Volume 43 Number 4
October - December 2022

ISSN 0125-6068
E-ISSN 2697-5858

THE THAI JOURNAL OF SURGERY

TJS

Official Publication of The Royal College of Surgeons of Thailand

https://he02.tci-thaijo.org/index.php/ThaiJSurg/index

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E-ISSN 2697-5858

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Author Guidelines

About the Journal

The Thai Journal of Surgery is the official publication of The Royal College of Surgeons of Thailand and is issued quarterly.

The Thai Journal of Surgery invites concise original articles in clinical and experimental surgery, surgical education, surgical history, surgical techniques, and devices, as well as review articles in surgery and related fields. Papers in basic science and translational medicine related to surgery are also welcome.

Aim & Scope

The Thai Journal of Surgery is dedicated to serving the needs of the members of The Royal College of Surgeons of Thailand, specifically the younger researchers and surgical trainees who wish to have an outlet for their research endeavors. The Royal College strives to encourage and help develop Thai Surgeons to become competent researchers in all their chosen fields. With an international outlook, The Thai Journal of Surgery welcomes submissions from outside of Thailand as well.

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Manuscripts

Manuscripts should be in the Microsoft Word Document format (.doc or .docx) only, with double spacing and 2.54 cm margins. The font used for the main text should be 12 pt. Times New Roman. Separate pages: title and abstract page, full paper, acknowledgments, references, individual tables, abstract in Thai (optional), and legends. Number pages consecutively, beginning with the title and abstract page. Type the page number in the footer of each page (center alignment). Metric measurements should be used. Generic names for drugs should be used and if trade name is mentioned, it should be put in parenthesis.

The title and abstract page of the manuscript should be typed on a separate sheet and should contain the following information:

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4. Abstract should not exceed 300 words.
5. At least 3 keywords
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7. Short running title and sources of funding, if any
8. Declaration that the manuscript has been proofread by the Journal's recommended Proofreading Service

Illustrations and Tables

All photographs and original drawings should be professionally made or drawn and uploaded as jpeg, png, tiff files with at least 300 ppi resolution. Typewritten or freehand lettering is not acceptable. The illustration should be numbered along with an appropriate description (legend/caption). Each table should be prepared on a separate sheet and should be numbered consecutively as mentioned in the text and each must have a title. All tables should be typed directly on the page using the table function in Microsoft Word and not copied and pasted. All columns must be in separated cells, but related rows in any column can be in the same cell. Otherwise, it is best to have 1 cell per item (name or number). Abbreviations in the table must be defined, either in the table or in a footnote to the table. See a concise example in the Journal's website.

References

References must be listed on a separate sheet in numeric order as referred to in the article, not alphabetically. A simplified Vancouver system is used. Only references mentioned in the text should be listed and should be selective with no more than 30 references except under unusual circumstances. Number references consecutively in the order in which they are first mentioned in the text. Identify references in text, tables, and legends by Arabic numerals (in superscript). The references must be verified by the author(s) against the original documents. Example forms of references are given below.

1. Standard Journal Article:

List all authors when three or less; when four or more, list only the first three and add et al.

- Soter NA, Wasserman SI, Austen KF. Cold urticaria: release into the circulation of histamine and eosinophil chemotactic factor of anaphylaxis during cold challenge. N Engl J Med 1976; 294:687- 90.

2. Corporate Author:

- The Committee on Enzymes of the Scandinavian Society for Clinical Chemistry and Clinical Physiology. Recommended method for the determination of gamma glutamyltransferase in blood. Scand J Clin Lab Invest 1976; 36:119-25.
- American Medical Association Department of Drugs. AMA drug evaluations. 3rd ed. Littleton: Publishing Sciences Group, 1977.

3. Personal Author(s):

- Osler AG. Complement: mechanisms and functions. Englewood Cliffs: Prentice - Hall, 1976.

4. Editor, Compiler, Chairman as Author:

- Rhooder AJ, Van Rooyen CE, comps. Textbook of virology:

for students and practitioners of medicine and the other health sciences. 5th ed. Baltimore: Williams & Wilkins, 1968.

5. **Chapter in a Book:**
   - o Weinstein L, Swartz MN. Pathogenic properties of invading microorganisms. In: Sodeman WA Jr. Sodeman WA, eds. Pathologic physiology: mechanisme of disease. Philadelphia: WB Saunders, 1974:457-72.
6. **Agency Publication:**
   - o National Center for Health Statistics. Acute conditions: incidence and associated disability, United States, July 1968-June1969. Rockville. Md.: National Center for Health statistics, 1972. Vital and health statistics. Series 10: Data from the National Health Survey, No. 69: (DHEW publication no. (HSM) 72-1036).
7. **Newspaper Article:**
   - o Shaffer RA. Advances in chemistry are starting to unlock mysteries of the brain: discoveries could help cure alcoholism and inso mnia, explain mental illness. How trhe messengers work. Wall Street Journal 1977 Aug 12:(col. 1), 10(col.1).
8. **Magazine Article:**
   - o Roueche B. Annals of medicine: the Santa Claus culture. The New Yorker 1971 Sep 4:66-81. 9.
9. **The use of the article's Digital Object Identifier (DOI):**

An article can be referenced using only the DOI for electronic Journals and online articles or the DOI can be used in addition to standard referencing to print articles.

- o Chirappapha P, Arunnart M, Lertsithichai P, et al. Evaluation the effect of preserving intercostobrachial nerve in axillary dissection for breast cancer patient. Gland Surg 2019. doi:10.21037/gs.2019.10.06.
- o Chirappapha P, Arunnart M, Lertsithichai P, et al. Evaluation the effect of preserving intercostobrachial nerve in axillary dissection for breast cancer patient. Gland Surg 2019;8:599-608. doi:10.21037/gs.2019.10.06.

Abbreviations

Use only standard abbreviations of commonly used approved abbreviations. Avoid abbreviations in the title. The full term for which an abbreviation stands should precede its first use in the text unless it is a standard unit of measurement.

Statistics

All statistical analyses and the statistical software used must be concisely described. Descriptive statistics for quantitative variables must include an appropriate central tendency measure (e.g., mean or median) as well as a corresponding measure of spread (e.g., standard deviation or range or interquartile range). Categorical variables must be summarized in terms of frequency (counts) and percentage for each category. Ordinal variables can be summarized in terms of frequency and percentage, or as quantitative variables when appropriate. Statistical tests must be named and p-values provided to 3 decimal places. P-values less than 0.001 should be written "< 0.001" and p-values approaching 1 should be written "0.999".

All statistical estimates (e.g., mean differences, odds ratios, risk ratios, hazard ratios, regression coefficients, and so on) must have corresponding 95% confidence interval limits. All statistical models used must be briefly described. Uncommon or unusual methods used should be referenced. Authors should refrain from over-modeling their dataset; for example, multivariable analyses of datasets with small sample sizes (e.g., < 100), or few outcomes (e.g. < 10), could be unreliable. Relative risks of categories in a categorical risk factor should be compared to its own reference category, which must be indicated, for example, in a table of multivariable analysis.

Randomized controlled trials should be analyzed using the intention-to-treat principle, and as treated analysis should be applied as well if there are significant cross-overs. Further details of statistical issues are available here (http://www.icmje.org/icmje-recommendations.pdf).

Standards of Reporting for Research Articles

Authors are advised that the Thai Journal of Surgery adheres to standards set by the International Committee of Medical Journal Editors (ICMJE) and the Committee on Publication Ethics (COPE). Reporting guidelines that authors should consult and follow include the CONSORT Guidelines for randomized controlled trials; PRISMA Guidelines for systematic reviews and meta-analyses of randomized controlled trials, MOOSE Guidelines for systematic reviews, and meta-analysis of observational studies; STROBE Guidelines for observational studies; and ARRIVE Guidelines for animal research. Details of these and other guidelines can be obtained from https://www.equator-network.org/reporting-guidelines/.

Common Format for Research Articles

(see Format https://bit.ly/3IaP4ZB)

Abstract: should be no more than 300 words in length, and written in a structured format, including the following headings: **Objective,** which can include some background material of 1 to 2 sentences in length, but mainly describing the research question; **Methods,** concisely describing the research design and data procurement; **Results,** describing the main findings of the study; and **Conclusion,** which should concisely answer the research question, and no more. Below the abstract, a list of keywords should be provided.

Main text: should be written in a structured format, including the following headings. **Introduction** should describe the rationale of the study within the context of current knowledge; the gap in knowledge with which the research study will fill must be clearly pointed out and a research question explicitly stated. **Methods (and patients, if applicable)** should clearly describe the details of research methodology and patient or research volunteer recruitment according to Guidelines for each type of research as listed above (…), and how the data was collected and analyzed. A short description of statistics used, and the software and references if appropriate, must be provided. A note on Ethics Committee approval, if applicable, must be given. **Results** should include data or summaries of patient or volunteer characteristics, summaries of risk factors or covariates and outcomes, presented in tabular, graphical or descriptions in the text as appropriate, without significantly duplicating one another. Results of statistical analyses must be clearly displayed and should include point estimates, standard errors, statistical tests, *p*-values, and 95% confidence intervals as detailed (…). Analyses not shown but

referred to must not change the conclusions or outcomes. **Discussion,** which must fully describe the implications of the research results, should include a concise literature review of previous published, related results. These related results must be compared with those of the authors' study, and the differences clearly stated along with plausible explanations. New unexpected findings, especially from subgroup analyses or those for which the research was not designed, should be considered hypothetical and stated as such. Any plausible, relevant clinical application should be indicated. Finally, any significant limitations of the study must be mentioned and possible extensions of research should be briefly provided. **Conclusion,** which should be concerned with answering the research question posed by the current study, should not be summarizing results of previous studies or recommendations. An **Acknowledgement** section can be added at the end of the article. The Reference list should be in the format as described previously.

Basic Science and Translational Research

Use the common format. Emphasis is on clinician comprehension. The **Abstract** uses the same common structured format. In the **Main text,** the **Introduction,** in addition to the usual context setting and rationale, should also contain explanations and descriptions of basic science concepts at the level of the educated layman. The **Methods** section should still be concise with sufficient detail for others to replicate the experiment, but one or two paragraphs in between explaining basic processes in plain English would be helpful. In the **Results** section, similar conciseness is still the rule, but a brief simplified summary of the findings should be provided. In the **Discussion,** clinical implications should be clearly stated. The **Conclusion,** again, should answer the research question.

Case Series and Case Reports

We encourage publication of case series or case reports if a comprehensive review of the literature is included, with the aim of helping the clinician manage rare and challenging diseases or conditions based on best available evidence in conjunction with practical, local experience. For the Thai Journal of Surgery, this implies that the case report format differs somewhat from that of the common format for research articles.

Abstract: Need not be structured. State objective of the case presentation, present a summary of the case, the outcome and learning points in one concise paragraph.

Main text: An **Introduction** is required to set the importance or relevance of the case within the current clinical context, based on a comprehensive literature review. A brief review of anatomy and pathology, or pathophysiology can be provided. **Report of the case** then follows with sufficient details on clinical presentation, diagnostic work up, interesting features, and decision making, to be useful for other surgeons. Surgical management should be concisely described and should be accompanied by high-resolution photographs or high-quality drawings and diagrams, if possible. Unique features of the case, and typical or general features should be distinguished. **Results** of management and follow-up information should be provided. **Discussion** then places the clinical, diagnostic, surgical and pathological features of the case within current knowledge or context and provides reasons for decision making and surgical management or otherwise. Wider implications of the case should be emphasized; for example, when management contradicts existing guidelines or when feasibility of some never-before performed surgery has been demonstrated. The **Conclusion** simply summarizes the case in terms of management implications.

Narrative Review Articles

Abstract: No structure is required. A description of the aims of the article and contents should be sufficient.

Main text: An **Introduction** serves to set the rationale or objective of the review. While systematic reviews focus on narrow research questions with aims of obtaining generalizable knowledge, the narrative review is education-based. The **main content** can be structured in any-way as is necessary for adequate comprehension. Finally, a **Conclusion** summarizes the content in greater detail than the abstract, emphasizing recent developments or future research.

Special Articles

Special articles are often solicited and may have no standard structure. But some structure will aid understanding or entice readers.

Abstract: A brief description of aims and content is sufficient.

Main text: An **Introduction** to set the aims of the article. The **main content** can be structured in any way. A **Conclusion** to summarize the content should be helpful, as well as to place some personal reflections.

Surgical Techniques

Abstract: A short description of what the techniques is about.

Main text: Description of the technique in sufficient detail such that a trained surgeon can perform the technique on his or her own. Good illustrations of the technique, step-by-step if possible, should be provided, in high-resolution photographs or well-executed drawings, or both.

Checking for Plagiarism and English Language Editing

The Thai Journal of Surgery policy on plagiarism and important notice for authors. The Thai Journal of Surgery takes the issue of plagiarism seriously. We have employed the services of the Akarawisut Plagiarism Detection (www.akarawisut.com) algorithm from Chulalongkorn University. All submitted manuscripts will undergo plagiarism checking prior to publication in the Journal. Authors must agree to this policy prior to submitting their manuscripts for publication. The results of plagiarism checking will be reported to all authors and coauthors as well as relevant authorities according to international guidelines.

Resources for English Language editing. The Thai Journal of Surgery suggests several vendors or individuals who will provide English Language Editing service for Authors of the Journal. These service providers are listed below. It is strongly recommended that Authors consider English editing by professional language editors if the manuscript has been marked as "English Editing Required" by the Journal. Recommended editing services and contact details can be obtained by emailing to rcst.tjs@gmail.com or Journal.TJS@gmail.com with a request for "English editing services".

The THAI Journal of SURGERY
Official Publication of The Royal College of Surgeons of Thailand

Vol. 43 October - December 2022 No. 4

The THAI Journal of SURGERY 2022;43(4):141-142.
Official Publication of The Royal College of Surgeons of Thailand

Editorial

Panuwat Lertsithichai, MD
Editor-in-Chief of The Thai Journal of Surgery
On Behalf of the Editorial Team

It is with profound sadness, as the current Editor-in-Chief of the Thai Journal of Surgery, that I will become a former Editor-in-Chief right after the new year. On the other hand, I am extremely proud that the Editorial Team of The Thai Journal of Surgery has done a tremendous job of transitioning our Journal to an electronic format as well as creating the infrastructure needed for a smooth running of an almost-international-level academic journal.

I have served the Journal in various capacities for almost 15 years. I strongly believe, and will continue to believe in the importance of the Journal to the Thai Surgical Community, and in the Journal's commitment to serve the needs of all Thai Surgeons, but with an international outlook. It is almost certain that the future path of the Journal would become that of a world class journal listed in reputable international databases, which I also believe to be the right path. However, to that end, requirements imposed on our Authors must be quite stringent, and may seem impossibly or at least frustratingly difficult. I apologize if these requirements and processes have caused our Colleagues some degree of mental anguish, but it is the right thing to do, as necessary as it is to hold our surgical practice standards up to international levels.

Ethical academic and scientific publishing, in which the reporting of scientific truths obtained ethically is paramount, must be a part of the Journal's unshakable foundation. The Thai Journal of Surgery is deeply committed to ethical publishing, to the extent that some behind-the-scene manuscript rejections were because of ethical issues, and I must apologize to the authors of those manuscripts. The ethical issues are often a result of ignorance or unintentional misconduct. Occasionally some unethical manuscripts will slip through our peer-review process, and may never be identified as such. It is crucial that we handle all research misconduct appropriately, and all our Surgical Colleagues must be aware of these issues. Surgical Educators must emphasize ethical research and ethical publishing, no less than ethical surgical practice.

As Editor I take my work very seriously. But as my own personal affairs have significantly impacted my editorial work, I can no longer serve as Editor with good conscience. It is, in every sense, unethical publishing if the Editor continues his or her substandard editorial

work in a compromised working environment. I have therefore decided to step down as Editor-in-Chief. The decision was not made lightly and was contingent upon the finding of a new and more capable Editor. Thus, it is with pleasure and a great sense of relief to announce that the next Editor-in-Chief of The Thai Journal of Surgery will be none other than our esteemed colleague *Professor Potchavit Aphinives*. I am sure that Professor Potchavit will continue to serve our Surgical Colleagues with utmost commitment, and will take our Journal to far greater heights than I can ever achieve on my own.

The THAI Journal of SURGERY 2022;43(4):143-149.
Official Publication of The Royal College of Surgeons of Thailand

Original Article

Laparoscopic Repair of Perforated Peptic Ulcer: A Report of 58 Cases

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Abstract

Objective: The most common cause of gastroduodenal perforation is a perforated peptic ulcer (PPU). Laparoscopic repair has proved to be beneficial over open repair in terms of less post-op pain and a shorter length of stay. However, complications from site leak and intra-abdominal abscess are more common. The author reported the outcomes of three laparoscopic repair procedures: simple closure alone (SC), simple closure with omental patch (SCO), and simple closure alone with leak test (SCL) in 58 patients who presented with perforated gastroduodenal lesions.

Methods: Between July 2011 and October 2020, retrospective data of 58 patients with gastroduodenal perforation and underwent SC, SCO, and SCL were analyzed.

Results: There were 57 benign peptic ulcers and 1 gastric cancer perforation. Laparoscopic surgery was accomplished in 52 cases (89.7%) and was converted to open surgery in 6 cases (10.3%). SCO was performed in 13 cases (22.4%), SC in 15 cases (25.9%) and SCL in 24 cases (41.4%). In the SCL group, wound leakage was detected in 2 cases (8.3%) and both were corrected intra-operatively. There was no site leak or intra-abdominal abscess in this study, and no re-operation was required. Two deaths (3.4%) were found in this study.

Conclusion: SCO for large ulcers was a safe procedure but took longer operative time. SC for small ulcer was secure with shorter operative time. SCL for high-risk ulcers could detect site leak intra-operatively and could prevent post-operative complications.

Keywords: Perforated peptic ulcer, Laparoscopic repair, Simple closure, Site leak

Introduction

Perforated peptic ulcer (PPU) is a life-threatening complication of peptic ulcer disease with the prevalence range from 2-14%.[1] Mortality remains relatively high and can reach 25% of patients, even in Western countries.[2] Management of this situation was primarily surgery, either by open surgery or a laparoscopic approach. A meta-analysis of eight randomized controlled trials comparing the outcomes of laparoscopic and open repair has shown slightly lower mortality in the laparoscopy group, but re-operation rates to repair site leak and drainage of intra-abdominal abscess rates were higher.[3]

Reinforced the suture line with omentum was expected to prevent complications, however, many reports showed no different rate of site leak when compared with simple closure alone. On the contrary, omentum reinforcement significantly took more operative time than simple closure alone.[4] The leak test is an adjunct

Received for publication 30 March 2022; Revised 21 October 2022; Accepted 30 October 2022

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procedure that is used to confirm the strength of the suture line after closure. If leakage is detected, it could be corrected promptly to prevent post-operative complications. If the wound is secure, omentum reinforcement is unnecessary, which could shorten the operative time.

The objective of the present study was to report the outcomes of three laparoscopic repair procedures: simple closure alone (SC), simple closure with omental patch (SCO), and simple closure alone with leak test (SCL) in 58 patients who presented with perforated gastroduodenal lesions.

Patients and Methods

Retrospective data of emergency laparoscopic surgery of 58 patients with perforated gastroduodenal ulcers admitted at Sawanpracharak Hospital during July 2011-October 2020 were reviewed. Patients' demographic data, pre-operative data, operative data, and post-operative data were analyzed. In the initial phase of the study (the first 24 cases), the procedures performed were simple closure alone (SC) and simple closure with omental patch (SCO). In the latter phase (the last 34 cases), the author developed the "Leak test," which was an adjunct procedure used for checking the integrity of suture lines. This procedure, simple closure alone with leak test (SCL), has been applied in some selected patients who had high-risk ulcers in order to replace the omental patch procedure.

After the perforated site in the stomach or duodenum is identified, the suction is used to remove exudate and friable tissue around the ulcer (Figure 1) until healthy tissue is visualized (Figure 2). If the ulcer is located at the body of the stomach, lesser curvature or greater curvature, a tissue biopsy is performed. If the lesion is located near the pylorus (prepylorus), only some ulcers are biopsied. The ulcer is closed with interrupted stitches (Figure 3) and a leak test is started with normal saline solution loading via a nasogastric tube (Figure 4). The volume is gradually increased every 50 ml until the stomach is fully distended

Figure 1 Ulcer at 1st part of duodenum

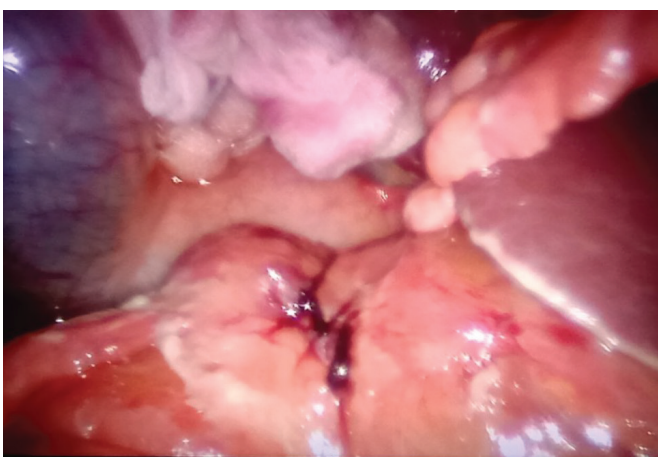

Figure 3 Interrupted closure of ulcer

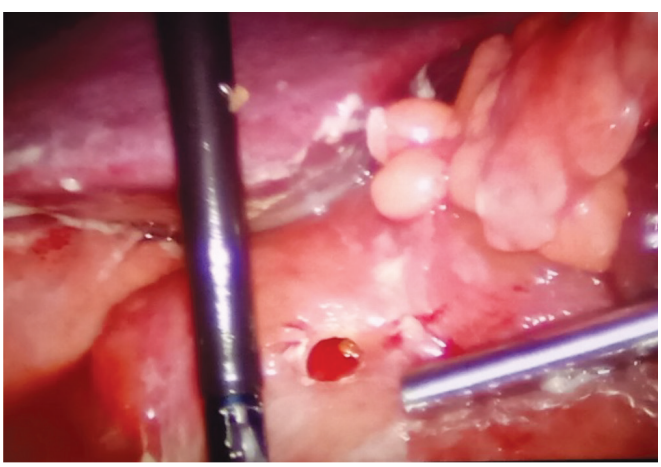

Figure 2 Removal of exudate and friable tissue

Figure 4 Leak test with NSS

(Figure 5). A grasper is pressed on the stomach to create tension at the suture line. If fluid can pass through the wound into the duodenum without leakage seen, the test is finished and residual fluid is sucked out. If a fluid leak is noticed, the wound may be reinforced with additional stitches or revised and the test repeated until it proves safe. In the event that leakage can't be controlled, conversion to open surgery is considered. The peritoneal cavity is irrigated with several liters of normal saline, starting at subhepatic, subphrenic, right paracolic gutter, splenic fossa, left paracolic gutter, and pelvic cavity. If there are gross food particles or sticky fibrin, a 4 × 4 gauze is used to remove them. If a drain is used, it is placed at subhepatic area and exits at the port site (Figure 6).

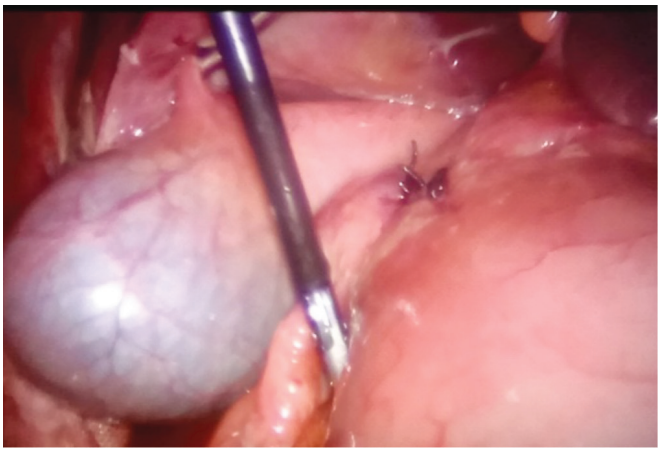

Figure 5 Fully distended stomach

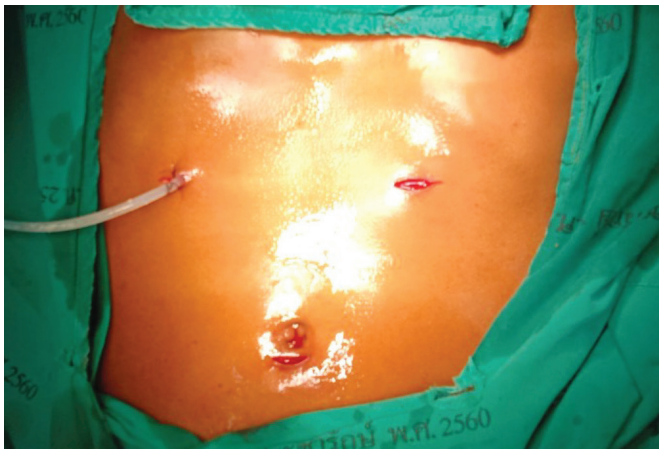

Figure 6 Drain placement

Results

Of a total number of 58 cases, there were 48 males (82.8%) and 10 females (17.2%). The mean age was 57.3 years (30-87). Diagnosis was made from chest film (pneumoperitoneum) 47 cases (81.0%), from CT scan 1 case (1.7%) and from diagnostic laparoscopy 10 cases (17.2%). The average time from onset to operation room was 23 hours (7–80). The average ASA score was 2E (1E–4E). About one-third of patients were operated on after midnight. Perforated sites were from duodenal ulcers in 31 cases (53.5%). Pre-pyloric ulcers were found in 18 cases (31.0%), with 11 cases of biopsy-proven benign lesions. Nine gastric ulcers (15.5%) had lesions at lesser curvature (5), body of stomach (3), and greater curvature (1). Eight were benign conditions, and one lesion at body was adenocarcinoma. The average size of the ulcer was 11.7 mm (5–40 mm) and the number of stitches used to close the ulcer was 2.6 stitches (1–5). Laparoscopic surgery was accomplished in 52 cases (89.7%) with simple closure and omental patch (SCO) in 13 cases (22.4%), simple closure alone (SC) in 15 cases (25.9%) and simple closure with leak test (SCL) in 24 cases (41.4%). In the SCL group, leak proof was confirmed in 22 cases (91.7%) and leakage was detected in 2 cases (8.3%). The mean overall operative time was 103 min (45-200), SCO was 113 min (60-250), SC was 97 min (65-200), and SCL was 93 min (46-160). The mean water volume used for the leak test was 738 ml (300-1,000 ml). The degree of contamination was minimal in 23 cases (39.7%), moderate in 16 cases (27.6%), and severe in 19 cases (32.8%). Drainage has been placed in 43 cases (74.1%).

