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Contact
Address: Koru Mah. Koru Sitesi, Ihlamur Cad. No: 26 06810 Çayyolu, Ankara, Türkiye
Phone: +90 312 241 99 90 Fax: +90 312 241 99 91 editor@turkjsurg.com

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34394
Mecidiyeköy, Şişli, İstanbul
Telefon/Phone: +90 212 217 17 00
Faks/Fax : +90 212 217 22 92
E-posta/E-mail: info@avesyayincilik.com

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Aims and Scope

Turkish Journal of Surgery (Turk J Surg) is the official, peer reviewed, open access publication organ of the Turkish Surgical Association, Turkish Hepatopancreatobiliary Surgery Association and Turkish Association of Endocrine Surgery (TAES). The financial expenses of the journal are covered by the Turkish Surgical Association. The journal is published quarterly on March, June, September and December and its publication language is English.

The aim of Turkish Journal of Surgery is to publish high quality research articles, review articles on current topics and rare case reports in the field of general surgery. Additionally, expert opinions, letters to the editor, scientific letters and manuscripts on surgical techniques are accepted for publication and various manuscripts on medicine and surgery history, ethics, surgical education and forensic medicine fields are included in the journal.

The journal is a surgical journal that covers all specialities and its target audience includes academicians, practitioners, specialists and students from all specialities of surgery.

The editorial and publication processes of the journal are shaped in accordance with the guidelines of the International Committee of Medical Journal Editors (ICMJE), World Association of Medical Editors (WAME), Council of Science Editors (CSE), Committee on Publication Ethics (COPE), European Association of Science Editors (EASE), and National Information Standards Organization (NISO). The journal is in conformity with the Principles of Transparency and Best Practice in Scholarly Publishing (doaj.org/bestpractice).

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All expenses of the journal are covered by the Turkish Surgical Association.

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Editor in Chief: Prof. Mustafa ŞAHİN
Address: Koru Mah. Koru Sitesi, Ihlamur Cad. No: 26 06810 Çayyolu, Ankara, Turkey
Phone: +90 (312) 241 99 90
Fax: +90 (312) 241 99 91
E-mail: editor@turkjsurg.com

Publisher: AVES
Address: Büyükdere Cad. 105/9 34394 Mecidiyeköy, Şişli, İstanbul, Turkey
Phone: +90 212 217 17 00
Fax: +90 212 217 22 92
E-mail: info@avesyayincilik.com
Web page: www.avesyayincilik.com

TURKISH JOURNAL OF SURGERY

Instructions to Authors

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Title page: A separate title page should be submitted with all submissions and this page should include:

- The full title of the manuscript as well as a short title (running head) of no more than 50 characters,
- Name(s), affiliations, and highest academic degree(s) of the author(s),
- Grant information and detailed information on the other sources of support,
- Name, address, telephone (including the mobile phone number) and fax numbers, and email address of the corresponding author,
- Acknowledgment of the individuals who contributed to the preparation of the manuscript but who do not fulfill the authorship criteria.

Abstract: A Turkish and an English abstract should be submitted with all submissions except for Letters to the Editor. Submitting a Turkish abstract is not compulsory for international authors. The abstract of Original Articles should be structured with subheadings (Objective, Material and Methods, Results, and Conclusion). Please check Table 1 below for word count specifications.

Keywords: Each submission must be accompanied by a minimum of three to a maximum of six keywords for subject indexing at the end of the abstract. The keywords should be listed in full without abbreviations. The keywords should be selected from the National Library of Medicine, Medical Subject Headings database (https://www.nlm.nih.gov/mesh/MBrowser.html).

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Original Articles: This is the most important type of article since it provides new information based on original research. The main text of original articles should be structured with Introduction, Material and Methods (with subheadings), Results, Discussion, , Conclusion subheadings. Please check Table 1 for the limitations for Original Articles.

Statistical analysis to support conclusions is usually necessary. Statistical analyses must be conducted in accordance with international statistical reporting standards (Altman DG, Gore SM, Gardner MJ, Pocock SJ. Statistical guidelines for contributors to medical journals. Br Med J 1983: 7; 1489-93). Information on statistical analyses should be provided with a separate subheading under the Material and Methods section and the statistical software that was used during the process must be specified.

Units should be prepared in accordance with the International System of Units (SI).

Expert Opinions: Editorial comments aim to provide a brief critical commentary by reviewers with expertise or with high reputation in the topic of the research article published in the journal. Authors are selected and invited by the journal to provide such comments. Abstract, Keywords, and Tables, Figures, Images, and other media are not included.

Review Articles: Reviews prepared by authors who have extensive knowledge on a particular field and whose scientific background has been translated into a high volume of publications with a high citation potential are welcomed. These authors

may even be invited by the journal. Reviews should describe, discuss, and evaluate the current level of knowledge of a topic in clinical practice and should guide future studies. The main text should contain Introduction, Clinical and Research Consequences, and Conclusion sections. Please check Table 1 for the limitations for Review Articles.

Case Reports: There is limited space for case reports in the journal and reports on rare cases or conditions that constitute challenges in diagnosis and treatment, those offering new therapies or revealing knowledge not included in the literature, and interesting and educative case reports are accepted for publication. The text should include Introduction, Case Presentation, Discussion, and Conclusion subheadings. Please check Table 1 for the limitations for Case Reports.

Surgical Methods: Images of remarkable, striking and rare cases that emphasize the basic mechanisms of diagnosis and treatment of diseases, express discrepancies and extraordinary situations and explain new treatment techniques and options are evaluated for publication. Display items are important in this type of manuscripts and supporting the manuscript with video (in WMV, AVI or MPEG formats) images can facilitate a faster evaluation process and increase the possibility of publication.

Letters to the Editor: This type of manuscript discusses important parts, overlooked aspects, or lacking parts of a previously published article. Articles on subjects within the scope of the journal that might attract the readers' attention, particularly educative cases, may also be submitted in the form of a "Letter to the Editor." Readers can also present their comments on the published manuscripts in the form of a "Letter to the Editor." Abstract, Keywords, and Tables, Figures, Images, and other media should not be included. The text should be unstructured. The manuscript that is being commented on must be properly cited within this manuscript.

Tables

Tables should be included in the main document, presented after the reference list, and they should be numbered consecutively in the order they are referred to within the main text. A descriptive title must be placed above the tables. Abbreviations used in the tables should be defined below the tables by footnotes (even if they are defined within the main text). Tables should be created using the "insert table" command of the word processing software and they should be arranged clearly to provide easy reading. Data presented in the tables should not be a repetition of the data presented within the main text but should be supporting the main text.

Figures and Figure Legends

Figures, graphics, and photographs should be submitted as separate files (in TIFF or JPEG format) through the submission system. The files should not be embedded in a Word document or the main document. When there are figure subunits, the subunits should not be merged to form a single image. Each subunit should be submitted separately through the submission system. Images should not be labeled (a, b, c, etc.) to indicate figure subunits. Thick and thin arrows, arrowheads, stars, asterisks, and similar marks can be used on the images to support figure legends. Like the rest of the submission, the figures too should be blind. Any information within the images that may indicate an individual or institution should be blinded. The minimum resolution of each submitted figure should be 300 DPI. To prevent delays in the evaluation process, all submitted figures should be clear in resolution and large in size (minimum dimensions: 100 × 100 mm). Figure legends should be listed at the end of the main document.

All acronyms and abbreviations used in the manuscript should be defined at first use, both in the abstract and in the main text. The abbreviation should be provided in parentheses following the definition.

When a drug, product, hardware, or software program is mentioned within the main text, product information, including the name of the product, the producer of the product, and city and the country of the company (including the state if in USA), should be provided in parentheses in the following format: "Discovery St PET/CT scanner (General Electric, Milwaukee, WI, USA)"

All references, tables, and figures should be referred to within the main text, and they should be numbered consecutively in the order they are referred to within the main text.

Limitations, drawbacks, and the shortcomings of original articles should be mentioned in the Discussion section before the conclusion paragraph.

References

While citing publications, preference should be given to the latest, most up-to-date publications. If an ahead-of-print publication is cited, the DOI number should be provided. Authors are responsible for the accuracy of references. Journal titles should be abbreviated in accordance with the journal abbreviations in Index Medicus/ MEDLINE/PubMed. When there are six or fewer authors, all authors should be listed. If there are seven or more authors, the first six authors should be listed followed by "et al." In the main text of the manuscript, references should be cited using Arabic numbers in parentheses. The reference styles for different types of publications are presented in the following examples.

Table 1. Limitations for each manuscript type

Type of manuscript	Word limit	Abstract word limit	Reference limit	Table limit	Figure limit
Original Article	5000	250 (Structured)	50	6	7 or total of 15 images
Review Article	5000	250	50	6	10 or total of 20 images
Case Report	1500	250	15	No tables	10 or total of 20 images
Surgical Methods	500	No abstract	5	No tables	10 or total of 20 images
Letter to the Editor	500	No abstract	5	No tables	No media

Journal Article: Rankovic A, Rancic N, Jovanovic M, Ivanović M, Gajović O, Lazić Z, et al. Impact of imaging diagnostics on the budget - Are we spending too much? Vojnosanit Pregl 2013; 70: 709-11.

Book Section: Suh KN, Keystone JS. Malaria and babesiosis. Gorbach SL, Barlett JG, Blacklow NR, editors. Infectious Diseases. Philadelphia: Lippincott Williams; 2004.p.2290-308.

Books with a Single Author: Sweetman SC. Martindale the Complete Drug Reference. 34th ed. London: Pharmaceutical Press; 2005.

Editor(s) as Author: Huizing EH, de Groot JAM, editors. Functional reconstructive nasal surgery. Stuttgart-New York: Thieme; 2003.

Conference Proceedings: Bengisson S. Sothemin BG. Enforcement of data protection, privacy and security in medical informatics. In: Lun KC, Degoulet P, Piemme TE, Rienhoff O, editors. MEDINFO 92. Proceedings of the 7th World Congress on Medical Informatics; 1992 Sept 6-10; Geneva, Switzerland. Amsterdam: North-Holland; 1992. pp.1561-5.

Scientific or Technical Report: Cusick M, Chew EY, Hoogwerf B, Agrón E, Wu L, Lindley A, et al. Early Treatment Diabetic Retinopathy Study Research Group. Risk factors for renal replacement therapy in the Early Treatment Diabetic Retinopathy Study (ETDRS), Early Treatment Diabetic Retinopathy Study Kidney Int: 2004. Report No: 26.

Thesis: Yılmaz B. Ankara Üniversitesindeki Öğrencilerin Beslenme Durumları, Fiziksel Aktiviteleri ve Beden Kitle İndeksleri Kan Lipidleri Arasındaki Ilişkiler. H.Ü. Sağlık Bilimleri Enstitüsü, Doktora Tezi. 2007.

Manuscripts Accepted for Publication, Not Published Yet: Slots J. The microflora of black stain on human primary teeth. Scand J Dent Res. 1974.

Epub Ahead of Print Articles: Cai L, Yeh BM, Westphalen AC, Roberts JP, Wang ZJ. Adult living donor liver imaging. Diagn Interv Radiol 2016 Feb 24. doi: 10.5152/dir.2016.15323. [Epub ahead of print].

Manuscripts Published in Electronic Format: Morse SS. Factors in the emergence of infectious diseases. Emerg Infect Dis (serial online) 1995 Jan-Mar (cited 1996 June 5): 1(1): (24 screens). Available from: URL: http:/ www.cdc.gov/ncidodlEID/cid.htm.

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.

Accepted manuscripts are copy-edited for grammar, punctuation, and format. Once the publication process of a manuscript is completed, it is published online on the journal's webpage as an ahead-of-print publication before it is included in its scheduled issue. A PDF proof of the accepted manuscript is sent to the corresponding author and their publication approval is requested within 2 days of their receipt of the proof.

Editor in Chief: Prof. Mustafa ŞAHİN
Address: Koru Mah. Koru Sitesi, Ihlamur Cad. No:26 06810 Çayyolu, Ankara, Turkey
Phone: +90 (312) 241 99 90
Fax: +90 (312) 241 99 91
E-mail: editor@turkjsurg.com

Publisher: AVES
Address: Büyükdere Cad. 105/9 34394 Mecidiyeköy, Şişli, İstanbul, Turkey
Phone: +90 212 217 17 00
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TURKISH JOURNAL OF SURGERY

Contents

TURKISH JOURNAL OF SURGERY

Editorial

Dear colleagues,

I am excited and pleased to be addressing you as the Editor-in-Chief of the Turkish Journal of Surgery, in which I have previously acted as part of different committees.

An intense effort is being made to improve and advance our profession as well as to solve our colleagues' problems as the Turkish Surgical Association. Providing scientific support and arranging organizations have an important role within such efforts.

The Turkish Journal of Surgery has been published in Turkish for a long period. It began publication in both Turkish and English 2 years ago, and as of today, starting with the first issue of the 32nd volume, the journal is going to be entirely published in English. Our journal's acceptance within the PubMed directory was a very important accomplishment for our Society.

We are delighted to announce that outstanding scholars both from our country and abroad have been added to our Editorial and Publication Boards.

A great effort is being paid to provide rapid evaluation of submitted articles and to publish articles that contribute to science.

Our main goal for our journal is its being part of SCI and SCI-Expanded indexed journals. Publication of high-quality clinic and experimental studies in our journal is vital to achieve this goal. In addition, using articles that have been published in our journal as references in articles to be published in international journals is even more important in this regard.

It is obvious that these goals can be achieved with the support and contributions of our distinguished fellow colleagues. I would like to extend my gratitude for your support and contribution in advance. Hoping to meeting in the future issues that will include high-quality articles with increasing scientific contribution in each issue.

Prof. Mustafa ŞAHİN

Editor in Chief

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Invited Review

The role of surgeons on the development and performance of endoscopy

Kemal Dolay, Mustafa Hasbahçeci

ABSTRACT

Endoscopy is being frequently performed for both diagnostic and therapeutic applications in surgical practice. Surgery, as a scientific area, has an important role in the propagation of therapeutic endoscopic procedures. The contribution of surgeons to the evolution of endoscopic applications and its practice is a triggering factor for the improvement of endoscopic instruments and their widespread use.

Training and education on basic diagnostic and therapeutic surgical endoscopy should be implemented as part of general surgery residency core program, according to accepted standardized criteria, in order for general surgeons to perform endoscopic applications in the future.

In light of this information, it can be concluded that endoscopy training and skills should be standardized within accepted general principles. Standards to be used during post-graduate endoscopic practice should be precisely stated. In addition to accreditation of both surgeons and endoscopic centers, theoretical and practical education programs should be composed and organized.

Keywords: Endoscopy, digestive system, surgical procedures, surgeons

INTRODUCTION

Endoscopy is an important tool both in the diagnosis and treatment of complex pathologies (1). With the development of endoscopic applications, the feasibility of diagnostic and therapeutic interventions has increased and endoscopy has become the first choice method in the diagnosis and treatment of most diseases (2). Faced with this intense need, the number of endoscopic procedures that need to be done is increasing day by day. The use of advanced endoscopic diagnosis and minimally invasive endoscopic treatment methods for the gastrointestinal system has further enhanced the importance of endoscopy-based approaches. This new situation, which is related to the widespread use of endoscopy and the development of its field of use, has also led to a new problem of who should be performing endoscopy (2). In particular, the development of surgical approaches associated with Natural Orifice Transluminal Endoscopic Surgery (NOTES), endoscopic-based treatment of gastroesophageal reflux disease, endoscopic control of gastrointestinal system bleedings, and endoscopic treatment of pancreatitis complications have become possible with the contribution of surgeons to endoscopy. Thus, the issue if endoscopy can be performed by surgeons as well as gastroenterologists should be evaluated by taking the impact of surgeons in the evolution of endoscopy into consideration.

HISTORY OF ENDOSCOPY

There are three different periods in the history of gastrointestinal endoscopy (3):

1. Rigid endoscopy period (1805-1932)

2. Semi-flexible endoscopy period (1932-1957)

3. Fiberoptic endoscopy (1957 and later)

The first data related to observe inside the human body begins with the use of the rectal speculum for the treatment of rectal fistula at the time of Hippocrates (4). It took hundreds of years for these first-use tools to become useful. Light reflection has emerged as an important problem for visualizing internal regions by tubes with two open ends. Philipp Bozzini, an urologist, was the founder of today's endoscopes as the first to use an artificial light source, a mirror, with a speculum in the early 19thcentury (3, 4). Although Bozzini's endoscopy systems have been used for vaginal, urethral, bladder and rectum imaging, its widespread use was made possible by Desormeaux (3). With the improvements in open-ended endoscopy systems, Adolf Kussmaul who was a surgeon extracted a foreign body from the esophagus using sunlight as a source of light in 1870 (5). Max Nitze introduced the idea of placing the light source with its miniaturized form to the tip of the instruments that are being used for endoscopy

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Department of General Surgery, Bezmialem Vakif University School of Medicine, İstanbul, Turkey

Address for Correspondence
Mustafa Hasbahçeci
e-mail: hasbahceci@yahoo.com

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for the first time (3-5). Nitze developed the first cystoscopy in 1877 (6). Another general surgeon, Johann von Mikulicz-Radecki, was the first to perform rigid gastroscopy under morphine sedation (7, 8). The semi-flexible tube endoscope was first developed and used by Georg Kelling in 1898 (9). Kelling, a surgeon, performed peritoneoscopy (celioscopy) simultaneously with Dimitrij Oscarovic Ott and Hans Christian Jacobeus (10-12). The idea of placing a camera at the end of an endoscope was put into practice by Lange and Meltzing in 1898 (13). Rudolf Schindler developed the semi-flexible endoscopic instruments used by Kelling (3, 14). Schindler, along with Wolf, has made semi-flexible endoscopy widely available and is considered the father of gastroscopy. Basil Hirschowitz developed and used the first fiberoptic endoscopy in 1957 (3, 8). In summary, the physicians mentioned above have been the pioneers in the development of today's endoscopy systems. Following improvements in fiberoptic endoscopy systems of the upper gastrointestinal tract, colonoscopy applications for both diagnosis and treatment has gained wide acceptance.

THE ROLE OF SURGEONS IN THE EVOLUTION OF ENDOSCOPY

Surgeons have been active both in the development of the concept of endoscopy and in its use for different purposes. Philipp Bozzini, the father of endoscopy, Adolf Kussmaul who used sunlight as an artificial light source and known by some authors as the father of gastroenterology, Max Nitze who developed and used cystoscopy, Johann von Mikulicz-Radecki who used rigid gastroscopy for the first time, Dimitrij Oscarovic Ott who performed the first peritoneoscopy with tube endoscopy at the same time with Georg Kelling are all surgeons who demonstratedtheir skills inthe endoscopic area as well (8, 15). Kussmaul was the first to use gastric tubes for therapeutic purposes. In addition, Kussmaul performed dilatation of esophageal strictures and drainage of gastric contents in case of gastric outlet obstruction by a gastric tube-pump system he developed. A gastroenterologist, Chevalier Jackson who is known as the father of broncho-esophagoscopy performed the first endoscopic gastric biopsy procedure in 1906 and was followed by Benedict, another surgeon, who developed a surgical endoscopy instrument that allowed the use of biopsy forceps in 1948 (16). Yeomans used a cystoscope through gastrotomy to control bleeding with cauterization in two patients who had previously undergone gastrotomy for palliative purposes due to hemorrhagic tumors. A German surgeon, Soehendra, described injection of sclerosing agents into bleeding gastric ulcers in 1976. The use of hypertonic saline and epinephrine for the same purpose was described by Hirao, a surgeon from Japan, in 1985.

The first endoscopic retrograde cholangiopancreatography was performed by a surgeon, McCune, in 1968 with endoscopic cannulation of the ampulla (17). This procedure has been primarily adopted as a standardized approach for surgeons for postoperative treatment of common bile duct stones after cholecystectomy and in the preoperative evaluation of patients with cholangitis or jaundice (4). Percutaneous endoscopic gastrostomy was first performed by Gauderer and Ponsky, both pediatric surgeons, in 1979 (16, 18).

Although the use of endoscopy in the lower gastrointestinal tract has gained acceptance after implementation of fiberoptic devices in the upper gastrointestinal tract, the first rectal polypectomy was performed by Kelly in 1895. Shinya, a Japanese surgeon, is an important name in the introduction of colonoscopic polypectomy and intraoperative colonoscopy. Shinya has also defined the alpha loop maneuver and showed that colonoscopy can be done by a single endoscopist. Ponsky is the inventor of the concept of marking in endoscopic polypectomy. Self-expandable metal stenting for palliative purposes in colorectal cancer was performed by a Japanese surgeon, Itabashi, and elective surgery following stenting was introduced by Tamim.

THE ROLE OF SURGEONS IN ENDOSCOPIC APPLICATIONS

"Endoscopy" refers to the knowledge and experience gained by endoscopic observations, and the term "endoscopist" should be used for all physicians from both medical and surgical departments dealing with endoscopy, regardless of their specialty (19). Based on their opportunity of observing the internal structures of the human anatomy during surgery along with the susceptibility of endoscopic applications, especially of those with rigid instruments, to complications, surgeons are expected to be pioneers in the development and practice of endoscopy. If the endoscopist is a surgeon, this may aid in treatment planning by enabling evaluation of endoscopic findings along with the knowledge obtained during surgical training. It can be expected that utilization of endoscopic procedures contributes to the surgeon in treatment planning, and therefore to the patient. Furthermore, the option of endoscopic treatment in some pathological situations, besides surgical treatment, mandates that surgeons have endoscopic knowledge and competency (19).

Nevertheless, physicians other than surgeons have also been active in this field, especially with the use of flexible or fiberoptic devices. There is controversy regarding the specialty of physicians to perform endoscopic interventions or if trained nurses can take part in screening endoscopies (20, 21). It is believed that whether the endoscopist is a surgeon or not does not lead to a fundamental difference in the course of performing routine diagnostic endoscopic procedures (19). Due to the limited number of surgeons, multidisciplinary approaches should be established taking into account the fact and the necessity of non-surgeon physicians performing endoscopic procedures.

Therapeutic endoscopic interventions should be evaluated as a surgical procedure, and principles applied in surgical operations should be applied to these interventions. Therefore, defining the entirety of therapeutic endoscopic procedures as "surgical endoscopy" can be considered as a more appropriate term. It is more appropriate to distinguish therapeutic endoscopic procedures from diagnostic ones due to the fundamental differences between these methods (19).

