadal vessels, and autonomic nerve plexus. This dissection plane should be held throughout the procedure, all the way down to the pelvic floor.

- TME: In rectum tumor surgery, TME is the gold standard surgical approach that is currently accepted in open, laparoscopic, and robotic surgery. The avascular presacral plane is usually entered from the posterior and dissected down to the pelvic floor muscles. Then, the dissection is continued laterally and anteriorly to the pelvic floor. At this stage, a digital rectal exam is used to determine whether the dissection margin extends to the distal border of the tumor. In anal canal tumors, the levator ani muscle can be cut to reach the adipose tissue in the ischiorectal space. Thus, the perineal stage can be shortened.

Colostomy: After mobilizing the colon and rectum, the colon is cut with the help of a stapler, and a colostomy is created by exteriorizing the colon to the skin at the left lower quadrant.

Then, in the perineal approach, the skin and subcutaneous tissues are passed through a perianal incision and merged with the dissection plan created in the deep pelvis with the abdominal approach. Through this incision, the distal colon, rectum, and anal canal are removed from the pelvis. Further, the pelvic floor is sutured and closed after a suction drain is placed on it.

Ethics

Informed Consent: Obtained.

Peer-review: Externally peer reviewed.

Authorship Contributions

Surgical and Medical Practices: C.A., M.K., Concept: C.A., Design: S.F., Data Collection or Processing: S.F., T.D., Literature Search: T.D., Writing: C.A., N.A.S.

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

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

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Video.

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VIDEO ARTICLE

Doppler-Guided Hemorrhoidal Artery Ligation and Hemorrhoidopexy in a Grade 3 Hemorrhoidal Disease: A Video Presentation

Evre 3 Hemoroidal Hastalıkta Doppler Eşliğinde Ligasyon ve Mukopeksi: Video Sunum

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ABSTRACT

Hemorrhoidal disease is a common clinical condition that affects one-third of the general population. It is caused by pathological conditions in the hemorrhoidal vascular cushions in the anal region and is characterized by the protrusion of these cushions into the anal canal. Long-term treatment, repeated hospitalizations of patients with recurring complaints, complications after traditional surgical approaches, worsening of life quality, and deterioration in social and business life as well as the financial aspect of treatment and the expensive and difficult management of complications have urged physicians to take this disease seriously and put effort into optimizing treatment and researching new treatment methods where necessary. Doppler-guided hemorrhoidal artery ligation in early-stage hemorrhoidal disease has recently become a common treatment method. The purpose of this video presentation is to demonstrate the Doppler-guided hemorrhoidal artery ligation treatment in a patient with grade 3 hemorrhoidal disease.
Keywords: Hemorrhoidal artery ligation, hemorrhoidal disease, hemorrhoidopexy

ÖZ

Hemoroidal hastalık toplumda sık karşılaşılan ve genel popülasyonun üçte birini etkileyen, anal bölgedeki hemoroidal vasküler yastıkçıklarda patolojik durumlara bağlı olarak gelişen ve pakelerin anal kanala protrude olması ile karakterize klinik tablodur. Uzun süren tedavi süreci, hastanın tekrarlayan şikayetlerle hastaneye başvurması, klasik cerrahi yaklaşımlarla operasyon sonrası yaşanan komplikasyonlar ve bunun gibi nedenlerin hastanın şahsi ve iş hayatında kayba neden olması, ayrıca tedavi ve komplikasyonlarının yönetiminin maddi yönü bu klinik tabloyu önemsenen ve üzerinde optimum tedaviyi bulmak amacıyla çalışılan bir hastalık haline getirmiştir. Erken evre hemoroidal hastalıkta Doppler yardımlı hemoroidal arter ligasyonu tedavisi gün geçtikçe daha çok uygulanan bir tedavi yöntemi olup bu video prezentasyonda evre 3 hemoroidal hastalığı olan bir hastada Doppler yardımlı hemoroidal arter ligasyonu tedavisi gösterilmesi amaçlanmıştır.
Anahtar Kelimeler: Hemoroidal arter ligasyonu, hemoroidal hastalık, hemoroidopeksi

Introduction

Hemorrhoidal disease is one of the most common benign anorectal diseases, and studies show that it affects nearly 30% of the population.[1] In the pathophysiology of this common condition, damage to the smooth muscle cells in the connective tissue of the hemorrhoidal vascular cushions in the anal region is one of the main causes. Many methods for treating this condition, which has a significant impact on the quality of life, have been described. Although recurrence rates in open surgical methods are low, postoperative pain is

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a limiting factor that has paved the way for the development of new treatment strategies.[2] Ligation-based applications have recently become more prominent. Although the cost of this method is a disadvantage, patient comfort and painless recovery process after the procedure have mitigated this disadvantage. Today, Doppler-assisted hemorrhoidal artery ligation is a treatment method that is increasingly being used in hemorrhoidal disease, and the goal of this video presentation is to demonstrate the Doppler-assisted hemorrhoidal artery ligation treatment in hemorrhoidal disease.

The patient provided written informed consent, and no examinations or preparations were performed other than preoperative 6-hour fasting. Moreover, no prophylactic antibiotics or enemas were administered. Under general anesthesia, the patient underwent surgery in the gynecological dorsolithotomy position. The grade 3 hemorrhoid pack at the 7 o'clock position was placed under traction. The video demonstrated a Doppler-guided anoscope and suturing technique. The anoscope (Comepa Angiodin) was inserted into the anus, with the probe tip to the root of the pack. A 12-mm deep hemorrhoidal artery pulsation was detected. Z-shaped suture ligation was performed. Further, the pulsation was observed to be cut off. The single end of the suture was suspended, and the pack was pulled vertically before hemorrhoidopexy was performed over it and the surgery was completed.