Table 1 Patient characteristics (N=58)

Characteristics	Summary
Sex: number (%)	
Men	48 (83)
Women	10 (17)
Age (years): mean (range)	57.3 (30 to 87)
Time operation (hour): mean (range)	22.9 (7 to 80)
Diagnostic radiology: number (%)	
CXR (pneumoperitoneum)	47 (81)
CT scan	1 (2)
Diagnostic laparoscopy	10 (17)
ASA score: mean (range)	2 (1 to 4)
Time of day: number (%)	
Before midnight	38 (66)
After midnight	20 (34)

Table 2 Operative findings and management (N = 58)

Operative findings and management	Summary
Number of trocar used: number (%)	
Three ports	50 (80)
Four ports	8 (20)
Perforation site: number (%)	
Benign	57 (98)
Duodenum	31 (54)
Pre-pylorus	18 (31)
Gastric	8 (4)
Malignant (gastric adenocarcinoma)	1 (2)
Ulcer size, overall (mm): mean (range)	11.7 (5 to 40)
Ulcer size in non-conversion group	10.3 (5 to 20)
Simple closure with omental patch	10.8 (5 to 20)
Simple closure alone	9.3 (5 to 15)
Simple closure with leak test	10.7 (5 to 20)
Ulcer size in conversion group	20.0 (10 to 40)
Number of stitches used: mean (range)	2.6 (1 to 5)
Type of operation: number (%)	
Non-conversion group	52 (90)
Simple closure with omental patch	13 (25)
Simple closure alone	15 (30)
Simple closure with leak test	24 (46)
Intact of suture line	22 (92)
Leakage of suture line	2 (8)
Conversion group	6 (10)
Truncal vagotomy with pyloroplasty	4 (67)
Simple closure with omental patch	2 (33)
Operative time, overall (min): mean (range)	99 (45 to 250)
Simple closure with omental patch	113 (60 to 250)
Simple closure alone	97 (65 to 200)
Simple closure with leak test	93 (45 to 160)
NSS volume used (mL): mean (range)	738 (300 to 1,000)
Degree of contamination: number (%)	
Minimal	23 (40)
Moderate	16 (28)
Severe	19 (32)
Drain used: number (%)	43 (74)
Time to start oral feeding (hour): mean (range)	21 (1 to 67)
Length of stay (day): mean (range)	3.4 (2 to 9)

Of the fifty-two cases, there were no post-operative complications, such as a site leak or an intraabdominal abscess, and no additional surgery was required. One operation was switched to hand-assisted surgery with an incision of 6 cm at mid-abdomen to clean the contamination after the ulcer was closed. The average time to start oral feeding was 21 hours (1–67). The mean length of hospital stay (LOS) was 3.4 days (2–9).

There were 6 patients (10.3%) converted to open surgery. Four truncal vagotomy and pyloroplasty procedures were performed, as well as two simple closures with an omental patch. There were two deaths (3.4%) found in this study (Table 1-2).

Discussion

The incidence of PPU in Thailand was about 10% of peptic ulcer disease,[5] which accounts for 5% of all abdominal emergencies.[6,7,8] Diagnostic indicators for peptic ulcer perforation were from clinical and imaging, including intense abdominal pain, tenderness, and guarding and X-ray with free air.[9] CXR could detect free air about 85%[10] and contrast enhanced CT scan has diagnostic accuracy of 98%.[11] Diagnostic laparoscopy is an alternative method which could make a definite diagnosis of 93-98% and 86-100% could be treated laparoscopically during the same session.[12,13] In this report, diagnostic laparoscopy was applied in 10 patients (17.2%) whose clinical suspicion of PPU but their chest film didn't demonstrate free air.

Since the introduction of laparoscopic repair in 1989, laparoscopic simple closure either with or without omental graft is comparable to open surgery, but site leak complications and intra-abdominal abscess are higher. One limitation of laparoscopic hand-sewing is the loss of touch sensation to evaluate suture line integrity. Reinforcement of suture line with omentum showed no different outcomes when compare with simple closure alone but significantly takes more operative time. Checking the integrity of the suture line intra-operatively might be an answer to this problem.

In the early period of this study, before the leak test was introduced, there were 24 PPU patients treated with laparoscopic surgery. SC was performed in 11 patients with small ulcers and SCO was operated in 13 patients with high-risk ulcers (large ulcers, ulcers with fragile edges, or ulcers with extensive scar). The average ulcer size of the SC group was 9.3 mm and the SCO group was 10.8 mm. Although there were no site leak or intra-abdominal abscess complication in both groups but the meticulous steps and time consuming of omental patch procedure had led to leak test trial. For the next 34 cases, 24 high-risk ulcers were closed and checked with a leak test. Twenty-two cases were confirmed secure and two cases showed leakage. Both leakages had 30 mm ulcers and were corrected with additional stitches, which could prevent site leak complications.

There were six patients subjected to open surgery. Ulcer was failed to identify in 2 patients (40 mm ulcer at posterior wall of stomach and duodenal ulcer with severe adhesive to omentum). Two patients had large (20 mm) ulcers with friable edges that couldn't hold tension. Two patients had severe contaminated abdomens which were evaluated as impossible to clean via trans-laparoscopy (ulcers were not attempted to close). However, the last problem could be managed by switching to hand-assisted surgery to clean the abdomen after the ulcer was closed. There was 1 patient diagnosed with gastric adenocarcinoma. He had underlying liver cirrhosis and had a 20 mm ulcer at body of stomach. The lesion was biopsied, closed with silk 2/0 and buttressed with an omental patch. He had an uneventful recovery with a length of stay (LOS) of 4 days. He later had subsequent definite surgery.

There were 2 deaths found in this study. The first patient was a 76-year-old male with an onset time of 30 hours before surgery. He had hypotension on arrival and his ASA score was 4E. He had a 30 mm chronic ulcer at the first part of duodenum with severe contamination. The ulcer failed to close and was converted to a simple closure with an omental patch. He developed pneumonia and respiratory failure and died of septic shock 9 days after surgery. The second patient was an 80-year-old male with an onset time to OR of 30 hours. He had a 4E ASA score and had a 10 mm ulcer at lesser curvature. He developed an acute myocardial infarction after just finishing a simple closure and leak test. His operative time was 95 minutes. He died 3 days after the surgery.

The watertight seal of the suture line could allow the patient to start early oral feeding. Patients would have their NG tubes removed as soon as they gained consciousness and had no GI symptoms (nausea, vomiting). They were allowed to sip water and take liquid and soft diets on the same day if they could tolerate it.[14] On the next day, if the patients had an uneventful recovery, the drain would be removed and they would be discharged.

The average time to start oral feeding was 21 hours, and the average length of stay was 3.4 days.

Leak test has also been applied to another condition other than PPU. The test has been used in one cholecystoduodenal fistula[15] and two iatrogenic duodenal injuries during laparoscopic cholecystectomy.

The limitations of this study was the lack of long-term follow-up. Most of the patients were scheduled two weeks after surgery to look for complications and be informed of the pathology report.

Conclusion

Laparoscopic simple closure alone (SC) for small ulcers is a secure operation with a short operative time. Laparoscopic simple closure with an omental patch (SCO) for large ulcers is a safe procedure but takes longer operative time. Laparoscopic simple closure alone with leak test (SCL) for high-risk ulcers could confirm the integrity of suture line and could prevent site leak complications.

REFERENCES

1. Lau JY, Sung J, Hill C, et al. Systematic review of the epidemiology of the complicated peptic ulcer disease: incidence, recurrence, risk factors and mortality: Digestion 2011;84:102-13.
2. Lolle I, Møller MH, Rosenstock SJ. Association between ulcer site and outcome in complicated peptic ulcer disease: a Danish nationwide cohort study. Scand J Gastroenterol 2016;51:1165-71.
3. Pansa A, Kurihara H, Memon MA. Updates in laparoscopic surgery for perforated peptic ulcer disease: state of the art and future perspectives. Ann Laparosc Endosc Surg 2020;5:5.
4. Pan CW, Liou LR , Mong FY, et al. Simple laparoscopic repair of perforated peptic ulcer without omental patch. Asian J Surg 2020; 43:311-4.
5. Ministry of Public Health. Thailand Health Profile Report 2005-2007.
6. Higham J, Kang JY, Majeed A. Recent trends in admissions and mortality due to peptic ulcer in England: increasing frequency of haemorrhage among older subjects. Gut 2002;50:460-4.
7. Noguiera C, Silva AS, Santos JN, et al. Perforated peptic ulcer: main factors of morbidity and mortality. World J Surg 2003;27:782-7.
8. Canoy DS, Hart AR, Todd CJ. Epidemiology of duodenal ulcer perforation: a study on hospital admissions in Norfolk, United Kingdom. Dig Liver Dis. 2002;34:322-7.
9. Suriya C, Kasatpibal N, Kunaviktikul W, et al. Diagnostic indicators for peptic ulcer perforation at a tertiary care hospital in Thailand. Clin Exp Gastroenterol 2011;4:283-9.
10. Mariëtta J, Bertleff OE, Lange JF. Laparoscopic correction of perforated peptic ulcer: first choice? A review of literature. Surg Endosc 2010;24:1231-9.
11. Kim HC, Yang DM, Kim SW, et al. Gastrointestinal tract perforation: evaluation of MDCT according to perforation site and elapsed time. Eur Radiol 2014;24:1386-93.
12. Ates M, Coban S, Sevil S, et al. The efficacy of laparoscopic surgery in patients with peritonitis. Surg Laparosc Endosc Percutan Tech 2008;18:453-6.
13. Agresta F, Mazzarolo G, Ciardo LF, et al. The laparoscopic approach in abdominal emergencies: has the attitude changed? A single-center review of a 15-year experience. Surg Endosc 2008;22:1255-62.
14. Manakijsirisuthi W. Early postoperative feeding after gastroduodenal operation: A 72 cases report. SMJ 2002;54:387-93.
15. Manakijsirisuthi W. Laparoscopic treatment of cholecystoduodenal fistula: A case report. Thai J Surg 2019;40:22-5.

บทคัดย่อ **รายงานการรักษาผู้ป่วยกระเพาะอาหารและลำไส้เล็กส่วนต้นทะลุด้วยวิธีการผ่าตัดผ่านกล้องจำนวน 58 ราย**

วันชัย มานะกิจศิริสุทธิ, พ.บ.

กลุ่มงานศัลยกรรม โรงพยาบาลสวรรค์ประชารักษ์ จังหวัดนครสวรรค์

โรคแผลในกระเพาะอาหารและลำไส้เล็กส่วนต้นทะลุเป็นภาวะแทรกซ้อนที่พบได้บ่อย การรักษาด้วยวิธีการผ่าตัดผ่านกล้องได้ผลดีกว่าการผ่าตัดแบบแผลเปิดในแง่ อาการปวดแผลน้อยกว่า มีระยะเวลานอนรพ.สั้นกว่า แต่พบปัญหารูรั่วจากแผลเย็บและการเกิดโพรงหนองในช่องท้องได้มากกว่า การทดสอบรูรั่วจากแผลเย็บในขณะทำการผ่าตัดช่วยให้สามารถตรวจพบรูรั่วและทำการแก้ไขได้ก่อนที่จะเกิดภาวะแทรกซ้อนขึ้น ผู้นิพนธ์ได้รายงานผู้ป่วยกระเพาะอาหารและลำไส้เล็กส่วนต้นทะลุจำนวน 58 รายเป็นผู้ป่วยโรคแผลในกระเพาะอาหาร 57 ราย เป็นมะเร็งกระเพาะอาหาร 1 ราย ทุกรายได้รับการรักษาด้วยวิธีการผ่าตัดผ่านกล้อง การผ่าตัดสำเร็จจำนวน 52 ราย (89.7%) เปลี่ยนการผ่าตัดเป็นแบบแผลเปิดจำนวน 6 ราย (10.3%) มีผู้เสียชีวิตจำนวน 2 ราย (3.4%) กลุ่มที่ผ่าตัดสำเร็จได้รับการผ่าตัด 3 แบบ คือ การเย็บปิดแผลทะลุร่วมกับการใช้เยื่อแขวนกระเพาะเสริม (omental patch) จำนวน 13 ราย (22.4%) การเย็บปิดแผลทะลุเพียงอย่างเดียวจำนวน 15 ราย (25.9%) และการเย็บปิดแผลทะลุร่วมกับการทดสอบรูรั่วจำนวน 24 ราย (41.4%) ในกลุ่มที่ทดสอบรูรั่ว ไม่พบรูรั่วจำนวน 22 ราย พบรูรั่วจำนวน 2 ราย (8.3%) และสามารถทำการแก้ไขได้ในขณะผ่าตัด ผลการศึกษาไม่พบภาวะแทรกซ้อนจากการเกิดรูรั่วที่แผลเย็บและไม่พบการเกิดโพรงหนองในช่องท้อง การเย็บปิดแผลทะลุร่วมกับการใช้เยื่อแขวนกระเพาะเสริม (omental patch) สำหรับแผลทะลุที่มีขนาดใหญ่มีความปลอดภัยแต่ใช้เวลาผ่าตัดนาน การเย็บปิดแผลทะลุเพียงอย่างเดียวในแผลขนาดเล็กมีความปลอดภัยและช่วยลดระยะเวลาการผ่าตัดได้ การเย็บปิดแผลทะลุร่วมกับการทดสอบรูรั่วในแผลขนาดใหญ่ช่วยให้สามารถวินิจฉัยและป้องกันการเกิดรูรั่วที่แผลเย็บได้

The THAI Journal of SURGERY 2022;43(4):150-154.
Official Publication of The Royal College of Surgeons of Thailand

Original Article

Results of Transurethral Incision of the Prostate Gland in Early Benign Prostatic Hyperplasia

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Abstract

Objective: The purpose of the present study is to report the results of treatment for symptomatic patients with early benign prostate hyperplasia (BPH) using transurethral incision of the prostate gland (TUIP), who had previously received medical treatment.

Methods: Patients with ages from 50 to 70 years who had early BPH with lower urinary tract symptoms (LUTS) and had received alpha 1 blocker and, or 5-alpha-reductase inhibitor during the years 2018 to 2020 were included in the study. After receiving information regarding surgical treatment (TUIP) instead of using only medications, 30 patients were willing to change from receiving medications to submitting to surgical treatment. The results of treatment before and after surgery were compared. Collected data included measurements of lower urinary tract symptoms using International Prostatic Symptoms Score (IPSS), the maximum flow rate of the urine (Q-max) and the quality of life (QoL) scores.

Results: There were 28 patients in the study. The mean IPSS scores obtained 3 months, 6 months, and 12 months after surgery were significantly lower than those before the surgery with p-values < 0.001 for all comparisons. The mean Q-max values obtained 3 months, 6 months, and 12 months after the surgery were significantly higher than those before the surgery. The mean QoL scores obtained 3 months after the surgery were significantly better than those before surgery.

Conclusion: TUIP in the treatment of early BPH with lower urinary tract symptoms in the early stages was associated with good outcomes and should be considered as an option for these patients.

Keywords: BPH, TUIP, IPSS, Q-max, QoL

Introduction

With the aging population, the number of patients diagnosed and treated with benign prostatic hyperplasia (BPH) is increasing.[1] Patients with BPH suffer from having lower urinary tract symptoms (LUTS), which disturb their daily lives. In the early stages of the disease there are many treatment options, such as the watchful and waiting method, medical treatment or minimally invasive surgery.[2] In order to choose which treatment is best for each patient, the doctor has to consider many factors such as the availability of each treatment and whether each patient will comply with the treatment and the follow up process.

Received for publication 30 March 2022; Revised 25 November 2022; Accepted 6 December 2022

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Since its initial description in 1969 by Orandi,[3] transurethral incision of the prostate (TUIP) alleviates LUTS secondary to bladder outlet obstruction without tissue removal. This technique is considered the surgical therapy of choice for men with small prostates and without median lobe enlargement as supported by guidelines of the European Association of Urology,[4] American urological association,[5] and the Canadian Urological association.[6] Surgical treatment such as TURP or TUIP results in the recovery of voiding efficacy and detrusor function within 3 months after treatment in a majority of patients with detrusor underactivity (DU).[7]

To determine the proportion of patients requiring medical therapy for LUTS following TUIP, the Trinet X Analytic Network showed that medication was used in 65% of patients between 6 months and 24 months after TUIP.[8] A meta-analysis of short-term and long-term data from 10 randomized control trials comparing TUIP with TURP found similar LUTS improvements and significant improvement in maximal flow rate for TUIP patients with small prostate gland without median lobe enlargement.[9] The benefits of TUIP included shortened operative time and a lower risk of operative complications such as retrograde ejaculation, postoperative bleeding, uncontrolled pain, incontinence and impotence. There are also published data supporting a significantly lower bladder neck contracture rate for men undergoing TUIP when compared to TURP.[10]

TUIP is thus a good choice for treating patients with BPH and LUTS, when the prostate size is small, and the median lobe is not enlarged. Currently, there is no study on the outcome of TUIP in such patients previously treated by medications in Thailand, and the objective of the present study was to obtain and present those outcomes.

Patients and Methods

The present prospective study received approval from the Research Ethics Committee of Trang hospital. The study included patients treated at Trang Hospital from January 2018 to December 2021. Patients with BPH receiving the medications including alpha-1blocker and or 5-alpha-reductase inhibitor between the ages of 50 to 70 years old were included. In addition, patients must have small prostate glands, of size of 2 to 3 finger breadths by digital rectal examination evaluation (exact evaluation of the prostate gland volume using ultrasonography were not done due to the limited resource); a PSA level less than 4 ng/dL; no previous history of any lower urinary tract surgery; no previous history of lower urinary tract injury; no neurogenic bladder diseases; and no evidence of vesical calculus.

All patients received information regarding TUIP in comparison to using medications to reduce LUTS, and all consented to participate in the study. Patients in the present study all responded well to medications but wishes to undergo TUIP due to the adverse effects caused by the medications, and many did not want to travel to the hospital to receive medications during the COVID-19 pandemic.

All patients received a full physical examination, and measurements of serum creatinine and PSA levels. LUTS were scored using the International Prostatic Symptoms Score (IPSS). Uroflowmetry was used to measure the maximal urine flow rate in ml/sec (Q-max), and the quality of life (QoL) was also evaluated.

All patients underwent TUIP performed by one surgeon, either under general anesthesia or spinal block. The one incision technique, made at 6 o'clock from the trigone to the verumontanum using a bipolar cautery knife which also stopped the bleeding, was chosen because of the shorter operative time and fewer complications compared with the 2-incision technique. If the median lobe was found to be enlarged or if the prostate gland was larger than 2 visual fields or if there were other conditions such as vesical calculi or urethral stricture present, then those patients would be excluded from the study. The duration of surgery was defined as the time from scope insertion to the time of inserting the urinary catheter.

The urinary catheter was retained after surgery and patients remained in hospital for 2 to 3 days for observation. They received antibiotics for 2 to 3 weeks and were followed by the surgeon at the outpatient department. All medications for BPH were discontinued after surgery. Patients were scheduled for follow up at 3, 6 and 12 months. Data to be collected at follow-up included IPSS, Q-max, QoL scores and presence of surgical complications. These measurements were compared between preoperative and postoperative periods using paired t-tests, and *p*-values less than 0.01 were considered statistically significant.

Results

Thirty patients consented to participate in the study. Two failed to follow up, therefore only 28 patients were included in this study. There were 25 patients who live in the Trang province, 2 patients lived in the Songkhla

province and 1 patient lived in the Krabi province. The average age was 61 years, with a range of 52 to 70 years. The average size of the prostate was 2 to 3 finger-breadths. The average preoperative PSA level was 2.68 ng/dL (range, 1.12 to 3.76 ng/dL). There were 24 patients who used only alpha 1 blocker before surgery and 4 patients who used an alpha 1 blocker and a 5-alpha-reductase inhibitor.

Four patients received spinal block and 24 patients received general anesthesia. The average time of surgery was 15.9 (range, 8 to 52) minutes. One patient had a rather long operative time of 52 minutes because of technical problems with the surgical equipment. The estimated blood loss was 20 (range, 10 to 50) mL. None of the patients required blood transfusion, had uncontrolled pain, retrograde ejaculation, incontinence, or impotence.

The comparisons of IPSS and Q-max before and after TUIP at 3, 6 and 12 months are provided in Tables 1 and 2. There were significant improvement in both IPSS and Q-max after surgery at all time points. In a similar manner, the mean QoL score after surgery at 3 months was 0.679 (with SD: 0.772), which was significantly different from the mean preoperative QoL score of 1.25 (SD: 0.646), with a *p*-value of 0.001.

Table 1 Comparison of IPSS before and after TUIP

Time after TUIP	Mean IPSS (SD) N = 28	*p*-value*
Before surgery	9.96 (6.24)	-
3 months after surgery	3.96 (3.04)	< 0.001
6 months after surgery	3.59 (2.46)	< 0.001
12 months after surgery	3.63 (2.74)	< 0.001

*Paired t-test between each postoperative period and the preoperative period; SD: standard deviation

Table 2 Comparison of Q-max before and after TUIP

Time after TUIP	Mean Q-max (SD) N = 28	*p*-value*
Before surgery	11.1 (4.99)	-
3 months after surgery	15.0 (5.02)	0.001
6 months after surgery	16.1 (7.96)	0.001
12 months after surgery	16.2 (7.87)	0.001

*Paired t-test between each postoperative period and the preoperative period; SD: standard deviation

Discussion

A dynamic role of peripheral condensation of the prostatic stoma acting as a capsule leading to BPH / LUTS has been proposed. Capsular constriction could further exacerbate the symptoms derived from already hyperplastic prostate.[11] Transurethral incision of prostate (TUIP) is an operative approach to disrupt the prostatic capsule to alleviate voiding symptoms. This is an ideal procedure for any patient with bladder-outlet obstruction and an enlarge prostate gland weighing 30 g or less, or in whom the primary obstruction is located at the bladder neck.[3,12] Either a single incision is made at 6 o'clock position or two incisions are made at 5 and 7 o'clock position.[13]

According to the present study, TUIP using a single incision at the 6 o'clock position can improve LUTS symptoms as well as urine flow (Q-max) when compared with medical treatment. Furthermore, the mean difference in the quality of life (QoL) scores before and three months after surgery emphasized that TUIP can improve QoL as well. Other benefits of TUIP over medication include eliminating the need for regular follow-ups to receive the medications as well as the side effects of medical treatment, and the costs associated with time-off work. The safety, or lack of complications of TUIP such as blood loss requiring blood transfusion, uncontrolled pain, retrograde ejaculation, incontinence or impotence, should be mentioned as well.

Four prospective, randomized trials comparing transurethral resection with transurethral incision of prostate gland have been conducted and showed that the complication rates associated with incision were much lower than those associated with resection (impotence 2% vs. 5%, retrograde ejaculation 15% vs. 66% incontinent 1% vs.6%, need for blood transfusion 1% vs. 6%).[14-17]

Most patients in the present study did not have confidence in receiving the surgery. It is very important to select patients suitable for TUIP, and no less important to explain to patients all the benefits and risks clearly before the surgery which may contribute to a better outcome.

It might be difficult to draw definite conclusions due to the small number of the patients in the present study. In the future, a randomized controlled study may be needed to make a definite conclusion that TUIP provides better results than using medications in the selected patients.

Conclusion

TUIP for LUTS provides good results for patients whose prostate is not too big and without median lobe enlargement. From the present study, TUIP provides better results than medications. Patients had significant LUTS improvement, significant improvement in maximal flow rate and the Quality of life at 3 to 12 months. There were no complications. TUIP is an option that should be considered when treating the patient suffering from LUTS whose prostate is not too large and without median lobe enlargement.