There is a clear distinction among countries in terms of the extent of provision of endoscopy training during general surgery residency program and regarding the physicians belonging in which of the specialty branches to perform endoscopies. In Canada, endoscopic procedures are performed by both gastroenterologists and surgeons, but surgeons are involved in more than half of the procedures (22, 23). It is emphasized that an endoscopist annually performing more than 200 colonoscopies with at least 90% cecal intubation rate (at least 95% on screening colonoscopy) is required for a high quality endoscopy practice. Endoscopy training is part of the core curriculum

in general surgery residency training across Canada. Endoscopy training is elaborated according to the years of general surgery residency training, but the number of required endoscopic procedures is not agreed upon. Therefore, it is noted that post-graduation practice should be carried out with specified standards and with special importance on education (22, 23). In relation to the importance of endoscopic skills in surgical practice, the American Board of Surgery has recognized endoscopy education as a fundamental component of general surgical residency training (19). Training on therapeutic endoscopic procedures is considered to be a requirement during the course of residency training (24). In European countries, there is no consensus in this respect. It is thought that in the near future, surgeons will be left behind in the practice of endoscopy in the UK since endoscopy training is generally less effective during general surgery residency than gastroenterology residency, and because there is a significant difference in postgraduate accreditation rates against surgeons (25). It is stated that major changes should be implemented in the general surgical residency core training program and that post-graduation accreditation should be emphasized. In a survey conducted among surgeons and gastroenterologists from Greece, it is reported that 22.4% of gastroenterologists believe that endoscopy is a procedure that should only be performed by gastroenterologists, and that 82% of surgeons think preoperative endoscopic imaging knowledge will assist surgeons in surgical planning (20). The authors emphasized the importance of designing endoscopy units in a way that both surgeons and gastroenterologists could work in a symbiotic environment, not as centers to be only used by gastroenterologists. In addition, distinctions are being made particularly in colonoscopy applications such as gastroenterologists and non-gastroenterologists in an attempt to create a perception that surgeons should not perform endoscopic procedures (26). However, in their colonoscopy series of 5237 cases, Mehran et al. (26) showed that general surgeons were as successful as gastroenterologists and colorectal surgeons in terms of complication and cecal intubation rates. A study by Bielawska et al. (27) showed that the risk of perforation during colonoscopy was twice as high with non-gastroenterologists than with gastroenterologists. The authors concluded that the three times higher number of procedures performed under supervision during gastroenterology training as compared to that of surgeons may have been effective in this difference. In a study by Zuckerman et al. (28) investigating the development of colorectal cancer after negative colonoscopy, they found that the risk of not detecting colorectal cancer was higher in colonoscopies performed by non-gastroenterologists. This difference was attributed to the formal gastroenterology training in the United States and Canada. A study on upper and lower gastrointestinal endoscopy training of residents conducted by a private foundation university in Turkey stated that although the training provided by the Turkish Surgical Association is a worthy solution, it was inadequate as compared to the endoscopy training given throughout the entire residency period (29). The authors emphasized that endoscopy training should be a mandatory rotation for specialist residents, which should be repeated annually, if necessary, in reference centers.

In light of this information, it can be concluded that endoscopy training and skills should be standardized within the accepted general principles both prior to and after graduation and accreditation practices should be generalized, rather than discussing to whom privileges for endoscopic applications should be granted. The applicability and monitoring of standards and the defined criteria should be debated rather than who is eligible to perform endoscopy procedures.

In this regard, in addition to the standards on endoscopy training and practice defined by international organizations such as the American Society for Gastrointestinal Endoscopy (ASGE) and the Society of American Gastrointestinal Endoscopic Surgeons (SAGES), the current status should be assessed with post-graduate seminars and annual scientific meetings, as well as establishing plans and programs for the future (19). It should not be forgotten that the future of endoscopy relies on the current practice of eligible doctors who have the knowledge and skills in endoscopy rather than who performs endoscopies. Therefore, the most important goal should be the provision and continuity of practical skills as well as knowledge in surgical endoscopic interventions, especially those for therapeutic purposes (19).

CONCLUSION

In the reality of our country, it is thought that regulations should be implemented in both training and practice of general surgeons on endoscopy in the following subjects:

The duration of basic diagnostic and therapeutic surgical endoscopy training, its distribution over the years of residency, and the number of endoscopic procedures to be performed under supervision and observation in each category should be stated in the general surgery residency core training program.

Standards to be followed during post-graduate endoscopy practice should be defined, and endoscopy centers and endoscopists should be accredited.

Theoretical and practical training programs should be held at certain intervals after graduation.

It can be suggested that supervision of the training and the implementation process by the Turkish Surgical Association, which is a higher committee, will gain wide acceptance.

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Invited Review

Treatment of pilonidal disease by phenol application

Mustafa Emiroğlu, Cem Karaali, Hüseyin Esin, Göksever Akpınar, Cengiz Aydın

ABSTRACT

The literature indicates various approaches regarding the properties of phenol, the target patient group, and the complication and recurrence rates. Although phenol is most frequently used to treat the fistulated form of the disease, it can also be applied for other types. The overall success and complication rates of the application is reported as 62-95% and 0%-2%, respectively. Phenol treatment in pilonidal disease can be used more frequently as an alternative method with acceptable success, complication, and recurrence rates.

Keywords: Non-surgical treatment, phenol, pilonidal disease

INTRODUCTION

Pilonidal disease (PD) is a chronic skin infection containing hair that presents with leakage. Although PD can be diagnosed in the axilla, umbilicus and between fingers, the majority of them are detected in the intergluteal sulcus at the pre-sacral area. Hodges first described pilonidal disease in 1880 by using the words 'pilus (hair)' and 'nidus (nest)' of Latin origin, meaning 'nest of hairs' (1). The incidence of this disease has been reported as 4.6% and is often seen in males at the age of 20-30 (2). PD is frequently encountered in clinical practice and causes serious chronic complaints.

The debate about the etiology of PD continues on whether the disease is congenital or acquired (3-5). New treatment methods of pilonidal sinus have evolved following determination of etiologic physiopathology. In recent years, the cause of PD is accepted as hair from the head, back and gluteal regions that falls into the intergluteal sulcus over time. These are believed to penetrate into the skin and reach the subcutaneous tissue, then microorganisms cause chronic anaerobic inflammation that in turn leads to abscess formation (3, 6). There are various surgical and non-surgical methods for its treatment (3, 4, 7). Approximately 15 different surgical techniques have been defined (5). None of these surgical techniques are defined as 'gold standard'. Despite improvements in surgical treatment of the disease, the delay to return to work due to the prolonged length of hospital stay and healing time increase cost (3, 8, 9). As a result, operated patients might be unsatisfied.

The success of phenol treatment in pilonidal disease is related to its easy application, low cost, and rapid healing process. The initial use of pure phenol was described by Notaras and Goodall under local anesthesia in 1964 as a form of non-surgical treatment (10). The incidence of PD in our country is increasing, and phenol is being used more frequently. Our researchers' contribution to the literature on this issue is growing (9, 11).

There is no standardization for phenol application, and each surgeon manages the procedure according to his/her own experience. The aim of this study was to investigate the properties of phenol used for the treatment of pilonidal disease, the application techniques, overall success and complications rates, as well as to define the patient group by a literature search.

METHOD

A Pubmed search was performed for relevant studies between January 1987-October 2015 with the key words ''pilonidal disease, pilonidal sinus and phenol' in English. In addition, a Google Academic search in Turkish was performed. The literature was analyzed to identify eligible studies that included the concentration of phenol, the success rates and the complications. The complications that occured within 60 days after the procedure were accepted as complications, whereas treatment failure and disease relapse were not considered as complications. Patients younger than 18 years of age and those with a disease outside the pre-sacral region were excluded from the study.

PROPERTIES OF PHENOL

Phenols are a class of compounds consisting of a hydroxyl group (-OH) bonded directly to a benzene ring. Phenol solution [aqueous] is a white crystalline mass that is dissolved in an aqueous solution. Phe-

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Department of General Surgery, İzmir Tepecik Training and Research Hospital, İzmir, Turkey

Address for Correspondence
Mustafa Emiroğlu
e-mail: musemiroglu@gmail.com

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nol is colorless if pure and crystalline solid shaped at room temperature. Phenol is a caustic, antiseptic, germicide, and poor sclerosing agent, and has a local anesthetic effect (12). Phenol denatures proteins in the cell membrane at densities higher than %5. As a result, cell membrane and cellular proteins are dissolved. Phenol causes caustic burns on the skin without pain (13). Hairs are made of proteins which consist of keratin in the form of polypeptide. Hair is formed by a dense protein called keratin. Hairs that cause PD are denatured quickly by phenol at high density.

It has been reported that inappropriate debridement and hair that is stuck in the edge of a sinus are responsible for recurrence and poor healing (9, 14). Phenol application, owing to its minor sclerosing effects, provides quick recovery by increasing granulation and fibrosis (9, 13, 15). Due to the anesthetic effect of phenol, patients experience minimal pain in the postoperative period (16, 17).

In which form and what density should phenol be applied? The answers to these questions have not been clarified in the literature so far. The concentration of phenol solution used in clinical practice varies between 25-80% (15, 18, 19, 20). In addition, several forms of phenol such as cream-gel, liquid and crystalline form can be applied (14, 15, 19, 21). Phenol destroys all biological structures at a density higher than %5. Therefore, a minimum density of 25 % is aimed for the use of phenol application. In a study, low concentrated phenol (%40) has been reported to be as effective as high concentrated phenol (80%), with a lower rate of complications and a faster recovery (19). But most studies indicate that application of high density phenol (%85) yields better results (14, 20, 22).

The size of the sinus is an important factor for the success of this treatment. The volume of the sinus sac is reported to be around 1-5 cm^3 (14). As a result of procedures like hair removal from the sinus and curettage of granulation tissue, an amount of bleeding and serous leakage occurs that in turn fills the small sinus sac immediately. As a result, the concentration of phenol applied to the sinus decreases rapidly, and the phenol concentration might not be enough for the chemical cauterization of hair that cause the disease, chronic infection, and debris. Phenol application at a high concentration of 80% overcomes these problems. It has been reported that 80% phenol provides better success rates as compared to 30% phenol (23).

The form of phenol applied varies according to individual clinical experience. A success rate of 86.5% has been reported for cream-gel form of phenol applied to the pre-sacral area (15). The success rates of liquid and crystalline phenol have been reported to be similar (9, 22, 24). Crystalline phenol melts at body temperature, thus showing its effects in the liquid form. The liquid phenol is crystallized at a temperature of 10-15°C. Cold storage of crystallized phenol, its transportation and storage in the operation room may be challenging.

METHOD OF PHENOL APPLICATION

The ideal phenol application method has not yet been defined. Except the initial period of this technique, i.e. after the 1990s, almost all patients were discharged from the hospital at the same day after the procedure (9, 25, 26). The procedure has been done under local anesthesia instead of general anesthesia for the last 20-25 years (9, 18, 27, 28). Some cases with local anesthesia combined with sedation has also been reported (11). Majority of the procedures were applied in the same day operating room in the outpatient clinics. The main advantage of this method is its being a same-day surgical procedure. If there are no comorbidities such as DM, prophylactic antibiotics are not recommended (14, 29).

The prone and jack knife positioning can be used for better exposure of the operative site. The position may be changed according to patient and surgeon preference. Hair clipping is performed before application. First, the hair, debris and granulation tissue are extracted from within the sinus under local anesthesia. The remaining and/or unaccessible tissues are further destroyed chemically by phenol application while the sinus cavity is sterilized. It is recommended that any sinus orifice smaller than 3 mm should be enlarged to apply phenol much easier and more comfortably (9, 11). Orifice dilation is often achieved by a clamp, but in some cases either a small incision is done or a 1 cm diamond shaped skin is excised along with the sinus orifice (9, 16, 27, 30, 31).

Expansion of the sinus orifice provides better exposure in all phases of the operation, as well as preventing early closure of the sinus by granulation and epithelialization. The curettage of the sinus is often done in order to remove granulation tissue (24, 31, 32). Some authors use a clamp to evacuate the sinus contents, while others clean the sinus with a gauze sponge (11, 17, 20, 22). Cleaning all the sinus content increases the effectiveness and benefits of phenol application. Management of the hemorrhage and serous leakage within the sinus is also important. These can seriously decrease chemical cauterization effectiveness of the phenol by decreasing its intensity applied to the sinus. It has been reported that microbiologic evaluation of sinus content does not help in understanding either disease etiology or treatment process (16). Sampling for culture and antibiotic susceptibility is required in case of an acute abscess.

Vaseline and antibiotic ointment is often used for skin protection prior to phenol application (14, 26). 70% ethyl alcohol is applied on the skin to neutralize the caustic effect of phenol (11). All the field except the application area must be protected from phenol, especially the perianal region close to the anal verge. Phenol that overflows from the sinus orifice can cause serious complications.

How much and how should phenol be applied into the sinus? The methods are various. There are techniques that adjust the amount of phenol based on sinus volume measurements (14, 16, 31). The amount of phenol in the application is usually determined by injecting a certain amount of phenol solution into the sinus and then by checking the overflow from the other sinus orifice (1, 18, 30). Extra attention must be paid to prevent leakage of the excess phenol to the skin. 2-5 gr crystalline phenol is filled into the sinus with the aid of a clamp, it quickly dissolves at body temperature, the excess phenol drains out of the sinus, and is removed carefully from the region. In some other cases, 1-4 mL of liquid phenol is injected by using a venous catheter into the sinus (14, 16, 17, 19, 21, 30). Phenol impregnated into small piece of cottons can also be used (11, 31). Phenol is kept in the sinus for approximately 1-3 min. Liquid phenol application is repeated 1-4 times.

Dogru et al. (22) force the excess phenol to drain by pressing onto the sinus 2 minutes after the application. In contrast to other methods, they do not apply any more phenol at the same session. It has been suggested that the sinus should be irrigated with saline solution in order to remove phenol from the area after application (21). Duration of the phenol in the sinus tract is an important factor for success of the application. Many studies have reported the duration of phenol in the sinus as approximately 2-8 min (20, 27, 31, 33). However, in one study, it has been reported that protein structure of the hair was destructed at least 9 min after phenolization (23). In this respect, it should be kept in mind that several publications reported that the hair in the sinuses might not have been broken down entirely. At the end of all applications, the operation was finished by closing the operation area with a gauze, without applying any special dressing.

Every surgeon has his/her own unique approach for postoperative clinical observation. In some studies, patients have been followed-up each week periodically (19, 31, 33). More frequent follow-up schedules have been reported as 1, 3, 5, 7, 15 days after the operation (16). Some surgeons examine the patients in every 3 weeks (20, 24). In some studies, they offer 3 week follow-up periods after 1st, 2nd, and 4th week follow-ups (34). The main objective of this approach is to observe the complications in the early stage, and to repeat the phenol application. It should be noted that patients should be examined by the team of operating surgeons at the designated intervals (We recommend weekly follow-up during the first two months, postoperatively).

PATIENT FEATURES

The medical history, complaints and signs of the disease should be investigated in the initial evaluation and diagnosis of patients. Also, risk factors and comorbidities like diabetes mellitus must be evaluated. In differential diagnosis of pilonidal sinus, it is important to distinguish hidradenitis suppurativa, anal fistulas and fissures, anal condyloma and perianal manifestations of Crohn's disease. Digital rectal examination should be performed for the differential diagnosis of perianal manifestations. Especially in case of difficulty in differentiating fistulas, magnetic resonance imaging (MRI) fistulography, colonoscopy, or probing the fistula tract can be preferred. Sometimes, PD may co-exist with perianal diseases simultaneously. The final diagnosis and treatment priority should be managed specifically in such patients.

Physical examination and medical history are important for treatment planning. It has been reported that presence of recurrent abscess drainage and the number of sinus orifices affect the results of phenolization. In a study, Dag and et al. (14) have identified the presence of three or more orifices in the intergluteal area as a negative risk factor for the failure of the phenolization. The importance of number of sinus orifices are highlighted in a few studies (14, 16, 22). According to Bascom's studies, a deep intergluteal sulcus has a role both in formation of the disease and in wound healing (5). None of the publications related to phenolization has considered this issue when selecting patients. Similarly, obesity has been reported as a risk factor in patients with PD (33, 35). This particular patient group with deep intergluteal sulcus or obesity might not benefit from phenol application.

The status of a sinus affects the decision of phenol application. Patients are evaluated in four different clinical forms of symptomatic disease, those with acute abscess, chronic form, fistulized form, or complex form (4, 36). Pilonidal disease with acute abscess are generally considered as an exclusion criterion in studies on phenol application (14, 17, 31, 37). Similarly, pilonidal disease with acute abscess was excluded from our study. However, some authors advocate that it can also be applied during acute disease process (16, 22, 26, 34). Application of phenol can be more comfortable for both the patient and the doctor after treatment of an acute abscess. The approach to complex PD and relapses is also similar. Nevertheless, successful treatment results with phenol application on these patients have also been reported (34, 38). Phenol is most frequently applied to patients with chronic fistulized form (11, 16, 39). In both surgical and non-surgical treatments of PD, relapses can be a nightmare for surgeons. Phenol application is used by some surgeons after relapse as a last resort. Despite all these, there is need for comprehensive studies to identify the eligible patient group for phenol application.

THE SUCCESS OF PHENOL APPLICATION

There is no consensus on the definiton of success and failure of phenol application for pilonidal disease. Improvement is defined as ceasing of the leakage and epithelization of the sinus tract. Some studies have published approaches based on symptomatic healing (21). Table 1 outlines the success rates of phenol application. In our study, we evaluated success rates as well as factors affecting successful outcome. According to the present literature, regardless of the characteristics of the patient, the overall success rate is reported as 62-95% in pilonidal disease (Table 1). The number of applications at different time periods is suggested as the most important data affecting outcome. The success rate of phenol application increases with multiple procedures. (20, 24, 27). Removal of residual hair and sinus curettage at different periods increase success rates. The number of sinus orifices that provide drainage and the width of the orifices have also been reported as factors that correlate with success rates (14, 22). These factors should be further analyzed, and management should be carefully planned before phenol application.

In some studies, phenol application has been reported to be as successful as surgical treatments for PD (18, 22). Treatment of PD with phenol should be accepted as a better choice according to these success rates and benefits. In a study from Konya/Turkey, the rate of phenol application has been reported as more than 90% at training and research hospitals (40). The popularity of phenol treatment increases among patients and doctors due to its ease of application, faster return to work, low cost, and low complication rates.

Generally, it has been reported that recurrence rates with phenol treatment are higher than that of surgical treatment. In this patient group, re-application of the operation discourages surgeons and brings extra stress regarding the possibility of second and third failures. Phenol is applied as a last resort in practice. Successful results have been reported for the recurrence of PD by repeated phenol applications (34). The recurrence rate in our study was 0-13.9%; however, follow-up periods were short. There are studies indicating that a follow-up of 5 to 10-years is the gold standard to evaluate results (37, 41).

Table 1. Results of phenol application in PD

Author	n	Number of applications per patient	Healing rate (%)	Complications (%)	Relapse (%)	Follow-up periods (Month)
Ataallah (2015) (27)	76	1 1.1 (1-3)	74 86	-	-	16
Girgin (2014) (24)	48	1 2 (1-6)	64.5 94.5	0 0	0 0	22
Akan (2013) (18)	42	1	88	12	12	26
Girgin (2012) (20)	42	1 1-8	61.9 90.5	-	0 0	24
Dag (2012) (14)	76	1-3	67	15.2	2	25
Ölmez (2012) (32)	83	3	86.7	-	-	20
Sakçak (2010) (19)	112	1	77.7	11.7	4.2	34
Aygen (2010) (34)	36	3.7 (1-7)	91.7	8.3	13.9	54
Kayaalp (2010) (31)	30	1	70	10	13.3	14
Kaymakcioglu (2005) (16)	143	1	92	16	8.3	24
Dogru (2004) (22)	41	1-6	95	0	5	24
Schneider (1994) (25)	42	1	60	13	-	-
Kelly (1988) (21)	54	1 (1-5)	70	4.5	-	-
Hegge (1987) (26)	48	1-9	94	-	6.3	36

PD: pilonidal disease; Number of applications per patient: the average number of injections applied at different times; -: no data

Doll noted that only %60 of recurrences develop within the first two years, and thus recurrences should be evaluated in the suggested periods rather than only focusing on short term results (37). Accordingly, none of the studies in table 1 meets this criteria.

THE COMPLICATIONS OF THE APPLICATION

Complication rates of phenol application are reported within acceptable limits, approximately 0-15.2%. Table 1 shows the complication rates from various studies. The most frequent morbidities of phenol application are irritant contact dermatitis and superficial cellulitis (9, 11, 14, 31). The anal region and the area out of the surgical field should be protected during the procedure to prevent the devastating effects of phenol. It might cause severe burns that may not be immediately painful, due to its anesthetic properties. Burns are easily treated with antibiotic ointment and analgesic tablets within 2-4 days. The surgical team should keep in mind the powerful caustic effect of phenol. Cellulitis and abscess are the other frequent complications of phenol application, which can be treated by superficial antibiotic ointment, oral antibiotics and drainage. In some studies, it is recommended that slight pressure should be periodically applied on the sinus to prevent debris formation within the sinus (23). One of the most beneficial parts of phenol application is the fact that patients can tolerate it easier than other methods, and that the recovery is fast. The complications do not exert a negative effect on quality of life .

CONCLUSION

Phenol application is a safe procedure for the treatment of pilonidal disease. It offers a good quality of life and satisfaction to patients (17, 23). The rate of cosmetic problems is high with surgical methods (18). Phenol application does not change the anatomic structure of the affected area. Despite the increase in published studies on this issue, almost all of them except two have a retrospective design (16, 23). The ideal treatment of PD should be; a simple procedure with short length of hospital stay, improved pain and comfort, performed under local anesthesia if possible, cost-effective, associated with low complication and high success rates, and should be applicable by all surgeons. Although there is no treatment that can fulfill all the listed requirements, the management plan is based on these criteria.

In conclusion, treatment of pilonidal disease with phenol application is an acceptable method that can be readily applied with relevant success and complication rates. Less invasive treatments should be planned as first-line treatment, and be applied before surgery. This approach is an alternative treatment method to surgery that suggests high success rates with less postoperative pain and more comfort. Phenol application is one of the most popular procedures among techniques used for the treatment of pilonidal disease. Multi-center prospective randomized studies should be performed on the treatment of PD by phenol application.

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Reliability of fine needle aspiration biopsy in large thyroid nodules

Osman Bozbıyık[1], Şafak Öztürk[1], Mutlu Ünver[1], Varlık Erol[1], Ümit Bayol[2], Cengiz Aydın[1]

ABSTRACT

Objective: Fine needle aspiration biopsy provides one of the most important data that determines the treatment algorithm of thyroid nodules. Nevertheless, the reliability of fine needle aspiration biopsy is controversial in large nodules. The aim of this study was to evaluate the adequacy of fine needle aspiration biopsy in thyroid nodules that are four cm or greater.

Material and Methods: We retrospectively examined 219 patients files who underwent thyroidectomy for thyroid nodules that were greater than four centimeter between May 2007 and December 2012. Seventy-four patients with hyperthyroidism, and 18 patients without preoperative fine needle aspiration cytology were excluded from the study. Histopathologic results after thyroidectomy were compared with preoperative cytology results, and sensitivity and specificity rates were calculated.

Results: False-negativity, sensitivity and specificity rates of fine needle aspiration biopsy of thyroid nodules were found to be 9.7%, 55.5%, and 85%, respectively. Within any nodule of the 127 patients, 28 (22.0%) had thyroid cancer. However, when only nodules of at least 4 cm were evaluated, thyroid cancer was detected in 22 (17.3%) patients.

Conclusion: In this study, fine needle aspiration biopsy of large thyroid nodules was found to have a high false-negativity rate. The limitations of fine-needle aspiration biopsy should be taken into consideration in treatment planning of thyroid nodules larger than four centimeters.

Keywords: Fine needle aspiration biopsy, thyroidectomy, thyroid cancer, thyroid nodule

INTRODUCTION

Fine needle aspiration biopsy (FNAB) is a cost-efficient method that should be primarily preferred and gives the most accurate results in suspicious thyroid nodules detected by ultrasound (1). With the use of fine needle aspiration biopsy, the diagnosis of thyroid cancer can be made with a high sensitivity and specificity, and its routine use prevents many unnecessary surgical operations (2-4). Although FNAB is the gold standard test, it does have some limitations (5, 6). Its reliability in thyroid nodules larger than 4 cm in size is still controversial. Diagnostic lobectomy/thyroidectomy has been recommended because of a high rate of false negativity of FNAB in large thyroid nodules in some studies, while many studies have reported that FNAB can be used with reliability in large nodules as well (6-15). In addition, there are publications showing that the prevalence of thyroid cancer increases as the nodule diameter increases (7, 9, 10). In this study, we aimed to determine the reliability of FNAB in thyroid nodules larger than 4 cm in size.