In conclusion, we believe that Doppler-guided hemorrhoidal artery ligation treatment is preferable to conventional methods for hemorrhoidal disease of grade 3 or below due to shorter operation time, lower morbidity, and lower postoperative complication rates.

*This video presentation was recorded during the proctology course held at Ümraniye Training and Research Hospital on October 17, 2020.

Ethics

Informed Consent: The patient provided written informed consent, and no examinations or preparations were performed other than preoperative 6-hour fasting.

Peer-review: Internally peer reviewed.

Authorship Contributions

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

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 1.

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VIDEO ARTICLE

Laser Hemorrhoidoplasty in a Grade 3 Hemorrhoidal Disease: A Video Presentation

Grade 3 Hemoroidal Hastalıkta Lazer Hemoroidoplasti Tedavisi: Video Sunum

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ABSTRACT

Hemorrhoidal disease is a common perianal disease in the general population that negatively affects the quality of life. Treatment is indicated only if the patient is symptomatic. The disease stage is still determined according to Goligher's classification, and treatments are determined accordingly. At hemorrhoidal disease stages accompanied by prolapse, excisional surgery methods are preferred. However, the contemporary literature suggests that different treatment methods can be applied in symptomatic patients at earlier stages. These methods are stapled hemorrhoidopexy, Doppler-guided hemorrhoidal artery ligation and hemorrhoidopexy, rubber band ligation, and laser hemorrhoidoplasty. These procedures can be performed according to the surgeon's experience in appropriate patients within the indication. This video presentation demonstrates laser hemorrhoidoplasty treatment in a patient with grade 3 hemorrhoidal disease.

Keywords: Goligher's classification, hemorrhoidal disease, laser hemorrhoidoplasty

ÖZ

Hemoroidal hastalık yaşam kalitesini olumsuz olarak etkileyen ve toplumda sık karşılaşılan perianal bölge hastalıklarındandır. Semptomatik olduğunda tedavi endikasyonu gelişir. Günümüzde halen kullanılagelen Goligher tarafından yapılan sınıflandırılmayla değerlendirilip tedavisi planlanmaktadır. Hemoroidal hastalığın prolapsusun da eşlik ettiği evrelerinde eksizyonel cerrahi yöntemleri ön planda olup daha erken evrelerdeki semptomatik hasta grubunda güncel literatür bir çok farklı tedavi yönteminin uygulanabileceğini önermektedir. Bu yöntemler stapler hemoroidopeksi, Doppler yardımlı hemoroidal arter ligasyonu ve hemoroidopeksi, lastik band ligasyonu ve lazer hemoroidoplasti olup endikasyon dahilinde uygun hastada cerrahın deneyimine göre yapılabilmektedir. Bu video prezentasyonda evre 3 hemoroidal hastalık nedeni ile lazer hemoroidoplasti uygulamasının sunulması amaçlanmıştır.

Anahtar Kelimeler: Goligher sınıflandırması, hemoroidal hastalık, lazer hemoroidoplasti

Introduction

Hemorrhoidal disease is the most common benign anorectal disease in the population. Its etiology is thought to be due to contractile mechanism damage in the corpus cavernosum recti.[1] This damage is generally caused by an increase in intra-abdominal pressure. Today, Goligher's classification is still used and planning is done according to this classification. A diet composed of fiber-rich foods, adequate fluid intake, and less straining during defecation comprises the basic approach to conservative treatment after classification. Oral flavonoids and suppositories, such as tribenoside, can be listed among the current medical treatments. At this stage, minimally invasive techniques without resection have been used instead of surgical resections in stage II-III hemorrhoidal disease that is unresponsive to treatment. These are rubber band ligation, infrared coagulation, Doppler-assisted hemorrhoidal artery ligation and hemorrhoidopexy, and

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laser hemorrhoidoplasty.[2] The main advantage of these methods is that the postoperative pain is significantly less than with resection methods. This video presentation aims to show laser hemorrhoidoplasty application in a patient operated on for stage III hemorrhoidal disease.

Written informed consent was obtained and no preoperative preparation was made for the patient, except for preoperative 6-hour fasting. No prophylactic antibiotics or enemas were administered. The operation was conducted under general anesthesia in the gynecological dorsolithotomy position. The right anterior stage III hemorrhoid pack was tractioned. The probe was entered into the package by shooting with a laser (Neo V 1470 nm Diode) over the package, 2 cm proximal to the anal verge. The root of the hemorrhoid pack was reached, and the probe was removed after three shots proximally, two shots in the middle of the pack, and a single shot into the entrance hole. The operation was completed by applying wet gas compression and ice compression for one minute. The patient did not need analgesics except for standard paracetamol in the postoperative period and was discharged on the first postoperative day. Home rest was not recommended and they were encouraged to return to work with the recommendation of adequate fluid and fiber consumption.

As a result, we think that laser ablation of hemorrhoids is preferable for the hemorrhoidal disease at stage III or below due to the shorter operation time, less morbidity, and lower postoperative pain rates than conventional methods.

*This video presentation was recorded at the proctology course held at University of Health Sciences Turkey Ümraniye Training and Research Hospital on October 17, 2020.

Ethics

Informed Consent: Written informed consent was obtained and no preoperative preparation was made for the patient, except for preoperative 6-hour fasting.

Peer-review: Internally peer reviewed.

Authorship Contributions

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

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Video 2.

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