REFERENCES

1. Ibis MA, Cayan S., Tokati Z, et al. Trend in Benign prostatic hyperplasia surgery over the years. J Urol 2021;47:501-8.
2. Oestering JE. Medical and minimal invasive treatment options. N Engl J Med 1995;332:99-109.
3. Orandi A. Transurethral incision of the prostate. J Urol 1973;110:229-31.
4. Oelke M, Bachmann A, Decazeaud A, et al. EAU guidelines on the treatment and follow-up of non-neurogenic male lower urinary tract symptoms including benign prostatic obstruction. Eur Urol 2013;64:118-40.
5. McVary KT, Roehrborn CG, Avins AL, et al. Update on AUA guideline on the management of benign prostate hyperplasia. J Urol 2011;185:1793-803.
6. Nickel JC, Mendez-Probst CE, Whelan TF, et al. 2010 Update: Guidelines for the management of benign prostatic hyperplasia. Can Urol Assoc J 2010;4:310-6.
7. Lee KH, Kuo HC. Recover of voiding efficacy and bladder function in male patient with Non-neurogenic detrusor underactivity after transurethral bladder outlet surgery. Urology 2019;123:235-41.
8. Ory J, Nakkeeran S, Rainor Q, et al, Persistent use of medical therapy after surgery for LUTS. World J urol 2022;40:169-75.
9. Lourenco T, Shaw M, Fraser C, et al. The clinical effectiveness of transurethral incision of the prostate: A systematic review of randomized controlled trials. World J Urol 2010;28:23-32.
10. Orandi A. Transurethral incision of prostate compared with transurethral resection of prostate in 132 matching case J Urol 1987;138:810-5.
11. Helo S, Wellive RC, McVary KT. Minimally invasive and endoscopic management of benign prostatic hyperplasia. Campbell-Walsh-Wein Urology. 12th ed. Vol III;146:3434-5.
12. Keitzer WA, Cervantes L, Demaculangan-Cruz B. Transurethral incision of bladder neck for contracture. J Urol 1961;86:242-6.
13. Kletcher BA, Oesterling JE. Transurethal incision of the prostate gland: a viable alternative to transurethral resection. Semin Urol 1992;10:265-72.
14. Christensen MM, Aagaard J. Madsen PO. Transurethral resection versus transurethral incision of the prostate: a prospective randomized study. Urol Clin North Am1990;17:621-30.
15. Dorflinger TM, Larsen JF, Gasser TC, et al.Transurethral prostatectomy or incision of the prostate in the treatment of prostatism caused by small benign prostates. Scand J Urol Nephrol Suppl1987;104:77-81.
16. Larsen EH, Dorflinger T, Gasser TC, et al. Transurethral incision versus transurethral resection of the prostate for the treatment of benign prostatic hyperplasia: a preliminary report. Scand J Urol-Nephrol Supp1987;104:83-6.
17. Hellstrom P, Lukkarinen O, Kontturi M. Bladder neck incision or transurethral electroresection for the treatement of urinary obstruction cause by s small benign prostate? Scand J Urol Nephrol1986;20:187-92.

บทคัดย่อ **เราสามารถทำนายผลการรักษาผู้ป่วยต่อมลูกหมากโต โดยวิธีการผ่าตัดกรีดลูกหมากได้หรือไม่**

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[2]พยาบาลห้องผ่าตัด กลุ่มงานศัลยกรรม โรงพยาบาลตรัง

วัตถุประสงค์: เพื่อประเมินผลการรักษาโดยวิธีผ่าตัดกรีดต่อมลูกหมากในผู้ป่วยต่อมลูกหมากโตที่เคยได้รับการรักษาโดยใช้ยามาก่อน

วิธีการศึกษา: การศึกษาครั้งนี้ทำในผู้ป่วยต่อมลูกหมากโตช่วงอายุ 50-70 ปี ที่มีอาการและเคยได้รับการรักษาด้วยยาแอลฟ่าวันบล็อกเกอร์ และ/หรือ ยาไฟว์แอลฟ่ารีดักเตสอินฮิบิเตอร์ มาก่อน โดยผู้ป่วยที่มารักษาจะได้รับฟังข้อมูลเกี่ยวกับการรักษาด้วยวิธีผ่าตัดกรีดต่อมลูกหมาก ในช่วงปี 2561-2563 มีผู้ป่วย 30 ราย เลือกที่จะรับการรักษาด้วยการผ่าตัดกรีดลูกหมากแทนการใช้ยารักษาต่อมลูกหมากโต โดยผู้ป่วยกลุ่มนี้จะได้รับการเก็บข้อมูลเพื่อเปรียบเทียบผลการรักษาก่อนผ่าตัดและหลังผ่าตัด โดยประเมินจาก 1. อาการแสดงที่เก็บข้อมูลจากแบบสอบถาม IPSS 2. อัตราการไหลสูงสุดของปัสสาวะ (Q-max) และ 3. แบบสอบถามเกี่ยวกับคุณภาพชีวิตของผู้ป่วย (QL)

ผลการศึกษา: ผลการศึกษาในผู้ป่วย 28 ราย แสดงให้เห็นว่า ค่าอาการแสดงของผู้ป่วย (IPSS) หลังการผ่าตัด 3 เดือน, 6 เดือน, 1 ปี ลดลงเมื่อเทียบกับอาการแสดงของผู้ป่วยก่อนผ่าตัดที่ใช้ยารักษาอย่างมีนัยสำคัญทางสถิติ (p-value < 0.01) ผลการรักษาเมื่อพิจารณาจากอัตราการไหลสูงสุดของปัสสาวะ (Q-max) พบว่าอัตราการไหลสูงสุด (Q-max) หลังผ่าตัด 3 เดือน, 6 เดือน, 1 ปี เพิ่มขึ้นมากกว่าอัตราการไหลสูงสุดของปัสสาวะก่อนผ่าตัดที่ใช้ยารักษาอย่างมีนัยสำคัญทางสถิติ (p-value < 0.01) และเมื่อพิจารณาคะแนนจากแบบสอบถามถึงคุณภาพชีวิตของผู้ป่วยพบว่าคุณภาพชีวิตหลังผ่าตัด 3 เดือนดีขึ้น เมื่อเทียบกับคุณภาพชีวิตก่อนผ่าตัดที่รักษาด้วยยาอย่างมีนัยสำคัญทางสถิติ (p-value < 0.01)

สรุปผลการศึกษา: การรักษาผู้ป่วยต่อมลูกหมากโตระยะแรกด้วยการผ่าตัดกรีดลูกหมากได้ผลดีและควรพิจารณาใช้ในผู้ป่วยบางรายที่มีอาการจากภาวะต่อมลูกหมากโต

The THAI Journal of SURGERY 2022;43(4):155-159.
Official Publication of The Royal College of Surgeons of Thailand

Original Article

Early Results of Inguinal Hernia Repair under General Anesthesia and a One-Day Surgery Protocol

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Abstract

Objective: Several studies have shown that herniorrhaphy under general anesthesia (GA) could be done in a one-day surgery (ODS) setting. However, no studies have evaluated the outcomes and complications of this approach. We aim to evaluate the early outcomes of herniorrhaphy under GA in a ODS protocol.

Methods: Medical charts of patients who underwent herniorrhaphy between the years 2018 and 2022 were reviewed. Data on patient characteristics and early outcomes were collected. Patients with ASA class ≥ III, acute incarcerated hernia, strangulated hernia, and who did not have a good care provider were excluded.

Results: 100 patients underwent herniorrhaphy under GA in a ODS protocol. All patients were male. More than 50% of patients were between 41 to 60 years of age. The majority (71%) of cases had ASA class I. The average overall length of stay ± SD was 6.1 ± 0.3 hours.

Seven patients could not be discharged home on the same day due to urinary retention, surgeon's concern, severe postoperative pain, and dyspnea. The average length of stay in patients who needed post-operative admission was 21.6 ± 6.5 hours.

The overall complication rate was 9%. Urinary retention was the main complication and the main cause of postoperative admission. There were no deaths, readmissions, or early recurrent inguinal hernia.

Conclusion: Herniorrhaphy under GA was effective and safe and could be done within a ODS setting. The rate of complication was low. Urinary retention was the main complication causing failure to discharge on the same day. However, these complications were not a serious problem and patients could usually be discharged the next day.

Keywords: Inguinal hernia, Herniorrhaphy, Under general anesthesia, One day surgery

Introduction

Inguinal herniorrhaphy is one of the most commonly performed operations in the world.[1] In 2018, inguinal hernia surgery was included in the One Day Surgery (ODS) campaign according to a policy of the Ministry of Health of Thailand. The ODS campaign aimed to reduce crowding, decrease waiting time and increase accessibility of medical services and decrease the cost of medical care.[2]

Many hospitals preferred herniorrhaphy under local anesthesia (LA) within the ODS protocol because of safety concerns, and the low postoperative complications when compared with general anesthesia (GA).[3] Inguinal herniorrhaphy under LA in Thailand is being performed only in a few hospitals with a special interest in hernia repair, because herniorrhaphy under LA requires more skill and patience.[4]

Received for publication 2 May 2022; Revised 10 June 2022; Accepted 20 June 2022

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Several studies have shown that herniorrhaphy under GA was safe and could be done as a one-day surgery.[5] However, no study has evaluated the outcomes of one-day herniorrhaphy under GA or its specific complications. This study aimed to evaluate the early outcomes of inguinal herniorrhaphy under GA in a ODS setting.

Patients and Methods

The present study was a retrospective descriptive study. Medical chart of patients who underwent herniorrhaphy over 5-year period, from 2018 to 2022 were reviewed. Six surgeons at Songkhla Hospital participated in the ODS protocol. Patients who received inguinal hernia repair under the ODS protocol were included, while excluding those who had ASA (American Society of Anesthesiologist) classes III or more, acute incarcerated hernia, strangulated hernia, and who did not have a good care provider.

In the ODS protocol, preoperative evaluation was done at a pre-anesthetic clinic before the day of surgery. Five surgeons performed herniorrhaphy under GA and one surgeon perform herniorrhaphy under GA combined with LA. Herniorrhaphy with the Lichtenstein technique was done in all patients. Patients were closely observed and discharged if no early postoperative complications were seen within 4 hours after surgery. Discharge criteria consisted of pain score less than 4, no wound bleeding/hematoma, no scrotal swelling, and no postoperative urinary retention.

All patients were prescribed Acetaminophen, Ibuprofen, Tramadol, and Milk of magnesia, if no contraindications exist. Nurses telephoned the patient to evaluate pain symptoms and detect early complications at 24 hours and 72 hours after discharge. Patients returned for follow-up at 2 weeks after the operation.

Data on patient characteristics were collected, which included ASA class, choice of anesthesia, hernia type, underlying disease, as well as the need for admission after surgery. Early outcomes occurring within 2 weeks after surgery were collected at the time of follow-up, including postoperative pain, wound infection, wound hematoma or seroma, urinary retention, complications from general anesthesia, and unplanned readmission.

The mean ± standard deviation (SD) was used to summarize continuous data such as the length of hospital stay, and counts and percentage was used to summarize categorical data such as postoperative complications.

Results

One hundred patients underwent herniorrhaphy under the ODS protocol. All patients were male. More than 50% of patients were between 41 to 60 years of age. The majority (71%) of cases had ASA class I. A vast majority of patients (94%) had a primary inguinal hernia. A few (3%) patients had bilateral inguinal hernias, and recurrent inguinal hernia was seen in 3% of cases (Table 1). Airway management during GA was achieved through an endotracheal tube in 93% of cases and a laryngeal mask airway in 7% of cases. Most patients underwent herniorrhaphy under GA (81%) and the rest underwent herniorrhaphy under GA combined with LA. Herniorrhaphy with the Lichtenstein technique was done in all patients. The average overall length of stay was 6.1 ± 0.3 hours.

Seven patients could not be discharged home on the same day. Two patients who had large inguinal hernias were admitted after surgery due to the surgeon's concern about wound complications. Three patients were admitted after surgery due to urinary retention, including one who had underlying benign prostatic hypertrophy.

Table 1 Patient characteristics (N = 100)

Characteristics	Number*
Age (years)	
< 2	3
21-40	16
41-60	56
61-80	23
> 80	2
Gender	
Male	100
Underlying disease	
Diabetes	6
Hypertension	19
Dyslipidemia	10
Benign prostate hypertrophy	4
Other	5
ASA	
I	71
II	29
Hernia type	
Primary inguinal hernia	94
Bilateral inguinal hernia	3
Recurrent inguinal hernia	3

*Counts and percentage are the same number

One patient had severe postoperative pain (pain score of 8) and was admitted after surgery, and one patient with underlying COPD had dyspnea and lung wheezing after extubation. The average length of stay in patients who required postoperative admission was 21.6 ± 6.5 hours.

The overall complication rate was 9% (Table 2), Seroma was seen in 3 patients, all of whom had large inguinal hernias, and one required reoperation. Urinary retention was seen in 4 patients. Three required urinary catheter placement and were admitted. Intermittent catheterization was done in one patient and was discharged on the same day. There were no deaths, readmissions, and no early hernia recurrence. No patient was loss follow-up in the present study.

Table 2 Early postoperative complications (N = 100)

Complication	Number*
Overall	**9**
Wound complication	
Small seroma	2
Seroma required reoperation	1
Urinary retention	4
Severe post-operative pain	1
Dyspnea after extubation	1

*Counts and percentage are the same number

Discussion

Inguinal hernia repair within an ODS setting was usually done under LA because of low postoperative complications and higher cost-effectiveness compared with inguinal hernia repair under GA.[4-11] However, many surgeons may not prefer repairing inguinal hernia under LA. At Songkhla Hospital, no surgeon wanted to repair inguinal hernias under LA. Previous studies have shown that inguinal hernia repair under GA was safe and could be done within a ODS setting. Therefore, at Songkhla Hospital inguinal hernia repair under GA using an ODS protocol was begun in 2018.

The technique of general anesthesia and herniorrhaphy under ODS was as same as in traditional care. In traditional care, patients remained in the hospital for 3 days and 2 nights, but in a ODS protocol, the length of stay was less than a day. Benefits of ODS include a reduction in crowding, a decrease in waiting time, increasing the accessibility of medical services and a decrease in the cost of medical care.[2]

In a previous study, the overall complication rates of herniorrhaphy were similar whether LA or GA was used, but urinary retention was significantly less with LA (OR = 0.13, $p < 0.001$).[3] Postoperative urinary retention (POUR) is a well-recognized complication of herniorrhaphy with reported incidence varying widely, ranging from 0.37 to 22%.[12]

POUR could be prevented by minimizing preoperative, intraoperative, and postoperative risk. Comorbidities frequently associated with POUR include renal failure, diabetes, and psychiatric illness.[13] Patients with untreated or undertreated benign prostatic hyperplasia are at increased risk. Those with voiding symptoms such as urgency, frequency, and nocturia are also at greater risk of developing POUR.[14] Several studies and meta-analyses have demonstrated the benefit of prescribing an alpha-blocker preoperatively and prophylactically in patients at greatest risk for POUR.[15]

Intraoperative risk factors for POUR include longer operative time, larger volumes of intraoperative intravenous fluid infusion, and type of anesthetic used. Operating time greater than 2 hours was a significant predictor of POUR.[16] Optimum intraoperative intravenous fluid volume management seems to decrease the incidence of POUR. Postoperative risk factors for POUR include a slow time to ambulation. One study demonstrated that early ambulation decreased the incidence of POUR from 52% to 19%.[17] Systemic opioids used postoperatively was also related to POUR.[18]

Wound hematoma and seroma are some of the most common complications of herniorrhaphy. Risk factors for hematoma or seroma include a large hernia defect, recurrent hernia, and use of anticoagulant and antiplatelet drugs.[19]

In the present study, patients were selected based on ASA classification. There was no documentation on the risk of wound complications and postoperative urinary retention. The number of postoperative admissions could be reduced if more stringent selection criteria were applied. However, postoperative admission was not a serious problem. Only 7% of patients required postoperative admission. All were discharged the next day, and readmission was seen. Postoperative seroma was detected

at 2 weeks in one patient, and surgical management was required. This complication was unrelated to the ODS protocol.

Limitations of the present study include the retrospective design of the study. Future prospective or randomized studies should be done to confirm the safety and outcome of herniorrhaphy under GA in a ODS protocol, compared with traditional care. Early outcomes in the present study were obtained within 2weeks after operation; however, complications occurring after 2 weeks or other longer-term outcomes should be similar to those of traditional care due to the technique of surgery being the same.

The results of the present study should inspire the confidence of surgeons to perform inguinal hernia repair under GA within a ODS protocol, and help increase the number of patients undergoing ODS in the future.

Conclusion

Herniorrhaphy under GA was safe and could be done within a ODS protocol. The rate of complications was low. Urinary retention was the main complication causing failure to discharge on the same day. However, these complications were not a serious problem, and patients could usually be discharged the next day.

REFERENCES

1. Baskerville PA, Jarret PEM. Day case inguinal hernia. Ann R Coll Surg Engl 1983;65:224-5.
2. Division of Medical Technical and Academic Affairs. Recommendations for the development of the service system ODS (One Day Surgery). Nonthaburi: Division of Medical Technical and Academic Affairs [Internet]; 2017 [cited 2019 September 20]. Available from: http://203.157.39.44/uploads/E000001/b052513ab8ca5dab33f0f425f186f801.pdf.
3. Argo M, Favela J, Phung T, et al. other forms of anesthesia for open inguinal hernia repair: a meta-analysis of randomized controlled trials. Am J Surg 2019;218:1008-15. doi:10.1016/j.amjsurg.2019.06.024.
4. Chainapapong K. Groin hernia repair under local anesthesia in one day surgery-8-year Experience. Thai J Surg 2019;40:27-34.
5. Pere P, Harju J, Kairaluoma P, et al. Randomized comparison of the feasibility of three anesthetic techniques for day-case open inguinal hernia repair. J Clin Anesth 2016;34:166-75.
6. Gonullu NN, Cubukcu A. Comparison of local and general anesthesia in tension-free (Lichtenstein) hernioplasty: a prospective randomised trial. Hernia 2002;6:29-32.
7. Sanjay P, Woodward A. Inguinal hernia repair: local or general anaesthesia? Ann R Coll Surg Engl 2007;89:497-503. doi:10.1308/003588407X202056.
8. Huntington CR, Wormer BA, Cox TC, et al. Local anesthesia in open inguinal hernia repair improves postoperative quality of life compared to general anesthesia: a prospective, international study. Am Surg 2015;81:704-9.
9. Ozgun H, Nil Kurt M, Kurt I, et al. Comparison of local, spinal and general anaesthesia for inguinal herniorrhaphy. Eur J Surg 2002;168:455-9.
10. Nordin P, Zetterstrom H, Gunnarsson U, et al. Local, regional or general anaesthesia in groin hernia repair: multicentre randomised trial. Lancet 2003;362:853-7.
11. Friemert B, Faoual J, Holldobler G, et al. A prospective randomized study on inguinal hernia repair according to the Shouldice technique. Benefits of local anesthesia. Chirurg 2000;71:52-7.
12. Pomajzl AJ, Siref LE. Post-op Urinary Retention. StatPearls [Internet]. [Updated 2022 May 1]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK549844/.
13. Wu AK, Auerbach AD, Aaronson DS, National incidence and outcomes of postoperative urinary retention in the Surgical Care Improvement Project. Am J Surg 2012;204:167-71. doi:10.1016/j.amjsurg.2011.11.012.
14. Blair AB, Dwarakanath A, Mehta A, et al. Postoperative urinary retention after inguinal hernia repair: a single institution experience. Hernia 2017;21:895-900. doi:10.1007/s10029-017-1661-4.
15. Clancy C, Coffey JC, O'Riordain MG, et al. A meta-analysis of the efficacy of prophylactic alpha-blockade for the prevention of urinary retention following primary unilateral inguinal hernia repair. Am J Surg 2018;216:337-341. doi:10.1016/j.amjsurg.2017.02.017.
16. Hansen BS, Søreide E, Warland AM, et al. Risk factors of postoperative urinary retention in hospitalised patients. Acta Anaesthesiol Scand 2011;55:545-8. doi:10.1111/j.1399-6576.2011.02416.x.
17. Hansen AB, Olsen KS. The number of in-out catheterisations is reduced by mobilising the postoperative patient with bladder needs to the toilet in the recovery room: A randomised clinical trial. Eur J Anaesthesiol 2015;32:486-92. doi:10.1097/EJA.0000000000000214.
18. Petros JG, Rimm EB, Robillard RJ. Factors influencing urinary tract retention after elective open cholecystectomy. Surg Gynecol Obstet 1992;174:497-500.
19. Zeb MH, Pandian TK, El Khatib MM, et al. Risk factors for postoperative hematoma after inguinal hernia repair: an update. J Surg Res 2016;205:33-7. doi:10.1016/j.jss.2016.06.002.

บทคัดย่อ **ผลลัพธ์ของการผ่าตัดไส้เลื่อนภายใต้การดมยาสลบแบบวันเดียวกลับ**

เมธัส อรัญนารถ, พ.บ.

กลุ่มงานศัลยกรรม โรงพยาบาลสงขลา

ความเป็นมา: การผ่าตัดไส้เลื่อนขาหนีบ เป็นหนึ่งในการผ่าตัดที่พบบ่อยที่สุดในโลก หลายโรงพยาบาลนิยมผ่าตัดไส้เลื่อนแบบวันเดียวกลับโดยใช้ยาชาเฉพาะที่ เนื่องจากปลอดภัยและมีภาวะแทรกซ้อนน้อยกว่าการดมยาสลบ มีหลายการศึกษาที่กล่าวถึงการผ่าตัดไส้เลื่อนโดยใช้ยาสลบนั้นสามารถทำแบบผ่าตัดวันเดียวกลับได้ แต่ยังไม่มีการศึกษาใดที่ศึกษาถึงความปลอดภัยและข้อควรระวังเกี่ยวกับภาวะแทรกซ้อนอย่างเฉพาะเจาะจง

วัตถุประสงค์: เพื่อศึกษาผลลัพธ์ระยะสั้นของการผ่าตัดไส้เลื่อนแบบวันเดียวกลับภายใต้การดมยาสลบ

วิธีการศึกษา: เป็นการศึกษาแบบเก็บข้อมูลย้อนหลัง โดยการนำเวชระเบียนของผู้ป่วยที่ได้รับการผ่าตัดไส้เลื่อน ในช่วงเวลา 5 ปี (พ.ศ. 2561-2565) มาทำการรวบรวมข้อมูลพื้นฐานและผลลัพธ์ระยะสั้นทางคลินิก เกณฑ์คัดเข้า คือ ผู้ป่วยที่ได้รับการผ่าตัดไส้เลื่อน เกณฑ์คัดออก ได้แก่ ผู้ป่ วยที่มี ASA class ≥ III มีภาวะไส้เลื่อนติดคาฉับพลัน (Acute incarcerated hernia) มีไส้เลื่อนร่วมกับลำไส้ขาดเลือด (Strangulated hernia) และไม่มีผู้ดูแลที่ดี

ผลการศึกษา: ผู้ป่วย 100 ราย ได้รับการผ่าตัดไส้เลื่อนแบบวันเดียวกลับภายใต้การดมยาสลบ โดยผู้ป่วยทั้งหมดเป็นเพศชาย ส่วนใหญ่อายุอยู่ในช่วง 41-60ปี ร้อยละ 71 ของผู้ป่วย มี ASA class I และ มีค่าเฉลี่ยระยะเวลานอนโรงพยาบาลโดยรวม คือ 6.12 ± 0.27 ชั่วโมง

ผู้ป่วย 7 ราย ไม่สามารถกลับบ้านได้ในวันที่ผ่าตัด เนื่องจากภาวะปัสสาวะไม่ออก ความกังวลของศัลยแพทย์ อาการปวดแผลอย่างรุนแรง และอาการหอบเหนื่อย ระยะเวลานอนโรงพยาบาลโดยเฉลี่ยของผู้ป่วยกลุ่มนี้ คือ 21.56 ± 6.48 ชั่วโมง พบภาวะแทรกซ้อนโดยรวม ร้อยละ 9 โดยมีภาวะปัสสาวะไม่ออก เป็นภาวะแทรกซ้อนที่พบมากที่สุดและเป็นสาเหตุหลักที่ทำให้ต้องนอนโรงพยาบาลหลังผ่าตัด ไม่มีผู้ป่วยเสียชีวิต กลับเข้ามานอนโรงพยาบาลซ้ำ หรือกลับมาเป็นไส้เลื่อนซ้ำ

สรุปผลการศึกษา: การผ่าตัดไส้เลื่อนแบบดมยาสลบ มีความปลอดภัย และสามารถทำผ่าตัดแบบวันเดียวกลับได้ ภาวะแทรกซ้อนต่ำ โดยมีภาวะปัสสาวะไม่ออก เป็นภาวะแทรกซ้อนหลัก ที่ทำให้ผู้ป่วยไม่สามารถกลับบ้านในวันที่ผ่าตัดได้ อย่างไรก็ตาม ภาวะแทรกซ้อนเหล่านี้ ไม่ได้มีความรุนแรงและผู้ป่วยมักจะกลับบ้านได้ในวันรุ่งขึ้น

The THAI Journal of SURGERY 2022;43(4):160-169.
Official Publication of The Royal College of Surgeons of Thailand

Original Article

Efficacy of Mosapride Citrate in Combination with Oral Mechanical Bowel Preparation for Colonoscopy

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Abstract

Objective: The present study aimed to evaluate the efficacy, in terms of bowel preparation quality, and safety of adjunctive mosapride citrate with oral mechanical bowel preparation for colonoscopy.

Methods: We conducted a randomized, controlled trial, mosapride in addition to mechanical bowel preparation. Of 330 patients undergoing colonoscopy, 158 were randomized to an additional 10 mg of mosapride citrate (intervention group) to oral mechanical bowel preparation, and 172 received only oral mechanical bowel preparation (control group). Patients completed questionnaires reporting the acceptability and tolerability of the bowel preparation process. The efficacy of bowel preparation was assessed by colonoscopists using a Boston Bowel Preparation Scale (BBPS).

Results: A total of 330 patients were included in the analysis. In the intervention group, optimal excellent bowel preparation rates were significantly higher compared with the control group (81.6% vs. 64.5%, $p < 0.001$). The incidence of adverse events was similar in both groups. Moreover, patients significantly favored intervention group over control, reflected by less clinical symptoms of nausea, abdominal pain, abdominal distension and willingness to repeat the same regimen.