MATERIAL AND METHODS

The data of 1563 patients who underwent thyroidectomy between May 1, 2007 and December 31, 2012 were examined retrospectively. The data of 219 patients who had a thyroid nodule larger than 4 cm in size according to pathology reports were examined. The demographic properties of the patients, preoperative TSH levels, history of drug use, preoperative FNAB results, numbers of nodule and definite pathology results were examined. 74 patients whose THS levels were below the normal limit or who had a history of antithyroid drug usage were excluded from the study. In addition, 18 patients who did not undergo FNAB before surgery were also excluded from the study. A total of 127 patients were included in the study.

In our clinic, thyroidectomy is performed in all patients with a thyroid nodule larger than 4 cm in size. Therefore, our sample represents all patients who have a thyroid nodule larger than 4 cm in size. The results of FNAB performed preoperatively were grouped as: benign, follicular lesion, follicular neoplasia, suspicious in terms of papillary cancer, malignant and insufficient for diagnosis. The results of histopathologic examination were grouped as: nodular goiter, follicular adenoma and malignant. The preoperative FNAB results and postoperative histopathologic examination results were compared. FNABs obtained from the nodules other than large nodules were not included in the study. The false negativity, sensitivity and specificity rates for FNAB were evaluated. The malignancies found in the nodules other than the ones with a size larger than 4 cm were not included in the calculations of false negativity, sen-

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[1]Clinic of General Surgery, İzmir Tepecik Training and Research Hospital, İzmir, Turkey
[2]Clinic of Pathology, İzmir Tepecik Training and Research Hospital, İzmir, Turkey

Address for Correspondence
Osman Bozbıyık
e-mail: bozbiyiko@gmail.com

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sitivity and specificity, because they were beyond the scope of this study; these malignancies were specified separately.

This research was conducted according to the principles of the World Medical Association Declaration of Helsinki "Ethical Principles for Medical Research Involving Human Subjects".

Statistical Analysis

The data were recorded in the software prepared with Microsoft Excel v: 12.0 (Microsoft Corporation, Santa Rosa, CA, USA) and the mean and percentage values were calculated. No additional statistic methods was used.

RESULTS

The mean age of the 127 patients included in the study was 47.8 years (18-75 years). 89 (70.1%) of the patients were female and 38 (29.9%) were male. The mean nodule diameter was found to be 49.0 mm, the smallest and largest nodule size was 40 mm and 90 mm, respectively. 28 (22.0%) of the patients had a solitary thyroid nodule while 99 (77.9%) had multiple thyroid nodules. Cytologic evaluation of the patients who underwent fine needle aspiration biopsy revealed benign cytology in 82 patients, suspicious cytology in terms of papillary thyroid cancer in 12 patients, cytology compatible with follicular lesion/neoplasia in 8 patients, malignant cytology in 3 patients, and insufficient cytology for a diagnosis in 22 patients. When only those nodules larger than 4 cm in size were included in postoperative histopathologic evaluation, nodular goiter was detected in 95 patients, follicular adenoma in 10 patients, papillary cancer in 14 patients and follicular cancer in 8 patients. A papillary cancer focus was found in 6 of 95 patients whose nodules larger than 4 cm in size was found to be benign. Thus, thyroid cancer was detected in 28 (22.0%) out of a total of 127 patients, whereas thyroid cancer was found in 22 patients (17.3%) when only those nodules larger than 4 cm in size were considered.

When the histopathologic results of 82 patients whose fine needle aspiration biopsy was found to be benign were examined, it was observed that 74 patients had nodular goiter, 3 patients had follicular thyroid cancer, and 5 patients had papillary thyroid cancer. Definite histopathologic examination of 8 patients whose fine needle aspiration cytology was compatible with follicular lesion/neoplasia revealed follicular adenoma in 6 patients and follicular thyroid cancer in 2 patients. When the histopathologic results of 12 patients whose preoperative cytologic examination was considered to be suspicious in terms of papillary cancer were examined, benign nodule was found in 7 patients, follicular thyroid cancer was found in 1 patient and papillary thyroid cancer was found in 4 patients (Table 1). Thus, the malignancy rate was found to be 41.6% in patients with suspicious cytology. Papillary thyroid cancer was found on histopathologic examination in all three patients whose preoperative FNAB was considered to be malign. On histopathologic examination of 21 patients whose preoperative FNAB was insufficient for making a diagnosis, nodular goiter was detected in 15 patients, follicular adenoma in 3 patients, follicular cancer in 2 patients and papillary cancer in 1 patient. When these results were evaluated, fine needle biopsy in thyroid nodules larger than 4 cm in size was found to have a false negativity rate of 9.7%, a specificity rate of 85.0% and a sensitivity rate of 55.5%.

Table 1. Comparison of preoperative cytology findings with postoperative histopathology results

Fine needle aspiration cytology	Histopathology	
	n	Result
Benign (n: 82)	74	Nodular goiter
	3	Follicular carcinoma
	5	Papillary carcinoma
Follicular lesion/neoplasia (n: 8)	6	Follicular adenoma
	2	Follicular carcinoma
Suspicious cytology (n: 12)	7	Nodular goiter
	1	Follicular carcinoma
	4	Papillary carcinoma
Malignant (n: 3)	3	Malignant

DISCUSSION

Fine needle aspiration biopsy (FNAB) is a cost-efficient method that should be primarily preferred and gives the most accurate results in suspicious thyroid nodules detected by ultrasound (1). FNAB has been shown to be feasible in the assessment of thyroid nodules with a sensitivity of 65-98%, a specificity of 72-100%, and a false negativity rate below 5% (2). Many unnecessary thyroidectomies can be prevented with the routine use of FNAB. Several factors including sampling error, fixation method, presence of non-homogenous nodule and the effect of the interpreter cyto-pathologist affect the success of FNAB (3-5). In addition, the adequacy of fine needle aspiration biopsy in the assessment of thyroid nodules larger than 4 cm in size is still controversial.

High false negativity rates lead to treatment delay and poor prognosis. In this study, we found that FNAB had a false negativity rate of 9.7%, a sensitivity of 55.5% and a specificity of 85% in thyroid nodules larger than 4 cm in size. Yeh et al. (16) reported the delay in treatment in thyroid cancers that could not be detected by FNAB as 28.2 months, and vascular invasion and capsule invasion were found at a higher rate in these patients. Thus, the error rate of FNAB is regarded as a factor affecting prognosis. In the literature, some publications have reported the false negativity rate of FNAB to be as low as 0.7% in large thyroid nodules while several other studies have reported this rate to be 17% (Table 2) (6-15).

In a leading study in this area, Meko et al. (6) reported that the rate of false negativity was 0% in solid nodules smaller than 3 cm while it was 17% in nodules larger than 3 cm. They found that the false negativity rate increased to 30% if nodules larger than 3 cm had both cystic and solid components. Based on these results, they recommended routine lobectomy for all large nodules. Mac Coy et al. (7) found the prevalence of cancer to be 19.3% in thyroid nodules larger than 4 cm and the false negativity rate of FNAB to be 13% in a study including 223 patients, and recommended diagnostic lobectomy for nodules larger than 4 cm. These results are compatible with our data. In contrast, some studies have reported that FNAB can be used with a success rate of 0.7-6.2% in large thyroid nodules. In these studies, it has been stated that FNAB can be reliably applied in large thyroid nodules as well, and that nodule size alone should not be an indication for lobectomy/thyroidectomy (8, 10, 11).

Table 2. Published series on reliability of fine needle aspiration biopsy for large thyroid nodules

	Nodule diameter (cm)	Patient number	Malignancy rate (%)	False negativity (%)	Sensitivity/ specifity (%)	FNAB method	Suggests routine lobectomy
Meko et al. (6)	>3	52	21	17		Manual	YES
MacCoy et al. (7)	>4	223	19.3	13		US	YES
Porterfield et al. (8)	>3	742 (145)		0.7		US	NO
Pinchott S.N. et al. (9)	>4	155	13.5	6		Manual and US	YES
Kuru et al. (10)	>4	148	24	4.3	88/86	US	NO
Yoon YH et al. (11)	>3	661 (206)	11.2	2	96.7/85.5	US	NO
Raj MD (12)	>4	223	7.2	6.2	93.8/62.2	US	NO
Albuja-cruz et al. (13)	>4	212	35	15	35/99	US	NO
Wharry et al. (15)	>4	361	21.7	10.4			YES
This study	>4	127	17.3	9.7	55.5/85	Manual and US	YES

FNAB: fine needle aspiration biopsy; US: ultrasound

In the study conducted by Porterfield et al. (8), which has the best results in the literature, the false negativity rate of FNAB was reported to be 0.7% in 696 patients who had nodules larger than 3 cm in size. However, surgery was performed and definite histopathologic result could be obtained in only 145 of these patients. 550 of the remaining 551 were considered benign based on clinical follow-up. Definite histopathology was evaluated only in 20% of the patients and the false negativity rate of FNAB was found to be 0.7%. Yoon et al. (11) reported the false negativity rate of FNAB to be 2% in nodules larger than 3 cm in size. In this study, surgery was performed only in 206 of 661 patients and all other patients were considered as benign as a result of clinical follow-up. Absence of definite histopathologic results in the majority of patients is a significant limiting factor in these two studies which showed that FNAB could be applied with success in large thyroid nodules. One of the difficulties encountered while calculating false negativity rates is the absence of a definite histopathologic diagnosis in many cases because of lack of surgery in patients with benign cytology. This affects false negativity rates. In our series in which we reported the false negativity rate to be 9.7%, histopathologic results were present in all patients. Kuru et al. (10) presented one of the most successful series in the literature with a high rate of histopathologic confirmation. They found the false negativity rate of FNAB to be 1.3% for thyroid nodules smaller than 4 cm in size and 4.3% for thyroid nodules larger than 4 cm in size. In their series, a definite histopathologic diagnosis was present in 86% of the subjects. However, all current series do not report such levels of success rates. Similar to our series, Wharry et al. (15) found the false negativity rate to be 10.4% in nodules larger than 4 cm in size in their series which consisted of 361 patients. In a current study from our country, Agcaoglu et al. (14) found the false negativity rate to be 11% in large thyroid nodules.

One of the mainstays of the authors who recommend routine lobectomy/thyroidectomy in large thyroid nodules is the increased possibility of malignancy in addition to the high false positivity rate of FNAB (7). The rate of cancer in large thyroid nodules has been reported to be 7.2-35% (6-15). In our series, the rate of thyroid cancer was 17.3% when only nodules larger than 4 cm in size were considered. As the diameter of the thyroid nodule increases, the prevalence of cancer increases (7, 9, 10).

When the nodule is non-homogenous and contains cystic and solid components, the diagnostic sufficiency of FNAB decreases (6, 17). Sampling only the cystic content decreases the chance of success especially in nodules with cystic and solid components. In other words, the success rate is higher when FNAB is performed under ultrasound guidance (12, 17, 18). In our series, the fact that biopsy of palpable lesions was performed without ultrasound guidance might be one of the reasons which increased the false negativity rate. Agcaoglu et al. (14) found that lack of accompaniment of a cytopathologist in the FNAB procedure increased the false negativity rate. In our study, cytopathologists did not accompany in any FNAB procedure. This may be another factor which increased the false negativity rate.

CONCLUSION

The data in the literature related to the reliability of FNAB in nodules larger than 4 cm in size are controversial. The limitations of FNAB should be taken into consideration when making treatment decisions in nodules larger than 4 cm in size. Well-planned prospective studies including factors such as technical causes, presence of non-homogeneous nodules, and cytopathologist effect are needed in this area.

Ethics Committee Approval: Authors declared that the research was conducted according to the principles of the World Medical Association Declaration of Helsinki "Ethical Principles for Medical Research Involving Human Subjects", (amended in October 2013).

Informed Consent: Informed consent was not received due to the retrospective nature of the study.

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Recurrent laryngeal nerve injury and hypoparathyroidism rates in reoperative thyroid surgery

Mohamed Benkhadoura[1], Salah Taktuk[1], Reem Alobedi[2]

ABSTRACT

Objective: Reoperative thyroid surgery is rare and has a high complication rate. This retrospective cohort study was performed to determine the recurrent laryngeal nerve injury and hypoparathyroidism rates after reoperative thyroid surgery in two university hospitals in Benghazi, Libya.

Material and Methods: All consecutive patients who underwent reoperative thyroid surgery between January 2002 and July 2014 were included retrospectively. The cohort was divided according to whether the reoperation was in the previously operated lobe or both lobes (ipsilateral group), or only in the previously non-operated lobe (contralateral group).

Results: Of the 73 patients, 66 were female and seven were male. The median age was 37 (19-80) years. Nine (12.3%), five (6.8%), and one (1.4%) patient developed postoperative transient hypocalcemia, transient recurrent laryngeal nerve palsy, and permanent recurrent laryngeal nerve injury, respectively. None of the patients developed permanent hypocalcemia. The ipsilateral group had a higher rate of permanent recurrent laryngeal nerve injury after reoperation than the contralateral group (3.1% vs. 0%). It also had higher rates of transient recurrent laryngeal nerve injury (12.5% vs. 2.4%) and transient hypocalcemia (28.1% vs. 0%), but the two groups did not differ in terms of permanent hypocalcemia rates (both 0%).

Conclusion: Reoperative thyroid surgery is technically challenging with a high incidence of complications. The ipsilateral group had more complications after reoperative thyroid surgery than the contralateral group. Hemi- or total thyroidectomy at the primary surgery is recommended to reduce the frequency of reoperative thyroid surgery.

Keywords: Complications, completion thyroidectomy, reoperations, thyroid

INTRODUCTION

While reoperation is uncommon in thyroid surgery (1, 2), some patients who have undergone a previous thyroid surgery for benign or malignant disease have to undergo thyroid reoperation (2). Reoperative thyroid surgery is challenging because of the scarring, edema, tissue friability, and anatomical distortion caused by the primary operation. These factors markedly increase the incidence of complications (3). The British Association of Endocrine and Thyroid Surgeons reported in 2009 that reoperative thyroid surgery is associated with a 3-fold and 2-fold increase in permanent hypoparathyroidism and permanent recurrent laryngeal nerve (RLN) palsy rates as compared to the rates after primary thyroid surgery, respectively (4). This indicates that even extensive surgical experience and a good knowledge of the normal anatomical variations of the RLNs and the parathyroid glands (which are important for reducing the postoperative morbidity after primary thyroid surgery) may not be sufficient in cases where the RLNs have a distorted anatomy due to strong postoperative adhesion or where devascularization of the parathyroid glands has occurred after the previous surgery (5).

A retrospective cohort study in Switzerland of 109 patients who underwent thyroid reoperation for disease recurrence after previous subtotal resection in 1997-2010 showed that reoperation on the previously operated lobe or both lobes (denoted as ipsilateral reoperation) is associated with a significantly higher rate of morbidity than the primary surgery, whereas this difference was not observed when reoperation was on the previously unoperated lobe (contralateral reoperation) (6).

The aim of the present study was to review our experience with reoperative thyroid surgery, to compare the results with published data, and to compare the ipsilateral and contralateral groups in terms of RLN injury and hypoparathyroidism rates.

MATERIAL AND METHODS

In total, 73 consecutive patients who underwent thyroid reoperation between January 2002 and July 2014 in two university hospitals (Benghazi Medical Center and 7th October Hospital) in Benghazi, Libya were identified by a retrospective review of the medical records. The research was performed according to the World Medical Association Declaration of Helsinki.

All patients had undergone a single prior thyroid surgical operation. The medical history, examination results, operation details, and clinical outcomes during follow-up were recorded. The patients were di-

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[1]Department of Surgery, Faculty of Medicine, University of Benghazi, Benghazi, Libya
[2]General Practitoner, Boatni Health Center, Benghazi, Libya

Address for Correspondence
Mohamed Benkhadoura
e-mail: khdoura@yahoo.com

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Available online at
www.turkjsurg.com

vided according to whether reoperation was on the ipsilateral or contralateral lobe, as defined previously (6).

Before reoperation, the mobility of the vocal cord was determined by indirect laryngoscopy. The reoperation approach was through the scar of the previous Kocher's incision. Thereafter, the thyroid gland was reached either by splitting the strap muscles in the midline or laterally by entering between the anterior border of the sternocleidomastoid and strap muscles. The parathyroid glands and RLNs were identified intraoperatively by standard techniques. A nerve stimulator was not used in all cases because of the paucity of this device in the hospitals. None of the cases underwent intraoperative frozen-section analysis. After reoperation, indirect laryngoscopy was repeated in patients who presented with hoarseness, dyspnea, and/or reduced voice quality. Nerve palsy that continued for more than 6 months was classified as persistent RLN palsy. The diagnosis of postoperative hypocalcemia was determined clinically and/or biochemically. Symptomatic hypocalcemia was considered if any episode of symptoms or signs of hypocalcemia appeared, including tingling or numbness in the lips, hands and/or feet, Chvostek's sign, Trousseau's sign, muscle cramp, or tetany. Biochemical hypocalcemia was considered if serum calcium levels dropped below 8.0 mg/dL. Symptomatic or biochemical hypocalcemia that continued for more than 6 months and required treatment was classified as persistent hypoparathyroidism. The parathyroid hormone (PTH) assay was not used to predict postoperative hypocalcemia.

All patients in both groups were followed in the surgical outpatient department for at least 6 months after reoperation and depending on postoperative endocrine status, each patient was then invited to engage in a further variable follow-up program by the endocrinologist in the endocrine clinic.

Statistical Analysis

The two groups were compared in terms of categorical variables by using Fisher's exact test. All statistical analyses were performed by using the Statistical Package for the Social Sciences (SPSS Inc.; Chicago, IL, USA), version 18.0 software program. P values <0.05 were considered to indicate statistical significance.

RESULTS

Of the 73 patients who underwent reoperative thyroid surgery during the study period, 66 were female and seven were male. The median age of the cohort was 37 (19-80) years. The most common indication for reoperation was completion thyroidectomy for well-differentiated thyroid cancer after finding malignancy in thyroid lobectomy (n=35, 48%), followed by recurrent multinodular goiter (n=27, 37%), recurrent uninodular goiter (n=9, 12.3%), and recurrent thyrotoxicosis (n=2, 2.7%). Of the 27 patients with recurrent multinodular goiter, 21 had multinodular goiter in the previously operated side and six in the contralateral compartment. The recurrent uninodular goiter and thyrotoxicosis cases all recurred in the ipsilateral side. None of the cohort patients underwent reoperation due to recurrent thyroid cancer after primary surgery.

Thus, of the 73 patients, 41 (56.2%) were placed in the contralateral group: all underwent contralateral thyroid lobectomy because the ipsilateral lobe had been removed at the initial thyroid surgery. Of these 41 contralateral group patients, 35 (85.4%) and six (14.6%) underwent lobectomy during reoperation for thyroid cancer and recurrent multinodular goiter, respectively.

Table 1. Patient characteristics, surgical indication, type of reoperation, and rates of recurrent laryngeal nerve injury and hypocalcemia in the contralateral and ipsilateral groups after reoperative surgery

		Contralateral group n=41	Ipsilateral group n=32	p
Age (years)		31 (19-80)	50.5 (28-61)	
Sex:	male	7	0	
	female	34	32	
Surgical indication:				
Completion thyroidectomy for cancer		35	0	
Recurrent multinodular goiter		6	21	
Recurrent uninodular goiter		0	9	
Recurrent thyrotoxicosis		0	2	
Type of reoperation:				
Lobectomy		41	9	
Total thyroidectomy		0	21	
Near total thyroidectomy		0	2	
Interval between primary surgery and reoperation (years)		1.2	10.1	
Transient RLN injury		1 (2.4)	4 (12.5)	p=0.161
Permanent RLN injury		0	1 (3.1)	p=0.438
Transient hypocalcemia		0	9 (28.1)	p<0.001
Permanent hypocalcemia		0	0	

RLN: recurrent laryngeal nerve injury
Datas are presented n (%).

The remaining 32 patients (43.8%) were placed in the ipsilateral group because all underwent reoperations to remove thyroid tissue from the ipsilateral side or both sides. Of these 32 ipsilateral group patients, 21 (65.6%) underwent total thyroidectomy (19 for recurrent multinodular goiter and two for recurrent thyrotoxicosis), nine (28.1%) underwent total lobectomy (all for recurrent uninodular goiter), and two (6.3%) underwent near total thyroidectomy (both for recurrent multinodular goiter).

For the overall cohort, the average interval between the initial thyroid surgery and reoperation was 5.1 years (range, 1 month to 19 years). For the 35 patients with thyroid cancer, this interval was 53.4 days on average (range, 1-4 months). Thus, the ipsilateral group had a significantly longer interval between the primary operation and reoperation than the contralateral group (10.1 vs. 1.2 year).

The overall average duration of postoperative follow-up was 13 months (6-24 months). Nine (12.3%) patients developed postoperative transient hypocalcemia. None developed permanent hypocalcemia. Five (6.8%) and one (1.4%) patient developed transient and permanent RLN injury, respectively. The ipsilateral group had a higher rate of permanent RLN injury after reoperation than the contralateral group (3.1% vs. 0%). It also had higher rates of transient RLN injury (12.5% vs. 2.4%) and transient hypocalcemia (28.1% vs. 0%). The two groups did not differ significantly in terms of permanent hypocalcemia rates (both 0%) (Table 1). There was no postoperative mortality in our study cohort.

DISCUSSION

Reoperative thyroid surgery is not a harmless procedure, even in highly specialized medical centers, as it is associated with relatively high rates of permanent RLN palsy and hypoparathyroidism (5). Both of these complications can severely affect patient quality of life, and are therefore key postoperative outcomes of thyroid surgery (7).

Müller et al. (7) showed in 2001 that the risk of permanent RLN palsy is five times greater after repeat surgery for recurrent goiter than after the primary surgery, even when the operation is performed by an experienced endocrine surgeon. Table 2 shows the rate of permanent RLN injury in their study (3%) along with the rates reported by other studies on reoperation. Five other studies reported very low permanent RLN palsy rates (0.9%, 0%, 0%, 0.4%, and 0.9%, respectively) (3, 8-11). Four other studies reported intermediate rates (1.7%, 1.8%, 1.5%, and 2.5%, respectively) (1, 2, 5, 12). By contrast, the studies of Wilson et al. (13), Erdem et al. (14), and Tun et al. (15) reported higher permanent RLN palsy rates of 3.1%, 3.5%, and 4%, respectively. Moreover, Seiler et al. (16) reported the permanent RLN palsy rate as 3.5% in the 1983-1990 period and as 5.6% in the 1991-1994 period. The greater rate in the latter period was explained by the introduction of a policy that mandated more extensive resection at the initial thyroid surgery and a more liberal approach to reoperation surgery. Eroğlu et al. (17) also reported a high permanent RLN palsy rate of 5.5% in 165 patients who underwent completion thyroidectomy. Their high permanent RLN palsy rate was explained by the fact that at the time of completion thyroidectomy, 36 (21.8%) of the patients had locoregional recurrence or metastatic disease (1). Thus, in our study, the overall rate of permanent RLN injury after reoperation was comparable to those of other studies (1.4%). Moreover, the transient RLN injury rate of 6.8% is comparable with that previously published, which ranged from 0% to 9.4% (9, 12, 15).

Permanent hypoparathyroidism is another dangerous and disabling complication of reoperative thyroid surgery. Three studies reported high rates of this complication (6.6%, 4.4%, and 4.2%, respectively) (3, 12, 14), while five others reported intermediate rates of 1.7-3.2% (Table 2) (1, 2, 5, 10, 18). The remaining six studies reported negligible rates of permanent hypoparathyroidism (0-0.5%; Table 2) (7-9, 11, 13, 15). In our study, the rate of permanent hypoparathyroidism was also 0%. The low rates of permanent hypocalcemia after reoperation may be due to the use of operative techniques that aim to preserve the vascular pedicle of the parathyroid glands after capsular dissection (1, 19).

Regarding transient hypoparathyroidism after reoperative thyroid surgery, one study reported an unusually high rate of 38.7% (3). By contrast, the remaining studies reported rates that range from 3% to 20.7% (Table 2). In our study, the rate of transient hypoparathyroidism was 12.3%.

Comparison of the ipsilateral and contralateral groups in the present study revealed that reoperation on the ipsilateral side was associated with a relatively higher rate of permanent RLN palsy (3.1%) than reoperation on the contralateral side (0%), but the difference was not statistically significant. This is likely to be due to the greater frequency of adhesions and anatomical difficulties in ipsilateral reoperation. By contrast, the contralateral group underwent surgery on a completely virgin territory, such as that seen in primary thyroid operations: all patients in the contralateral group either had had a previous unilateral hemithyroidectomy and required reoperation for recurrent benign thyroid disease, or they had well-differentiated thyroid cancer and required completion thyroidectomy after finding malignancy in initial thyroid lobectomy.

Despite the scarring, adhesions, and the anatomical complications associated with reoperative thyroid surgery, a number of previous studies found no significant correlation between complication rate and previous surgery (12, 14). Gulcelik et al. (12) reported that when permanent RLN palsy and permanent hypoparathyroidism were evaluated, there was no statistically significant difference between completion thyroidectomy and total thyroidectomy for differentiated thyroid cancer. The rates for permanent RLN palsy and

Table 2. Comparison of the results in the present study with those in former studies

Author (Reference)	Number of patients	Transient hypocalcemia (%)	Permanent hypocalcemia (%)	Transient RLN palsy (%)	Permanent RLN palsy (%)
Chao et al. (1)	115	5.2	1.7	2.6	1.7
Calò et al. (3)	106	38.7	6.6	4.7	0.9
Lefevre et al. (5)	685	5	2.5	1.2	1.5
Terris et al. (9)	45	4.5	0	0	0
Hardman et al. (2)	164	7.3	2.4	5.5	1.8
Teksöz et al. (10)	263	8	2	2	0.4
Rudolph et al. (18)	494	11.3	3.2	5.9	2
Tun et al. (15)	25	12	0	0	4
Wilson et al. (13)	32	9.4	0	3.1	3.1
Levin et al. (11)	114	3.4	0	0.9	0.9
Peix et al. (8)	47	14.9	0	4.3	0
Muller et al. (7)	949	3	0.5	5	3
Gulcelik et al. (12)	159	20.7	4.4	9.4	2.5
Erdem et al. (14)	141	6.3	4.2	5.6	3.5
Our study	73	12.3	0	6.8	1.4

RLN: recurrent laryngeal nerve

permanent hypoparathyroidism reported were 2.5% and 4.4%, respectively, in the completion thyroidectomy group and 0.9% and 4.6%, respectively, in the total thyroidectomy group. Erdem et al. (14) concluded that completion thyroidectomy for differentiated thyroid cancer can be done safely with a low morbidity rate that is not significantly different from that of primary total thyroidectomy when the operation is performed in specialized centers. The rates of the two most important complications, permanent RLN palsy and permanent hypoparathyroidism, were 3.5 and 4.2%, respectively, in the completion thyroidectomy group, and 3.3 and 4.3%, respectively, in the primary total thyroidectomy group.

Rudolph et al. (18) observed that as compared to patients who had undergone unilateral lobectomy for multinodular goiter, patients who had previously undergone subtotal thyroidectomy had a significantly higher permanent RLN injury rate (3.44% vs. 0.77%). Our results are consistent with those of Kurmann et al., whose retrospective study showed no statistical difference in permanent RLN nerve injury between patients undergoing ipsilateral and those undergoing contralateral redo-surgery (3.8% vs. 0%) (6).

The study of Rudolph et al. (18) also showed that patients who had previously undergone subtotal thyroidectomy had a significantly higher permanent hypoparathyroidism rate than patients who had undergone unilateral lobectomy (5.1% vs. 1.5%). In the present study, however, the ipsilateral and contralateral groups did not exhibit this difference. This may be explained by the limited number of patients in our study.

Our study has some limitations. First, it is a retrospective study and has a relatively limited number of cases. The latter is due to the relative rarity of this surgical procedure. Postoperative vocal cord examinations were not done routinely. Thus, the real rate of vocal cord paralysis cannot be reported, since voice changes may not be recorded in patients with one-sided vocal cord paralysis. Furthermore, the lack of facilities such as intraoperative laryngeal nerve monitoring may also have affected the RLN outcomes especially in the ipsilateral group. Since intraoperative laryngeal nerve monitoring may reduce the morbidity of reoperative thyroid surgery, further studies assessing its ability to reduce RLN injury rates after thyroid reoperation are warranted.

CONCLUSION

Reoperative thyroid surgery is a challenging operation due to the scarring, adhesions, tissue friability, and anatomical distortion caused by the primary surgery. This is responsible for the relatively high incidence of complications after this procedure, as shown by our present study. Reoperative thyroid surgery on the ipsilateral side is associated with greater complication rates than reoperation on the contralateral side, which had not undergone previous surgery. To reduce the frequency of reoperative thyroid surgery and its complications, we recommend that hemi- or total thyroidectomy be performed at the primary surgery instead of subtotal resection.

Ethics Committee Approval: Authors declared that the research was conducted according to the principles of the World Medical Association Declaration of Helsinki "Ethical Principles for Medical Research Involving Human Subjects", (amended in October 2013).

Informed Consent: Informed consent was not received due to the retrospective nature of the study.

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The clinicopathologic characteristics and prognostic factors of gastroesophageal junction tumors according to Siewert classification

Bala Başak Öven Ustaalioğlu[1], Metin Tilki[2], Ali Sürmelioğlu[2], Ahmet Bilici[3], Can Gönen[4], Recep Ustaalioğlu[5], Özlem Balvan[6], Mehmet Aliustaoğlu[6]

ABSTRACT

Objective: The treatment of gastroesophageal junction tumors remains controversial due to confusion on whether they should be considered as primary esophageal or as gastric tumors. The incidence of these tumors with poor prognosis has increased, thus creating scientific interest on gastroesophageal cancers. Esophagogastric cancers are classified according to their location by Siewert, and the treatment of each type varies. We evaluated the prognostic factors and differences in clinicopathologic factors of patients with gastroesophageal junction tumor, who have been treated and followed-up in our clinics.

Material and Methods: We retrospectively analyzed 187 patients with gastroesophageal junction tumors who have been operated and treated in the Oncology Department between 2005 and 2014. The chi-square test was used to evaluate differences in clinicopathologic factors among Siewert groups I, II and III. Prognostic factors were analyzed by univariate and multivariate analysis.

Results: The median age of our patients was 62 years, and approximately 70% was male. Nineteen patients (10.2%) had Siewert I tumors, 40 (21.4%) II, and the remaining 128 (64.4%) had Siewert III tumors. Siewert III tumors were at more advanced pathologic and T stages. Preoperative chemoradiotherapy was mostly applied to Siewert group I patients. There was no difference between the 3 groups in terms of recurrence. While the median overall survival and 2-year overall survival rate were 26.6 months and 39.6%, the median disease free survival and disease free survival rates were 16.5 months and 30.1%, respectively. The N stage, pathologic stage, vascular invasion, lymphatic invasion, perineural invasion, surgical margin, and grade were associated with both overall survival and disease free survival, while pathologic stage and presence of recurrence were significant factors for overall survival. The median disease free survival for Siewert III tumors was 20 months, 11.3 month for Siewert I tumors, and 14 months for Siewert II tumors, but the finding was not statistically significant (p=0.08).

Conclusion: Although gastroesophageal junction tumors were grouped according to their location and they exerted different clinicopathologic properties, their prognosis was similar.

Keywords: Esophagogastric junction, Siewert classification, prognosis

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[1]Department of Medical Oncology, Haydarpaşa Numune Training and Research Hospital, İstanbul, Turkey
[2]Department of General Surgery, Haydarpaşa Numune Training and Research Hospital, İstanbul, Turkey
[3]Department of Medical Oncology, Medipol University School of Medicine, İstanbul, Turkey
[4]Department of Gastroenterology, Haydarpaşa Numune Training and Research Hospital, İstanbul, Turkey
[5]Department of Thoracic Surgery, Siyami Ersek Thoracic and Cardiovascular Surgery Hospital, İstanbul, Turkey
[6]Department of Medical Oncology, Kartal Training and Research Hospital, İstanbul, Turkey

Address for Correspondence
Bala Başak Öven Ustaalioğlu
e-mail: basakoven@yahoo.com

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www.turkjsurg.com

INTRODUCTION

The incidence of gastroesophageal junction (GEJ) tumors has been on a rapid upsurge in Western societies (1). Adenocarcinomas are the most frequent type within these tumors (2). Despite multimodality treatment, their prognosis is still poor with a 5-year survival rate of around 20% (1). The issue whether they should be treated like esophageal tumors or gastric tumors remains controversial due to their location. Siewert classified these tumors into three groups according to their anatomical locations in 1996 (3). By definition, all of these tumors invade the GEJ. The classification was revised in 2000, and type I tumors were defined as tumors within 1-5 cm above the GEJ, type II those within 1 cm above and 2 cm below the GEJ, and type III as tumors extending 2-5 cm below the GEJ (4). This classification is clinical and is based on barium study, endoscopy, computed tomography, and intraoperative evaluation findings (5). Type I tumors are distal esophageal tumors, type II tumors are true cardiac tumors, while type III tumors are subcardial gastric tumors.

R0 resection is the most important determinant of long-term survival in GEJ tumors (6). The 5-year overall survival (OS) after R0 resection has been reported as 43.2%, and those of R1 and R2 resection as 11.1% and 6.2%, respectively (7). While Siewert I and II lesions are treated like esophageal tumors, Siewert III tumors are treated like gastric cancer (1). Due to screening and treatment of Barrett's esophagus, Siewert I tumors can be diagnosed at an early stage. Lymph node metastasis is another important predictor of survival, with a decrease from 53% to 11% in 5-year OS in case of presence of lymph node metastasis (8). For this reason, lymph node dissection should be included to surgery. The rate of lymph node metastasis increases from 10% to 67% in tumors with submucosal infiltration (9). The standard surgical treatment is subtotal esophagectomy and proximal gastrectomy with the exception of endoscopic treatment at a very early stage (10, 11). Distal esophagectomy and total gastrectomy are preferred in type II tumors (10, 11). The standard surgical approach in type III tumors is total gastrectomy and D1 lymph node dissection (12).

10-20% of GEJ tumors are potentially resectable and systemic recurrence is detected in 70% despite curative surgery (13). For this reason, adjuvant, neoadjuvant chemotherapy, and chemoradiotherapy have been considered as part of treatment (14). The SWOG9008 / INT 0116 study reported that the OS was prolonged from 27 months to 36 months in gastric and GEJ tumors with postoperative chemoradiotherapy as compared to surgery alone ($p<0.005$) (15). In this study, 21% of the patients had GEJ tumor. Another neoadjuvant study, the MAGIC study included 11.5% patients with GEJ tumors, and reported that 3 cycles of preoperative ECF (epirubicin, cisplatin, 5-FU) increased survival as compared to surgery (16). In a study involving only GEJ tumors, the overall survival was increased from 11 months to 16 months with preoperative chemoradiotherapy ($p=0.01$) (17). In the German Study Group study comparing pre-operative chemoradiotherapy (CT-RT) with only chemotherapy, a 3-year increase was reported in OS with preoperative CT-RT (18). Preoperative chemoradiotherapy is preferred in Siewert I and II tumors, while preoperative chemotherapy is used in type 3 tumors as in gastric tumors (19).

In our study, we evaluated the clinicopathologic features, survival rates and differences in treatment in GEJ tumors according to Siewert classification, among patients who have been treated in 3 different oncology centers in our country. We think that our study retrospectively analyzing the treatment approaches and characteristics of GEJ tumors, a group we frequently treat in oncology clinics, will reflect the approach to these tumors in our country

MATERIAL AND METHODS

We evaluated a total of 1320 patients with gastro-esophageal cancer who have been treated and followed-up in three separate oncology clinics in Istanbul between 2005 and 2014. We retrospectively analyzed 187 patients who have been operated for GEJ adenocarcinoma. Patients were classified as Siewert I, II, or III according to their endoscopic diagnosis and postoperative pathology reports. We excluded patients with other gastric and esophageal tumors. Data regarding clinicopathologic characteristics, type of surgery, additional treatments, and the survival period were extracted from patient files after obtaining written consent. The study was made according to Helsinki Declaration. The tumors were staged according to IUACC 7th edition (20).

Statistical Analysis

We evaluated the data by using Statistical Package for the Social Sciences 17 (SPSS Inc.; Chicago, IL, USA). Categorical values were compared with chi-square and Fisher's exact test. The data are presented as median (range:). We calculated overall survival (OS) as the time from the diagnosis until the date of last observation or until the date of death. Disease-free survival (DFS) was accepted as the time when recurrence was detected or as the period between the last follow-up and the diagnosis if there was no recurrence. We evaluated the OS and DFS by the Kaplan-Meier method, and the survival-related factors were analyzed by the log-rank test. We analyzed independent risk factors for OS and DFS by using the COX-proportional hazard model. We considered a p value <0.05 to be statistically significant.

RESULTS

The median age of our patients is 62 years (35-88), and approximately 70% (number: 130) was male. Total gastrectomy was performed in 144 patients (77%), 25 of whom underwent additional distal esophagectomy. Proximal gastrectomy and distal esophagectomy was performed in the remaining 43 patients (23%). Approximately two thirds of the patients underwent D1 and D2 lymph

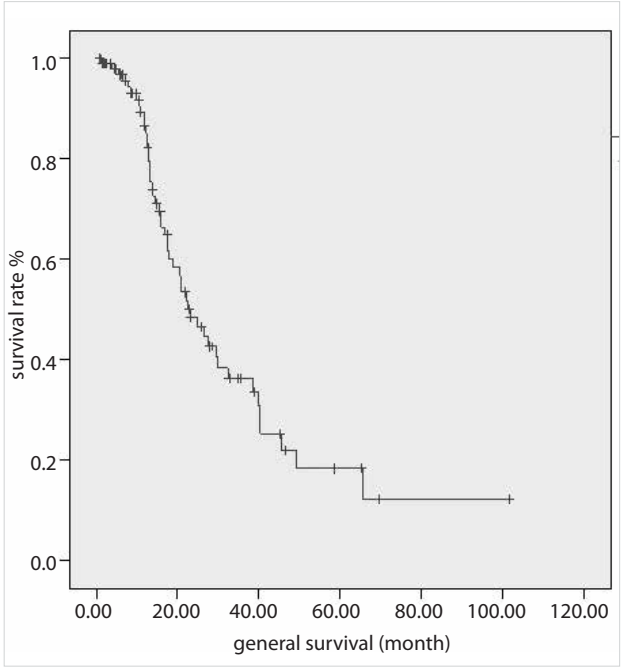
Table 1. Clinicopathologic properties according to Siewert classification

Properties	Siewert I	Siewert II	Siewert III	p
Gender				
Female	3 (15.7)	11 (27.5)	43 (33.5)	
Male	16 (84.3)	29 (72.5)	85 (66.5)	0.2
Age				
≤50	4 (21)	3 (7.5)	20 (15.6)	
>50	15 (79)	37 (92.5)	108 (84.4)	0.3
Histopathology				
Mucinous adenocarcinoma	12 (63.1)	30 (75)	100 (78.1)	
Signet ring cell	2 (10.5)	3 (7.5)	9 (7)	
Carcinoma	5 (26.4)	7 (17.5)	15 (11.7)	
Mixed	0	0	4 (3.2)	0.4
Lymph node dissection				
D0	2 (10.5)	2 (5)	3 (2.3)	
D1	9 (47.5)	11 (27.5)	50 (39)	
D2	4 (21)	16 (40)	50 (39)	
D3	4 (21)	11 (27.5)	25 (19.7)	0.001
T stage				
T0	1 (5.2)	0	0	
T1	0	0	3 (2.3)	
T2	2 (10.5)	2 (5)	35 (27.3)	
T3	4 (21)	21 (52.5)	44 (34.3)	
T4	12 (63.6)	17 (42.5)	46 (36.1)	0.001
N stage				
N0	4 (21)	7 (17.5)	26 (20.3)	
N1	3 (16)	5 (12.5)	34 (26.5)	
N2	4 (21)	10 (25)	38 (29.6)	
N3	8 (42)	18 (45)	30 (23.6)	0.1
Stage				
1	1 (5.2)	0	12 (9.3)	
2	3 (16)	9 (22.5)	41 (32)	
3	11 (57.8)	27 (67.5)	72 (56.2)	
4	4 (21)	4 (10)	3 (2.5)	0.006
LI				
Absent	3 (16)	11 (27.5)	36 (28.1)	
Present	14 (73.5)	29 (72.5)	88 (68.7)	
Unknown	2 (10.5)	0	4 (3.2)	0.2
VI				
Absent	4 (21)	15 (37.5)	37(28.9)	
Present	13 (68.5)	23 (57.5)	85 (66.4)	
Unknown	2 (10.5)	2 (5)	6 (4.7)	0.5
PNI				
Absent	5 (26.3)	11 (27.5)	32 (25)	
Present	13 (68.5)	28 (70)	90 (70.3)	
Unknown	1 (5.2)	1 (2.5)	6 (4.7)	0.9

Table 1. Clinicopathologic properties according to Siewert classification (continued)

Properties	Siewert I	Siewert II	Siewert III	p
Borrmann classification				
Type 1 (polipoid)	1 (10.2)	0	2 (1.5)	
Type 2 (fungating)	0	2 (5)	2 (1.5)	
Type 3 (ulcerated)	15 (73.8)	33 (82.5)	105 (82)	
Type 4 (diffuse infiltrative)	3 (16)	2 (5)	5 (3.9)	
Unknown	0	3 (7.5)	14 (11.1)	0.1
Lauren classification				
Intestinal	4 (21)	9 (22.5)	44 (34.3)	
Diffuse	3 (16)	2 (5)	27 (21)	
Mixed	1(10.2)	4 (10)	3 (2.3)	
Unknown	11 (52.8)	25 (62.5)	54 (42.4)	0.03
Grade				
1	0	0	9 (7.2)	
2	5 (26.3)	18 (45)	56 (43.7)	
3	14 (73.7)	19 (47.5)	60 (46.8)	
Unknown	0	3 (7.5)	3(2.3)	0.08
Surgical margin				
Positive	4 (21)	15 (37.5)	26 (20.4)	
Negative	15 (79)	25 (62.5)	102 (79.6)	0.08
Metastasis				
Present	6 (31.5)	6 (15)	6 (4.6)	
Absent	13 (68.5)	34 (85)	122 (95.4)	<0.001
Preoperative CT-RT				
Present	9 (47.3)	5 (12.5)	0	
Absent	10 (52.8)	35 (87.5)	128 (100)	<0.001
Recurrence				
Present	8 (42.1)	21 (52.5)	65 (50.7)	
Absent	11 (47.9)	19 (47.5)	63 (49.3)	0.7
Type Of Surgery				
Total Gastrectomy	12(63.1)	39 (97.5)	93 (72.6)	
Proximal Gastrectomy	7 (36.9)	1 (2.5)	35 (27.4)	0.02

LI: lymphatic invasion; VI: vascular invasion; PNI: perineural invasion; CT: chemotherapy; RT: radiotherapy
Datas are presented as n (%).



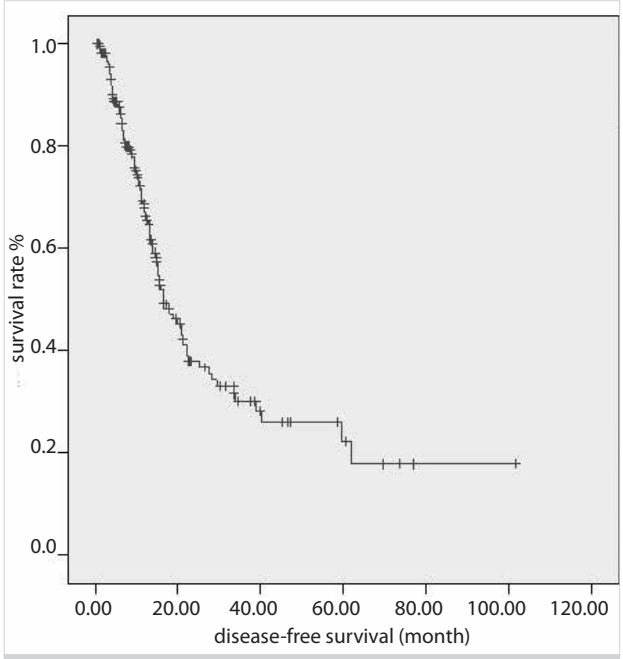


Figure 1. a, b. (a) OS curve, (b) DFS curve

node dissection, and 53.7% had D0 while 21% had D3 dissection. The median number of extracted lymph nodes was 22 (4-76), and that of metastatic lymph nodes was 4 (0-69). Pathologic stage III (58.8%) and stage II (28.3%) disease was more frequent with 7% stage 1 and 5.9% stage 4 disease. A total of 142 patients (75.9%) underwent R0 resection. R1 resection was performed in the remaining 45 patients. 7.5% of patients received preoperative chemoradiotherapy, neoadjuvant 5-FU based treatment was applied to 15 patients, and adjuvant chemotherapy was applied to 162 patients (5-FU, capecitabine, CF, ECF). 124 of the patients who received adjuvant chemotherapy also received postoperative radiotherapy.

Evaluation of the differences in patient clinicopathologic features according to Siewert classification showed that a more aggressive lymph node dissection (D2, D3) was performed in Siewert II tumors whereas D1 dissection was performed more in Siewert I tumors. Patients with Siewert I tumors were at advanced T and pathologic stages, and their metastasis detection rate was also high. Siewert III patients presented at earlier pathologic and T stages. From the surgical treatment point of view, total gastrectomy was performed more in Siewert II tumors whereas proximal gastrectomy was performed more frequently in type I and III (p=0.02). The number of patients with total gastrectomy and proximal gastrectomy within Siewert I, II and III patients was 12 and 7, 39 and 1, and 93 and 35, respectively. Distal esophagectomy was performed in 25 patients with total gastrectomy and 4 with proximal gastrectomy. The type of surgery was not associated with survival rate (Table 1).

During a median follow-up of 13.9 months, the OS and 2-year survival rates were identified as 26.6 months and 55.9%, while the median DFS and 2-year DFS rates were 16.5 months and 37.9%, respectively. The OS and DFS curves are shown in Figure 1

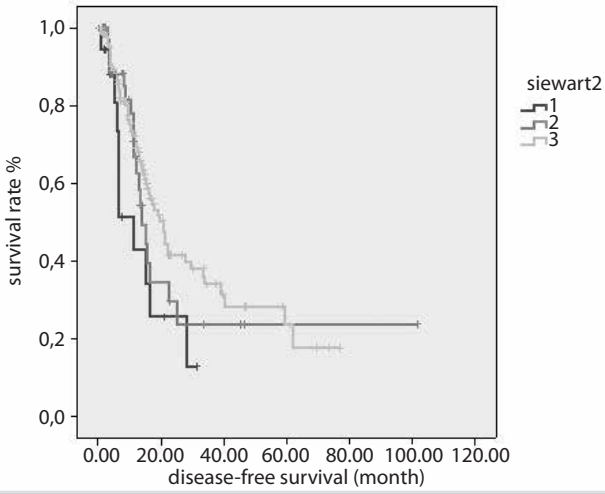


Figure 2. DFS curves according to Siewert classification

The overall survival rate of patients did not differ according to Siewert classification (p=0.5), while the DFS was increased in patients with Siewert III tumors (11.3 months in Siewert I, 14 months in II, and 20.8 months in III) despite not reaching statistical significance (p=0.08) (Figure 2). Recurrence was detected in 93 (49.7%) patients, the most frequent sites being the liver, peritoneum, loco-regional, lung, bone, ovary, brain and multiple metastases. The site of recurrence did not differ among groups according to the Siewert classification. On univariate analysis; N stage, pathologic stage, lymphatic invasion (LI), vascular invasion (VI), perineural invasion (PNI), surgical margin, and grade were associated with both OS and DFS, while recurrence and histopathologic type were associated with overall survival. The results of univariate analysis are shown in Table 2. On multivariate analysis; stage, grade, and recurrence were found as independent risk factors for OS, while grade, surgical margin, and preoperative chemoradiotherapy were independent risk factors for DFS (Table 3).