Conclusion: Mosapride citrate may be an effective and safe adjunct to oral mechanical bowel preparation for colonoscopy that leads to improve quality of bowel preparation and patient compliance.

Keywords: Mosapride citrate, Colonoscopy, Boston bowel preparation scale, Polyethylene glycol, Sodium phosphate solution

Introduction

From the past to the present, many methods of detection of pathologies in the lining of the colon have been developed. Currently, it is accepted that colonoscopy is the best method. Since the pathology in the lining of the colon can be seen[1] as well as being able to cut or biopsies to prove the pathology of such pathologies. The quality of bowel preparation is the main factor in successful colonoscopy, with 19.6 percent of the unsuccessful colonoscopies caused by non-quality in colon cleansing bowel preparation.[2] However, oral mechanical bowel preparation often causes difficulties and discomfort to the patient. As a result, several patients refused to undergo screening for colon and rectum cancer, colonoscopy. In addition, poor bowel cleansing results in risks and dangers while performing procedures,[3] and increase the time it takes to insert the camera and withdraw the camera.

In preparation for colonoscopy, the two types of laxatives were use in Rajavithi Hospital, mainly 1) Polyethylene glycol electrolyte solution (PEG), 4 liters

Received for publication 11 June 2022; Revised 9 October 2022; Accepted 10 October 2022

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divided into 3 liters at the evening of the day before the test, and 1 liter at 5 a.m. on the colonoscopy day. Another laxative drug that use is sodium phosphate solution (NaP), takes 45 ml twice at a time, and is followed by a large amount of water. Both methods can cause nausea and vomiting, abdominal pain and bloating. Lead to some patient unable to take all dose of preparation drug. As a result, bowel preparation is not good enough for colonoscopy.

Mosapride citrate is drugs that increase gastrointestinal movement and drives food out of the stomach.[4] It has indications in patients who nausea vomiting and lower side effects than other drugs. The author try to study that in addition to reducing the side effects of nausea and vomiting, this drug also increases the movement of laxatives from the stomach to the intestines faster, As a result, Patients have an excellent bowel preparation then have a positive effect on both diagnosing and management in colonoscopy.

Patients and Methods

This was a single-center, prospective, randomized controlled trial study, comparing PEG or NaP plus Mosapride citrate (Intervention group) with PEG or NaP alone (control group) in patients who were scheduled for an elective colonoscopy. All patients provided written, informed consent prior to entering the study. The study was conducted at the Department of Surgery, Rajavithi Hospital, Thailand, from February 2021 to February 2022. This study was reviewed and approved by the ethics committee of Rajavithi Hospital EC No.029/2022.

The Primary Outcome is colon-cleansing quality measured on Boston Bowel Preparation Scale and the secondary outcome are nausea symptoms, compliance with bowel preparation, how easy/difficult it to take preparation compared with the previous one, willingness to repeat the same regimen and any adverse symptom.

Subjects are all outpatients of both sexes, aged 18 to 80 years, who were scheduled for screening or diagnostic colonoscopy at Rajavithi Hospital and were evaluated for inclusion criteria of the study. Patients with the following clinical features were excluded: history of Mosapride citrate allergies, uncorrectable coagulopathy, renal impairment, pregnant or lactating, clinical complete bowel obstruction, congestive heart failure (NYHA 3-4) or severe liver dysfunction (serum albumin < 2.5 g/dL or Child-Pugh score ≥ 10). After written informed consent then will be randomly allocated to the intervention group and control group.

The allocation to the intervention group and control group was performed by random 1:1 Switch back and forth up to the required amount (Figure 1).

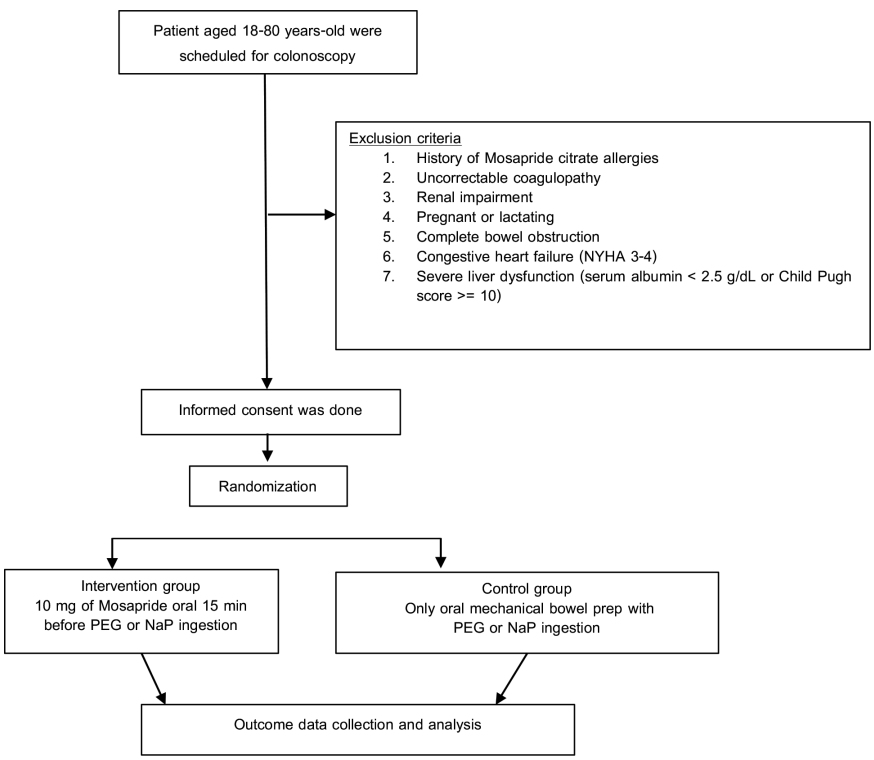

Figure 1 The study design flowchart showing details of the randomized controlled trial

The colonoscopy preparation steps used in this study are shown in Figure 2. Steps of preparation for colonoscopy. Two days before the colonoscopy, all participants were instructed to eat only a liquid diet. On one day before the colonoscopy, all participants were instructed to eat a clear liquid diet and in the evening, they will be received oral bowel preparation. An oral bowel preparation type which is PEG or NaP was chosen individually from surgeon. The Control group will not receive any other drug but only oral mechanical bowel preparation with PEG or NaP ingestion. All patients from both groups will be received the same regimen of PEG or NaP which are PEG total of 4 L, 3L at 17:00, 18:00, 19:00 on the evening and another 1L at 5:00 in the morning or NaP By taking 45 ml. every 4 hrs, total 2 doses. In the Intervention group, two tablets of mosapride citrate total of 10 mg were administered orally with water 15 minutes before oral mechanical bowel preparation.

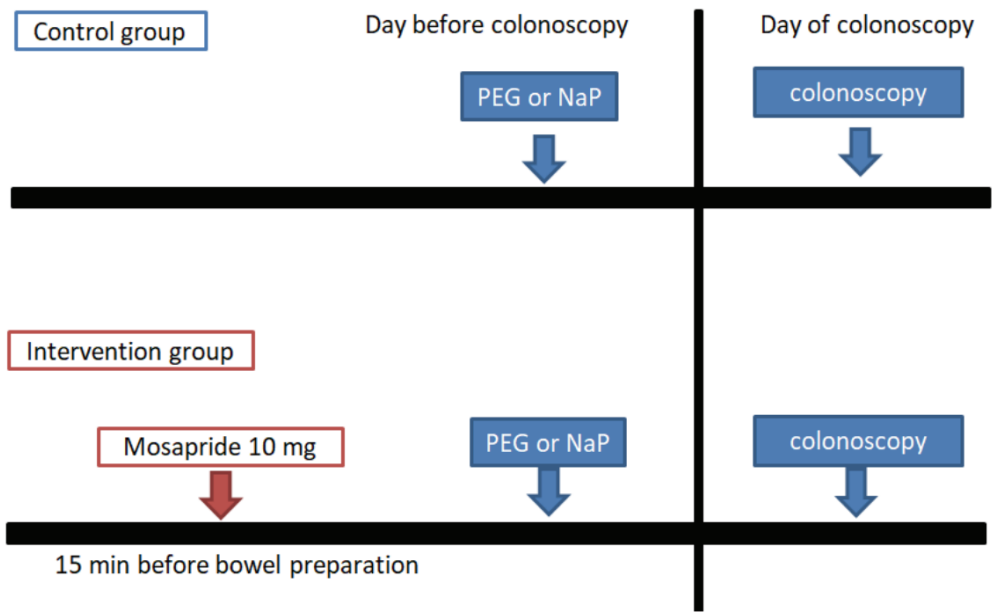

Figure 2 Steps in the preparation for colonoscopy

The colonoscopy was performed by 4 endoscopist who are surgeons. The efficacy of bowel preparation was assessed based on Boston Bowel Preparation Scale. The Boston bowel preparation scale (BBPs) has recommended as the current standard for use in clinical practice.[5] It is rated as follows. Unprepared colon segment with mucosa not seen due to solid stool: 0; portion of mucosa of the colon segment seen, but other areas of colon segment not well seen due to staining, residual stool and/or opaque liquid: 1; minor amount of residual staining, small fragment of stool and/or opaque liquid, but mucosa of colon segment seen well: 2; entire mucosa of colon segment seen well with no residual staining, small fragment of stool or opaque liquid: 3.

The results provide separate information for each of the three parts of the colon and then combined. For example, for scores 3-3-3 the total score is of 9 points and the quality of preparation is excellent, or for 1-1-1, the total is 3 points and the quality of preparation is poor. The rating if total score is as follows. Excellent: 7-9; good: 4-6; poor: 1-3; inadequate: 0.

The researcher and nursing staff whose access the secondary outcomes are blind, which recorded the Nausea symptom, compliance with bowel preparation, how easy/difficult to take preparation compared with the previous one, willingness to repeat the same regimen and any adverse symptoms through completing the patient's questionnaire.

The primary efficacy analysis based on an intention to-treat analysis and included patients who were randomized and received any treatment. In this study, the preparation was classified as adequate or inadequate

based on the Boston bowel preparation scale. These score were compared between the groups by chi-square test or Fisher's exact test for categorical variables. For the secondary endpoints, student t-test was used to compare continuous variables. Categorical variables were tested by using the corrected chi-square test.

Results

The study subjects allocation and disposition are described in Figure 3. A total of 369 consecutive patients met inclusion criteria for scheduled elective colonoscopy and consent participated in this study. After being randomized into two groups, the intervention group total of 182 patients, 16 patients have to postpone the colonoscopy due to the covid 19 situation, and 8 patients absent. In the control group total 187 participants, 9 patient has to postpone the colonoscopy due to the covid 19 situation, 5 patients were absent, one of them declare death before colonoscopy. The remaining patients 158 in the intervention group and 172 in control group were compared by intention to treat analysis.

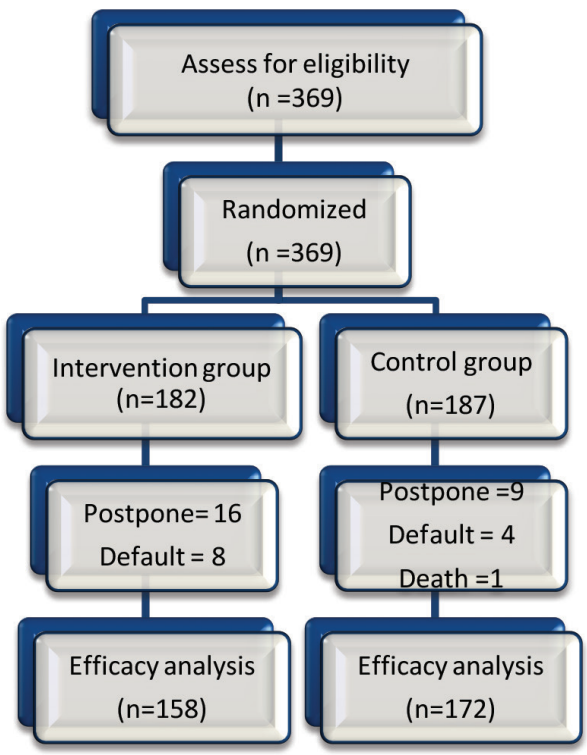

Figure 3 Schematic flow of the study.

The baseline characteristics are summarized in Table 1. There were no significant differences among the 2 groups concerning age, sex, body weight, height, underlying disease, bowel preparation type, indications for colonoscopy, previous colorectal surgery, or frequency of defecating .There were significant in BMI (23.30 ± 4.40 vs. 24.28 ± 4.53, $P < 0.047$) but after subgroup analysis there are not significant ($p = 0.169$).

In this study, 16 colorectal cancers were detected in 16 patients (9.2%), 10 (6.3%) in the intervention group, and 5 (2.9%) in the control group (Table 1). A total of 111 patients were detected with colonic polyp, 34.2% in the intervention group, and 33.2% in the control group. There were no significant differences in finding and histopathology from both groups .Total of 57 polyps from the control group were sent for pathology reveal to tubular adenoma 42 (71.2%), hyperplasia 8 (13.6%), adenocarcinoma 4 (6.8%), inflammatory 2 (3.4%), and carcinoma 1 (1.7%). In the intervention group 50 from 54 polyps was sent for pathology reveal to tubular adenoma 37 (60.7%), hyperplasia 6 (9.8%), tubulo-villous adenoma 5 (8.2%). and inflammatory 2 (3.3%). Other colonoscopy finding has no significant differences between both groups such as normal finding and diverticular.

Table 1 Comparison of patient characteristics between control and intervention groups

Characteristics	Control n = 172	Intervention n = 158	*p*-value
Age (years): mean ± SD	57.42 ± 10.7	57.59 ± 12.92	0.901
Female sex: number (%)	96 (55.8)	89 (56.3)	0.925
Weight (kg): mean ± SD	61.64 ± 13.27	60.45 ± 13.33	0.417
Height (cm): mean ± SD	160.12 ± 8.9	160.44 ± 8.61	0.735
BMI (kg/m²): mean ± SD	24.28 ± 4.53	23.30 ± 4.40	0.047*
Underlying Disease: number (%)			0.206
No	96 (55.8)	99 (62.7)	
Yes	76 (44.2)	59 (37.3)	

Table 1 (cont.) Comparison of patient characteristics between control and intervention groups

Characteristics	Control n = 172	Intervention n = 158	*p*-value
HT: number (%)	70 (40.7)	50 (31.6)	0.088
DM: number (%)	21 (12.2)	24 (15.2)	0.431
CAD: number (%)	4 (2.3)	4 (2.5)	1.000
Liver disease: number (%)	3 (1.7)	0 (0)	0.249
CKD: number (%)	1 (0.6)	3 (1.9)	0.353
Bowel Preparation: number (%)			0.178
PEG	141 (82.0)	138 (87.3)	
NaP	31 (18.0)	20 (12.7)	
Indication: number (%)			0.334
Surveillance	58 (33.7)	39 (24.7)	
Screening	48 (27.9)	30 (19.0)	
Stool occult positive	6 (3.5)	2 (1.3)	
Lower GI bleeding	27 (15.7)	44 (27.8)	
Abdominal pain	16 (9.3)	10 (6.3)	
Chronic constipation	10 (5.8)	16 (10.1)	
Other	7 (4.1)	17 (10.8)	
Defecation frequency: number (%)			0.678
Every 1-2 day	135 (78.5)	121 (76.6)	
More than 3 day	37 (21.5)	37 (23.4)	
Previous colorectal surgery: number (%)			0.310
No	135 (78.5)	131 (82.9)	
Yes	37 (21.5)	27 (17.1)	0.063
Right Hemicolectomy	4 (11.4)	5 (21.7)	
Left Hemicolectomy	2 (5.7)	2 (8.7)	
Low anterior resection	16 (45.7)	6 (26.1)	
Sigmoidectomy	9 (25.7)	2 (8.7)	
Anterior resection	3 (8.6)	4 (17.4)	
Abdominal pelvic resection	0 (0)	3 (13)	
Other	1 (2.9)	1 (4.3)	
Previous colonoscopy: number (%)			0.002*
0 (none)	96 (55.8)	116 (73.4)	
1 (once)	43 (25.0)	27 (17.1)	
2-3	32 (18.6)	13 (8.1)	
> 3	1 (0.6)	2 (1.3)	
Familial colonic cancer: number (%)			0.029*
No	140 (81.4)	142 (89.9)	
Yes	32 (18.6)	16 (10.1)	
Findings: number (%)			0.439
Normal	91 (52.9)	72 (45.6)	
Cancer	5 (2.9)	10 (6.3)	
Polyp	57 (33.2)	54 (34.2)	
Diverticular	9 (5.2)	9 (5.7)	
Other	10 (5.8)	13 (8.2)	
Histopathology: number (%)			0.111
Inflammatory	2 (3.4)	2 (3.3)	
Hyperplasia	8 (13.6)	6 (9.8)	
Tubular adenoma	42 (71.2)	37 (60.7)	
Tubulo-villous adenoma	0 (0)	5 (8.2)	
Adenocarcinoma	4 (6.8)	10 (16.4)	
Carcinoma	1 (1.7)	0 (0)	
Colitis	1 (1.7)	1 (1.6)	

p-value from student t-test and chi-square test *significant at $p < 0.05$

The efficacy of bowel preparation is shown in Table 2. The overall Excellent bowel preparation rates were 81.6% in the intervention group and 64.5% in the control group, the overall Non-excellent bowel preparation rates were 18.4% in the intervention group and 35.5% in the control group. The Good bowel preparation rates were 12.1% in the intervention group and 31.4% in the control group, the poor bowel preparation rates were 6.3% in the intervention group and 3.5% in the control group. ($p < 0.001$).There is no Inadequate bowel preparation in intervention group but only 1 patient in the control group.

Table 2 Results of colon-cleansing efficacy

Variables	Control Number (%); n = 172	Intervention Number (%); n = 158	*p*-value
BBPs			< 0.001*
Excellent (7-9)	111 (64.5)	129 (81.6)	
Non-excellent (0-6)	61 (35.5)	29 (18.4)	
BBPs			< 0.001*
Excellent (7-9)	111 (64.5)	129 (81.6)	
Good (4-6)	54 (31.4)	19 (12.1)	
Poor (1-3)	6 (3.5)	10 (6.3)	
Inadequate (0)	1 (0.6)	0 (0.0)	

Abbreviations: BBPs-The Boston bowel preparation scale

Value were represented as n (%), the *p*-value from chi-square test *significant at $p < 0.05$

Results of patient tolerability and safety are shown in Table 3. There were significant difference in patient compliance and tolerability as no nausea symptom (65.2% vs 59.3%, $p < 0.001$), nausea but not vomiting (27.2% vs 17.4%, $p < 0.001$), no abdominal pain (62.7% vs 66.9%, $p = 0.019$), no abdominal distension (77.2% vs 54.7%, $p < 0.001$), frequency of defecation > 7 times (74.1% vs 52.9%, $p < 0.001$), how easy to take preparation compared with previous one (79.5% vs 42.3%, $p < 0.001$), willingness to repeat the same regimen (51.3% vs 20.9%, $p < 0.001$) between intervention group and control group. However, there were no significant differences in Compliance with bowel preparation and any adverse symptoms.

Table 3 Results of patient questionnaire.

Variables	Control Number (%); n = 172	Intervention Number (%); n = 158	*p*-value
Nausea Symptom			< 0.001*
No Nausea	102 (59.3)	103 (65.2)	
Nausea	30 (17.4)	43 (27.2)	
Vomiting 1-2 times	35 (20.3)	12 (7.6)	
Vomiting 3-4 times	5 (2.9)	0 (0)	
Abdominal Pain			0.019*
No abdominal pain	115 (66.9)	99 (62.7)	
Mild abdominal pain	39 (22.7)	53 (33.5)	
Mod abdominal pain	14 (8.1)	6 (3.8)	
Severe abdominal pain	4 (2.3)	0 (0)	

Table 3 (cont.) Results of patient questionnaire.

Variables	Control Number (%); n = 172	Intervention Number (%); n = 158	*p*-value
Distension			< 0.001*
No distension	94 (54.7)	122 (77.2)	
Mild distension	54 (31.4)	13 (8.2)	
Mod distension	20 (11.6)	15 (9.5)	
Severe distension	4 (2.3)	8 (5.1)	
Time to first defecation (Mean ± SD)	29.13 ± 17.32	22.88 ± 13.98	0.011*
Frequency of defecation			< 0.001*
< 4 times	27 (15.7)	7 (4.4)	
4-7 times	54 (31.4)	34 (21.5)	
> 7 times	91 (52.9)	117 (74.1)	
Compliance of bowel preparation			0.722
Not 100% intake	11 (6.4)	15 (9.5)	
Less than 3 hours	69 (40.1)	59 (37.3)	
In 3-4 hours	52 (30.2)	50 (31.6)	
More than 4 hours	40 (23.3)	34 (21.5)	
Difficulty compared with previous			< 0.001*
Easy	33 (42.3)	31 (79.5)	
Invariable	40 (51.3)	8 (20.5)	
Difficult	5 (6.4)	0 (0)	
Willingness to repeat same regimen			< 0.001*
Very Satisfied	36 (20.9)	81 (51.3)	
Somewhat Satisfied	78 (45.3)	57 (36.1)	
Neutral	51 (29.7)	20 (12.7)	
Somewhat dissatisfied	6 (3.5)	0 (0)	
Very dissatisfied	1 (0.6)	0 (0)	
Any Symptom			0.611
No	91 (52.9)	88 (55.7)	
Yes	81 (47.1)	70 (44.3)	
Dry lip	45 (26.2)	41 (25.9)	
Abdominal pain	14 (8.1)	15 (9.5)	
Palpitation	15 (8.7)	14 (8.9)	
Headache	15 (8.7)	1 (0.6)	
Dizziness	33 (19.2)	19 (12)	
Rash	2 (1.2)	1 (0.6)	

p-value from student t-test and chi-square test * significant at $p < 0.05$

Discussion

From a previous study, many alternate regimens of bowel preparation was used for excellent cleansing efficacy some using Ascorbic Acid,[6] showed PEG with Ascorbic Acid regimen is improve patient compliance and acceptance of surveillance colonoscopy. Some studies used olive oil.[7] Pretreatment with olive oil before administration of a low volume of Polyethylene glycol electrolyte lavage solution (PEG-ELS) enhances both patient satisfaction and the quality of right-side colonic cleansing over the administration of the conventional.

Mine Y. et al, have used mosapride in guinea pigs and found that mosapride enhances the colon cleansing action of Polyethylene glycol electrolyte lavage solution (PEG-ELS) via an increase in colonic transit in guinea pigs, that is, it reduces not only fecal residue but also excessive fluid in the colonic lumen. It is therefore believed that co-administration of mosapride and PEG-ELS can allow better visualization in barium enema examination.[8]

Later studies, Jung IS et al, studies of prokinetic drug using a 10 mg dose of mosapride and prove that it can be enhanced gastric emptying time, assessed by both endoscopy ,compared with scintigraphy and radiopaque markers.3 Another study from Mishima Y. et al, Administration of mosapride citrate or itopride hydrochloride prior to oral lavage solution statistically significantly fewer uncomfortable abdominal symptoms found that prokinetic agents effectively decreased the incidence of uncomfortable abdominal symptoms experienced during colonoscopy preparation.[9] Masahiro T. et al, evaluate the possibility of reducing the volume of polyethylene glycol (PEG)-electrolyte solution using adjunctive mosapride citrate for colonoscopy preparation. Although the 1.5 L group had better acceptability and tolerability, 15 mg of mosapride may be insufficient to compensate for a 0.5-L reduction of PEG solution.[10]

In recent year Lee J et al, administration of mosapride citrate with a split-dose of PEG plus ascorbic acid in elderly patients showed an increase in bowel preparation efficacy and reduced adverse events, particularly abdominal fullness, during the administration of a bowel cleansing agent.[11] Also Mishima Y. et al showed that administration of mosapride prior to PEG solution significantly decreased the incidence of uncomfortable abdominal symptoms.[12] But there still are no demonstrated the optimal dosage and timing of administration required to clarify the proper regimen for colonoscopy.

This is the prospective, randomized, controlled study to evaluate the efficacy, acceptability, and tolerance of mosapride citrate as an adjunct to PEG or NaP in bowel preparation for colonoscopy. We aimed to study which mosapride citrate increases the movement of laxatives from the stomach to the intestines faster as the hypothesis so that patients should have an excellent bowel preparation in addition to having a positive effect on both diagnostic and management in colonoscopy.

We found that there were no significant differences in patient characteristics among the 2 groups including age, sex, race, body weight, underlying disease, bowel preparation type, indications for colonoscopy, Frequency of defecating, or historic of previous colorectal surgery. The significant differences such BMI of 23.30 ± 4.40 in the intervention group vs. 24.28 ± 4.53 in the control group ($p < 0.0047$) but after subgroup analysis there are not significant ($p = 0.169$).

Results of colon-cleansing efficacy. The overall excellent bowel preparation rates were 81.6% in the intervention group vs. 64.5% in the control group. More than 90% of patients have at least good bowel preparation. It may explain why there were no significant differences in disease detection rates between both groups. Go the same way with the study of Tholey DM., determine whether excellent bowel cleansing is superior to good for the detection of adenomas. Found out that adenomas detection rate is not significantly different between the adequate subcategories of excellent and Good. However, excellent cleansing is associated with superior detection of advanced adenomas and sessile serrated polyps (SSP).[13] The polyp detection rate found more in the excellent bowel preparation group than non-excellent.