Table 2. Univariate analysis results

Properties	2 year OS number n (%)	2 year OS ratio (%)	Median OS (month)	Margin	p	2 year DFS ratio (%)	Median DFS (month)	Margin	p
Gender									
Female	57 (30.5)	57.5	33.2	15.7-50.6		43.8	21.1	14-28.2	
Male	130 (69.5)	55.1	24.5	19.7-31.1	0.7	35.4	16.4	12.-19.9	0.2
Age									
≤50	27 (14.4)	64.2	25.4	3.7-47		45.3	22.1	0-45.4	
>50	160 (85.6)	54.7	26.6	20.4-37.7	0.6	36.6	16.4	13-19.7	0.3
Histopathology									
Adenocarcinoma	142 (75.9)	57.1	28.7	21.7-35.6		40.3	17.9	13.2-22.6	
Mucinous	14 (7.5)	46.7	23.1	2.5-43.6		25	9.7	0-25.9	
Signet ring cell	27 (14.4)	53.4	25	10.3-39.6		44.7	15.5	13-17.9	
Mixed	4 (2.1)	25	13	8.5-17.5	0.04	0	11.8	5.6-18.1	0.3
Lymph node dissection									
D0	7 (3.7)	Na				85.7	Na	na	
D1	70 (37.4)	57.6				32.9	16	11.9-20	
D2	70 (37.4)	53.8				32.4	16.4	8.4-24.3	
D3	40 (21.4)	48.7	Na	na	0.1	43.3	15.4	1.5-29.3	0.1
T stage									
T0	(0.5)	Na							
T1	3 (1.6)	Na				na			
T2	39 (20.9)	60.6				48.1			
T3	69 (36.9)	52.1				35.4			
T4	175 (40.1)	51.9	Na	na	0.2	31	Na	na	na
N stage									
N0	37 (19.8)	76.8	Na	na		60.5	Na	na	
N1	42 (22.5)	70.1	40.3	20.6-59.9		52.4	22.1	0-49.1	
N2	52 (27.8)	53.9	26.6	12.1-41		33.8	16.5	9-24	
N3	36 (29.9)	33.8	15.8	11.2-20.4	0.001	20.1	13	9.7-16.3	<0.001

Table 2. Univariate analysis results (continued)

Properties	2 year OS number n (%)	2 year OS ratio (%)	Median OS (month)	Margin	p	2 year DFS ratio (%)	Median DFS (month)	Margin	p
Stage									
1	13 (7)	60.6	24.6	na		49.4	20.8	na	
2	53 (28.3)	80.3	na	na		64.9	na	na	
3	110 (58.8)	49.9	23.1	18.4-27.7		29.4	14.5	12-17	
4	11 (5.9)	20	15.8	10.3-21.3	<0.001	0	11.2	4.2-18.2	<0.001
LI									
Absent	50 (26.7)	75	na	na		51.6	25.1	15.3-34.8	
Present	131 (70.1)	48.2	22.5	16.1-28.9	0.004	32.1	14.5	12.5-16.5	0.03
VI									
Absent	56 (29.9)	70	22.9	20.7-110		5.5	27.6	11.8-43.4	
Present	121 (67.4)	49	22.5	16.4-28.5	0.001	30	14.5	12.4-16.6	0.01
PNI									
Absent	48 (25.7)	69.9	17.9	10.2-80.8		61.3	38.9	7.4-70.4	
Present	131 (70.1)	50.1	3.5	17.1-31	0.001	29.9	14	11.7-16.2	0.002
Borrmann classification									
Type 1 (polipoid)									
Type 2 (fungating)	3 (1.6)	na	19	na	na	20.8	na		
Type 3 (ulcerated)	4 (2.1)	75	45.5	0-92.8	75	38.9	0.6-77.2		
Type 4 (diffuse infiltrative)	153 (81.8)	56.8	27.6	22.3-32.9	37.7	16.4	13.2-16.9		
Unknown	10 (5.3)	50	12.6	4-21.1	0.7	46.4	10.4	2.2-18.5	0.2
Siewert									
I	19 (10.1)	38.4	19	11.8-26.1		25.7	11.3	3-19.5	
II	40 (21.3)	48.1	23.1	15.5-30.6		28.6	14	11-16.9	
III	128 (68.6)	60.6	27.9	22.7-33	0.5	41.5	20.8	16.5-29.2	0.08
Lauren classification									
Intestinal	57 (30.5)	76.7	29.8	23.9-35.6		47.8	21.1	10.3-31.9	
Diffuse	32 (17.1)	52.1	na	na		47	15.4	2.5-28.3	
Mixed	8 (4.3)	68.6	16.5	0-56	0.1	34.3	17.2	7.3-27.1	0.2
Surgical margin									
Positive	45 (24.1)	44.9	17.6	9.1-26.1		20.6	11.2	6.3-16	
Negative	142 (75.9)	57.3	29.8	16.9-42.6	0.01	42.9	22.8	15.9-25.6	0.001
Grade									
1	9 (4.8)	85.7	45.5	na		62.5	27.6	16.6-38.7	
2	79 (42.2)	60.5	27.9	14.9-40.8		36.6	20.8	14.1-27.4	
3	93 (49.7)	51.2	24.1	19.1-29	<0.001	38	1.5	12.8-18.1	0.01
Neoadjuvant CT									
Present	15 (8)	14	17.5	7.6-27.4		na	6.6	6.2-7.1	
Absent	172 (92)	58.6	27.9	21-34.7	0.03	40.1	17.9	13.4-22.4	<0.001
Preoperative CT-RT									
Present	14 (7.5)	13	17.5	7.6-27.4		na	6.6	6.1-7.1	
Absent	173 (92.5)	58.6	27.9	21-34.7	0.03	40.2	18	14.1-23.9	<0.01
Recurrence									
Present	93 (49.7)	36.1	17.9	13.3-22.4					
Absent	94 (50.3)	98	na	na	<0.001				

LI: lymphatic invasion; VI: vascular invasion; PNI: perineural invasion; CT: chemotherapy; RT: radiotherapy; na: not applicable

Table 3. Multivariate analysis results

	Overall survival		Disease-free survival	
properties	**HR**	**p**	**HR**	**p**
grade	0.81	0.01	0.94	<0.001
recurrence	0.84	<0.001		
Surgical margin			0.30	0.009
Preop CT-RT			0.59	0.02

HR: hazard ratio; CT: chemotherapy; RT: radiotherapy

DISCUSSION

In our study, we evaluated the clinicopathologic features, treatment methods and survival rates of 187 patients with GEJ tumor by grouping them according to the Siewert classification. The T stage of Siewert I tumors was more advanced than the others, and presence of metastasis at the time of diagnosis was higher in group I as compared to the others. However, the overall survival rates were similar in each group. Disease-free survival rate was the longest in Siewert III and the shortest in group I, although not statistically significant.

Leers et al. (2) evaluated the data on 509 GEJ tumor according to their location. Including patient symptoms, they reported that reflux symptoms, Barrett's esophagus, and intestinal metaplasia was more frequent in proximal tumors. Since our patients have been referred to our clinic after surgery, we could not evaluate their symptoms. In their study, the presence of lymph node metastases, T and N stages were similar between the groups while in our study, T stage, pathologic stage, and Lauren diffuse classification was higher in proximal tumors. The OS, DFS, and recurrence patterns were not different between groups, as in our study. Systemic recurrence and the most common liver metastasis rates were around 25% in their study like the 20% rate in our study.

Bai et al. (10) evaluated 203 GEJ tumor according to the Siewert classification, and they reported 29 type I, 80 type II, and 94 type III patients. Type I tumors were also less frequent in our study. Unlike Western societies, in our community similar to the Asian race, this finding may be due to the relatively less frequent occurrence of Barrett's esophagus and intestinal metaplasia. An et al. (12) compared 251 cardia tumors with other gastric tumors, and reported that cardia tumors were at more advanced stages and that the 5-year survival rate during 40-months follow-up was 79.7%. They also found lymph node metastasis as an independent risk factor for DFS. Our follow-up period of 13.9 months is the most obvious limiting factor in our study. However, our study is noteworthy not only for including GEJ tumors alone but also for evaluating the differences according to their location and prognosis. In our study group, the median OS was found as 26.6 months. Since our follow-up period is short, the 2-year OS rate, rather than 5 years, was determined as 55.9%. The shorter survival rate may be due to the surgical technique as well as diagnosis of symptomatic patients at more advanced stages.

In a study evaluating the impact of tumor location on survival in GEJ tumors according to the SEER data, 1474 distal esophageal tumors were compared with 192 cardia tumors and no survival difference was reported (21). Feith et al. (7) detected a better survival rate in type I and II tumors as compared to type III tumors. In our series, there was no difference in survival between the three groups, although type I tumors were more aggressive and had more advanced stages. However, type III tumors tended to have a better DFS. This difference may be related to differences in surgical operations performed in our population and in different centers. Distal esophagectomy and subtotal gastrectomy with D1 lymph node dissection was preferred for surgery in proximal tumors, while total gastrectomy and D2 or D3 lymph node dissection was favored more in type 3 tumors.

It is recommended that Siewert I tumors should be staged and treated as esophageal cancer while III tumors as gastric cancer (1). Rüdiger Siewert et al. (4) has shown that esophagectomy does not provide an advantage over extended gastrectomy in type II tumors. Only 67 of our cases had esophagectomy, 24 of which were total and the remaining distal esophagectomies, and no survival benefit was detected in accordance with the literature.

The presence of lymph node metastasis, T stage, N stage, gender, grade, and surgical margin have been shown as independent prognostic factors in GEJ tumors (22). Similar to the literature, stage and grade were independent factors for OS, while grade and surgical margin were associated with DFS. In addition, presence of recurrence was found as an independent risk factor for OS, and preoperative chemoradiotherapy for DFS.

CONCLUSION

Our study is important since it assesses differences in clinicopathologic features and survival according to location in GEJ tumors alone, and because it reflects our population and treatment approaches, despite the short follow-up period and limited number of patients.

Ethics Committee Approval: Authors declared that the research was conducted according to the principles of the World Medical Association Declaration of Helsinki "Ethical Principles for Medical Research Involving Human Subjects", (amended in October 2013).

Informed Consent: Written informed consent was obtained from patient who participated in this study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - B.B.O.U.; Design - B.B.O.U., M.T., A.S.; Supervision - A.B.; Resource - C.G., A.S.; Materials - M.T., A.S., R.U.; Data Collection - B.B.O.U., R.U.; Analysis and/or Interpretation - R.U., A.B.; Literature Search - Ö.B., M.A.; Writing Manuscript - B.B.O.U.; Critical Reviews - C.G.

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Is it necessary to perform prophylactic cholecystectomy for all symptomatic gallbladder polyps diagnosed with ultrasound?

Mehmet Velidedeoğlu[1], Bülent Çitgez[2], Akif Enes Arıkan[1], Fadıl Ayan[1]

ABSTRACT

Objective: The main aim of this study is to determine the necessity of cholecystectomy in patients with ultrasound diagnosed symptomatic polypoid lesions of the gallbladder.

Material and Methods: The data of 82 patients with polypoid lesions of the gallbladder who had cholecystectomy between 2000 and 2012 were analyzed retrospectively with preoperative ultrasound and histopathology results.

Results: The mean age was 48.05±11.18 years (range 25-74 years). All patients underwent preoperative ultrasound examination. Eighteen (22%) of the 82 patients were asymptomatic; their polypoid lesions of the gallbladder were detected with ultrasound during a check-up or other reasons. In 45 (55%) of cases pathology reported no polypoid lesions of the gallbladder. Right upper quadrant or epigastric pain was the most common symptom (41.46%) that led to hepatobiliary ultrasound, the other symptom was dyspepsia (36.59%). On preoperative ultrasound evaluation, 22 patients had multiple polyps, and 9 of these 22 patients had at least 3 polyps.

Conclusion: There is an inaccuracy of ultrasound to detect polypoid lesions of the gallbladder. After diagnosing polypoid lesions of the gallbladder by using standard ultrasound, further pre-operative diagnostic tests are needed to help discriminating benign lesions from malignant ones, which may prevent unnecessary surgery regardless of symptoms.

Keywords: Cholecystectomy, gallbladder cancer, gallbladder polyps, ultrasound

INTRODUCTION

Polypoid lesions of the gallbladder (PLGs), are defined as immobile echoes protruding from the gallbladder wall into the lumen by ultrasonography (US), and the mass lesions occurred as a result of protrusion from the wall to the inside of the gallbladder, regardless of neoplastic potential (1). PLGs are often diagnosed incidentally following a routine abdominal ultrasound or cholecystectomy for other reasons as gallstones or biliary colic (1-3). The prevalence of PLGs in healthy people according to US findings is reported as 4.0-5.6%. On the other hand the frequency in cholecystectomy specimens is between 2.6% and 12.1% (4-10). In 1970 a simplified classification of benign tumors and pseudotumors were offered that allows separation of neoplastic conditions from non-neoplastic ones on the basis of 180 cases together with the review of the literature (11). Benign tumors are epithelial tumors including papillary and nonpapillary adenomas, supporting tissue tumors including hemangioma, lipoma, leiomyoma, and granular cell tumor. Benign pseudotumors are hyperplastic lesions including adenomatous and adenomyomatous heterotropias including pancreas, liver, gastric and intestinal mucosa. Cholesterol and inflammatory polyps are the other benign pseudotumors. The last group also can be mentioned as miscellaneous including fibroxanthogranulomatous inflammation, parasitic infection and the others (11). Cholesterolosis and hyperplasia are the inflammatory polyps (3). Adenomas and carcinoma in situ are classified as neoplastic polyps and the rest are non-neoplastic, according to current accepted classification (12). Malign PLGs are gallbladder carcinomas (3). The increasing use of US and the improving resolution of abdominal imaging modalities led to discover PLGs more frequently (7, 13). Endoscopic ultrasound (EUS) makes very high-resolution images so will possibly play an important role in the management of gallbladder polyps (14). Unfortunately to detect the biological nature and differentiate tumorous polyps from nontumorous ones before the surgery is difficult, so the indication for cholecystectomy is not clear (7, 13). A summary of indications for surgery is in Table 1 (6, 15-17). The main aim of this study is to determine the necessity of cholecystectomy in patients with US diagnosed symptomatic PLGs. And the secondary outcomes of this study are clinical characteristics of subjects with PLGs, the diagnostic accuracy of ultrasound, and to investigate the operative indications.

MATERIAL AND METHODS

The records of 82 consecutive patients with PLGs, diagnosed by the US, who underwent either open cholecystectomy (OC) or laparoscopic cholecystectomy (LC) by one surgeon in Cerrahpaşa School of Medicine from 2000 to 2012, were reviewed retrospectively. Clinical data including age, sex, symptoms, and histopathological characteristics of the PLGs were collected. All the patients underwent US preoperatively. U.S. was performed by multiple operators The pathologic findings were classified according to Christensen and Ishak's system (11).

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[1]Department of General Surgery, İstanbul University Cerrahpaşa School of Medicine, İstanbul, Turkey

[2]Clinic of General Surgery, Şişli Hamidiye Etfal Training and Research Hospital, İstanbul, Turkey

Address for Correspondence
Bülent Çitgez
e-mail: bcitgez@yahoo.com

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Mobile, dependent echogenic foci within the gallbladder lumen with posterior acoustic shadowing in the ultrasonographic examination was accepted as criteria for the diagnosis of gallstones. Any mucosal projection into the lumen of the gallbladder that was fixed to the gallbladder wall and did not cast acoustic shadowing in the ultrasonographic examination was accepted criteria for the diagnosis of gallbladder polyps (18).

Statistical Analysis

All averages were denoted as mean±standart deviation. Student's t-test, Pearson's chi-square tests were used for comparisons. Statistics Package for Social Sciences 20.0 (IBM Corp., Armonk, NY, USA) was used for analysis. This study was conducted in accordance with the Helsinki Declaration. Patient constent forms were assigned and approval for this study was given by Ethical Committee of İstanbul University Cerrahpaşa School of Medicine.

RESULTS

Of the 82 patients 35 were male and 47 were female with a ratio of 0.74. The mean age was 48.05±11.18 years (range 25-74 years). Patients underwent either OC (n=4) or LC (n=78). Sixty-four of all patients (78.04%) had some form of symptoms, while 18 (21.95%) were asymptomatic. Right upper quadrant or epigastric pain was the most common symptom (n=34, 41.46%) and dyspepsia (n=30, 36.59%) was the other symptom.

According to the results of the histopathology there was no polyp [PLGs (-) group] in the gallbladder in 45(55%) of the 82 PLGs patients who were preoperatively diagnosed by US. Of these, 35 patients had only chronic cholecystitis, 10 had gallstones. All patients who had gallstone in PLGs (-) group also had chronic cholecystitis. In PLGs (+) group (patients with histopathologically confirmed PLGs), there were 17 males and 20 females, whereas there were 18 males and 27 females in PLGs (-) group (p=0.588). Mean age was 50.70±11.78 in PLGs (+) group and 45.87±10.27 in PLGs (-) group (p=0.051). In PLGs (-) group 19 patients had dyspepsia, 18 patients had right upper quadrant or epigastric pain, and 8 patients had no symptom where as in PLGs (+) group 11 patients had dyspepsia, 16 patients had right upper quadrant or epigastric pain, and 10 patients had no symptom. So symptom was not a helpful factor to differentiate each group (p=0.425).

Table 1. Indications for cholecystectomy in PLGs patients (23)

Highly recommend cholecystectomy
Any symptomatic patient (pain, flatulence, food intolerance, and nausea)
Any patient with concomitant cholelithiasis
Polyp diameter >1 cm
Enlarging size of polyp between serial ultrasonograms
Consider cholecystectomy
Polyp diameter 0.6-1.0 cm
Patient age >50 yr
Single polyp vs. multiple polyps
Sessile polyp vs. pedunculated polyp
Observation acceptable (controversial)
Size <0.5 cm and patient is not symptomatic

PLGs: Polypoid lesions of the gallbladder

Table 2. Histopathologic findings of PLGs and characteristics of patients

Type	Female	Male
Benign		
Cholesterol polyp	6 (46.15)	7 (53.84)
Cholesterolosis	13 (56.52)	10 (43.47)
Papillar adenoma	1 (50)	1 (50)
Gastric metaplasia	2 (66.6)	1 (33.33)
Epitelial hiperplasia	1 (25)	3 (75)
Malignant		

PLGs: Polypoid lesions of the gallbladder
Datas are presented as n (%).

Thirteen (16%) cholesterol polyps with a diameter of 3.94±2.83 mm were found in which ten (54%) were multiple lesions. All of them had a diameter of less than 10 mm and only one (14%) of them was complicated by gallbladder stones. There were 23 cholesterolosis with a diameter less than 10 mm, four (57%) of them had concomitant gallstones. Three of the cholesterolosis were multiple lesions. Papillary adenoma was seen in two specimens with a diameter of 10 and 3 mm. The specimen having 3 mm diameter lesion also had another smaller lesion. There were three gastric focal metaplasia lesions with a diameter less than 1 mm. There were four epithelial hyperplasias with a diameter less than 3 mm. One of them had multiple lesions. Non-neoplastic polyps include cholesterol polyps, inflammatory polyps (cholesterolosis and hyperplasia), and gastric metaplasia. Papillary adenoma was the only neoplastic polyp. There was no malignant polyp and one of the two neoplastic polyps (papillary adenomas) was symptomatic. Histopathological findings are denoted in Table 2-5.

In patients ≥50 years-old, 20 patients had non-neoplastic polyps and two had neoplastic polyps whereas in patients younger than 50 years-old, 15 patients had non-neoplastic polyps and no patient had neoplastic polyp. Therefore, being over 49 years-old had no discriminatory effect on having neoplastic or non-neoplastic polyp (p=0.23).

DISCUSSION

As a result of wide use of routine abdominal US, the frequency of detecting the elevated lesions of the gallbladder called PLGs has increased such as 4.0-5.6% in healthy subjects (2, 4, 7, 13). Adenomas and carcinoma in situ are classified as neoplastic polyps and the rest are non-neoplastic, according to current accepted classification (3). Malign PLGs are gallbladder carcinomas. In the previous literature (3) the occurrence of PLGs is equal in both sex, however in our study PLGs were more common in females (M:F=17:20), a finding also suggested by recent studies (4, 19, 20). PLGs were found most often in third to fifth decades of life in our study which was correlated with previous studies, besides a higher prevalence in 70 years old population was reported from Denmark (20). Although age is a significant factor that increases the probability of malignancy, our results did not confirm this, as there were 22 (59%) patients with PLGs whose ages were over or equal to 50 years, and no malignant PLGs was seen in any patients (6, 7). There were only two patients over 50 years-old who had neoplastic polyps as adenomas.

Cholesterolosis is described as a submucosal deposit of esters of cholesterol chiefly in histiocytes. According to published reports, it has less surgical significance because it does not have an association with inflammation thus no severe symptoms

are seen (21). However in our study 17 of 23 (74%) patients were symptomatic, and there were concomitant gallstones only in four patients. So at least 13 patients had symptoms related with cholesterolosis. Cholesterol polyps, which are characteristically smaller than 10 mm and multiple, are the most common polypoid lesions and have no malignant potential (19). In our series, cholesterol polyps were smaller than 10 mm but were not the most common lesion.

As having the advantages of its accessibility and low cost, abdominal ultrasound seems to be the best available choice to detect the PLGs, besides has a technical limitation because of the intraobserver variability in interpretation (3, 22). U.S. examination is operator dependent and is less specific than the EUS most suitable for the evaluation and study of polypoid lesions of the gallbladder (PLGs) At the point of the size, polyps bigger than 5 mm are generally demonstrable with US (23). Endoscopic ultrasound (EUS) is superior to conventional US in differentiating polyps in the gallbladder (97% versus 76%) (24, 25). The PLGs diagnosed by US can be missed even up to 60% by unenhanced computerized tomography (CT) scans (26). The sensitivity of CT decreases especially on the polyps smaller than 10 mm (3, 27). In a study, a poor correlation was reported between ultrasonographic and pathological findings in the assessment of PLGs (28). Our study also reveals the inaccuracy of gallbladder US for the diagnosis of PLGs, thus the correct diagnosis by US confirmed with the pathology was 45.12%. Even recent advances in the diagnostic imaging modalities rapidly develops, it is still difficult to differentiate tumorous polyps from non-tumorous ones before surgery, thus there is no general agreement about the indications for cholecystectomy (3, 7, 13). Although the incidence of the carcinoma is low in PLGs, being afraid of developing cancerous changes of gallbladder polyps, surgery is preferred by also many patients and surgeons. On the other hand, there is a possible relation between the cholecystectomy and colon cancer risk according to many epidemiologic reports (29-32). The composition and secretion of the bile acid pool changes after cholecystectomy, the exposure of colonic mucosa to the carcinogenic secondary bile acids is a likely result (33, 34). Cholecystectomy also causes an increase of the incidence of gastritis as a result of bile regurgitation (35). There is no discussion on the indication of surgery for the symptomatic PLGs patients regardless of the size, however asymptomatic polyps is a dilemma for the clinician. In our study, in cholesterolosis group, seven of 23 patients (30%) have dyspepsia, in one of them there was concomitant gallstone. Ten patients (43%) had right upper quadrant or epigastric pain, in three of them there were concomitant gallstones, and six (26%) had no symptoms. In cholesterol polyp group, four of 13 patients (31%) had dyspepsia and there was no concomitant gallstone. Four patients (31%) had right upper quadrant or epigastric pain, in one of them there was concomitant gallstone, and five (38%) had no symptoms. So even there was no malignant potential, just because of having symptoms, surgery was preferred easily for the patients having cholesterolosis or cholesterol polyps. This study shows that there is an inaccuracy of US to detect the PLGs. According to the results of the histopathology it was seen that 45 of the 82 PLGs patients, who has diagnosed preoperatively by US, had no polyps in their gallbladders. These 45 patients had chronic cholecystitis and 10 of them had concomitant gallstones. So retrospectively we concluded that 35 patients should have not undergone surgery. Seventeen of 23 (73.91%) patients in cholesterolosis group were symptomatic and there were concomitant gallstones only in four patients. So at least 13 patients had symptoms related with cholesterolosis. Eight of 13 (61.54%) patients in cholesterol polyp group were symptomatic, and there was concomitant gallstone only in one patient. So at least 12 patients had symptoms related with cholesterol polyp. At least 25 patients underwent surgery just because of they were symptomatic, even they had benign lesions such as cholesterolosis and cholesterol polyps.