Results of patient tolerability and safety are derived from the completion of the questionnaire (Table 3). There were significant difference in patient compliance and tolerability as No Nausea Symptom (65.2% vs 59.3% , $p < 0.001$), Nausea but not vomiting (27.2% vs 17.4%, $p < 0.001$), No abdominal pain (62.7% vs 66.9%, $p = 0.019$), No abdominal distension (77.2% vs 54.7%, p < 0.001), Frequency of defecation > 7 times (74.1% vs 52.9%, $p < 0.001$), Easier to take preparation compared with previous one (79.5% vs 42.3%, $p < 0.001$), Willingness to repeat the same regimen (51.3% vs 20.9%, $p < 0.001$) between intervention group and control group. It can explain from the fill-in questionnaire, that patients from intervention group who received mosapride, the patients knew that the drug was effective in reducing nausea and vomiting, possibly biased while filling the

question because the patient in the control group didn't get any placebo. When receiving the drug, patient tolerability, whether it is a matter of Nausea Symptoms or abdominal distension, there are less common symptoms in the intervention group, including how easier to take preparation compared with the previous one or willingness to repeat the same regimen as well. In the same way with surveillance study, the most common adverse events associated with mosapride are abdominal pain and loose stools (both 0.35%).[14] There were more number of patient have abdominal pain in the intervention group to the control group (37.3% vs. 33.1%, $p = 0.019$), but the loose stools, it would be difficult to explain, since all patients get laxatives. However, there were no significant differences in compliance with bowel preparation and any adverse symptoms from the drug between the two groups. The previous study did not evaluate adverse symptoms or events, as co-administration of mosapride with PEG or NaP, so we try to collect such data on which possible adverse effects from mosapride such as dry lip, abdominal pain, palpitation, headache, dizziness or rash. The most common adverse symptom is dry lip 41 (25.9%) vs. 45 (26.2%) in both groups. It can explain by the patient has a frequency of defecation from the laxative drugs. There are no serious adverse symptoms have been reported.

One of the limitations of this study was due to the covid-19 situation we have to postpone colonoscopy appointments for many participants. As a result, some patient data are missing. Other limitations are the difference in surgeon operated colonoscopy, patients in the intervention group possible to bias while completing the questionnaire due to known themselves taking medication.

Conclusion

Mosapride citrate may be found to have a benefit when used in combination with oral mechanical bowel preparation adjunct to PEG or NaP leads to improve colonoscopy cleansing quality without severe adverse complications. Furthermore, mosapride citrate still helps to reduce nausea symptoms and improve compliance with bowel preparation.

References

1. Jang JY, Chun HJ. Bowel preparations as quality indicators for colonoscopy. World J Gastroenterol 2014;20:2746-50.
2. Hendry PO, Jenkins JT, Diament RH. The impact of poor bowel preparation on colonoscopy: a prospective single centre study of 10,571 colonoscopies. Colorectal Dis 2007;9:745-8.
3. Millien VO, Mansour NM. Bowel preparation for colonoscopy in 2020: a look at the past, present, and future. Curr Gastroenterol Rep 2020;6;22-8.
4. Jung IS, Kim JH, Lee HY, et al. Endoscopic evaluation of gastric emptying and effect of mosapride citrate on gastric emptying. Yonsei Med J 2010;51:33-8.
5. Kastenberg D, Bertiger G, Brogadir S. Bowel preparation quality scales for colonoscopy. World J Gastroenterol 2018;24:2833-43.
6. Kamei M, Shibuya T, Takahashi M, et al. Efficacy and acceptability of 1 Liter of polyethylene glycol with ascorbic acid vs. 2 Liters of polyethylene glycol plus mosapride and sennoside for colonoscopy preparation. Med Sci Monit 2018;24:523-30.
7. Abut E, Guveli H, Yasar B, et al. Administration of olive oil followed by a low volume of polyethylene glycol-electrolyte lavage solution improves patient satisfaction with right-side colonic cleansing over administration of the conventional volume of polyethylene glycol-electrolyte lavage solution for colonoscopy preparation. Gastrointest Endosc 2009;70:515-21.
8. Mine Y, Morikage K, Oku S, et al. Effect of mosapride citrate hydrate on the colon cleansing action of polyethylene glycol electrolyte lavage solution (PEG-ELS) in guinea pigs. J Pharmacol Sci 2009;110:415-23.
9. Mishima Y, Amano Y, Okita K, et al. Efficacy of prokinetic agents in improving bowel preparation for colonoscopy. Digestion 2008;77:166-72.
10. Tajika M, Niwa Y, Bhatia V, et al. Can mosapride citrate reduce the volume of lavage solution for colonoscopy preparation? World J Gastroenterol 2013;19:727-35.
11. Lee J, Jeong SJ, Kim TH, et al. Efficacy of mosapride citrate with a split dose of polyethylene glycol plus ascorbic acid for bowel preparation in elderly patients: A randomized controlled trial. Medicine 2020;99:e18702.
12. Mishima Y, Amano Y, Okita K, et al. Efficacy of prokinetic agents in improving bowel preparation for colonoscopy. Digestion 2008;77:166-72.
13. Tholey DM, Shelton CE, Francis G, et al. Adenoma detection in excellent versus good bowel preparation for colonoscopy. J Clin Gastroenterol 2015;49:313-19.
14. Oikawa T, Takemoto Y, Haramu K. Post-marketing surveillance of mosapride citrate (Gasmotin) in patients with nonulcer dyspepsia on long-term administration [in Japanese]. Rinsho Iyaku 2005;21:831-7.

บทคัดย่อ ผลการศึกษาความสะอาดของลำไส้ใหญ่เมื่อเพิ่ม โมซาพรายด์ ซิเตรต ในการเตรียมเพื่อการส่องกล้องลำไส้ใหญ่

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ความเป็นมา: การเตรียมลำไส้เป็นปัจจัยสำคัญสำหรับผลลัพธ์ที่ดีที่สุดของการส่องกล้องตรวจลำไส้ใหญ่ ปัจจุบันยาที่ใช้เตรียมลำไส้ที่นิยม ได้แก่ สารละลายโพลีเอทิลีนไกลคอล (polyethylene glycol, PEG) และสารละลายโซเดียมฟอสเฟต (Sodium phosphate, Sopho) เพื่อความสะอาดลำไส้เพื่อส่องกล้องตรวจลำไส้ใหญ่ แต่ผู้ป่วยบางรายไม่สามารถทนต่อ PEG หรือ Sopho ได้เนื่องจากรสชาติและหรือปริมาตรที่ต้องดื่ม

วัตถุประสงค์: การศึกษานี้มีวัตถุประสงค์เพื่อประเมินความสะอาดของลำไส้ใหญ่เมื่อมีการใช้ โมซาพรายด์ ซิเตรต (mosapride citrate) เป็นยาเสริม

วิธีการศึกษา: การศึกษาทดลองแบบสุ่ม โดยกลุ่มควบคุม และกลุ่มที่ได้ยา ยาโมซาไพรด์ ซิเตรต เสริมโดยการรับประทานก่อนยาเตรียมลำไส้เป็นเวลา 15 นาที โดยประเมิน ประสิทธิภาพของการเตรียมไส้ได้รับการประเมินโดยแพทย์ผู้ตรวจส่องกล้องตรวจลำไส้ใหญ่ โดยใช้มาตราคะแนนความสะอาดลำไส้ใหญ่ของบอสตัน (Boston Bowel preparation Score,BBPS) และเก็บข้อมูลจากแบบสอบถาม ผู้ป่วยในด้านการยอมรับและความอดทนต่อกระบวนการเตรียมลำไส้

ผลการศึกษา: ผู้ป่วยทั้งหมด 330 ราย รวมอยู่ในการวิเคราะห์ ในกลุ่มทดลองที่ได้รับยาเสริมมีคะแนนความสะอาดลำไส้ใหญ่ที่ดีเยี่ยมสูงกว่ากลุ่มควบคุมอย่างมีนัยสำคัญ (ร้อยละ 81.6 กับ ร้อยละ 64.5, $p < 0.001$) อุบัติการณ์ของเหตุการณ์ไม่พึงประสงค์มีความคล้ายคลึงกันในทั้งสองกลุ่ม นอกจากนี้ ความพึงพอใจของกลุ่มทดลองต่อการเตรียมลำไส้ใหญ่มีมากกว่ากลุ่มควบคุมอย่างมีนัยสำคัญ โดยสะท้อนจากอาการทางคลินิกที่น้อยกว่า ได้แก่ คลื่นไส้ ปวดท้อง ท้องอืด และความเต็มใจที่จะทำซ้ำวิธีการเดิม

สรุปผลการศึกษา: โมซาพรายด์ ซิเตรต (Mosapride citrate) อาจเป็นยาเสริมที่มีประสิทธิภาพและปลอดภัยในการเตรียมลำไส้สำหรับการส่องกล้องตรวจลำไส้ใหญ่ ซึ่งนำไปสู่การปรับปรุงคุณภาพของการเตรียมลำไส้ใหญ่และช่วยให้ผู้ป่วยสามารถปฏิบัติตามข้อกำหนดในการเตรียมลำไส้ได้ดีขึ้น

The THAI Journal of SURGERY 2022;43(4):170-177.
Official Publication of The Royal College of Surgeons of Thailand

Case Report

Esophageal Squamous Cell Carcinoma with Intragastric Metastasis Invading Liver: A Case Report

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Abstract Esophageal squamous cell carcinomas often metastasized to lymph nodes and distant organs. The incidence of metastasis to the stomach from esophageal cancer was rare. However, early-stage esophageal carcinoma with gastric metastasis is very rare. We report a case of submucosal esophageal SCC arising in the mid-thoracic esophagus with a large metastasis tumor in the gastric cardia invading liver. A 54 year-old Thai male presented with sudden epigastrium pain for 3 days. He had melena 1 month previously. Endoscopic examination revealed a 0.5 cm small ulcerative lesion squamous cell carcinoma and a giant gastric tumor at cardia. Computed tomography showed that the gastric tumor was directly invading the liver. He underwent Ivor Lewis esophagectomy and wedge resection left lobe liver. Final pathological findings were superficial esophageal carcinoma invading the submucosal layer with gastric mass involving the gastric submucosa, the muscular propria, and partially extended into the adjacent liver. After chemotherapy cycle 3, computed tomography showed liver metastasis. The outcome for patients with esophageal carcinoma who have gastric metastasis is very poor, even after surgery and chemotherapy. Optimal management of gastric metastasis from esophageal cancer is not established yet.

Keywords: Early-stage esophageal carcinoma, Gastric metastasis, Intramural gastric metastasis, Liver invasion

Introduction

Squamous cell carcinoma (SCC) of the esophagus is associated with a poor prognosis. Many patients with this disease already have metastasis by the time the primary tumors are detected. Distant metastasis to other organs such as the liver, lungs, and bone are commonly found in advanced esophageal cancer cases, but not in the stomach, less than 70 cases were reported until now.[1] The incidence of metastasis to the stomach from esophageal cancer was 6.2% at autopsy[2] and 5.3-8.1% at endoscopic findings.[3,4] However, early-stage esophageal carcinoma with intramural gastric metastasis is very rare. The prognosis for patients with gastric metastasis is poor. Optimal management of gastric metastasis from esophageal cancer is not established yet. We report a case of submucosal esophageal SCC arising in the mid-thoracic esophagus with a large metastasis tumor in the gastric cardia invading liver.

Received for publication 23 May 2022; Revised 19 September 2022; Accepted 21 September 2022

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Report of A Case

A 54 years old Thai male presented with sudden epigastrium pain for 3 days. He wasn't complaining about dysphagia but a weight loss of 5 kg in 1 month. He had melena 1 month previously. He had no past medical and was not taking any regular medications. His social history was significant for smoking ½ pack of cigarettes for 30 years and drinking a ½ bottle of alcohol daily, 20 years previously. He had no significant family history.

He was alert and look cachexia. His blood pressure was 130/90 mm Hg, pulse 84/min, respiration 20/min, body temperature 36.7°C. His general examination revealed pallor and tenderness at the epigastrium. The complete blood count showed a white blood cell count of 22,430/mm^3, Hemoglobin 6.6 g/dL, platelets 498 × 103/mm^3. His blood chemistry was normal, with tumor markers carcinoembryonic antigen (CEA) 2.6 Ug/L. The chest X-ray showed no abnormality. He then underwent esophagogastroduodenoscopy (EGD). The endoscopic finding revealed a 0.5 cm small ulcerative lesion was seen at 33 cm from the incisor teeth and a 7 cm fulgurating mass was seen at cardia of the stomach below EGJ. (Figure 1) A biopsy of two specimens demonstrated moderately differentiated squamous cell carcinoma. CT scan shows heterogeneous mass, which was measured about 7.9 × 7.0 × 6.9 cm in greatest dimensions and shows central necrotic portion, arising from the gastric fundus. It causes mass effect and luminal narrowing without gastric wall thickening. Note that direct invasion of the gastric mass into the left lobe of the liver is seen. There is no obviously seen esophageal mass in the chest CT. Neither perigastric nodes nor mediastinal nodes are demonstrated (Figure 2).

Intraoperative findings showed a 7 cm sized endophytic mass below Z-line that invade the left lobe liver and 0.5 cm mass at the mid-thoracic esophagus.

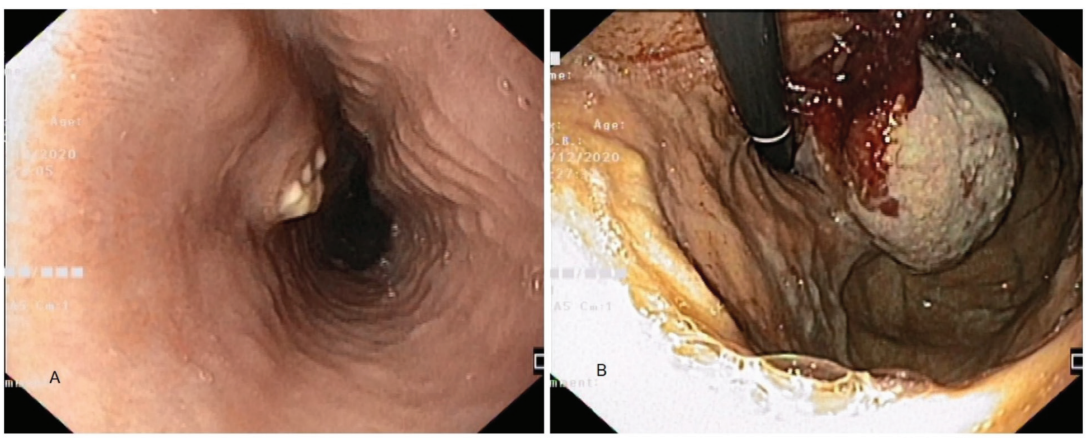

Figure 1 Endoscopic finding (a) small ulcerative lesion at the mid-thoracic esophagus. (b) fulgurating mass at cardia of the stomach below EGJ.

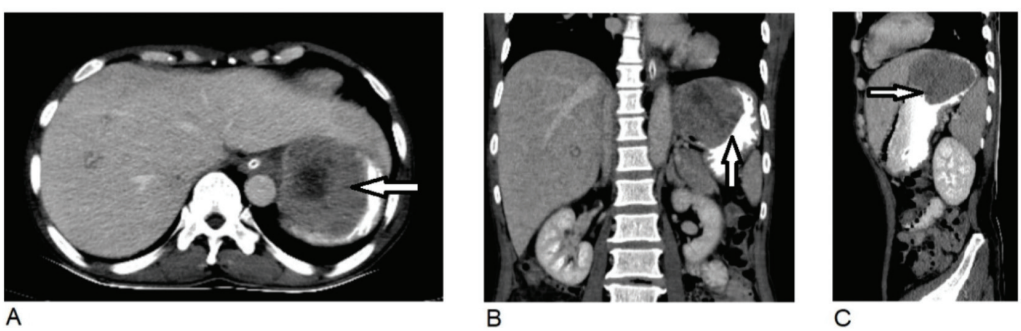

Figure 2 CT scan (a) Axial contrast-enhanced CT scan shows heterogeneous mass, which was measured about 7.9x7.0x6.9 cm in greatest dimensions and shows central necrotic portion, arising from the gastric fundus (arrow). (b) The coronal view shows the gastric mass causing luminal narrowing without gastric wall thickening (arrow). (c) The sagittal view shows the direct invasion of the gastric mass into the left lobe of the liver.

There was no intrathoracic and intraabdominal lymph node enlargement. He underwent Ivor Lewis esophagectomy and wedge resection left lobe liver. The microscopic examination of the esophagus revealed an infiltrative tumor that invaded the submucosal layer. There was an obvious transformation zone detected, showing the progression from the intraepithelial dysplasia into the invasive component. The tumor presented as irregular, cohesive nests/sheets surrounded by desmoplastic stroma. The squamous differentiation was identified by focal keratinizations, dyskeratotic cells, and the presence of intercellular bridges. (Figure 3) There were multiple tumor emboli with several esophageal nodal metastases seen. (Figure 4) The histologic sections of the stomach revealed an infiltrative tumor that almost exclusively involved the gastric submucosa, the muscular propria, and partially extended into the adjacent liver. The gastric mucosa was spared. Only a few focal ulcers were detected without evidence of intraepithelial dysplasia. (Figure 5) The gastric mass showed squamous differentiation similar to the esophageal primary. All of the perigastric nodes were negative for metastasis.

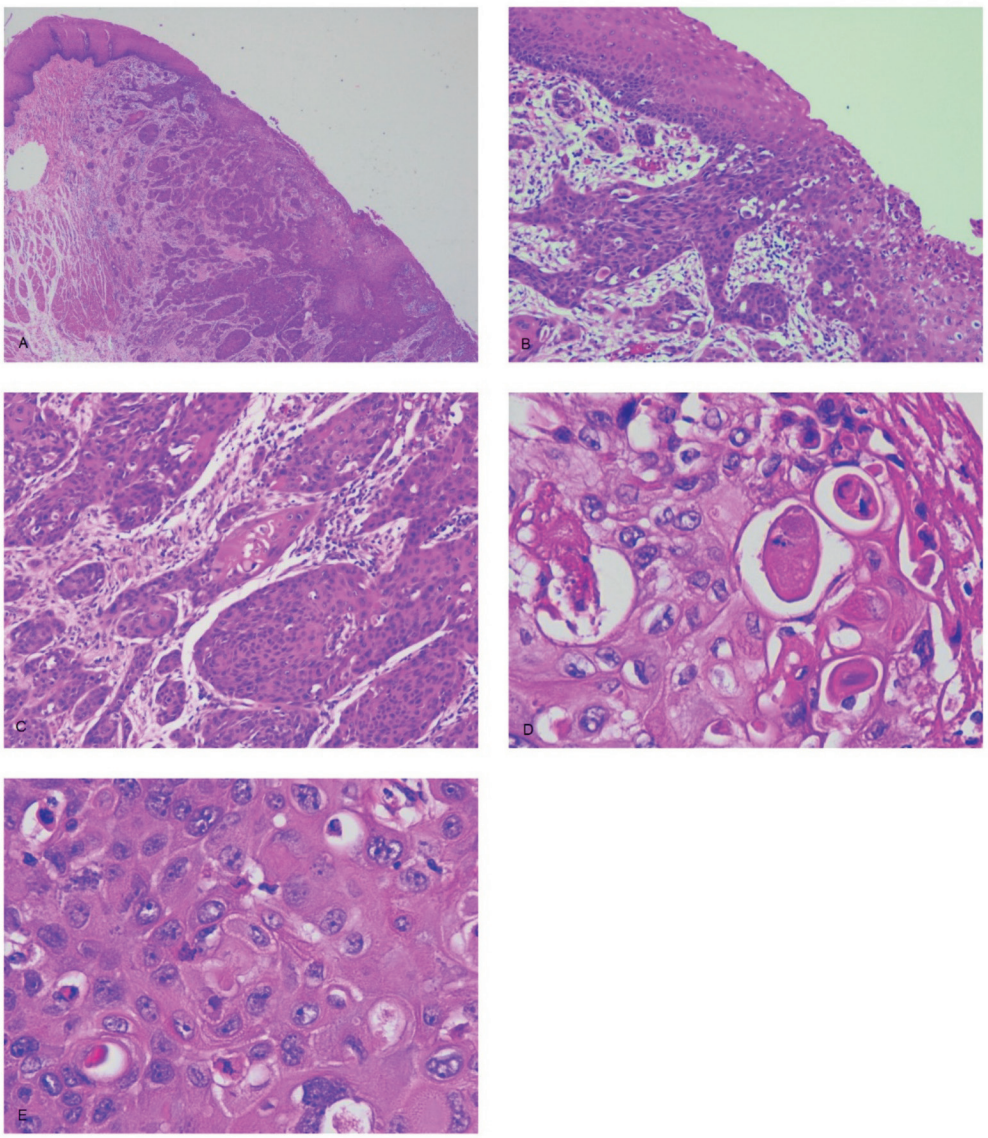

Figure 3 (a) The microscopic section of the esophagus revealed an infiltrative tumor that invaded the submucosa. (b) There was a transformation zone from the high-grade esophageal squamous intraepithelial neoplasia into the invasive component. (c) The tumor presented as irregular cohesive sheets with focal keratinization. (d) The tumor with dyskeratotic cells. (e) The neoplastic cells reveal focal intercellular bridges.

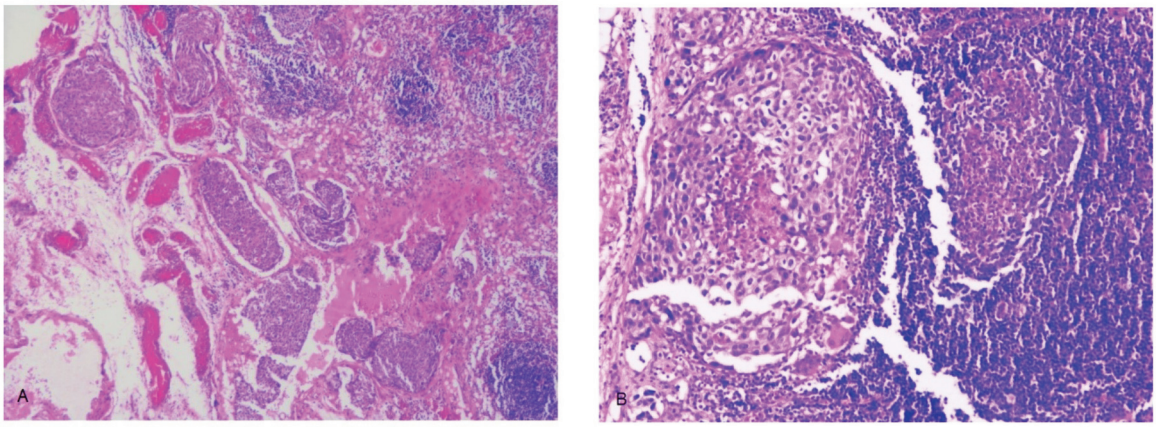

Figure 4 (a) Multiple tumor emboli identified in the nodal hilum. (b) The metastatic tumor in the periesophageal lymph node.

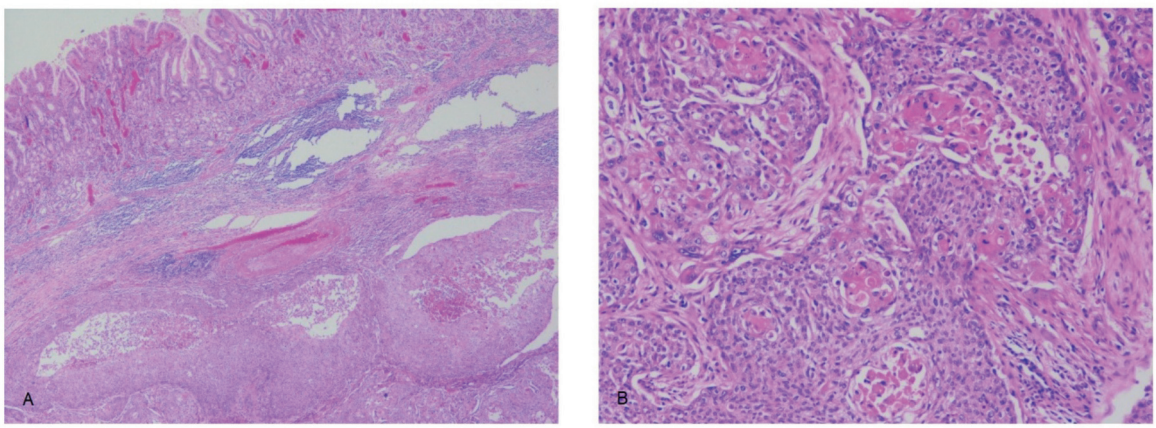

Figure 5 a) The gastric mass revealed an infiltrative tumor that almost exclusively involves the submucosa and muscular propria. The gastric mucosa was spared. There was no transformation zone detected. (b) The gastric tumor showed squamous differentiation similar to esophageal primary.

He was discharged on postoperative day 18 because of wound complications. He could eat semi-solid food before discharge and feed blenderized diet supplementally via jejunostomy. Chemotherapy was started at postoperative week[8]. He underwent chemotherapy for adjuvant treatment with cisplatin and 5-fluorouracil. Cisplatin 75 mg/m^2 was administered intravenously for 2 hours. After the completion of the cisplatin infusion on day 1. 5-Fluorouracil 1,000 mg/m^2/day was administered as a protracted intravenous infusion on days 1 to 4. Cycles of chemotherapy were repeated every 3 weeks.

After chemotherapy cycle 3, He came to the emergency room with abdominal distension and vomiting. The abdomen series showed small bowel dilatation with a different high in the same loop of the small bowel. He then underwent a CT scan of the abdomen. CT scan showed evidence of small bowel obstruction at the distal ilium and 4.2 × 3.9 × 4.8 cm hypodense lesion in hepatic segment VI/VII, possibly liver metastasis. The conservative treatment was done with NG and jejunostomy decompression. His clinical was improved 2 days after treatment. After discharge, he denies further chemotherapy and lost follow-up.

Discussion

The stomach is an unusual site for metastasis. Metastatic lesions to the stomach are found in 0.2% to 1.7% of populations in the autopsy series.[1,5] The common primary lesion was found to be melanoma, lung cancer, and breast cancer.[6-8]

Patient prognosis and survival outcomes are poor because the presence of gastric metastasis is associated with advanced disease.[3,5] The median survival period from the diagnosis of gastric metastasis was 3.0 months (range, 1.0 to 11.0 months).[3]

The presence of metastases within the stomach from esophageal carcinoma is rare. The incidence of metastasis to the stomach was 6.2% at autopsy2 and 5.3- 8.1% from endoscopic findings in the era of high-definition (HD) endoscopes.[3,4] Although 11.5% of the esophageal cancer patients had synchronous gastric tumors. The most common synchronous gastric tumor was adenocarcinoma of the stomach.[9]

Gastric metastatic firstly involved the submucosa and then might invade to the other layers of the stomach wall.[2] The pathological report was different from primary gastric squamous cell carcinoma. Primary Squamous cell carcinoma of the stomach is defined according to the following diagnostic criteria proposed by the Japanese Classification of Gastric Carcinoma: (1) all tumor cells are SCC cells, with no adenocarcinomatous components in any sections and (2) distinct evidence that SCC arises directly from the gastric mucosa.[10] Early in 1960-1980, EGD wasn't used routine for preoperative before gastrectomy. Some cases that reported primary SCC stomach, revealed another lesion at the esophagus in pathologic specimens.[11,12]

The mechanisms underlying gastric metastasis have not been clearly explained and are probably different for each primary tumor. Four pathways may be involved in the metastatic spread of original primary cancers to the stomach: peritoneal dissemination, hematogenous dissemination, lymphatic spread, and direct tumor invasion.[1] Saito et al. (1985) reported that gastric metastasis in esophageal cancer spread via the lymphatic route. From their report, examination of the surgical specimens revealed that not only lymphatic invasion but also lymph node metastasis was present in almost all patients. They summarized that metastases within the stomach are produced by the lymphatic invasion of carcinoma cells from the primary carcinoma in the esophagus.[2,12] Thus, it is considered that stomach metastasis is induced mainly via the lymphatic route rather than via the bloodstream route that is common in other types of distant organ metastasis.[2,13] But there had a case report that revealed the case of gastric metastasis without lymphatic infiltration in the surgical specimen because the primary esophageal tumor was a mucosal carcinoma with no lymphatic infiltration of the submucosa.[14]

Kuwano et al. classified gastric involvement by esophageal squamous cell carcinoma pathologically into the following four patterns: (1) gastric invasion from metastatic lymph nodes, (2) intramural metastasis, (3) direct gastric wall involvement by the primary tumor, and (4) intraepithelial spread to the gastric mucosa. In conclusion, esophageal cancer that involves the gastric wall or epithelium by direct spread appears to have a similar prognosis to other esophageal tumors, but gastric involvement by metastases indicates a poor prognosis.[15]

Intramural metastasis (IMM) of esophageal carcinoma was first reported by Watson in 1933. Watson explained IMM as an extension by way of the submucous lymphatic spread. Takubo (1989) defined IMM as the metastatic tumor in the esophagus or stomach from the primary esophageal carcinoma, not located within a vessel lumen but rather invading the esophageal or gastric wall. The primary carcinoma and the focus of IMM were distant from each other.[16] The recent definition of IMM purposed by Hashimoto et al. (2013) is as follows: (1) separated from the primary tumor; (2) located in the wall of the esophagus, stomach, or duodenum; (3) having a gross appearance of a submucosal tumor without intraepithelial cancer extension; (4) having the same histological type as the primary tumor; and (5) lacking any evidence of intravascular growth. These criteria discriminated IMM from multiple primary tumors in the esophagus or stomach and intravascular tumor emboli around the primary tumor.[13] The incidence of IMM observed by five Japanese research groups varied from 7.0 to 14.3%.[16-18] and 1.0% had IMM to stomach.[18] Lymph node metastasis and distant organ metastasis were observed higher in IMM patients than patients without IMM. IMM patients resulted in significantly shorter overall survival than patients without IMM.[13,16,19]

There were two peaks in the distribution patterns of the sizes of the metastatic tumors: less than 2 cm and more than 4 cm in diameter from autopsy specimen.[2] Solitary metastases were reported to be more common than multiple metastases.[2,3] Metastatic tumors resembled submucosal tumors of the stomach.[2,3] In contrast, a large tumor could form a dome-like lesion or ulcerative lesion. It exhibited pronounced submucosal growth and equally pronounced invasiveness into the gastric wall or further into the neighboring structures or rupture.[2,20]

From another case report, metastasis tumors could be larger than the primary esophageal carcinoma from which they originated.[14,18,20] The explanation for the large metastasis tumor was the blood supply to the stomach is more abundant than that to the esophagus; this may facilitate gastric tumor growth.[14] Submucosal lymphatic drainage from the middle and lower esophagus is thought to be connected to the gastric lymphatic drainage from the cardia and fundus; thus, the submucosal lymphatic system may be the route taken by cells metastasizing to the stomach. These connections might explain the predominant location of metastatic gastric lesions in the upper portion of the stomach, rather than in the body.[14] We found one report that was similar to our case of esophageal SCC with gastric metastasis invading the liver. It was questionable that early T staging in esophageal SCC can have distant metastasis. Ebihara et al. report 1 case of IMM from stage T1 esophageal cancer from 1,259 patients with esophageal cancer who underwent surgical treatment.[18] Patients with esophageal carcinoma should undergo a careful examination of their stomachs, even if their esophageal carcinoma is at an early stage.[11,14]

The GASTRIC group's meta-analysis of disease-free survival (DFS) in trials of adjuvant treatment for gastric cancer shows that DFS is an acceptable surrogate for overall survival (OS) in trials of cytotoxic agents for gastric cancer in adjuvant treatment. DFS is highly predictive of OS. The strong correlation between DFS and OS can be partly attributed to the short time interval between relapse and death in gastric cancer. Therefore, patients with a short DFS also tend to have a shorter OS.[21] However, a meta-analysis of studies of esophageal cancer showed that there was no correlation between progression-free survival (PFS) and OS, so PFS could not be a surrogate endpoint for OS.[22] A Cochrane meta-analysis revealed a clear survival benefit for the treatment of metastatic esophageal cancer with chemotherapy compared with best supportive care. The duration of response is only generally 4 to 6 months, with a median OS of 10 to 12 months.[23,24] In the report as mentioned before, the patient died of local recurrence 8 months after surgery despite adjuvant chemotherapy. They suggested that gastric metastasis invading other organs have extremely poor prognoses, even after adjuvant chemotherapy.[14] The outcome for patients with esophageal carcinoma who have IMM is very poor, even after aggressive treatment.[2,16] The mean survival time of patients in whom gastric metastasis develops after esophagectomy is 5.8 months (range, 1-13 months).[2,14] As was true of our case, the patient was recurrent in 4 months post-operative.

Conclusions

Patients with esophageal carcinoma should undergo a careful examination of their stomachs, even if their esophageal carcinoma is at an early stage. The outcome for patients with esophageal carcinoma who have gastric metastasis is very poor, even after surgery and chemotherapy. Optimal management of gastric metastasis from esophageal cancer is not established yet.

Acknowledgements

We would like to thank all staff members at Buddha Sothorn Hospital (Chachoengsao, Thailand) for their contribution to this report.

Consent for Publication

The patient's wife provided consent for this case report to be published.

REFERENCES

1. Namikawa T, Hanazaki K. Clinicopathological features and treatment outcomes of metastatic tumors in the stomach. Surg Today 2014;44:1392-9.
2. Saito T, Iizuka T, Kato H, et al. Esophageal carcinoma metastatic to the stomach. A clinicopathologic study of 35 cases. Cancer 1985;56:2235-41.
3. Kim GH, Ahn JY, Jung HY, et al. Clinical and endoscopic features of metastatic tumors in the stomach. Gut Liver. 2015;9:615.
4. Bento LH, Minata MK, Batista CP, et al. Clinical and endoscopic aspects of metastases to the gastrointestinal tract. Endoscopy 2019;51:646-52.
5. Kobayashi O, Murakami H, Yoshida T, et al. Clinical diagnosis of metastatic gastric tumors: clinicopathologic findings and prognosis of nine patients in a single cancer center. World J Surg 2004;28:548-51.
6. Linda K, Green M. Hematogenous metastasis to the stomach. Cancer 1990;65:1596-600.
7. Namikawa T, Munekage E, Ogawa M, et al. Clinical presentation and treatment of gastric metastasis from other malignancies of solid organs. Biomed Rep 2017;7:159-62.
8. De Palma GD, Masone S, Rega M, et al. Metastatic tumors to the stomach: clinical and endoscopic features. World J Gastroenterol 2006;12:7326.
9. Koide N, Adachi W, Koike S, et al. Synchronous gastric tumors associated with esophageal cancer: a retrospective study of twenty-four patients. American J Gastroenterol 1998;93:758-62.
10. jp JGCAjkk-ma. Japanese classification of gastric carcinoma: 3rd English edition. Gastric Cancer. 2011;14:101-12.
11. Talerman A, Woo-Ming MO. The origin of squamous cell carcinoma of the gastric cardia. Cancer 1968;22:1226-32.

12. Glick SN, Teplick SK, Levine MS. Squamous cell metastases to the gastric cardia. Gastrointest Radiol 1985;10:339-44.
13. Hashimoto T, Arai K, Yamashita Y, et al. Characteristics of intramural metastasis in gastric cancer. Gastric Cancer 2013;16:537-42.
14. Nakazawa N, Fukuchi M, Sakurai S, et al. Mucosal esophageal squamous cell carcinoma with intramural gastric metastasis invading liver and pancreas: a case report. Int Surg 2014;99:458-62.
15. Kuwano H, Baba K, Ikebe M, et al. Gastric involvement of oesophageal squamous cell carcinoma. Brit J Surg 1992;79:328-30.
16. Takubo K, Sasajima K, Yamashita K, et al. Prognostic significance of intramural metastasis in patients with esophageal carcinoma. Cancer 1990;65:1816-9.
17. Kato H, Tachimori Y, Watanabe H, et al. Intramural metastasis of thoracic esophageal carcinoma. Int J Cancer 1992;50(1):49-52.
18. Ebihara Y, Hosokawa M, Kondo S, et al. Thirteen cases with intramural metastasis to the stomach in 1259 patients with oesophageal squamous cell carcinoma. Eur J Cardiothorac Surg 2004;26:1223-5.
19. Nishimaki T, Suzuki T, Tanaka Y, et al. Intramural metastases from thoracic esophageal cancer: local indicators of advanced disease. World J Surg 1996;20:32-7.
20. Hosoda S, Nagayo T, Suchi T, et al. Submucosal extension with spherical appearance of esophageal carcinoma into gastric cardia clinico-pathologic study of four cases. Tohoku J Experiment Med 1971;105:381-90.
21. Oba K, Paoletti X, Alberts S, et al. Disease-free survival as a surrogate for overall survival in adjuvant trials of gastric cancer: a meta-analysis. J Natl Cancer Inst 2013;105:1600-7.
22. Kataoka K, Nakamura K, Mizusawa J, et al. Surrogacy of progression-free survival (PFS) for overall survival (OS) in esophageal cancer trials with preoperative therapy: Literature-based meta-analysis. Eur J Surg Oncol 2017;43:1956-61.
23. Ku GY. Systemic therapy for esophageal cancer: chemotherapy. Chin Clin Oncol 2017;6:49.
24. Wagner A, Syn N, Moehler M, et al. Chemotherapy for advanced gastric cancer. Cochrane Database Syst Rev 2017;8:Art No: CS004604.

บทคัดย่อ **รายงานผู้ป่วย : มะเร็งหลอดอาหารระยะต้น (T1b) ที่มีการแพร่กระจายไปยังกระเพาะอาหารและตับ**

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การกระจายของมะเร็งหลอดอาหารชนิด Squamous cell carcinoma มักพบที่ต่อมน้ำเหลือง และอวัยวะอื่นๆเช่น ตับ ปอด กระดูกเป็นต้น ซึ่งการพบกระจายของมะเร็งไปยังกระเพาะอาหาร (Intragastric metastasis) พบได้น้อยมาก และโดยปกติของการกระจายไปยังอวัยวะอื่นนั้นมักจะพบในมะเร็งระยะลุกลาม ในผู้ป่วยรายนี้ พบการกระจายของมะเร็งหลอดอาหารในระยะต้น และมีการกระจายไปยัง กระเพาะอาหารและตับ

รายงานเคสผู้ป่วยชายไทย อายุ 54 ปี มาโรงพยาบาลด้วยอาการปวดท้องบริเวณลิ้นปี่ 3 วันก่อนมาโรงพยาบาล และมีถ่ายดำมาก่อน 1 เดือนก่อน จากการส่องกล้องทางเดินอาหารพบแผลขนาด 0.5 เซนติเมตร ที่หลอดอาหาร และก้อนเนื้อขนาดใหญ่ที่กระเพาะอาหาร ผลชิ้นเนื้อทั้ง 2 ตำแหน่งเป็น Squamous cell carcinoma เอกซเรย์คอมพิวเตอร์พบว่าก้อนเนื้อที่กระเพาะอาหารติดกับตับซ้าย การรักษาผู้ป่วยรายนี้ได้ทำการผ่าตัด มะเร็งที่หลอดอาหารเป็นระยะ T1b และก้อนที่กระเพาะอาหารเป็น Intragastric metastasis หลังการผ่าตัด ผู้ป่วยได้รับเคมีบำบัด และหลังการให้เคมีบำบัด ครั้งที่3 ตรวจพบการกระจายไปยังตับขวา

การพยากรณ์โรคของมะเร็งหลอดอาหารที่กระจายไปยังกระเพาะอาหารตามที่มีรายงานพบว่ามีการพยากรณ์ของโรคที่แย่ แต่ในปัจจุบันยังไม่มี วิธีการรักษาที่เป็นมาตราฐาน รวมทั้งสูตรยาเคมีบำบัด

The THAI Journal of SURGERY 2022;43(4):178-198.
Official Publication of The Royal College of Surgeons of Thailand

Abstracts of the 47th Annual Scientific Congress of The Royal College of Surgeons of Thailand, 13-16 July 2022, (Part II)

Poster Award

6 YEARS OUTCOMES AFTER BARIATRIC SURGERY IN VACHIRA PHUKET HOSPITAL

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Background: Laparoscopic sleeve gastrectomy (LSG) and Laparoscopic Roux-en-Y gastric bypass (RYGB) are the standard bariatric procedure due to their significant weight loss, remission of comorbidities. But there are not many studies showing its long term efficacy and safety in Thai patients.

Objectives: To give results of LSG and RYGB in terms of weight loss, Type 2 diabetes mellitus (T2DM) remission and possible complications from a single center in Phuket, Thailand.

Methods: This is a retrospective study of 819 morbid obese patients who underwent LSG and RYGB by a single surgeon from January 2015 to December 2020. Outcomes in terms of weight loss in kg, % of total weight loss (%TWL), % excess weight loss (%EWL), % resolution of T2DM and % complication and mortality rate are studied.

Results: LSG : The %TWL overall were 33.29 (SD = 6.55) n = 794), 32.95 (SD = 4.57) (n = 399), 29.93 (SD = 7.43) (n = 199), 26.32 (SD = 19.02) (n = 81), 25.52 (SD = 13.98) (n = 19), 22.13 (SD = 15.91) (n = 8) and %EWL were 76.97 (SD = 27.54), 72.89 (SD = 21.33), 66.44 (SD = 23.02), 58.17 (SD = 32.81), 50.23 (SD = 26.42), 39.2 (SD = 24.35) at 1, 2, 3, 4, 5 and 6 years, respectively. RYGB: The %TWL overall were 30.11 (SD = 4.75) (n = 25), 29.21 (SD = 3.68) (n = 18), 20.33 (SD = 11.2) (n = 9), 18.40 (SD = 8.1) (n = 4) and %EWL was 70.62 (SD = 16.61), 67.27 (SD = 16.61), 59.12 (SD = 30.24), 46 (SD = 40) at 1, 2, 3 and 4 years respectively. T2DM remission rate was 72.9% at one year. There were 3 stapler line leakage after LSG (0.37%). There was no stapler line bleeding, no port site herniation. There was no RYGB related compliation such as anastomosis leakage, internal hernia, and there was no complication related mortality. The re-admission rate in 1 month was 0.9% due to acute pancreatitis, dehydration and portomesenteric thrombosis.

Conclusions: Bariatric surgery is a safe and effective weight loss procedure with good 6 years results for Thai patients.

Keywords: Morbid obesity, Bariatric surgery

A RANDOMIZED CONTROLLED TRIAL COMPARISON OF ENOXAPARIN 40 MG VERSUS 60 MG DOSAGE FOR VENOUS THROMBOEMBOLISM PROPHYLAXIS IN BARIATRIC SURGERY

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Background: Venous thromboembolism (VTE) is a common postoperative complication that may lead to serious problems. Morbidly obese is an independent risk factor for VTE with an increased risk greater than normal population. Proper dosing regimen of enoxaparin for VTE prophylaxis in morbidly obese is not clearly defined in available guidelines.

Objectives: To compare the achievement of anti-factor Xa target level after the administration of enoxaparin 40 mg or 60 mg for VTE prophylaxis in patients were planned for bariatric procedure in order to determine the best dose.

Methods: A randomized controlled trial carried out on morbidly obese patients scheduled for bariatric procedure in King Chulalongkorn Memorial Hospital between April 2019 and March 2020. All recruited patients randomly received 40 mg or 60 mg of enoxaparin subcutaneously 12 hours before the scheduled operative time. Blood specimens for peak 4-hour anti-factor Xa level were collected after the administration. The target range of anti-factor Xa level was defined between 0.2-0.5 IU/ml.

Results: 56 patients underwent bariatric procedure during our study period. 28 patients received 40 mg of enoxaparin while 28 patients received 60 mg randomly. The percentage of target level achievement in both groups were 53.57% and 78.57% respectively (p-value = 0.048). The mean anti-factor Xa levels were 0.19 IU/ml and 0.28 IU/ml respectively ($p < 0.001$). Subgroup analysis focused on the patients that BMI over 50 kg/m^2 (n = 16) shown no statistically significant in achievement of target level in both groups 28.57% and 55.55% respectively (p-value = 0.28). Mean estimated blood loss were 28.03 ml and 24.64 ml respectively ($p = 0.46$). No patient obtained levels exceeding 0.5 IU/ml of anti-factor Xa and no occurrence of VTE in both groups.

Conclusions: For VTE prophylaxis in bariatric surgery, enoxaparin dosage at 60 mg subcutaneously is more achieved the desired target level of anti-factor Xa comparing to 40 mg without any unwanted complications in overall morbid obesity patients. The higher dose of enoxaparin was possibly considered in BMI over 50 kg/m^2 patients.

Keywords: Venous thromboembolism, Prophylaxis, Bariatric surgery, Morbid obesity, Enoxaparin

FIVE-YEAR FOLLOW-UP OF LOWER EXTREMITY LYMPHEDEMA TREATMENT FOR TOTAL OMENTAL LYMPH NODE FLAP TRANSFER WITH FLOW-THROUGH CONFIGURATION AND COMPARTMENT EFFECT

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Lymphedemas are caused by the accumulation of protein-rich fluid in the interstitial space, resulting from lymphatic system obstruction. In recent years, omentum flap transfer has gained popularity as a treatment for lymphedema due to its immunogenic and lymphangiogenic properties, which aid in reducing infection rate and volume. Using a flowthrough procedure after an omental flap transfer can help reduce complications at the recipient site. We present a long-term follow-up case of primary lymphedema treated with omental flap transfer with flowthrough figuration, demonstrating a gradual decrease in volume, infection rate, and chronic wound coverage.

Keywords: Omental flap, Lymph node transfer, Lymphedema

THE EFFECT OF ROUX-EN-Y GASTRIC BYPASS SURGERY IN MORBIDLY OBESE PATIENTS ON PHARMACOKINETIC OF LANSOPRAZOLE; THE PILOT STUDY

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Background: Roux-en-Y gastric bypass (RYGB) is a common procedure in bariatric surgery. It combines 2 mechanisms; restriction and malabsorption. Marginal ulcer is one of the most common complications. The incidence is 1-16%, and the complication can be reduced by oral proton-pump inhibitor (PPI). Since the alimentary tract, which is the absorptive site of the drug, is bypassed, there's a study shown the lower absorption of omeprazole after the surgery. However, the pharmacokinetic data of other orally administered PPI drugs, such as lansoprazole, following RYGB is limited and inconclusive.

Objectives: To study the pharmacokinetic of lansoprazole in postoperative RYGB patients.

Methods: In these repeated measures of drug level at time point, ansoprazole serum concentrations were measured before and after RYGB in 33 morbidly obese subjects. The data of the first 5 patients was obtained to create and evaluate and became a pilot study.

The time to maximum concentration (T_{max}), maximum concentration (C_{max}), and area under the serum concentration versus time curve (AUC) or drug exposure in 8 hours were calculated by noncompartmental model to determine possible differences in drug absorption after the procedure.

Results: The first 5 patients's data were used. Preoperatively, all patients had symptoms of dyspepsia. During postoperative period, the data shown 30% reduction of lansoprazole drug exposure (AUC), prolonged time to maximum concentration (T_{max}), and decreased maximum concentration (C_{max})

Conclusions: The results of this pilot study shown that the standard dose of lansoprazole (60 mg/ day) after LRYGB may be insufficient to achieve the therapeutic level. Increasing dose for the patients who underwent RYGB may be considered to achieve therapeutic level and effect.

Keywords: Lansoprazole, Roux-en-Y gastric bypass, Pharmacokinetic, Bariatric surgery, Marginal ulcer

THE PRECISION OF DIFFERENT TYPES OF PLATES FABRICATED WITH A COMPUTER-AIDED DESIGN AND MANUFACTURING SYSTEM IN MANDIBULAR RECONSTRUCTION WITH FIBULAR FREE FLAPS

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Background: Computer-assisted surgery (CAS) has been introduced to mandible reconstruction with fibular free flap in cutting guide placement. When CAS is cooperated with different plate fixations, the results show various degrees of errors by which this study aimed to evaluate.

Objectives: The three objectives of this study were to (1) compare the errors in the mandibular condyle and the fibular model among different types of fixations, (2) compare the error associated with the defect extent and type of fixation, and (3) evaluate the underlying causes of the errors.

Methods: Mock surgeries were conducted in 3D-printed mandibles with either 2 types of defects; limited or extensive, reconstructed from 2 ameloblastoma patients. Three types of fixations; miniplate, manually bending reconstruction plate and patient-specific plates are tested, each of which was performed 3 times in each type of defects, adding up to 18 surgeries. One with the least errors was selected and applied with patients whose 3D-printed mandibles derived. Finally, *in vivo* errors were compared with the mock.

Results: In limited defect, average errors show no statistical significance among all types. In extensive defect, patient-specific plate had a significantly lower average condylar error than manually bending reconstruction plate and miniplate (8.09 ± 2.52 mm vs. 25.49 ± 2.72 and 23.13 ± 13.54 mm, respectively). When patient-specific plate was applied in vivo, the errors were not significantly different from the mock.

Conclusions: Patient-specific plates cooperated with CAS shows the least errors. Nevertheless, manually bent reconstruction plates and miniplates could be applied in limited defects with caution.

Keywords: Computer-assisted surgery, Mandibular reconstruction, Fibular free flap

Pisith Viseshakul Award

COMPARISON BETWEEN RISC II AND TRISS IN PREDICTING 30-DAY MORTALITY IN MAJOR TRAUMA PATIENTS ADMITTED AT A UNIVERSITY HOSPITAL IN NORTHEASTERN THAILAND

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Backgrounds: The trauma and Injury Severity Score (TRISS) has been used worldwide for predicting the probability of survival (PS) with some limitations. Revised Injury Severity Classification, version II (RISC II) score was proposed to complete those limitations by adding more clinical and laboratory values.

Objectives: To compare 30-day mortality prediction models using TRISS and RISC II at a university hospital in northeastern Thailand

Materials and Methods: We retrospectively collected data on patients with ISS > 11 admitted to the trauma unit, Srinagarind Hospital, a university hospital in northeastern Thailand from 2019 to 2021. PS using TRISS and RISC II models were compared using the receiver operating characteristic (ROC) curve, and the area under the ROC curve (AUROC) was reported. The primary outcome was 30-day mortality.

Results: A total of 627 patients were finally included. The 30-day mortality was 15.5%. The median age was 39 years and 73.2% were male. The most common mechanism of injury was blunt (97.1%). Most of the parameters were significantly different between the two groups. The AUROC of RISC II and TRISS were 0.953 and 0.934. Subgroup analyses showed that RISC II and TRISS performed worse for head injury defined by head AIS 3 – 6. RISC II performed statistically better for SBP < 90 mmHg and worse for ISS > 20.

Conclusions: RISC II was superior to TRISS in predicting 30-day mortality of major trauma patients in a university hospital in Thailand.

Keywords: Trauma, RISCII, TRISS, Score, Survival

EFFECT OF TIME TO THE OPERATION ON IN-HOSPITAL MORTALITY OF TRAUMA

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Background: According to previous studies, the time to the operation matters in an aspect of trauma patients. The earlier operation understandingly reduces the mortalities. The author found the greatest opportunity for improvement of the trauma patients' care.