After detecting PLGs by the standard US, further diagnostic tests are needed to help discriminating benign lesions from malignant ones. The routine use of endoscopic EUS is recommended, because distinguishing signs for cholesterol polyps are possible with EUS (27). EUS has ability of stratifying polyps into high or low risk for malignancy and then can alter the decision of surgery due to having

Table 3. The disrubition of lesions

	Numbers of		Size of (mm)	
Lesions	Multiple	Single	<10 mm	>10 mm
Nonneoplastic	12	31	43	0
Neoplastic	1	1	1	1
Total	13	32	44	1

mm: millimeter

Table 4. Histologic diagnosis and size of polypoid gallbladder lesions

Size (mm)	Cholesterol polyp	Cholesterolosis	Adenoma	Hyperplasia	Gastric metaplasia
<10 mm	13	23	1	4	3
≥10 mm	0	0	1	0	0
Total	13	23	2	4	3

mm: millimeter

Table 5. Patients characteristics

	Cholesterol polyp	Cholesterolosis	Adenoma	Hyperplasia	Gastric metaplasia
Mean age (years)	49.69±12.64	54.17±10.87	62±2.66	43.75±12.07	52.33±17.04
Number of men	7	10	1	3	1
Number of women	6	13	1	1	2
Number of patients with gallstones	1	4	0	1	0
Numbers of patients with symptoms	8	17	1	4	3
Dyspepsia	4	7	0	2	1
Right epigastric pain	4	10	1	2	2
No symptom	0	6	0	0	0

symptoms (22). By the use of EUS, many polyps can be confidently monitored with serial imagings instead of unnecessary surgery.

CONCLUSION

It must be thought again before deciding to make such an aggressive approach as cholecystectomy for PLG solely depending on US findings, with considering the disadvantages of the surgery and lack of an organ. The routine use of endoscopic EUS is strongly recommended for evaluating the PLGs.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of İstanbul University Cerrahpaşa School of Medicine.

Informed Consent: Written informed consent was obtained from patient who participated in this study.

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A new approach in bowel preparation before colonoscopy in patients with constipation: A prospective, randomized, investigator-blinded trial

Murat Yıldar, İsmail Yaman, Murat Başbuğ, Faruk Çavdar, Hasan Topfedaisi, Hayrullah Derici

ABSTRACT

Objective: Enema administration in the morning of routine colonoscopy is known to be useless. However, the potential bowel cleansing effects of distal colon emptying with enema prior to purgatives are not known. The aim of this study is to investigate the effects of enema use before purgatives in preparation for colonoscopy.

Material and Methods: Two hundred twenty-seven patients were randomly assigned into three groups; enema before purgative use, enema after purgative use, and no enema. Patients were compared in terms of age, sex, BMI, Rome III constipation criteria, history of abdominal surgery, tolerance to the preparation procedure, complications during preparation such as nausea, vomiting, headache and dizziness, cecal insertion time, total duration of colonoscopy, polyp determination rate and colonic cleansing based on the Boston Bowel Preparation Scale.

Results: One hundred two (44.9%) patients were male and 125 (55.1%) female. The mean age and BMI was 55.4±11.8 years and 28.8±4.7, respectively. No difference was observed between the groups in terms of sex, age, or BMI. The number of fulfilled Rome criteria and of previous abdominal surgeries were significantly higher in females than in men. Right colon Boston Bowel Preparation Scale score was higher in the group using enemas before purgatives than the scores of other groups. This improvement was statistically significant in the female patient group with higher constipation rate.

Conclusions: Use of enemas before purgatives in patients with constipation significantly improves adequacy of right colon cleansing.

Keywords: Bowel preparation, colonoscopy, constipation, sennoside A&B, sodium phosphate enema

INTRODUCTION

Colonoscopy is widely used for the diagnosis and treatment of colon lesions. Adequate bowel cleansing forms the basis of successful colonoscopy (1). Purgatives are widely used for bowel cleansing (2). Experimental and clinical studies aimed at providing optimum colon cleansing are still being performed.

Solutions containing polyethylene glycol (PEG) and sodium phosphate (NaP) are generally used in colonoscopy preparations. The sennosides are generally used in combination with PEG. The use of sennosides without PEG combination is controversial (3). Enema is an agent that evacuates the distal colon and was a basic component of colonoscopy preparation before the introduction of PEG (2). However, it was later reported that additional enema use following colonic cleansing with purgatives was useless and caused patient discomfort (4). With this anecdotal information, the colonoscopy preparation document prepared by the American Society for Gastrointestinal Endoscopy (ASGE) recommended the use of enemas in individuals in whom poor preparation was observed during colonoscopy or in case of presence of de-functional bowel segment such as Hartmann's procedure (2). Despite these recommendations, enemas are being routinely used before colonoscopy as a standard approach in colon cleansing protocols in some general surgery and gastroenterological endoscopy units.

Sloots et al. (5) reported that bowel cleansing shortened colonic transit time, especially in patients with constipation. Bowel cleansing was performed with Klean-Prep® in both patients and volunteers in their study. They reported that radioactive markers were expelled more quickly from the colon with bowel cleansing. In light of these findings, we thought that emptying the distal colon before purgative use can enhance the effect of purgatives by increasing bowel activity. With this aim, we investigated the effects of enema administration before purgative use on colonoscopy preparation.

MATERIAL AND METHODS

This prospective study was performed on patients who were referred to our clinic for elective total colonoscopy either for screening or evaluation of abdominal pain or fecal occult blood positivity. Patients younger than 18 years of age or with previous colorectal resection were excluded. All colonoscopies were performed by experienced endoscopists performing more than 150 colonoscopies annually, between 9:00 AM and 2:00 PM. A video colonoscope (EC-380LKp; Pentax, Japan) was used. Midazolam + pentidine HCL was used for sedation in all procedures. Patients were monitored during colonoscopy and their blood pressure, heart rate and pe-

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Department of General Surgery, Balıkesir University School of Medicine, Balıkesir, Turkey

Address for Correspondence
Murat Yıldar
e-mail: muratyildar@hotmail.com

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ripheral oxygen saturation were kept under control. Midazolam + pentidine HCL was administered by a nurse under endoscopist supervision. The standard oral purgative agent used in the pre-colonoscopy cleansing protocol contained sennoside A+B calcium (XM®; solution 250 mL, Yenişehir Lab., Ankara, Turkey). The enema administered by the rectal route contained sodium hydrogen phosphate and disodium hydrogen phosphate (BT®; enema 210 mL, Yenişehir Lab., Ankara, Turkey). Approval for this prospective observational study was obtained from Çanakkale Onsekiz Mart University Clinical Research Ethical Committee. All participants were informed of potential complications before the procedure, and written informed consent was obtained.

Patients were randomly assigned into one of three groups using sequential group forms by endoscopy nurses. Patients in all groups were given a clear diet without pulp one day before the procedure. Purgatives were given twice, at 11:00 AM and 6:00 PM, at a rate of 125 mL, on the day before colonoscopy. Group 1 (Pre-enema) patients were administered fleet enema by the rectal route at 10:00 AM before purgative administration, one day before the procedure. Group 2 (Post-enema) patients received enema by the rectal route in the hospital on the day of colonoscopy. Group 3 (No enema) patients did not receive enema.

Patients were assessed in terms of constipation using the Rome constipation criteria and their demographic data were recorded before colonoscopy (6). Previous abdominal surgeries were noted. Preparatory procedure tolerance was defined as very comfortable, comfortable, uncomfortable and very uncomfortable, and symptoms such as nausea, vomiting, abdominal pain, dizziness and headache were described as none, mild, moderate or severe. Colonic cleansing was scored by the endoscopist blind to the cleansing protocol with the Boston Bowel Preparation scale (BBPS) (Table 1) (7). The endoscopist scored the right colon (the cecum and ascending colon), transverse colon (hepatic and splenic flexures), and the left colon (descending colon, sigmoid colon and rectum) separately. The minimum total score was 0 and maximum total score was 9. Cecal intubation and total colonoscopy times and presence of polyp or tumor were also recorded.

Statistical Analysis

Data were summarized as means, standard deviation, median (min-max) and percentages. ANOVA or the Kruskal-Wallis test were used for intergroup comparisons depending on normal distribution of data (using the Lilliefors test), with the Post Hoc test if necessary. Categorical data were compared using the chi square test. Values less than 0.05 were regarded as statistically significant. Analysis was performed with Statistical Package for the Social Sciences 20 software (SPSS Inc.; IBM, Armonk, NY, USA).

RESULTS

Patient Characteristics

Patients identified as not adhering to the diet or with incomplete colonoscopy due to pain were excluded from the study. Of the remaining 227 patients, 102 (44.9%) were male and 125 (55.1%) female. The mean age and BMI were 55.4±11.8 and 28.8±4.7, respectively. The groups were similar in terms of age, sex or BMI (Table 2). The mean number of fulfilled Rome constipation criteria were higher in female patients than in males (1.3±1.8 and 0.8±1.4, p=0.4). There was no statistically significant difference between the groups in terms of Rome criteria (Table 2). Evaluation of previous abdominal surgeries revealed a history of laparoscopic abdominal surgery in 22/125 (17.6%) women and in 12/102 (11.7%) men, and conventional open abdominal surgery in 28/125 (22.4%) women and in 5/102 (4.9%) men. Female patients had a significantly higher number of previous surgeries (p<0.001).

Table 1. Boston Bowel Preparation Scale

0	Unprepared colon segment with mucosa not seen due to solid stool that cannot be cleared
1	Portion of mucosa of the colon segment seen, but other areas of the colon segment not well seen due to staining, residual stool and/or opaque liquid
2	Minor amount of residual staining, small fragments of stool and/or opaque liquid, but mucosa of colon segment seen well
3	Entire mucosa of colon segment seen well with no residual staining, small fragments of stool or opaque liquid

Table 2. All groups' demographic data. Lengths of procedure and polyp detection rates

	Pre-enema	Post-enema	No enema	p
Number (No.)	78	78	71	
Age*	55.1±12.5	55.6±11.9	55.6±11.1	0.958
Sex				
Female#	42 (53.8)	44 (56.4)	39 (54.9)	0.949
Male#	36 (46.2)	34 (43.6)	32 (45.1)	
Body mass index*	28.7±4.6	29.3±5.0	28.4±4.3	0.498
Rome criteria*	1.0±1.5	1.1±1.8	1.1±1.7	0.532
Cecalentubation time*	9.8±5.4	8.8±4.3	9.0±4.0	0.361
Length of procedure*	17.6±7.2	16.5±5.4	17.2±7.3	0.637
Polyp detection rate*	26 (33.3)	21 (26.9)	20 (28.2)	0.670

Datas are presented as *mean±standard deviation, #n (%).

Patient Tolerance and Side-Effects

Patient satisfaction with the preparation procedure was 86.4% (196/227). No significant difference was determined in preparation procedure tolerance in terms of complications such as nausea, vomiting, abdominal pain, dizziness and headache (Table 3).

Effectiveness of Colonic Cleansing

There was no significant difference between the groups in terms of total BBPS scores (p=0.469). Right colon BBPS scores was increased with pre-purgative enema use, but the increase was not significant as compared to other groups (p=0.109). Comparison between women only, excluding men, revealed a significantly higher right colonic cleansing score in the group using enemas before purgatives as compared to other groups. No difference was determined between the groups in terms of the other parameters investigated. The effect on the study groups' BBPS scores in male and female patients is shown in Table 4.

Duration of Colonoscopy and Other Findings

Mean cecal intubation time was 9.2±4.6 min, and total duration of colonoscopy was 17±6.7 min. Cecal intubation and total colonoscopy times were similar in all three groups (Table 2). One or more polyps were detected in 67 (29.5%), and tumoral lesions were detected in 11 (4.8%) patients. The rates of poyp detection were also similar in all three groups (Table 2).

Table 3. Tolerance to preparation procedure in all groups, nausea, vomiting, abdominal pain, dizziness and headache

	Pre-enema (n= 78)	Post-enema (n= 78)	No enema (n= 71)	p†
	Tolerance to preparation procedure			
Very comfortable	39 (50.0)	44 (56.4)	27 (38.6)	0.336
Comfortable	29 (37.2)	25 (32.1)	32 (45.7)	
Uncomfortable	9 (11.5)	9 (11.5)	11 (15.7)	
Very uncomfortable	1 (1.3)	0 (0)	0 (0)	
	Nausea			
None	57 (73.1)	54 (69.2)	47 (66.2)	0.349
Mild	15 (19.2)	22 (28.2)	17 (23.9)	
Moderate	5 (6.4)	2 (2.6)	7 (9.9)	
Severe	1 (1.3)	0 (0)	0 (0)	
	Vomiting			
None	75 (96.2)	74 (97.4)	68 (95.8)	0.446
Mild	2 (2.6)	1 (1.3)	0 (0)	
Moderate	1 (1.3)	1 (1.3)	3 (4.2)	
Severe	0 (0)	0 (0)	0 (0)	
	Abdominal pain			
None	65 (83.3)	69 (88.5)	61 (85.9)	0.826
Mild	8 (10.3)	7 (9)	7 (9.9)	
Moderate	5 (6.4)	2 (2.6)	3 (4.2)	
Severe	0 (0)	0 (0)	0 (0)	
	Dizziness			
None	75 (96.2)	74 (96.1)	68 (95.8)	0.863
Mild	2 (2.6)	3 (3.9)	2 (2.8)	
Moderate	1 (1.3)	0 (0)	1 (1.4)	
Severe	0 (0)	0 (0)	0 (0)	
	Headache			
None	74 (94.9)	75 (98.7)	67 (94.4)	0.677
Mild	3 (3.8)	1 (1.3)	3 (4.2)	
Moderate	1 (1.3)	0 (0)	1 (1.4)	
Severe	0 (0)	0 (0)	0 (0)	

†Chi Square Test
Data are presented as n (%).

DISCUSSION

Evacuation of the distal colon with enemas immediately before purgative use in individuals undergoing preparation for colonoscopy significantly improved right colonic cleansing in this study, particularly in women. It has been reported that fecal impaction in the rectum has an inhibitory effect on bowel movements (5). We think that the probable reason why enema increased right colonic cleansing in this study is that it potentializes the purgative effect by emptying the rectum prior to purgative use. This observation in the female patient group was attributed to the higher prevalence of constipation in females than in males (8).

Table 4. Cleansing scores for colon segments according to the BBPS scale for men and women in all groups

	Female			Men		
Location and score	Pre-enema (n= 42)	Post-enema (n= 44)	No enema (n= 39)	Pre-enema (n= 36)	Post-enema (n= 34)	No enema (n= 32)
Right colon†						
3	18 (42.9)	11 (25)	9 (23.1)	11 (30.6)	12 (35.3)	12 (37.5)
2	19 (45.2)	17 (38.6)	18 (46.2)	20 (55.6)	16 (47.1)	13 (40.6)
1	5 (11.9)	15 (34.1)	12 (30.8)	4 (11.1)	5 (14.7)	6 (18.8)
0	0 (0)	1 (2.3)	0 (0)	1 (2.8)	1 (2.9)	1 (3.1)
p††		0.017			0.993	
Transverse colon†						
3	27 (64.3)	22 (50)	26(66.7)	21 (58.3)	18 (52.9)	24 (75)
2	13 (31.0)	16 (34.4)	8 (20.5)	9 (25)	14 (41.2)	7 (21.9)
1	2 (4.8)	6 (13.6)	5 (12.8)	6 (16.7)	1 (2.9)	1 (3.1)
0	0 (0)	0 (0)	0 (0)	0 (0)	1 (2.9)	0 (0)
p††		0.245			0.147	
Left colon†						
3	20 (47.6)	27 (61.4)	25 (64.1)	20 (58.3)	20 (58.86)	18 (56.3)
2	19 (45.2)	11 (25)	10 (25.6)	11 (30.6)	13 (38.2)	10 (31.3)
1	3 (7.1)	6 (13.6)	4 (10.3)	4(11.1)	0 (0)	4 (12.5)
0	0 (0)	0 (0)	0 (0)	0 (0)	1 (2.9)	0 (0)
p††		0.470			0.889	

†Right colon: includes the cecum and ascending colon; transverse colon: includes the hepatic and splenic flexures; left colon: includes the descending colon; sigmoid colon and rectum.
††Kruskal-Wallis test; BBPS: Boston Bowel Preparation Scale
Data are presented as n (%).

Colonic cleansing is one of the main factors affecting colonoscopy quality. Bowel cleansing technique for colonoscopy has undergone significant changes over the course of time.

The first methods employed in colonic cleansing involved diet restriction for a few days, oral cathartics and cathartic enema use (9). These methods led to fluid and electrolyte imbalances. With the discovery of more effective purgatives, the earlier traditional few-day clear fluid diet was gradually replaced by the better tolerated fiber-free diets (10, 11).

In 1980, Davis et al. (12) reported that they had developed a polyethylene glycol electrolyte lavage solution (PEG) with minimal fluid and electrolyte absorption and secretion. Although this solution was effective and safe, the necessity of high volume consumption, high salt content, and unpleasant odor due to its sodium sulphate component has led to modifications in the solution and development of low volume osmotic laxatives (13).

In 1990, Vanner et al. (14) developed a low volume sodium phosphate solution that was better tolerated. However, in the 2000s, side-effects associated with sodium phosphate like electrolyte impairments and renal toxicity restricted its use to high-risk groups such as children, the elderly, and those with diseases such as kidney failure and hypertension (15).

Low volume osmotic laxatives containing magnesium have been reported to be insufficient when used alone but are effective when combined with other agents such as sodium picosulphate. These agents, which are well tolerated and effective as compared to PEG, unfortunately have the risks of causing dehydration, electrolyte changes and magnesium retention due to osmotic activity (16).

Sennosides are stimulating laxative-purgatives frequently employed in the treatment of constipation via increasing colonic motility, accelerating colonic transit time, and reducing fluid electrolyte secretion (17). They are frequently used in addition to PEG regimen, but have been shown to be as effective as PEG by themselves (3). However, the role of sennosides alone in colonic cleansing is controversial (2).

Sennoside A+B calcium salt was used as a purgative in this study. We did not use PEG and NaP, which are known to perform better cleansing at standard doses, since the improving effect of the enema might have been masked. In Sloots et al. (5) study, the basis for our hypothesis, colonic transit time was significantly shorter in patients with constipation than in those without. With pre-purgative enema administration in our study, BBPS scores increased, although the difference was not statistically significant. Although not statistically significant, constipation was higher in female patients in terms of Rome criteria. Additionally, abdominal surgery history which is described as a separate risk factor for constipation was significantly higher in female patients. Both these factors might be the reason of statistically higher right colon BBPS scores. In other words, pre-purgative enema use improved right colon cleansing in patients with constipation. No significant difference was observed in terms of other parameters, such as tolerance, complications, length of procedure, or polyp detection.

CONCLUSION

Use of enemas before purgatives increases right colon cleansing in patients with tendency to constipation, such as female gender and a history of previous abdominal surgery. Further studies are needed to establish patient-specific colonoscopy preparation protocols.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Çanakkale Onsekiz Mart University Clinical Research Ethical Committee.

Informed Consent: Written informed consent was obtained from patients who participated in this study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - M.Y., İ.Y., M.B.; Design - M.Y., H.D., F.Ç.; Supervision - H.D., İ.Y., M.Y.; Resource - M.Y., H.D., F.Ç.; Materials - M.Y., İ.Y., H.D.; Data Collection and/or Processing - M.Y., İ.Y., M.B.; Analysis and/or Interpretation - M.Y., F.Ç., H.T.; Literature Search - M.Y., İ.Y., H.D.; Writing Manuscript - M.Y., F.Ç., H.D.; Critical Reviews - M.Y., M.B., İ.Y.

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Analysis of the publishing rate and the number of citations of general surgery dissertations

Burhan Mayir, Tuna Bilecik, Tuğrul Çakır, Uğur Doğan, Umut Rıza Gündüz, Arif Aslaner, Mehmet Tahir Oruç

ABSTRACT

Objective: A dissertation is a scientific document. However, if it is not published in a scientific journal, it will gain access to only a limited audience and thus will be unable to achieve its objective. Nevertheless, the rate of publishing in journals is not high among dissertations. In this study, we aimed to investigate the publishing rates of general surgery dissertations in journals and the total number of citations.

Material and Methods: All medical dissertations that have been prepared at general surgery departments of university hospitals and presented between the years 2006 and 2008 were analyzed. The authors checked whether the dissertations were published in a journal or not, by searching the dissertation in 4 different resources with the name of their authors.

Results: Two hundred and thirty-two dissertations were included. Half of those dissertations were experimental animal studies. Seventy dissertations were published in various journals. Fifty one (22%) of these were published in Science Citation Index Expanded journals, while 19 (8.1%) of them were published in Turkish non-Science Citation Index Expanded journals. There was no significant difference in terms of publishing rates between study types. The number of annual citations per article was 1.1. The writer of the dissertation was the first author in 35 (68,6%) articles.

Conclusion: The publishing rates of dissertations in general surgery is low, with only 22% being published in Science Citation Index Expanded journals. The citation rate was also detected to be low in our study. Consequently, a dissertation should be considered as a scientific research study and planned as such, not as obligatory assignments. The publishing rates of dissertations should be increased, and authors should be led and encouraged to publish their dissertations.

Keywords: Dissertation, education, publication, research

INTRODUCTION

A dissertation is a scientific document reflecting qualifications of a medical doctor who is to become specialized in making specific research studies and analyses in his discipline and drawing scientific conclusions from analyses. The Regulation on Medical Specialization in Turkey requires that all candidates prepare and submit medical dissertations at the completion of their medical residency. However, the rate of dissertations published in a scientific journal is not high in our country (1, 2). In this study, we aimed to investigate the publishing rates of general surgery dissertations in journals and the total number of citations.

MATERIAL AND METHODS

All medical dissertations that have been prepared in general surgery departments of university hospitals and presented between the years 2006 and 2008 were analyzed within the scope of the study. Dissertations were identified by searching the Electronic Archive of Higher Education Council Dissertation Center (http://tez.yok.gov.tr/UlusalTezMerkezi/) database. Data regarding the subject and type of research, as well as the university hospital name were recorded.