Objectives: The study aimed to examine the effect of time to the operation on in-hospital mortality of trauma patients with an abdominal injury who underwent immediate laparotomy. Moreover, the effect of time to operation on 24-hour mortality, hospital length of stay, and ICU-free days of trauma were also in consideration.

Methods: The retrospective single-center study included trauma patients aged at least 15 years old with an abdominal injury who underwent immediate laparotomy in Songklanagarind Hospital between January 1st, 2015 and December 31st, 2018. The factors of time and duration from injury to the operation along with potential confounders were assessed from hospital medical records and recorded. Univariable and multivariable analyses were applied.

Results: A total of 65 abdominal injured patients with a median age of 32 years old were included. The median time to operation was 165 minutes with a maximum of 480 minutes and a minimum of 55 minutes. The most common cause of death was exsanguination. The time to the operation did not have statistically significant effect on in-hospital mortality, 24-hour mortality, hospital length of stay, and ICU-free days. Three factors were associated with in-hospital mortality by multivariable analysis; ISS (Adjusted OR 1.09) patients with shock (Adjusted OR 12.73), and patients with GCS score < 15 (Adjusted OR 15.43).

Conclusions: This study showed no statistically significant effect of time to the operation on in-hospital mortality and 24-hour mortality of trauma patients with an abdominal injury who underwent immediate laparotomy.

The higher ISS, presence of signs of shock, and lower GCS score of the patients could be prognostic factors which associated with higher in-hospital mortality.

Keywords: Time to operation, Mortality, Abdominal injury

PREDICTION OF MORTALITY IN SEVERELY INJURED PATIENTS

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Background: Trauma is the most common cause of death in Thailand. Patients who met the trauma team activation criteria (TTAC) are likely to have higher mortality rates than less severe patients.

Objective: This research aimed to identify the mortality rate and predictors for the mortality of patients who met TTAC.

Materials and Methods: This is a retrospective cohort study that collected patients who met TTAC within 1 hour after arriving at the emergency department. The parameters comprised physiological performances, mechanism of injury, and initial laboratory results. The potential parameters from a univariable analysis were selected for a multivariable analysis. The probability of death was calculated.

Results: Eight hundred and sixty-seven patients were eligible for the cohort. The 28-day mortality rate was 14.7%. The multivariable analysis showed that age ≥ 60 years (OR 8.2, 95% CI 4.0-16.9, $p < 0.001$), GCS ≤ 8 (OR 6.2, 95% CI 3.3-11.7, $p < 0.001$), Base excess (BE) ≤ –10 mEq/L (OR 8.5, 95% CI 4.5-16.1, $p < 0.001$). The AuROC of this prediction model was 0.82. The probability of death if the patients presented with these three parameters was 0.91.

Conclusions: Elderly, severe head injury and high BE were significant predictors of death in trauma patients who met TTAC.

Keywords: Trauma, Mortality, Trauma team activation

THE COMPUTED TOMOGRAPHY-ASSESSED SARCOPENIA AND OUTCOMES FOR CHEST TRAUMA PATIENTS

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Background: Trauma is the leading cause of death in Thailand. Chest trauma, one of the most common traumas, can range of various clinical outcomes from thoracic wall contusion to ribs fracture, pneumothorax, or hemothorax. Sarcopenia has been advocated as a way of estimating the nutritional status of the patient. One popular way is a skeleton muscle volume at the L3 vertebral level, evaluated by a CT scan. However, no studies have assessed the skeleton muscle volume at the T12 vertebral level to predict various clinical outcomes of post-traumatic events.

Objectives: To evaluate the outcome, Length of hospital stay, pain score 24 hours and another diagnosis, in chest trauma patients compare between sarcopenic and non-sarcopenic patients.

Methods: We retrospectively reviewed chest trauma patients who were admitted to Prince of Songkla University Hospital between February 2020 and August 2021. We analyzed 63 patients who had chest trauma and CT of the chest before admission. We assessed the amount of skeletal muscle present according to CT for diagnosis of sarcopenia and its relevance to length of hospital stay, pain score 24 hours after admission, and another diagnosis.

Results: A total of 330 chest trauma patients were enrolled in this study. The CT chest was done for 138 chest trauma patients and 63 patients were isolated chest trauma patients. Thirty (47.62%) patients were defined as sarcopenia. The sarcopenic patients were significant had ribs fracture (100% vs 72.7%; $p = 0.002$), pneumothorax (46.7% vs 15.2%; $p = 0.014$) and atelectasis (36.7% vs 3%; $p = 0.002$) more than non-sarcopenic patients. The length of hospital stay for sarcopenic patients was significantly longer than non-sarcopenic patients (10.5 vs 5 days; $p < 0.001$) and pain score 24 hours after admission was also significantly higher than non-sarcopenic patients (6.3 vs 3.4; $p < 0.001$).

Conclusions: Sarcopenia is a risk factor for ribs fracture, pneumothorax, atelectasis post chest trauma event and predicts prolonged hospital stay and higher pain score post-admission.

Keywords: Chest trauma, Muscle atrophy, Sarcopenia

Free Paper Presentation (General Surgery)

A UTILIZATION OF MEMORIAL SLOAN KETTERING CANCER CENTER NOMOGRAM TO SUBSTITUTE FROZEN SENTINEL LYMPH NODE BIOPSY IN THAI EARLY BREAST CANCER PATIENTS

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Background: As Frozen sentinel lymph node dissecti posted to be the gold standard procedure for treating patients with breast cancer. In many areas of Thailand, availability of pathologists is still insufficient. By optimizing predictive factors of sentinel lymph node metastasis in MSKCC nomogram model to dictate axillary management could be helpful under such circumstances.

Objectives: To evaluate and compare risk factors for sentinel lymph node metastasis in Thai early breast cancer patients to those in MSKCC nomogram model and also validate cut off point of nomogram in Thai patients.

Methods: Retrospective analysis of 263 early breast cancer patients in Surat Thani Hospital since 2018 to 2022 which are examined and calculated in MSKCC nomogram then evaluated in area under the receiver-operators characteristic curve. Predictive factors for sentinel lymph node metastasis are also evaluated.

Results: Three significant predictive factors for sentinel lymph node metastasis are Tumor size, lymphovascular invasion, multifocality ($p < 0.05$). After calculation of area under the curve of ROC curve of probability of sentinel lymph node metastasis, value is 0.56 which mean the test is not good diagnostic test of sentinel lymph node metastasis.

Conclusions: In our study, risk factors for sentinel lymph node metastasis are not fully similar to those in MSKCC nomogram (only tumor size, LVI, multifocality) which could be due to axillary lymph node status understaging before surgery and nature of patients who mostly presented with palpable breast mass rather than abnormal annual breast cancer screening program which disease status at presentation might be earlier stage. Area under the ROC curve of probability of sentinel lymph node metastasis from MSKCC posted to be not useful in our patient group and cannot be use as predictors for axillary management as proposed.

AN EFFECT OF THE COVID-19 PANDEMIC: SIGNIFICANTLY MORE COMPLICATED APPENDICITIS?

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Background: Little do people realize that COVID-19 pandemic has affected the number of patients visiting hospitals with acute abdomen. Since appendicitis is one of the most common urgent surgical conditions; hence, this study main objective was to establish whether there was an increased prevalence of complicated appendicitis during the 2021 COVID-19 pandemic compared with a 2019 unknown COVID-19 time.

Objectives: Compared the prevalence of complicated appendicitis during the 2021 COVID-19 pandemic with a 2019 unknown COVID-19 time.

Methods: This retrospective observational study was conducted in Police General Hospital to compare the number of patients diagnosed with complicated appendicitis (severity of appendicitis 3,4,5,6 as gangrenous, ruptured, phlegmon and abscess respectively) before and during COVID-19 pandemic (1st January to 31st June in 2019 and 2021). Secondary outcomes included post-operative complications, length of hospitalization, operative time and estimate blood loss.

Results: The total of 110 patients were included in this study. During the pandemic (group 1), the total of patients with complicated appendicitis was reported 24 cases, compared with the previous period (group 2) showed 14 cases (43.6% versus 25.5%, OR 2.27 (95% CI 1.01-5.08), *P*-value 0.045); however, patients with severity of appendicitis 3-6 were not statistically significant different between each subgroup during these two periods. Comparing the two groups, significant differences were witnessed both duration from onset of symptoms to the hospital and from arriving the hospital to an operation room (median (IQR) = 628 (440-787) versus 213 (87-320) min with *P*-value < 0.001 and 2,048 (1,725-3,570) versus 1,593 (733-2,955) min with *P*-value 0.001 respectively). Operating time was also noted different outcomes with *p*-value 0.003 as mean duration in group 1 was 72.75 (± 37.18 SD) minutes but 54.55 (± 23.15 SD) minutes in group 2.

Conclusions: The COVID-19 pandemic resulted in an overall increased prevalence of complicated appendicitis compared with the previous period. Those patients reported more delayed from the time that symptoms occurred to hospital and to operating room. They also had an increase length of operating duration and stay. Therefore, COVID-19 had an obvious negative impact to people to developed more serious outcome of appendicitis.

Keywords: Uncomplicated appendicitis, Complicated appendicitis, COVID-19 infection

BUNION CALLOUS ULCER IN NEUROPATHIC DIABETIC FOOT PATIENT: A CASE REPORT

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Neuropathic callous ulcer is a common problem in diabetic foot that leads to more complicated problem, e.g., infection, sepsis, limb loss and death as well. Healing the ulcer and prevention of recurrent ulcer are the gold standard to protect limb loss and decrease complication. There are many surgical techniques for bunion callous ulcer treatment. The first metatarsal head ostectomy is one of choice.

Keywords: Neuropathy, Diabetic foot, Callous, Bunion, Ulcer

CORRELATION BETWEEN CHANGING OF SERUM ALBUMIN LEVEL AND CYTOKINES LEVEL IN CRITICALLY ILL TRAUMA PATIENTS

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Background: Severely injured trauma patients have high mortality rate. High cytokines level associated with morbidity and mortality in critically ill patients; however, its measurement is limited. Albumin is a protein which its production is decreased in the setting of high cytokines. We would like to study correlation between these two markers whether albumin can be used as prognostic marker instead of cytokine.

Objectives: To study correlation between changing of serum albumin level and cytokines level in critically ill trauma patients.

Methods: Trauma patients aged at least 18 years old admitted to ICU trauma at Siriraj Hospital were enrolled. After consent was informed, blood sampling was sent for level of albumin, IL-6, IL-8, and TNF-α at the time of patient's visit then at 24, 48 and 120 hours after the first sample. Data was recorded and analyzed for correlation between albumin and cytokines level at each interval respectively.

Results: A total of 20 patients were enrolled. Among these patients, there were 14 male (70%) and 7 female (30%) with average age of 36 years old. 80% are related to traffic accidents and 70% are neurosurgical condition (severe traumatic brain injury) in majority. The strongest correlation result was obtained between serum albumin and serum IL-8 at patient's first arrival at trauma bay of Siriraj Hospital (correlation -0.769, *p*-value < 0.001). The result also indicated that serum albumin mostly correlated to serum IL-6 level instead at 24, 48, and 120 hours after arrival (correlation -0.678, -0.231, -0.636, *p*-value 0.001, 0.341, 0.003 respectively). After analyzing correlation with TRISS probability of survival, correlation between albumin and IL-8 at arrival are 0.128 and -0.382 (*p*-value 0.625 and 0.096). No mortality while admission was observed from this study.

Conclusions: Serum albumin was correlated with serum cytokines level, especially IL-8 if measured at patient's initially visit. However, we could not demonstrate the correlation between albumin and early mortality and further studies are required prior to clinical application.

Keywords: Albumin, Interleukin, Critical, Trauma

EARLY FEEDING VERSUS CONVENTIONAL POSTOPERATIVE CARE IN ACUTE PEPTIC ULCER PERFORATION

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Background: Enhanced recovery after surgery (ERAS) pathways have been accepted as safe and feasible in patients undergoing surgery for acute peptic ulcer perforation. However, the adaptation of early feeding versus

conventional enteral feeding after surgery for peptic ulcer perforation has yet to be established.

Objectives: This study aims to evaluate the safety and benefit of early enteral feeding (within 24 hours after surgery) versus conventional feeding (more than 48 hours after surgery).

Methods: A non-randomized control trial was conducted in a single-center, tertiary care hospital from August 2020 - August 2021. Inclusion criteria were age 18-65 years, ASA class 1-2, perforation < 24 hours, perforation size < 1 cm, and mild to moderate abdominal contamination. Exclusion criteria were pregnancy, septicemia, immunocompromised host, multiple site perforations, and steroid usage. The primary outcome was the length of hospitalization. The secondary outcomes were the 30-day postoperative morbidity and mortality.

Results: A total number of 26 patients were included, 17 in the early feeding group (EF), and 9 in the conventional feeding group (CF). The patients' demographic data were comparable in both groups. The length of hospital stay was significantly less in the EF group 3.39 ± 0.76 days vs CF group 6.04 ± 1.56 days, with the mean difference of -2.04 (95% CI -3.00, -1.08, $p < 0.001$). The time to removal of nasogastric tube and urinary catheter was earlier in the EF group 0.76 ± 0.35 days and 1.24 ± 0.68 days vs CF group 3.25 ± 0.96 days and 3.34 ± 2.17 days consecutively ($p < 0.001$). The mean time to first clear liquid diet was 0.75 ± 0.32 days in the EF group and 3.37 ± 0.96 days in the CF group ($p < 0.001$). The 30-day post operative morbidity were minor and comparable in both groups such as post operative nausea and vomiting and surgical site infection. One patient required re-insertion of nasogastric tube in the early feeding group for gastric decompression. No severe morbidity requiring surgical intervention and no mortality observed.

Conclusion: Early feeding is a safe and feasible approach in a selected group of patients undergoing surgery for peptic ulcer perforation. It reduces the length of hospital stay significantly with good operative outcomes.

Keywords: Peptic ulcer perforation, Early feeding, Enhanced recovery after surgery (ERAS), Gastric ulcer perforation, Duodenal ulcer perforation

ENDOVASCULAR REPAIR OF RUPTURED ABDOMINAL AORTIC ANEURYSM IN OCTOGENARIANS, IS IT DIFFERENT?

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Background: Endovascular aneurysm repair (EVAR) had been used to treat abdominal aortic aneurysm (AAA) widely. There are multiple evidences regarding to the benefits of EVAR in ruptured AAA over open repair with less perioperative mortality. However, EVAR perioperative outcomes in octogenarians (aged 80 and older) presented with ruptured AAA still limited.

Objectives: This study aimed to compare in hospital mortality rate between elderly who received EVAR and open surgery for ruptured AAA treatment. Furthermore, in hospital mortality rate between octogenarians and non-octogenarians who received EVAR were compared.

Methods: We conducted a retrospective chart review of patients aged 60 years and older who were diagnosed with ruptured infrarenal abdominal aortic aneurysm between January 2016 to December 2021 at a tertiary hospital in Thailand. Baseline demographic data, clinical presentation, and laboratory results at the emergency room were collected. Fisher's exact test and unpaired t test were used for categorial and continuous data comparison, respectively.

Results: A total of 46 elderly patients presented with ruptured AAA were identified for chart review. 29 patients (63%) received EVAR and 17 patients (37%) received open surgery as their first treatment module. Baseline characteristic including gender, mean age, clinical presentation, laboratory results at the emergency room, and mean hardman index were not statistically different. Patients who received open repair were presented with ECG signs of ischemia higher than those who received EVAR (47.1 vs 10.3%, $p = 0.01$). In hospital mortality rate between open repair and EVAR was not statistically different (47.1 vs 34.5%, $p = 0.53$). Other complications such as recurrent bleeding, abdominal compartment syndrome, and ischemic colitis were not statistically different between each group. When compared between octogenarians and non-octogenarians who received EVAR, in hospital mortality rate and complications were not statistically different between both age groups.

Conclusions: Our study could not prove that endovascular aneurysm repair is a better choice of therapy

to treat ruptured abdominal aortic aneurysm in elderly. Furthermore, there is no significant different in mortality rate and complications during admission between octogenarians and non- octogenarians who received EVAR.

INCIDENCE AND PREDICTIVE FACTORS OF POST-HEPATECTOMY LIVER FAILURE, SIRIRAJ EXPERIENCE

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Background: Hepatectomy is the standard treatment for either malignant or benign liver tumors. Inadequate future liver remnant will lead to post-hepatectomy liver failure (PHLF) that increase morbidity and mortality to the patients, however, the other cause may not well-defined.

Objectives: The aim of this study is to identify incidence and predictive factors of post-hepatectomy liver failure in Siriraj Hospital.

Methods: The medical records of the patients who underwent hepatectomy in Siriraj Hospital between 2018 and 2020 were retrospectively reviewed. The diagnosis and severity of post-hepatectomy liver failure were categorized according to the International Study Group of Liver Surgery criteria.

Results: A total of 419 hepatectomy patients were included. PHLF was developed in 70 patients (16.7%), including grade A 15 (3.6%), grade B 41 (9.8%) and grade C 14 (3.3%). The factors affect PHLF were statistically significant found in male gender ($p = 0.039$), preoperative diabetes mellitus ($p = 0.002$), previous treatment with TACE ($p = 0.004$) and blood components (PRC, FFP, Platelet) transfusion ($p < 0.011$). Patients in PHLF group have higher mortality than those in non-PHLF group (10.0% vs 1.1%, $p = 0.01$).

Conclusions: PHLF remains a serious complication in patients undergoing hepatectomy that increase mortality. We found that male gender, diabetes mellitus, previous treatment with TACE and blood components transfusion during surgery were associated with post-hepatectomy liver failure. Consideration with these factors may improve outcome of the surgery.

Keywords: Hepatectomy, Liver resection, Liver failure, Liver insufficiency, PHLF

IS 30-DAY CUT-OFF DIAGNOSIS-TO-SURGERY INTERVAL TIME ASSOCIATED WITH BETTER SURVIVAL FOR PATIENTS WITH NON-METASTATIC COLORECTAL CANCER?

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Background: The correlation between diagnosis-to-surgery interval time and survival for colorectal cancer is debatable. Some, but not all, studies indicated worse survival with longer time from diagnosis to surgery. Majority of the studies and guidelines recommended all non-metastatic colorectal cancer patients should be operated on within 30 days after diagnosis was made, including Ministry of Public Health of Thailand recommendation.

Objectives: The objection of this study was to determine the association between diagnosis-to-surgery interval time and survival of stage I-III colorectal cancer patients.

Methods: Stage I-III colorectal patients, who underwent elective resection at Siriraj Hospital, Thailand between January 2010 and December 2020 were retrospectively analyzed. The 5-year overall survival (OS) and 3-year disease free survival (DFS) were primary outcomes. The statistical analysis included Kaplan Meier method and Cox regression analysis.

Results: Total of 979 patients, median age 65 years (range 75), 526 male (53.7%), stage I = 18.4%, stage II = 38.6%, stage III = 43.0%. Median diagnosis-to-surgery interval time was 30 days (IQR = 19-47). 5-year overall survival and 3-year disease free survival were 97.3% and 86.3%, respectively. The independent risk factors of decreased 3-year DFS were lymph node metastasis (HR 3.492; 95% CI 2.418-5.043), present of perineural invasion (HR 2.597; 95% CI 1.845-3.656), and present of lymphovascular invasion (HR 2.144; 95% CI 1.504-3.055). The 30-day cut-off interval time was not associated with 5-year OS and 3-year DFS (97.2% vs 96.7%, $p = 0.537$ and 86.9% vs 85.9%, $p = 0.15$, respectively).

Lymph node metastasis was a dependent risk factor for 3-year DFS in both groups (HR 2.411; 95% CI 1.450-4.008 and HR 5.137; 95% CI 3.001-8.795, respectively).

Conclusions: Prolonged interval time of diagnosis-to-surgery was not associated with poor outcome of 5-year OS and 3-year DFS. However, patients with lymph node metastasis, surgery within 30 days was associated with better 3-year DFS.

Keywords: Colorectal cancer, Diagnosis-to-treatment interval time, 5-year overall survival, 3-year disease free survival, Delay surgery

LIVER TRANSPLANTATION IN HIGH ACUITY RECIPIENT: A SINGLE CENTER ANALYSIS OF OUTCOMES AND FACTOR PREDICTING FUTILE LIVER TRANSPLANTATION

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Background: Although the survival benefit of liver transplantation (LT) is clearly evident in end-stage liver disease (ESLD) patients, the futility rate among high acuity recipients is high. To predict patients are unlikely to be a futile LT would be medically and economically advantage to select appropriate candidate for LT.

Objectives: The study aims to identify factors predicting futile LT in high acuity recipients, and to evaluate survival outcomes of this recipient in Siriraj Hospital.

Methods: A retrospective analysis included high acuity patients who underwent primary LT including acute liver failure (ALF), acute on chronic liver failure (ACLF), and chronic liver failure (CLF) with model for ESLD score (MELD) ≥ 28. The Kaplan-Meier survival analysis were done each group. The multivariate analysis (binary logistic regression) was performed to predict factor associated with futile LT in-hospital mortality, 90-day mortality or post-operative totally dependent status.

Results: Of total 343 LT, 81 high acuity recipients (ALF 14.8%, ACLF 49.4%, and CLF 35.8%) were enrolled. There were 20 futile LT (24.7%). The univariate analysis revealed variables with a trend towards futility including pretransplant vasopressor use ($p = 0.001$), pretransplant abnormal chest film ($p = 0.106$), pretransplant sepsis ($p = 0.135$) and pretransplant renal replacement therapy ($p = 0.160$). However, only pretransplant vasopressor use was an independent factor predicting futile LT ($p = 0.012$) in multivariable analysis. The 5-year overall survival rate of recipient with ALF, ACLF and CLF were 83.3%, 62.8%, and 61.1%, respectively.

Conclusions: Pretransplant vasopressor need was associated with futile LT. The survival outcomes of patients with ALF were excellent. Appropriate patient selection is the key to achieve best outcomes for high acuity recipients.

Keywords: Liver transplantation, Futile, High acuity, Outcome, Survival

LONG-TERM OUTCOMES OF ENDOVASCULAR REPAIR AMONG TRAUMATIC THORACIC AORTIC INJURY

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Background: Treatment of blunt thoracic aortic injuries (BTAIs) has shifted from the open surgical approach to the use of thoracic endovascular aortic repair (TEVAR), of which early outcomes appear promising but controversy regarding long-term outcome remain.

Objectives: The primary outcome of this study was the long-term outcome of TEVAR treatment in traumatic aortic injury patients focusing about late survival and documented late graft-related complications as well as post-procedure systemic complications. As for the secondary outcome we look for all the possible factors which affect the outcome of TEVAR repair.

Methods: Retrospectively, All trauma patients with BTAIs presented at Songklanagarind Hospital between 1 November 2006 to 31 December 2018 were included in the study. Patients who transferred from an outside hospital without imaging were excluded. Radiographic and clinical outcomes were determined in both early and long-term outcome.

Results: Sixty-four BTAIs patients met the inclusion criteria. Of these, all patient received TEVAR which two died in hospital due to aorta-unrelated causes. Median ISS score was 27.5, Most of them were polytrauma patients 62.5% and the most associated injury were thoracic

injury (78.1%). Stent graft implantation was successful in all 64 patients without convert to open approach (100%). At median radiographic follow-up of 24 months, found stenosis in 2 patients, thrombosis in 2 patients and 1 endoleak (Ia) event which successfully repaired. No open reintervention was found. Of 12/62 patients, excluding death in hospital, lost to follow up.

Due to very small number of events on database, the analyses of associated factors couldn't be performed. Long-term survival probability equal to 96.9% (95% CI 92.7-100) at less than 12 months and equal to 94.2% (95% CI 87.8-100) after 12 months. Survival probability against re-intervention after 9 days equal to 98.2% (95% CI 94.8 – 100) In which, median survival time of mortality and reintervention couldn't be calculate due to too small number of events occurred.

Conclusions: This study shows good long(er)-term radiographic outcomes of BTAI patient who received TEVAR, and low reintervention rate after necessary complete LSCA coverage.

Keywords: Thoracic endovascular repair, Blunt thoracic aortic injury, Long term outcome

OUTCOMES OF PANCREATECTOMY USING ENHANCED RECOVERY AFTER SURGERY (ERAS) PROTOCOL COMPARED WITH TRADITIONAL CARE

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Background: Enhanced recovery after surgery (ERAS) program has been implemented in various surgeries and shows that it can reduce length of stay, complications and cost. However, ERAS in pancreatic surgery is still in the early stage. ERAS in pancreatic surgery has been implemented in Siriraj Hospital since 2020, and this study aims to evaluate outcomes of ERAS pancreatectomy program compared with previous traditional care.

Methods: Between January 2020 and December 2020, 70 patients underwent pancreatectomy with ERAS program (ERAS group). These patients were compared with 70 patients of historical cohort treating with traditional program, between January 2019 and December 2019 (Pre-ERAS group) in terms of post-operative hospital stay (POHS), bowel movement, morbidity, mortality and cost. Subgroup analyses of those underwent pancreaticoduodenectomy (PD) and distal pancreatectomy (DP) were also performed.