Afterwards, the dissertations were sought in different databases, i.e. PubMed, Thomson Reuters Web of Science, Google Scholar database, and Turkmedline website (www.turkmedline.net) through which many international journals can be reached, by the author names to check whether they had been published in a journal or not. In case of publication; if the journal was included in the Science Citation Index Expanded (SCIE), the date when the article was published, the first author, the person who made the article publicly available, and the number of citations to the related article were evaluated from Thomson Reuters Web of Science. Citations were assessed by publication date, and the number of citations per year was determined.

This study was performed in accordance with the ethical standards of the Declaration of Helsinki.

Statistical Analysis

Study data was analyzed using the Statistical Package for Social Sciences (SPSS Inc.; Chicago, IL, USA) 16.0. Categorical values were analyzed by Chi-square test and non-parametric values were analyzed by

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Clinic of General Surgery, Antalya Training and Research Hospital, Antalya, Turkey

Address for Correspondence
Burhan Mayir
e-mail: burmay@yahoo.com

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Mann-Whitney U test. p value below <0.05 was considered as statistically significant.

RESULTS

Two hundred and thirty-two dissertations were completed between 2006 and 2008. 116 (50%) of those dissertations were animal studies while the other 116 (50%) were clinical studies. Of all the clinical studies, 19 (8.2%) were randomized prospective clinical studies, 10 (4.3%) were non-randomized prospective clinical studies, 22 (9.5%) were case-control studies, 9 (3.9%) were cross-sectional studies, and 55 (23.8%) were case series. Only 70 (30%) of all those dissertations have been published in journals. 51(22%) dissertations were published in SCIE journals, while 19 (8.1%) were published in Turkish non-SCIE journals. There was no significant difference between study types in terms of publishing rate as shown in Table 1.

Table 1. Publishing rates of dissertations according to study types

Study type	Total	Published	Publishing rate (%)
Randomized prospective clinical studies	19	3	15.8
Non-randomized prospective clinical studies	10	3	30.0
Case-control studies	22	5	22.7
Cross-sectional studies	9	1	11.1
Case series	56	12	21.4
Animal studies	116	27	23.0

The time spent for a dissertation to be published after submission ranged from 1 to 7 (2.8) years. This interval was approximately 2.8 years for SCIE journals, and was 2.8 years for Turkish non-SCIE journals. There was no significant difference between journal types regarding the time to publication (p=0.621).

When SCIE journals were considered, the number of citations was between 0 and 15. Thirty-six of 51 articles have been cited in different studies while 15 of them have never been referred to. The number of references per publication was 1.1/year. Only 23 publications were cited more than once in a year.

When the authorship order in the published dissertations was analyzed it was determined that the writer of the dissertation was the first author in 35 dissertations that were published in SCIE journals. The dissertation's advisor was stated as the first author in 8 articles, while an author other than the owner or the advisor was the first author in the other 8 papers . Within the Turkish non-SCIE journals, the first author was the owner of the dissertation in 17 articles. The advisor ranked first in one publication while in another one someone other than the owner and the advisor was credited as the primary author. There was no significant difference between these two groups regarding authorship order (p=0.284). When publishing rates of dissertations in SCIE journals was assessed by subject it was found that most studies were related to colorectal cancer, intra-abdominal adhesions, and ischemia reperfusion injury as shown in Table 2.

Table 2. Publishing rates of dissertations according to subjects

Dissertation subject	Publishing rate (%)
Colorectal cancer	41
Intraabdominal adhesion	35
Ischemia-reperfusion injury	27
Thyroid diseases	21
Colorectal anastomosis	20
Breast diseases	18
Pancreas diseases	14

We also analyzed dissertation publishing rates by the location of the universities. According to this analysis, 103 (44.4%) have been conducted at the universities located in the 3 biggest cities of Turkey, namely Istanbul, Ankara and Izmir, while the remaining 129 (55.6%) have been carried out at universities in other cities of the country. When the publishing rate in SCIE journals was considered, it was observed that 29.1% of the dissertations completed in the aforementioned 3 big cities have been published in contrast to 16.3% of dissertations from other cities (p=0.019).

DISCUSSION

Although the process may change from one country to another, in some countries including Turkey, medical doctors are required to prepare and present a dissertation in completion of their residency training. Dissertation preparation helps a specialist candidate improve his/her skills required for both performing and interpreting research. While preparing a dissertation, new questions and hypothesis are set, a literature review is conducted, appropriate methods are determined for the study, and the required data is collected. Afterwards, the collected data is analyzed and the researcher tries to draw a conclusion from this analysis. Results obtained in the scope of the study are discussed in light of previous information, and presented as a study paper. Thus, it provides the specialist candidate the skills to conduct research studies and offers him/her an opportunity to use these skills (3).

A dissertation is considered a scientific paper regardless of whether it is published in a journal or not. A dissertation reveals results and informs readers about the related subject. However, if it is not published in a scientific journal, it will gain access to only a limited audience and thus will be unable to achieve its objective (4). A dissertation should be published as a scientific article to contribute to the national or international scientific literature. The publication of a dissertation is a significant marker indicating the quality of both the dissertation and the institution where the relevant study took place (5). Furthermore, if a dissertation is not published, it may be considered as a waste of time, work, and financial resource. Another ethically unfavorable aspect is that thousands of experimental animals are being used in the research phase of dissertations; therefore, if the dissertation is not published such animals may be considered to have been used for non-scientific purposes.

There is limited information in the literature regarding the publishing rate of general surgery dissertations, but relevant studies have reported a rate ranging between 17% and 52% (6-9). When the studies carried out in our country are taken

into consideration, the publishing rate is not very high. The low publishing rate may be related to the authors' not having academic expectations, the lack of incentives supporting publications, and the requirement of writing the dissertation in foreign languages such as English (1, 10). A Turkish study analyzing dissertations submitted between 1980 and 2005 identified that 6.2% have been published in journals that were included in the Medline database. The same study reported that in 2000 the number of published dissertations increased as compared to previous years. It was also indicated that the publishing rate changed with medical specialty, and that studies from surgical departments had a lower share in publications. According to that study, dissertations on general surgery were published at a rate of 5% (1). Another study from Turkey analyzed dissertations and doctoral dissertations on public health and reported that 11.9% were published in international journals while 18% were published in national medical journals. Similar to the aforementioned study, this study also reported that this rate increased in 2001 (2).

In our study, we found a higher publishing rate for dissertations as compared to previous studies. This may be related to different reasons. First of all, we searched 4 different resources to identify the publishing rate for medical dissertations. Thus, we were able to find dissertations which had been published but were not available on the PubMed website. We think that since previous studies were mainly based on PubMed database, researchers may have failed to notice several dissertations that have been published but not included in the PubMed. It was stated in the previous studies that the publishing rate showed an increase since 2000, and as our study analyzed dissertations between 2006 and 2008 it may have reflected this tendency. The increase in publishing rate may also be correlated with the fact that the included dissertations were conducted at university hospitals.

Ozgen et al. (1) suggested that the publishing rate of dissertations completed at university hospitals was 5 times higher as compared to the ones carried out at state hospitals. Therefore, this study analyzing only the dissertations completed at university hospitals revealed a higher publishing rate than other series. Other factors which may have increased the publishing rate may include the fact that becoming an academic faculty member is a more preferred profession today in our country as compared to the past. Therefore, one may prefer having published papers, which is a significant contributing factor in the academic field. Sayek et al. (11) reported that while those who wanted to have an academic career had their dissertations published at a rate of 82.4% in contrast to the 57.1% rate among those without such academic expectations. The widespread use of internet has facilitated the access to reference articles, and enhanced both the submission of manuscripts to journals and the procedures within the publication phase. Subsequently, internet has paved the way for publishing and encouraged the authors. Additionally, English has become a more commonly used language making it easier to translate dissertations into foreign languages. Thus, it has become easier for authors to prepare manuscripts for international journals. The obligation to publish in foreign languages for international medical journals may have been a cause of the low publishing rate in the past (1). Universities have also improved technically and are focusing more on the importance of research studies, which may have encouraged original studies in medical disciplines.

According to study types, half of the dissertations were animal studies. There may be different reasons for preferring animal studies for dissertation planning. As animal studies are more likely to provide original data, they might have a higher potential for publication. In this study, we also observed that animal studies had a higher publishing rate as compared to clinical studies, nevertheless, the difference was not significant. Animal studies do not require as much effort as clinical studies and they can be completed within relatively shorter time periods. The need to include a significant number of subjects, long follow-up, and possible data loss due to losing the patient during follow-up make clinical studies more difficult than animal studies. Although a prospective randomized study is the most valuable study type for medical disciplines, it is not always preferred as it requires both long time and hard work.

The present study also analyzed authorship. When SCIE journals were taken into consideration, 68% of the dissertations were published by the main author. This rate was 88% for Turkish non-SCIE journals. Similar to our study, Sipahi et al. (2) observed that the dissertation writer was the first author in 70% of international journals. This issue is ethically controversial since the individual who conducts the study should be credited as the first author.

The main limitation of the present study is that we may have overlooked some published dissertations due to different reasons, especially surname changes for female authors, although four different sources were checked to see whether the dissertations were published or not.

In this study, different from other studies on the subject, we have also investigated the citation rate of articles. Although citation of an article is not the only determinant for its quality, it is an important indicator. This is the first study attempting to get an idea on the quality of dissertations by evaluating the number of relevant citations. According to our results, published manuscripts have been cited 1.1 times per year. While 15 articles have never been cited, only 23 articles have been referred to more than once a year. These results generate a negative opinion about the quality of dissertations carried out in our country.

CONCLUSION

Although the publishing rate of dissertations in our country was higher in our study as compared to previous results, it was determined that 70% of Turkish-origin dissertations have not been published in either national or international journals. The citation rate was also detected to be low in our results. Consequently, a dissertation should be considered as a scientific research study and should be planned and approached as such. The publishing rates of dissertations should be increased, and authors should be led and encouraged to publish their dissertations.

Ethics Committee Approval: Authors declared that the research was conducted according to the principles of the World Medical Association Declaration of Helsinki "Ethical Principles for Medical Research Involving Human Subjects", (amended in October 2013).

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Case Series

Damage-control laparoscopic partial cholecystectomy with an endoscopic linear stapler

Beyza Özçınar, Ecem Memişoğlu, Ali Fuat Kaan Gök, Orhan Ağcaoğlu, Fatih Yanar, Mehmet İlhan, Hakan Teoman Yanar, Kayıhan Günay

ABSTRACT

Objective: Several damage-control procedures have been described in the literature in case of severe Calot's triangle inflammation and fibrosis. In this report, we describe patients who underwent laparoscopic partial cholecystectomy using an endoscopic linear stapler.

Materials and Methods: Five patients with acute cholecystitis underwent laparoscopic partial cholecystectomy in our clinic between January - December 2011. All patients had severe fibrosis and inflammation of Calot's triangle. The anterior and posterior walls of the gallbladder were totally resected if possible. The gallbladder was transected at its neck or Hartmann's pouch, leaving a remnant gallbladder pouch behind.

Results: Five patients had laparoscopic partial cholecystectomy with an endoscopic linear stapler. The main symptom of all patients on admission to the emergency room was abdominal pain. The mean time for the surgical procedure was 140 minutes (range, 120-180 minutes). Inflammation and fibrosis of Calot's triangle was detected in all patients during surgery and a phlegmonous gallbladder was detected in one patient. Surgical drains were used in all patients and no biliary leakage was detected. Remnant common bile duct calculi were detected in one patient and this patient underwent endoscopic retrograde cholangiopancreatography one month after surgery.

Conclusions: When a reliable view of Calot's triangle cannot be obtained due to severe inflammation and fibrosis during laparoscopy, laparoscopic partial cholecystectomy seems to be a safe and feasible alternative to open surgery with an acceptable morbidity rate.

Keywords: Acute cholecystitis, damage control surgery, endoscopic linear stapler, laparoscopy, partial cholecystectomy

INTRODUCTION

Laparoscopic management of gallstones and acute cholecystitis has become standard of care in current practice. Open cholecystectomy is usually performed in patients with severe inflammation where there is a requirement to convert to open surgery or in gallbladder malignancy.

Due to safety concerns, conversion to open surgery is advocated to prevent injury to the bile duct or major blood vessels if biliary tract anatomy cannot be clearly identified. In case of severe Calot's triangle inflammation and fibrosis, the rate of injury to the biliary tract and portal structures increase. Several damage-control procedures have been described in the literature for such circumstances (1-5).

In the current era of laparoscopy and high definition (HD) systems, conversion to open procedure for these cases is not always required. One of the damage-control procedures to be used is laparoscopic partial cholecystectomy (LPC), and various techniques have been described for LPC (6-8).

In this report, we describe patients who underwent LPC in our clinic with an endoscopic linear stapler.

MATERIAL AND METHODS

Five patients who presented to İstanbul University Istanbul School of Medicine General Surgery Department, Trauma and Emergency Medicine Unit with acute cholecystitis between January - December 2011 were included in the study. The demographic and clinical data of these patients were collected retrospectively. Informed consents were given from the patients.

All patients underwent surgery for acute cholecystitis and/or biliary pancreatitis. Laparoscopic procedures were performed in all patients with four standard trocars and HD systems (Karl Storz; GmbH & Co. KG, Tuttlingen, Germany). All patients had fibrosis and severe inflammation of Calot's triangle.

A laparoscopic partial cholecystectomy was performed in all patients. The anterior and posterior walls of the gallbladder were totally resected if possible. The gallbladder was transected at its neck or Hartmann's pouch, leaving a remnant gallbladder pouch behind. The gallbladder pouch was closed using a linear

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Department of General Surgery, İstanbul University İstanbul School of Medicine, İstanbul, Turkey

Address for Correspondence
Beyza Özçınar
e-mail: drbeyza@hotmail.com

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endoscopic stapler (Endopath Ets Articulating Linear Cutters; Johnson & Johnson, New Jersey, USA). Staple line lengths and cut line were selected according to gallbladder wall thickness (35 mm [cut line 32 mm], 45 mm [cut line 41 mm], and 60 mm [cut line 56 mm]). The pouch was cleared of remnant calculi before closing with the endoscopic stapler to minimize complications. The remnant mucosa was coagulated to reduce the secretion from mucosa and surgical drains were routinely used.

RESULTS

During a one-year period in Trauma and Emergency Medicine Unit, 200 patients underwent laparoscopic or open cholecystectomy for acute cholecystitis or biliary pancreatitis. Of the 200 patients, five underwent laparoscopic partial cholecystectomy with an endoscopic linear stapler. One (20%) of these patients was female and four (80%) were male. The mean age of patients was 49 years (range, 31-61 years). The main symptom of all patients on admission to the emergency room was abdominal pain. All patients had acute cholecystitis at admission; four patients also had acute biliary pancreatitis, and two had obstructive jaundice.

Antibiotic treatment was started on the day of admission in all patients. Two patients with obstructive jaundice underwent preoperative endoscopic retrograde cholangiopancreatography (ERCP). Papillotomy and stone extraction from the common bile duct was performed in both patients.

One patient underwent surgery in the acute phase of cholecystitis, 3 days after the onset of symptoms, two patients after recovering from the signs and symptoms of acute biliary pancreatitis at day 9 and 10. Two patients underwent surgery at later periods, one and two months after the onset of symptoms. The mean surgical procedure time was 140 minutes (range, 120-180 minutes).

Inflammation and fibrosis of Calot's triangle was detected in all patients during surgery and phlegmonous gallbladder was detected in one. Surgical drains were placed in all patients. The mean drainage time was 4.8 days (range, 1-13 days) and no biliary leakage was detected after surgery. The mean hospital length of stay was 7.4 days (range, 3-13 days). None of the patients had bile duct injury, symptoms of remnant gallstones, and/or stump cholecystitis after surgery.

None of the patients required reoperation for any reason. Remnant common bile duct calculi were detected in one patient who underwent ERCP one month later. Papillotomy and stone extraction from the common bile duct was performed in this patient. None of the patients had wound infections, subhepatic or subphrenic abscesses or hematoma after surgery. There was no in-hospital mortality. The median follow-up time was 15 months (range, 12-20 months). During the follow-up period, one patient had recurrent cholecystitis of the remnant gallbladder that was conservatively treated.

DISCUSSION

When severe inflammation and fibrosis of Calot's triangle is observed in cases of acute cholecystitis, conversion to open surgery or partial cholecystectomy (PC) is recommended to preserve the biliary tract and associated arterial structures. Partial cholecystectomy has been described in the literature since the beginning of the 20th century (1,9,10). The definition of partial cholecystectomy requires that some portion of the gallbladder is left in continuity with the cystic duct and not resected (11). Partial cholecystectomy can be performed laparoscopically or as an open procedure depending on the surgeon's experience. Experienced surgeons may feel comfortable performing damage-control procedures laparoscopically (12).

In case of a difficult gallbladder, a change in surgical strategy rather than conversion to an open approach seems more feasible. In this situation, antegrade cholecystectomy or LPC can be performed (13). Partial cholecystectomy is not surgical failure. More precisely, it is wise for a surgeon to perform a partial cholecystectomy in difficult cases rather than causing disastrous complications. Surgical skill and experience combined with good quality microscopes with HD systems play the most important role in choosing damage-control strategies (laparoscopic or open). ERCP is the best rescue method for post PC complications.

Many LPC techniques have been described in the literature. Some authors close the remnant gallbladder whereas some leave them open. Many surgeons perform only anterior wall excision and leave the posterior wall, and may or may not coagulate the remnant gallbladder mucosa. All of these techniques can be used with acceptable success rates. The choice depends on surgeon preference and the features of the case. However, the main aims in all cases should be to resect the maximum amount of gallbladder wall without major complications, remove all stones from the remnant gallbladder, and coagulate the remnant mucosa to reduce postoperative secretion. After LPC, drainage systems are used in some patients but not all. In the current report, we resected the anterior and posterior walls of the gallbladder if possible, and a minimal remnant of the gallbladder at the level of Hartmann's pouch was left in situ, remnant mucosa was coagulated, gallstones were aspirated, the remaining gallbladder pouch was closed using a linear endoscopic stapler, and surgical drainage was routinely used.

The major morbidities of LPC are bile leakage, remnant symptomatic gallstones, remnant cholecystitis, subphrenic or subhepatic abscess due to continuous drainage from the remnant mucosa, and need for reoperation. In our review of PC literature, the most common complication was bile leakage (11%), while the rate of recurrence of symptomatic gallstones was about 2% (6,14). In the present report none of the patients developed bile leakage, and there was only one case of recurrent remnant gallstones. During the follow-up period, one patient developed remnant cholecystitis, which was conservatively treated. No intraabdominal abscesses were detected. In the literature, the rate of remnant common bile duct stones after laparoscopic cholecystectomy ranges between 0.5-12% (15-17). Although postoperative remnant bile duct stones and postoperative ERCP after PC are not uncommon, it was detected in about 0-20% of cases. In our current report, ERCP was required postoperatively in only one patient (20%). This rate seems to be high; however, the current report contains a low total number of cases, which is the most important limitation of our case series.

CONCLUSION

In conclusion, when a reliable view of Calot's triangle cannot be obtained due to severe inflammation and fibrosis during laparoscopy, LPC seems to be a safe and feasible alternative to open surgery with an acceptable morbidity rate. Moreover, closure of the remnant gallbladder with an endoscopic linear stapler is also a fast, safe, and effective method as compared to hand suturing, and did not result in bile leakage in our series.

Informed Consent: Written informed consent was obtained from patients who participated in this study.

Peer-review: Externally peer-reviewed.

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Case Report

A rare case of Spigelian hernia combined with direct and indirect inguinal hernias

Murat Özgür Kılıç, Gürkan Değirmencioğlu, Cenap Dener

ABSTRACT

Spigelian hernia is a rare type of ventral hernias with nonspecific symptoms and signs. Therefore, its diagnosis is often difficult and requires more clinical attention. Although intermittent abdominal swelling and pain are the main symptoms, Spigelian hernias can be sometimes asymptomatic and are discovered incidentally at the operation. In some cases, these hernias can be associated with other abdominal wall hernias, therefore a detailed physical examination of the patients is necessary to avoid mistakes in diagnosis. Herein, we report an interesting and educational case of Spigelian hernia with accompanying ipsilateral both direct and indirect inguinal hernias in a male patient treated by open surgical repair with use of polypropylene mesh.

Keywords: Abdominal wall hernia, inguinal hernia, Spigelian hernia, ventral hernia

INTRODUCTION

Inguinal hernia is one of the most common surgical disorders in general surgery practice. Indirect form of inguinal hernia is characterized by the presence of a protruding peritoneal sac through the deep inguinal ring. However, Spigelian hernia (SH) is an uncommon type of hernia with an incidence of 0.1-2% of all abdominal wall hernias (1). SH, also known as hernia of semilunar line, is the protrusion of preperitoneal fat, peritoneal sac or intraabdominal organs through a congenital or acquired defect in the Spigelian zone. This zone is formed by the fusion of transverse abdominis and internal oblique aponeurosis, and is bounded medially by the lateral margin of the rectus muscle and laterally by the linea semilunaris. Although the Spigelian aponeurosis extends from the pubic tubercle to the costal cartilage of the eighth rib, most of SHs are located in a 6 cm wide region inferior to the umbilicus and superior to the interspinous line, which is called as the Spigelian hernia belt (Figure 1). However, low SH is rare and may mimic inguinal hernias. Additionally, coexistence of Spigelian and inguinal hernia is an extremely rare clinical entity. To our knowledge, there is a small number of cases of SH combined with inguinal hernia in the literature. Herein, we report a case of low SH with incidentally found coexisting ipsilateral inguinal hernia in a 62 years-old male patient.

CASE PRESENTATION

A 62-years-old-man presented with a painful abdominal swelling at the right lower quadrant of abdomen for approximately 3 years. He was retired with a medical past of umbilical hernia repair and laparoscopic cholecystectomy before 10 and 6 years, respectively, and diabetes mellitus under treatment. Abdominal examination revealed the presence of a painful, reducible bulge located between the umbilicus and right anterior superior iliac spine (Figure 2). The mass was more prominent while the patient was standing and coughing. Ultrasound (US) revealed a fascial defect, 18 mm in diameter, at the lateral border of the rectus muscle in the right lower quadrant with herniation of bowel loops. The hernia sac was revealed by transverse skin incision, and it was seen that there was not any sign of incarceration. On visualization of surgical area, we suspected a small swelling at the deep ring of inguinal cord. The patient was performed valsalva maneuver, and thus the presence of both direct and indirect inguinal hernia was demonstrated (Figure 3). Both inguinal region and Spigelian defect were revealed by classic steps. All hernial defects were closed with primary sutures, and then reduced into the abdomen. Lichtenstein technique was performed for inguinal hernias, and then the upper part of the patch has been extended up to the Spigelian defect, and thus all hernial defects were completely closed. The postoperative course was uneventful, and the patient was discharged on the third postoperative day. Additionally, a written consent was obtained from the patient for this study.

DISCUSSION

Most of SH occurs through the transversalis and internal oblique fascia in the lower abdomen at the lateral border of the rectus muscle. SH can be both acquired and inherited. Pediatric cases are suspected to be congenital, however adult SH are generally considered to be acquired. These hernias are seen most

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Department of General Surgery, Turgut Özal University School of Medicine, Ankara, Turkey

Address for Correspondence
Murat Özgür Kılıç
e-mail:murat05ozgur@hotmail.com

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frequently between the ages of 50-60, and are more common in women. Although the exact etiology of SH is uncertain, various predisposing factors including collagen disorders, chronic obstructive pulmonary disease, constipation, aging, obesity, rapid weight loss, multiparity, trauma, ascites and previous surgery have been reported. Congenital SH is mostly seen in male infants, and 75% of these are associated with ipsilateral undescended testis, named as Spigelian-cryptorchidism syndrome (2, 3). In approximately half of the acquired SHs, there is a previous abdominal surgery. Some authors have suggested that almost 50% of patients with SHs had previous abdominal operations. In our patient, obesity and previous surgery likely resulted in SH formation. Correct diagnosis of these hernias by physical examination is unreliable, especially in obese patients. Because, SH originates inferior to an intact external oblique aponeurosis, and this condition usually makes its symptoms and signs nonspecific. In a retrospective study of 76 cases at the Mayo Clinic, only 64% of all SH patients could be diagnosed by physical examination (4). In another study, preoperative diagnosis was made clinically in 72% of cases (5). Therefore, a high index of suspicion and additional radiological investigations are generally required for the diagnosis of SH. The differential diagnosis includes abdominal wall tumors, hematoma of rectus sheath, diverticulitis, appendicitis, intraabdominal abscess and masses. Although US is a largely operator-dependent radiological investigation, it is usually considered to be the first step imaging method in diagnosis due to its high properties of accessibility and repeatability. Its ability to perform real time examination while the patient performs a valsalva maneuver, is also an advantage (1). However, regarding to some authors, US has high false negative rate especially in obese patients, thus contrast enhanced computed tomography (CT) should be the imaging modality of choice (6). CT may provide more information about the hernia contents and the anatomy of the surgical area (7). Although intermittently palpable mass and pain are the most common symptoms of the patients with SH (8), asymptomatic cases have also been reported. Generally, these are incidentally discovered during a routine medical check-up or operations for another surgical condition. Our patient presented with a painful abdominal mass at the right-inferior side of the umbilicus. SH is prone to incarceration and strangulation due to the narrow hernia neck. In the largest series published from the Mayo Clinic, incarceration rate has been reported to be as 24% (4). Due to the high strangulation risk, surgical repair of SH is mandatory. However, the optimal surgical approach is still controversial. Although open hernioplasty with the use of polypropylene mesh constitutes the most frequent technique, laparoscopic approaches has been increasingly used in recent years (8). Laparoscopic treatment modalities can be transperitoneal so called intraabdominal and extraperitoneal. The violation of peritoneal layer seems to be the main advantage of TEP approach, but intraabdominal SH repair was recommended as a gold standart technique due to its technical and economic advantages in a recent study (9). Independent of laparoscopic operation type, less postoperative infectious complications, less recurrence rate, less postoperative pain, less hospital stay, and early resumption of daily activities are the main advantages of laparoscopic techniques (10). However, the laparoscopic approach requires a longer learning curve as a disadvantage. We performed open surgery to our patient because of the history of previous laparotomies. Classic open

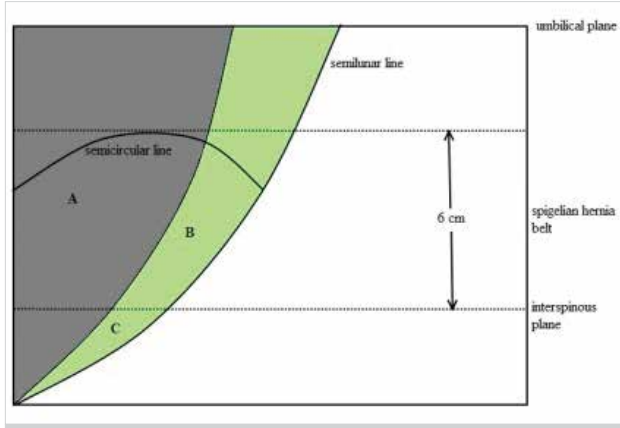

Figure 1. Illustration of the Spigelian aponeurosis (green area). A. Rectus muscle B. Area of high Spigelian hernia C. Area of low Spigelian hernia

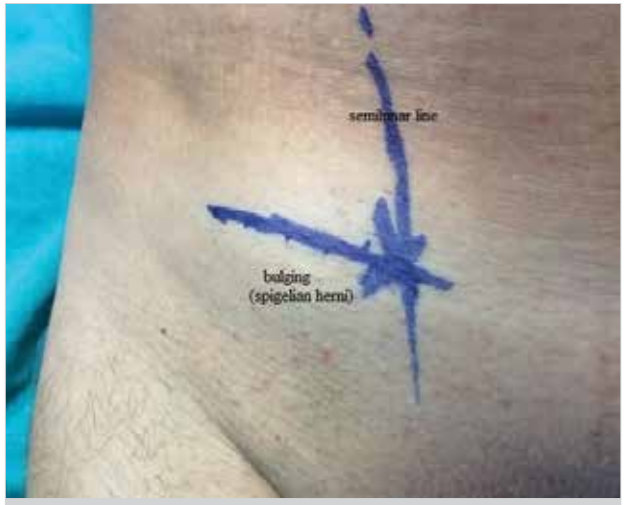

Figure 2. A bulging can be seen next to the rectus muscle. It appears especially during coughing and standing

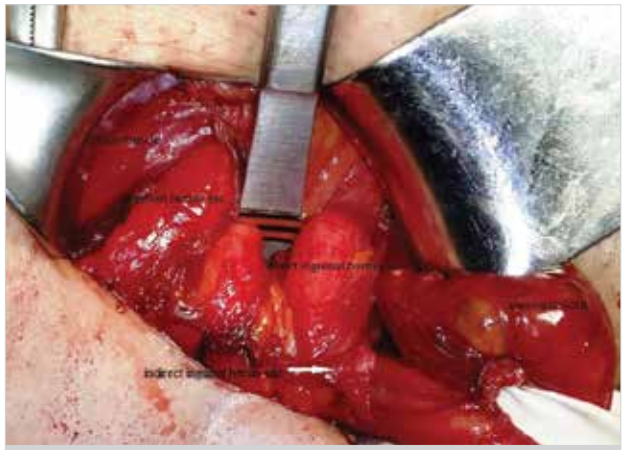

Figure 3. All-in-one view of hernias at the operation

technique can be performed with or without mesh. Primary repair can be considered for small defects, however mesh repair is appeared to be more appropriate in cases of wide defect or atrophic aponeurosis (6). In addition, open surgery is the most frequent procedure done in cases of emergency surgery (5). In our case, Spigelian defect was smaller than 2 cm, but both Spigelian area and inguinal region were weak, and thus use of prosthesis was preferred for hernia repair. In addition, lower lo-

calization of Spigelian hernia allowed us to use a single mesh. To our knowledge, this combined type of surgery on simultaneous inguinal and Spigelian hernias has not been reported in the literature. Additionally, we think that this technique can be preferred in appropriate cases.

Bilaterality of SH is an unusual condition. However, these hernias may be occasionally associated with other abdominal wall hernias (5). In a case series, 4 of 6 patients with SH had concomitant hernias including groin, umbilical and incisional hernias (11). Therefore, a detailed examination of all herniation sites in the abdominal wall should be required for all patients with SH. In our case, we found both direct and indirect inguinal hernias incidentally during the operation, but it may be detected by a whole physical examination of the patient or CT preoperatively.

CONCLUSION

Spigelian hernia is an uncommon abdominal wall defect and requires a high index of suspicion in diagnosis. The presence of pain and a palpable mass in the typical location should alert the clinicians. In addition, the coexisting of SH and other abdominal wall hernias should always be kept in mind, and hence a complete evaluation of patients should be done preoperatively.

Informed Consent: Written informed consent was obtained from patient who participated in this case.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - M.Ö.K., C.D.; Design - C.D.; Supervision - C.D., G.D.; Funding - M.Ö.K., C.D., G.D.; Materials - M.Ö.K., G.D.; Data Collection and/or Processing - M.Ö.K.; Analysis and/or Interpretation - M.Ö.K.; Literature Review - M.Ö.K.; Writer - M.Ö.K., C.D.; Critical Review - M.Ö.K., C.D., G.D.

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

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Case Report

Extremely rare presentation of an omphalomesenteric cyst in a 61-year-old patient

Recep Aktimur[1], Uğur Yaşar[2], Elif Çolak[1], Nuraydın Özlem[1]

ABSTRACT

The umbilicus is remaining scar tissue from the umbilical cord in the fetus. If the omphalomesenteric duct in the umbilicus is not properly closed, an ileal-umbilical fistula, sinus formation, cysts, or, most commonly, Meckel's diverticulum can develop. The others are very rare and mostly occur in the pediatric population. We describe herein a 61-year-old female with a giant omphalomesenteric cyst presented as an asymptomatic infraumbilical mass. To our knowledge, this is the oldest patient reported and the largest cyst described in the literature. The diagnosis of a painless abdominal mass frequently suggests malignancy in older patients. But, extremely rare conditions can be detected, such as an omphalomesenteric cyst.

Keywords: Adult, anomaly, cyst, duct, omphalomesenteric

INTRODUCTION

The umbilicus is remaining scar tissue from the umbilical cord in the fetus. It contains the urachus, omphalomesenteric duct, and the round ligament's embryonic remnants, which can be a source of many clinical problems. Also, umbilical hernia can occur in cases of closure defects of the umbilical ring. If the omphalomesenteric duct is not properly closed, an ileal-umbilical fistula, sinus formation, cysts, or Meckel's diverticulum can develop. Meckel's diverticulum is the most common omphalomesenteric duct anomaly, and it is also the most common congenital abnormality of the gastrointestinal tract (2%). Other anomalies associated with the omphalomesenteric duct are very rare and mostly occur in the pediatric population. An omphalomesenteric duct cyst may cause symptoms, such as pain, abscesses, and hernias (1, 2). We describe an unexpected case of a giant omphalomesenteric cyst presenting as an asymptomatic infraumbilical mass in a 61-year-old woman.

CASE PRESENTATION

A 61-year-old woman presented to our clinic with complaints of a palpable mass in the umbilical region. She had no pain and told us that she has had this mass for many years. Her medical history included hypertension, hyperlipidemia, coronary artery disease, and two previous coronary angiographies. The physical examination showed no abnormality, but there was a painless mass in the right infraumbilical region. The laboratory workup, including carcinoembryonic antigen (CEA) and carbohydrate antigen 19-9 (CA19-9), was normal. The abdominal computed tomography (CT) scan showed a thin-walled, regularly contoured, hypodense, cystic mass at the level of the umbilicus, slightly to the right of the anterior abdominal wall. The cyst measured 115 x 100 x 68 mm in size (Figure 1). Preoperatively, the diagnosis was not clear, but a number of possibilities were considered: an omphalomesenteric cyst, a urachal cyst, or a mesenteric cyst. She was informed about the surgery, informed consent was taken, and elective surgery was planned. A laparotomy via a median incision was performed. On exploration, the cyst was attached to the umbilicus, there was no evidence of a persistent urachus, and the cyst had no connection with the intestines (Figure 2). The cystic mass was resected with sharp dissection and removed (Figure 3). The histological diagnosis was an omphalomesenteric cyst. The postoperative course was uneventful, and the patient was discharged on day 2. There were no complications or complaints observed in a 1-month control examination.

DISCUSSION

The omphalomesenteric duct, or vitelline duct, is the embryonic link between the primary yolk sac and embryonic midgut. This connection normally closes off spontaneously at about 5-9 weeks of gestation. Omphalomesenteric duct anomalies are most commonly seen in pediatric population. Vane et al. (3) reported 217 pediatric patients, from birth to 18 years. In their series, symptomatic patients accounted for 40%, and only 15% of them were over the age of 4 years. The reported symptoms of omphalomesenteric duct remnants included abdominal pain, rectal bleeding, intestinal obstruction, umbilical drainage, and umbilical hernia (4). The male:female ratio for omphalomesenteric duct anomalies is 2:1-4:1, with a male predominance.

Adult cases of omphalomesenteric cyst are extremely rare. Surgical resection is generally performed for symptomatic omphalomesenteric duct remnants. Our patient requested surgical resection and

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[1]Clinic of General Surgery, Samsun Training and Research Hospital, Samsun, Turkey

[2]Clinic of General Surgery, Darende State Hospital, Malatya, Turkey

Address for Correspondence
Recep Aktimur
e-mail:recepaktimur@gmail.com

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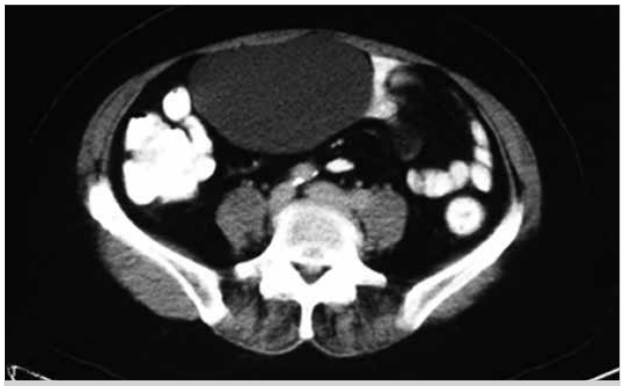

Figure 1. Abdominal computed tomography image

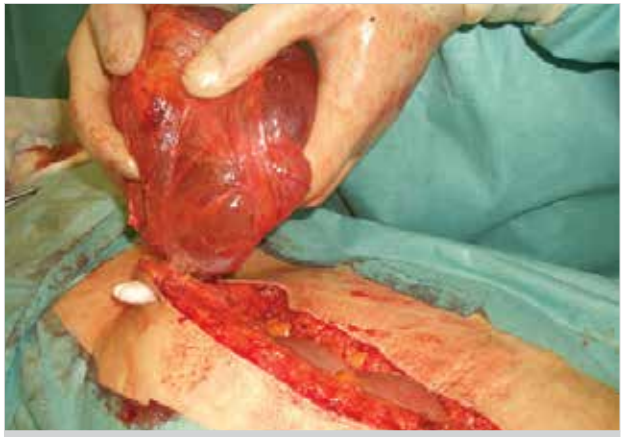

Figure 2. Omphalomesenteric cyst and umbilical connection

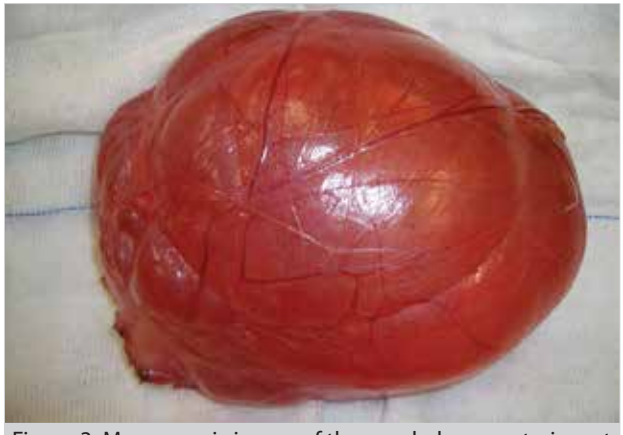

Figure 3. Macroscopic image of the omphalomesenteric cyst

presented to our general surgery department. However, the preoperative diagnosis was not clear, according to the radiological workup, and all diagnostic possibilities were benign. There are quite a few reported omphalomesenteric cyst cases in adults, and most of them advocated surgical resection in symptomatic patients. Laparoscopic and open approaches for symptomatic or asymptomatic patients have been reported. A 49-year-old female patient with an omphalomesenteric duct cyst (20 x 60 mm) abscess was treated with open surgery (2). A 24-year-old male patient with abdominal pain was treated with a totally laparoscopic approach for a 20 x 45 x 75-mm-sized omphalomesenteric cyst (1). A 29-year-old male with a 50 x 80 x 100-mm-sized omphalomesenteric cyst was treated laparoscopically, and the cyst was removed through a 5-cm abdominal incision (5). In our patient, the preoperative CT assessment revealed a cyst measuring 115 x 100 x 68 mm in size. As we considered that another incision would be needed to remove the cyst properly, we did not use a laparoscopic approach.

CONCLUSION

To the best of our knowledge, our case is the oldest patient to have an omphalomesenteric cyst, and this is the largest omphalomesenteric cyst reported in the literature. Although the diagnosis of a painless abdominal mass frequently suggests malignancy in older patients, extremely rare conditions can be detected, such as an omphalomesenteric duct anomaly. Thus, it may be helpful to remember an omphalomesenteric cyst in the differential diagnosis of someone who is admitted with complaints of an asymptomatic or symptomatic mass in the umbilical region, even in elderly patients.

Informed Consent: Written informed consent was obtained from patient who participated in this case.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - R.A., U.Y.; Design - N.Ö.; Supervision - N.Ö.; Funding - E.Ç.; Materials - E.Ç.; Data Collection and/or Processing - R.A.; Analysis and/or Interpretation - R.A.; Literature Review - R.A.; Writer - R.A.; Critical Review - N.Ö.

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

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

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Editorial comment on: Laparoscopic resection for colorectal diseases: short-term outcomes of a single center

Erdinç Kamer

Dear Editor,

I read the article on "Laparoscopic resection for colorectal diseases: short-term outcomes of a single center" by Attaallah et al. (1) with great interest. I wanted to draw attention to certain details in order to avoid misunderstanding by future readers. First, liver metastasis was detected in 2 (6%) patients. One of these patients underwent metastasectomy with abdominoperineal resection while there is no information on the other patient (Table 2) (1). I believe a brief information on laparoscopic metastasectomy (e.g. if there was a requirement for an additional port, bleeding amount, surgical drainage of the site, operation time, energy device used) in the material method section would enlighten the reader on the subject. The authors stated their conversion rates as "low" in the discussion section. I think that it would be informative to the readers if the authors presented their conversion rate and the reasons for converting in the results section.

The authors cited a study by Ertem and Baca (2) to specify the relative indications for laparoscopic colorectal surgery in the discussion section (1). However, the article by Ertem and Baca (2) has identified major cardiac disease, severe pulmonary disease, portal hypertension, coagulopathy, pregnancy, tumor obstruction or perforation, and T4 tumor as absolute contraindications. This section should be corrected in order not to mislead the reader.

In addition, this is a descriptive study in which the authors present their experience on 33 cases. There was no comparison group, and no statistical analysis was performed. I believe that it would not be right to reach the definite results mentioned in the conclusion section in such study designs.

Peer-review: Externally peer-reviewed.

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

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

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Department of General Surgery, Katip Çelebi University İzmir Atatürk Training and Research Hospital, İzmir, Turkey

Address for Correspondence
Erdinç Kamer
e-mail: erdinc.kamer@gmail.com

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Author's Reply

To the Editor,

We appreciate the commentary of Dr. Kamer.

First, liver metastasis was detected in 2 (6%) patients. Our comment on the interpretation of one patient undergoing metastasectomy with abdominoperineal resection is that the patient underwent a simultaneous resection while the other patient had liver metastasectomy at a second operation (two-stage approach). The practice in our center is to apply simultaneous resection to patients with synchronous liver metastasis if the condition of the patient is appropriate (absence of irresectable metastases outside the liver, no serious comorbidities) (1).

We did not provide much detail on laparoscopic metastasectomy, since it has been performed in a single patient (a bleeding rate cannot be determined based on one case), but the author's question is in place. Depending on the localization of the liver metastasis, an additional port may be required. The bleeding rate depends on factors such as the location and size of the metastases. We routinely place surgical drains to the metastasectomy site due to probable bile leakage. Ligasure was used as an energy device in our patient who underwent laparoscopic metastasectomy.

The rate of conversion to open surgery was expressed numerically in the results section (3 out of 36 patients) and as a rate in the discussion section (8%). Laparoscopically un-controllable bleeding was the reason for conversion.

In answer to Dr. Kamer's righteous criticism, the study published by Ertem M and Baca B. in 2006 stated major cardiac disease, severe pulmonary disease, portal hypertension, coagulopathy, pregnancy, tumor obstruction or perforation, and T4 tumor as definite contraindications. However, due to the rapid technologic progress and the increase in experience in laparoscopic surgery, contraindications in colorectal surgery are entirely relative and vary according to the experience of the surgeon and the protocols of the centers. As a matter of fact, T4 tumor is no longer considered as a contraindication (2, 3).

Wafi Attaallah

Department of General Surgery, Marmara University School of Medicine, İstanbul, Turkey

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Editorial comment on: Analysis of the İstanbul Forensic Medicine Institute expert decisions on recurrent laryngeal nerve injuries due to thyroidectomy between 2008-2012

Mehmet Hacıyanlı, Erdinç Kamer, Emine Özlem Gür

Dear Editor,

We read with great interest the study entitled "Analysis of the İstanbul Forensic Medicine Institute expert decisions on recurrent laryngeal nerve injuries due to thyroidectomy between 2008-2012 "by Karakaya et al. (1).The authors retrospectively evaluated the approach on recurrent laryngeal nerve (RLN) injuries as well as parameters taken into consideration in differentiating complication and malpractice.

According to the article, the institution consideredunilateral nerve injuries as a complication if the indication for thyroidectomy and postoperative follow-up were proper, regardless of surgical technique. However, if the injury was bilateral then the surgical technique was also evaluated. The study reported that there were no inadequacies in operation indications, type of thyroidectomy and postoperative follow-up in any of the cases in the study, and that all 19 unilateral nerve injurieshave been considered as complications. On the other hand, all 19 cases with bilateral nerve injuries were reported to have been considered as malpractice since any situation that may prevent or complicate nerve dissection was not stated in pre-operative imaging reports, operative notes, or pathology reports.

One of the criteria taken into consideration for discriminating malpractice from complication inrecurrent laryngeal nerve injurieswasthe lack of evidence on any signs that will make nerve dissection difficult, but this alone is not a sufficient criterion. We would like to emphasize the need for comprehensive evaluation parameters todefinemalpractice.

It should be standard practice to identify the integrity of the RLN visually in thyroid surgery and to state so in the operative note. Although RLN injury can be caused by mechanisms such as shearing, rupture, suturing, and thermal damage, retraction injury is also an important cause. Intraoperative neuro-monitoring (IONM) experiences have shown that visualization of an intact nerve at the time of operation does not mean that it is functionally intact (2). Temporary or permanent vocal cord paralysis may be encountered even when the nerve is visually identifiable, preserved throughout its course, and the utmost care is given during dissection.

Bilateral vocal cord paralysis may also occur due to over-inflation or traumatic withdrawal of the intubation tube (3).

Another issue that is noteworthy in the study is that although none of the patients underwent preoperative vocal cord (VC) inspection, all files have been evaluated as if all the VCs were normal before surgery. One conclusion to be drawn from this is the necessity of a VC evaluation before thyroidectomy, especially prior to secondary interventions.

We also think that, in the evaluation of these types of files, there is a need for a data system documenting the individual complication rates of surgeons on this type of surgery.

The authors stated in the discussion section that the injury "may have been missed due to not dissecting the nerve through its entire tract" and recommended in the conclusion section that "continuing the operation on the other side only after assuring that the nerve has not been damaged on one side by careful dissection may prevent surgeons from legal problems".

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Clinic of General Surgery, Katip Çelebi University İzmir Atatürk Training and Research Hospital, İzmir, Turkey

Address for Correspondence
Erdinç Kamer
e-mail: erdinc.kamer@gmail.com

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Although there are advocates that careful dissection does not increase nerve damage, currently many authors suggest that RLN is very susceptible to surgical dissection and that minimal dissection should be performed since dissection throughout its tract will put the nerve at greater risk (4, 5). Since the issue is controversial, identification of the nerve, not its dissection, should be emphasized to preclude RLN injury.

Although it is still controversial if intraoperative neuro-monitoring leads to a reduction in RLN injury, its most important contribution is providing the prognostic information on functional integrity of a visually intact nerve. Thus, it may be possible to avoid bilateral VC paralysis, and the test can offer medico-legal assurance by providingquantitative and documentable information. However, the use of IONM in thyroid surgery is not standard practice and cost-effectiveness is still an important issue.

We believe that since RLN injuries constitute a substantial part of general surgery-related case files and due to difficulties in decision-making, more objective criteria that will form the basis for evaluation of such filesshould be introduced.

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