Result: Demographic data between ERAS and pre-ERAS was not statistically different except slightly more robotic surgery in ERAS group (21.4% vs. 12.9%, $p = 0.08$) and longer operative time (376 vs. 334 min, $p = 0.03$). Median POHS in ERAS group was slightly shorter than Pre-ERAS group (8 vs. 9 days; $p = 0.599$), and they passed stool slightly earlier in ERAS group (2 vs. 3; $p = 0.228$), but these did not reach the statistical significance. There was no significant difference of morbidity, mortality, specific complications (POPF, PPH, DGE, chylous leakage), re-admission and re-operation rates between the two groups. The total cost was significantly higher in ERAS group (225,945 vs 156,593; $p = 0.01$), and this may be due to higher proportion of robotic surgery in ERAS group. Subgroup analysis of PD (55 patients in ERAS, 50 patients in Pre-ERAS) showed that median POHS was also slightly shorter in ERAS groups (9 vs. 10 days, $p = 0.382$), but not reaching the statistical significant. Subgroup analysis of DP (12 patients in ERAS, 18 patients in Pre-ERAS) showed that median POHS was not different between the two groups (5 vs. 5 days, $p = 0.88$).

Conclusions: ERAS program is safe and may reduce length of post-operative hospital stay, and shorten first bowel movement in pancreatectomy patients.

RECURRENT RATE OF FISTULA IN ANO CLASSIFIED BY TYPE OF SURGERY

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Background: Post-operative recurrent Fistula In Ano (FIA) occurs at highly variable rates ranging from 3-50%. Despite the increased morbidity, risks associated with multiple operations, and patients' quality of life, the factors that contribute to recurrent FIA remain inconclusive.

Objectives: This study aimed to evaluate the recurrent rate of FIA after surgery and associated factors.

Patients and Methods: Our retrospective cohort study included 143 patients with anal fistula who underwent surgery from January 2015 to December 2019 in Srinagarind Hospital, Khon Kaen, Thailand. Three deceased patients after surgery follow up were excluded from the cohort. Association factors to recurrent FIA were analyzed by univariate and multivariate logistic regression models.

Results: Of 140 patients, the majority of our patient cohort is male 116 (82.8%) with mean age 45.5 ± 14.4 years, ranging from 18 to 78 years. About half of them had previous anal surgery 75 (53.6%). Based on the types of anal fistula in the cohort, 97 (69.3%) patients had simple types including low-transphincteric type 48 (34.3%) and intersphincteric type 49 (35.0%). Whereas, 26 (18.6%) patients had a complex type, high-transphincteric. Fistulotomy was the most common operation performed on these patients 56 (40%), followed by ligation of sphincteric tract (LIFT) 39 (27.9%) and staged seton fistulotomy 30 (21.4%). Overall recurrent FIA was 44 (31.4%). The significant factor associated with recurrent FIA were previous anal surgeries with adjusted OR 4.45 (1.71-11.58, *p*-value = 0.002), Seton with adjusted OR 9.07 (2.71-30.37, *p*-value < 0.001 and LIFT with adjusted OR 9.03 (2.89-28.18, *p*-value < 0.001). There was no significant difference between simple and complex fistula with regards to recurrent FIA.

Conclusions: In this study, we found that the overall rate of recurrent FIA was high (31%). The history of previous anal surgeries significantly contributes to the rate of recurrent FIA. In addition, patients who received Seton and LIFT procedures tend to develop a higher rate of recurrent FIA.

Keywords: Anal fistula, Fistula in ano, Recurrent rate, Fistula recurrence, Anal fistula surgery

RELATIONSHIP BETWEEN NUTRITIONAL STATUS AND CLINICAL OUTCOMES OF GENERAL SURGERY INPATIENT UNIT IN RAJAVITHI HOSPITAL

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Background: Malnutrition is prevalent in the hospital and it effects the patient and the treatment in many various way such as delay healing of treatment, prolong length of stay in the hospital. Nowadays Nutritional status assessment can be evaluated with various method such as the Nutrition Alert Form (NAF).

Objectives: To evaluate relationship between nutritional status of the patient and patient's factor with length of hospital stay, infection and mortality in hospital.

Methods: Retrospective study was performed on patient who admitted in general surgery inpatient unit in Rajavithi Hospital from 1 December 2019 to 1 September 2020. The information was collected from medical records including age, sex, underlying disease, NAF score, length of hospital stays, infection, mortality.

Results: A total of 300 patients were enrolled. 50.3% were male, the mean age was 59.63 + 14.97 years and NAF group A, B, C were 19.3%, 30% and 50.7% respectively. On Univariate analysis found that Factors associate with death were NAF ($p = 0.021$), Food EN ($p = 0.002$), Food PN ($p = 0.017$) and infection ($P < 0.001$). Factors associate with Length of Stay in Hospital were NAF ($p = 0.001$), Food EN ($p < 0.001$), Food PN ($p < 0.001$) and Infection ($p < 0.001$). Factors associate with infection were Food EN ($p < 0.001$) and Food PN ($p < 0.001$). On Multivariate analysis found that infection associate with death (OR = 4.23; 95% CI: 1.60-11.16; $p < 0.001$), factors associated with Infection were Food EN (OR = 2.67; 95% CI: 1.10-6.46; $p = 0.029$) and Length of Stay (OR = 1.02; 95% CI: 1.01-1.04; $p < 0.001$) and factors associated with Length of Stay in Hospital were infection ($p < 0.001$), Food EN ($p < 0.001$) and Food PN ($p = 0.032$).

Conclusions: In this study, NAF associated with death, length of stay in hospital.

Keywords: Nutritional status, Impact of nutrition, Hospitalized patient, Nutritional outcome, Nutritional alert form

RISK FACTORS OF SUBOPTIMAL BOWEL PREPARATION IN ELECTIVE COLONOSCOPY IN BANMI HOSPITAL, LOPBURI PROVINCE

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Background: Colonoscopy is gold standard diagnosis modality for colorectal cancer. Optimal bowel preparation is the most important factor of successful and good quality colonoscopy. There are many previous studies about the risk factors of suboptimal quality bowel preparation but most of them did not used Sodium phosphate for bowel preparation.

Objectives: To identify risk factors that are associated with suboptimal quality of bowel preparation in a patient who used sodium phosphate for bowel preparation in elective colonoscopy.

Methods: Retrospective cross-sectional study. We review patients were used Sodium phosphate solution for preparation bowel in elective colonoscopy from January 2020 to February 2022. We have 121 patients with suboptimal bowel preparation in case group. And 251 patients with optimal bowel preparation in control group in ratio was 1:2.

Results: In univariate analysis, when compare demographic data between suboptimal bowel preparation group and optimal bowel preparation group. There were significant difference in male (47.11% vs 35.46% p = 0.04), mean age (67.23 years, SD 11.67 vs 59.86 years, SD 11.04 $p < 0.0001$), education below secondary school (85% vs 75% $p = 0.05$), diabetes (30.58% vs 15.54% p = 0.001), smoking (9.92% vs 3.19% $p = 0.03$), constipation or bowel habit change symptoms (44.63% vs 18% $p <$ 0.001), history of suboptimal bowel preparation (7.44% vs 1.2% p = 0.003) and ASA more than 3 (19.83% vs 5.98% $p < 0.001$). There was no significant difference in mean BMI, neurological illness, Tricyclic anti-depressant used, inpatient, after 1PM colonoscopy, previous abdominal surgery.

In multiple logistic regression analysis we found that age 70-79 years (aOR = 2.82, 95% CI 1.29-6.13, p = 0.009), age more than 80 years (aOR = 7.06, 95% CI 2.53-19.65, $p < 0.001$), Diabetes (aOR = 3.28, 95% CI 1.66-6.49, p = 0.001), active smoking (aOR = 4.83, 95% CI 1.57-14.86, $p < 0.006$), constipation or bowel habit change symptoms (aOR = 5.35, 95% CI 2.94-9.72, $p =< 0.0001$), history of suboptimal bowel preparation (aOR =7.48, 95% CI 1.26-44.23, p = 0.02) and ASA more than 3 (aOR = 2.97, 95% CI 1.23-7.20, $p = 0.02$) is statistically significant risk factor for suboptimal bowel preparation.

Conclusions: Age more than 70 years, diabetes, active smoking, constipation or bowel habit change symptoms, history of suboptimal bowel preparation and ASA more than 3 is statistically significant risk factors for suboptimal bowel.

Keywords: Suboptimal bowel preparation, Risk factor, Colonoscopy, Inadequate bowel preparation

SARCOPENIA DURING CONCURRENT CHEMO-RADIOTHERAPY INPATIENTS WITH LOCALLY ADVANCED ESOPHAGEAL SQUAMOUS CELL CARCINOMA

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Background: Esophageal cancer is one of the most common gastrointestinal diseases and can easily spread to different parts of the body, which is the cause of low survival rates. Sarcopenia is a condition that indicates a loss of muscle mass and function and is a factor that indicates a poor prognosis in various types of malignancies. However, the effect of concurrent chemoradiotherapy (CCRT) on sarcopenia in patients with locally advanced esophageal squamous cell carcinoma (ESCC) remains unclear.

Objectives: To clarify the impact of CCRT on sarcopenia and the relation between sarcopenia, CCRT-related toxicity, and survival in locally advanced ESCC patients.

Methods: This was a retrospective study in which clinical data were collected from 217 patients with locally advanced ESCC at Songklanagarind Hospital between January 1, 2010 and December 31, 2019. Data were obtained from the database and hospital information system of Songklanagarind Hospital. Sarcopenia was assessed by skeletal muscle index (SMI) at the 3rd lumbar vertebra (L3), which includes the psoas, paraspinal, and abdominal wall muscles, in cross-sectional CT scans before and after CCRT, and patients were classified into sarcopenic and non-sarcopenic groups. Sarcopenia was defined as SMI < 43 cm^2/m^2 for body mass index (BMI) < 25 kg/m^2 and < 53 cm^2/m^2 for BMI ≥ 25 kg/m^2 in men and < 41 cm^2/m^2 in women.

Results: A total of 217 patients with locally advanced ESCC were included in the study. 181 patients (83.4%) in the sarcopenia group and 36 patients (16.6%) in non-sarcopenia group were presented before CCRT,

and 17 patients (47.2%) in non-sarcopenia group developed sarcopenia after their CCRT. The skeletal muscle index was significantly decreased after CCRT in both the sarcopenia and non-sarcopenia groups by 4.1% (p = 0.043) and 12.5% (p = 0.002), respectively. Patients with or without sarcopenia showed no significant association with overall survival or CCRT-related toxicity. The median OS was about 1 year and the most common CCRT-related toxicity was neutropenia.

Conclusions: Most of the ESSC patients had sarcopenia and short survival. CCRT also induced sarcopenia. Therefore, assessing sarcopenia before treatment and starting an intervention to prevent or treat sarcopenia may improve outcomes.

Keywords: Esophageal squamous cell carcinoma, Sarcopenia, Skeletal muscle index, Chemoradiotherapy, Survival

SHORT COURSE ANTIMICROBIAL THERAPY IN COMPLICATED INTRA-ABDOMINAL INFECTIONS

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Background: Intra-abdominal infections (IAIs) include a wide severity of organ infections, ranging from uncomplicated to complicated intraabdominal infection. Mortality rate is 2% to 7.7% among patients with complicated IAIs and is increase to 32% to 50% in critically ill patients. However, the optimal duration of antimicrobial therapy is controversy.

Objectives: The purpose of this study is to compare the short course antimicrobial and standard course antimicrobial in complicated intra-abdominal infection patient.

Methods: In this single blinded randomized control trial, non-inferiority trial, the patient with complicated intra-abdominal infection who underwent adequate source control were randomized into 2 groups. The short course group, patient were received antimicrobial for 3 days. The standard course group, patient were received antimicrobial at least 5 days or until afebrile for 24 hours. The primary end point was composite event in whom a surgical site infection, recurrent intra-abdominal infection or death within 30 days. The secondary outcome were length of hospital stay, surgical site infection, recurrent intra-abdominal infection cost and extra abdominal infection within 30 days.

Results: One hundred and twelfth patient were randomly assigned to groups. Baseline and operative characteristic data were clinically similar both groups except age [40 (26.5, 53.2) in short course group and 46.5 (31.7, 59) in standard course groups (P < 0.0282)] and gender [male; 58 in short course groups and 74 in standard course group (P < 0.0298)]. Overall 30 days composite event were 5.36 percent. The composite event were clinically and statistically similar in two groups; the short course (6 of 112 patient, 5.4%) versus standard course (6 of 112 patient, 5.4%), respectively (P > 0.999). Surgical site infection was the most leading of infectious postoperative complication. Neither death nor extra-abdominal infection were found.

Conclusions: In patient with complicated intra-abdominal infection, in this study found no significantly difference in composite event in surgical site infection or recurrent intra-abdominal infection or death after adequate source control.

Keywords: Intra-abdominal infection, Complicated intra-abdominal infection, Short course antimicrobial

SKELETAL OUTCOME OF PARATHYROIDECTOMY IN PATIENTS WITH RENAL HYPERPARATHYROIDISM

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Background: Renal hyperparathyroidism, which is secondary hyperparathyroidism and tertiary hyperparathyroidism, is common amongst end stage renal disease patients. These patients usually had reduced bone mineral density (BMD). Subsequently, they developed osteoporosis and osteoporotic fracture. Although total parathyroidectomy with forearm auto-transplantation (PTX) is effective in reducing parathyroid hormone (PTH), the effect on their BMD changes requires further evaluation.

Objectives: To demonstrate BMD changes at 6 months after total parathyroidectomy with forearm autotransplantation in patients with renal hyperparathyroidism with preoperative osteopenia and osteoporosis.

Methods: The 6-month postoperative dual energy X-ray absorptiometry (DEXA) scan at Lumbar and femoral neck of 15 renal hyperparathyroidism patients with osteopenia or osteoporosis who underwent successful PTX in Thammasat university hospital were measured.

Preoperative and 6-month postoperative parathyroid hormones were taken to demonstrate the indication for PTX and the successful PTX, respectively. 5 of them were osteopenia and 10 of them were osteoporosis using preoperative BMD using T-score criteria for patients over 50 years old and Z-score criteria for patients under 50 years old. 5% changes in BMD were classified as significant improvement, 0-5% changes were classified as moderate improvement, and below 0% were classified as declining BMD. Paired T-test analysis was used for the hypothesis that 6-month postoperative BMD are not improved more than 5% of preoperative mean BMD at lumbar spine and femoral neck at $P = 0.05$.

Results: After PTX, BMD of all patients are improved. 1 of them was osteoporosis, 8 of them were osteopenia, and 6 of them were normal BMD. 12 of the patients had significant improvement and 3 of them had moderate improvement, none was declining BMD. Paired T-test analysis suggested that BMD improved significantly in both lumbar spine ($P = 0.0001$) and femoral neck ($P = 0.0029$).

Conclusions: Renal hyperparathyroidism patients with preoperative osteopenia and osteoporosis who underwent successful PTX are significantly improved their 6-month postoperative lumbar and femoral neck BMD.

Keywords: Renal hyperparathyroidism, Bone mass density, Osteoporosis, Osteopenia, Total parathyroidectomy with forearm auto-transplantation

THE DIAGNOSTIC ACCURACY OF MESS SCORE IN PATIENT WHO UNDERWENT LOWER EXTREMITY INJURY WITH ASSOCIATED ARTERY INJURY

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Background: 10-20% of lower extremity injury with associated artery injury are found to undergo amputation. The Mangled Extremity Severity Score (MESS) has been adopted as the amputation predictor with a MESS score of ≥ 7 reportedly being accurate in predicting the need for amputation. However, the accuracy and the cutoff point remain controversial. This study aims to determine the most appropriate cutoff point of a MESS score for amputation prediction.

Objectives: To determine the most appropriate cutoff point of a MESS score in terms of sensitivity, specificity, and diagnostic accuracy for amputation prediction.

Methods: We retrospectively reviewed patients with lower extremity injury with associated artery injury at our institution between January 2012 and December 2021. Data collection included demographic data, mechanism of injuries, ischemic time, MESS, pathology of vascular injury, and method of vascular repair. The outcome of treatment was divided into 3 groups: primary amputation, secondary amputation, and limb salvage. The mean of the MESS score related to each group and the diagnostic accuracy of each cutoff point for amputation were also analyzed.

Results: There were 35 patients aged 17–59 years (mean 33 years) with lower extremity injury with associated artery injury in this study. Blunt and penetrating injuries were found in 31 and 4 patients, 89 and 11% respectively. The overall amputation rate in this study was 54%, with 16 successful-limb-salvage patients and 19 lower-limb-amputation patients (10 from primary amputations and 9 from secondary amputations). The mean MESS scores of primary amputation, secondary amputation, and limb salvage were 9.8, 8, and 6.6. From multivariate analysis, the most appropriate cutoff point is ≥ 9 with sensitivity, specificity, and accuracy of 78.9%, 81.2% and 80.0% respectively for the overall amputation.

Conclusions: The MESS score is one of the amputation predictors. The cutoff point at 9 can be considered the most appropriate cutoff point for limb amputation. However, not all patients with successful limb salvage had the MESS score < 9. A decision on amputation should be made individually based on clinical evaluation.

Keywords: Amputation, Lower extremity injury, MESS score, Vascular

THE MID-TERM MORPHOLOGICAL CHANGES OF COMMON ILIAC ARTERIES IN AORTOILIAC ANEURYSM AFTER TREATMENT WITH ENDOVASCULAR AORTIC REPAIR AND BELL-BOTTOM TECHNIQUE

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Background: Endovascular aortic repair (EVAR) with the bell-bottom technique is a choice of treatment in patient with aortoiliac aneurysm that can preserve internal iliac artery that can reduce complications; buttock claudication, bowel ischemia and erectile dysfunction. The technique is quick, safe and provide a good short-term result.

Objectives: To evaluation the morphological change of common iliac artery after EVAR and bell bottom technique by computed tomography angiography (CTA) between perioperative period and last time follow-up.

Methods: The retrospective reviews of clinical data and CTA finding of the common iliac artery diameter and iliac limb graft migration in 47 patients (mean age 74 ± 7.06; 41 men) who underwent EVAR with the bell-bottom technique were performed individually by 2 investigators.

Results: During median follow-up of 25.40 months (11.93, 46.29 months), the median dilatation of the right common iliac artery were 4.125 mm (1.325, 8.063 mm) and 3.425 mm (1.338, 5.013 mm) on the left side. The median of the upward migration the right and left iliac limb graft were 2.475 mm (0.313, 5.288 mm) and 1.750 mm (0.350, 6.175 mm) respectively. The dilatation rate of common iliac artery increased significantly within 31 months postoperatively then turned to stable condition. The morphological changes caused reintervention in 6 patients and 1 patient had ruptured abdominal aortic aneurysm. The significant related factors of common iliac artery dilatation are preoperative common iliac artery size and upward migration iliac limb graft.

Conclusions: In mid-term follow-up, the dilatation common iliac artery was about 3.5 mm causing 12% of reintervention rate. However, the common iliac artery dilated significantly just within the 31-month follow-up then no further significant dilatation. The preoperative common iliac artery size and the upward migration of iliac limb graft are significant related with common iliac artery dilatation.

Keywords: Endovascular aortic repair (EVAR) with the bell-bottom technique, Common iliac artery aneurysm, Aortoiliac aneurysm

THE POTENCY, OUTCOME, AND COMPLICATION OF LAPAROSCOPIC SURGERY FOR SALVAGE MALFUNCTION PERITONEAL DIALYSIS

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Background: CAPD (continuous ambulatory peritoneal dialysis) is a prevalent mode of renal replacement therapy for ESRD (End-stage renal disease) patients. Catheter malfunction can result from its luminal occlusion due to omental or small bowel wrapping, malposition, and migration of the catheter. Our study found that laparoscopy offers an alternative approach for revision catheters for patients.

Objectives: Using laparoscopic revision surgery to determine the cause of the malfunctioning catheter and fixed. To study the advantages of laparoscopic revised PD catheter (Peritoneal dialysis catheter) in Surat Thani Hospital, which the Potential of the PD catheter based on the duration of the PD Catheter and postoperative complications.

Methods: We retrospectively and prospectively from the patients admitted to Suratthani Hospital with diagnosed ESRD who have dialysis with PD catheter and has a malfunction of the catheter between Jan 2017 and Dec 2020 which have been repaired by laparoscopic technique. The variables studied were demographic details of the patients, etiology, and causes of catheter malfunction, maneuvers undertaken for salvage, operative time, length of stay, and post-operative complications.

Results: The study population comprised 37 patients that have Mean age of 60 years old's. The average

operative time was 62.02 mins, length of stay was 10.8 days. The number of patients who have immediate post-operative complication was 6 patients, Success rate was 83.7%, our result showed the catheter survival rates of laparoscopic revision has to mean efficiency of 454.676 days and median efficiency of 313 days. 6-month survival was 23 patients (62.1%) and 1-year survival was 17 patients (45.94%) and 2-year survival was 9 patients (24.32%).

Conclusions: In conclusion, laparoscopic salvage has advantaged to identify the causes of malfunctioning and allowed us to fix the problem at the same time. Laparoscopic revised PD catheters are easily performed and avoid catheter replacement.

THE RATE OF PATHOLOGICAL COMPLETE RESPONSE [pCR] IN NON-METASTATIC BREAST CANCER PATIENTS AFTER RECEIVED NEOADJUVANT CHEMOTHERAPY, CLINICOPATHOLOGICAL FACTORS ASSOCIATED WITH pCR AND SURVIVAL OUTCOME

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Background: There are a high number of patients suffering awfully from morbidity and mortality in breast cancer. Neoadjuvant chemotherapy (NAC) has been used in order to increase R0 resection and ensure a good quality of life for patients.

Objectives: To investigate the rate of pathological complete response (pCR), after received NAC in non-metastatic breast cancer as well as the clinicopathological factors that are associated with an increasing pCR rate, overall survival (OS) and disease-free survival (DFS).

Methods: A retrospective study. Data recording was searched from women who had received NAC and who underwent surgery; from January 2014 - January 2019. The pCR was calculated with no residual invasive cancer in the breast and axillary nodes, with presence or absence of in situ cancer (ypT0N0/ypTisN0) criteria. Overall survival and disease-free survival were recorded until January 2021.

Results: From 168 identified patients, 28 patients (16.6%) achieved pCR. The pCR rate was significantly lower in clinical T-staged 3 and 4 tumors than others (95% CI, 0.06-0.93, $p = 0.04$, 95% CI, 0.04-0.58, $p = 0.005$, respectively) in presence of lymphovascular invasion (LVI) (95% CI, 0.01-0.35; $p < 0.003$); whereas, they were higher in ERneg/HER2pos and ERpos/HER2pos (95% CI, 1.44-20.47, $p = 0.013$, 95% CI, 1.97-22.42, $p = 0.002$, respectively). The 5-year OS in the pCR group was higher than in the non pCR group (100% vs 61.1%; HR, $p = 0.0017$); corresponding with 5-year DFS in the pCR group being higher than in the non pCR group (100% vs 44.56%; HR, $p < 0.001$).

Conclusions: The pCR in patients who underwent neoadjuvant chemotherapy was 16.6%. The pathological factors that affected decreases in pCR were; clinical T-staged 3,4 and presence of LVI; whereas, the factor that increased pCR were HER2 positivity. Achieved pCR was a surrogate endpoint of a better survival outcome.

Keywords: pCR, Neoadjuvant chemotherapy, Breast cancer, Survival

USEFULNESS AND OUTCOME OF WHOLE-BODY COMPUTED TOMOGRAPHY (PAN-SCAN) IN TRAUMA PATIENTS: A PROSPECTIVE STUDY

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Background: Severe trauma can cause multi-organ injuries, and the mortality rate may increase if significant organ injuries are missed. This study was performed to determine whether whole-body computed tomography scan (pan-scan) can detect significant injury and leads to proper management, including alteration the priority of management.

Methods: This prospective study was conducted from January 2019 to March 2021 and involved trauma patients level 1, level 2, and dangerous mechanism of trauma. Additionally, the data of trauma patients who had selective computed tomography scan were retrospectively reviewed to compared the clinical benefits.

Results: Twenty-two patients were enrolled in the prospective study. The pan-scan detected significant organ injury in 86% of the patients. Prioritization of organ injury management changed after performance of the pan-scan in 64% (major change in 64.29% and minor change in 35.71%). Skull base fracture, small bowel injury, retroperitoneal injury, kidney and bladder injury, and occult pneumothorax were the majority of injuries which was not consider before underwent pan-scan ($p < 0.05$). The door-to-scan time tended to be shorter in the pan-scan group than in the selective scan group without a significant difference [mean (SD), 59.5 (34) and 72.0 (86) min, respectively; $p = 0.13$]. Pan-scan contribute 100% confidence for trauma surgeon in diagnosis of specific organ injuries in severe injured patients.

Conclusions: The pan-scan facilitates timely detection of significant unexpected organ injuries such as the skull base, occult pneumothorax, small bowel, and retroperitoneum. It also helps to prioritize management and increases the diagnostic confidence of trauma surgeons, leading to better outcomes without delay.

Keywords: Multi-organ injury, Multiple trauma, Pan-scan, Trauma, Whole-body computed tomography scan

Free Paper Presentation (Pediatric Surgery)

ACUTE PANCREATITIS IN CHILDHOOD: A COMPARATIVE INTERNATIONAL STUDY AND A TALE OF TWO CITIES

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Background: There are perceptible difference(s) considered in the incidence and aetiology of acute pancreatitis in pediatric patients from disparate geographic nations.

Objectives: To compare pertinent factor(s) contributing to the etiology, management and clinical outcome(s) of paediatric patients acquiring acute pancreatitis at two major pediatric surgery centers in Liverpool UK and Bangkok Thailand.

Methods: All patients (< 18 years) with an index diagnosis of AP (ICD 10 coding) during 2006-2016 were studied.

Results: 121 patients included n = 79 (65.3%) Thailand vs n = 42 (34.7%) UK center with no difference in age(s) at primary diagnosis at 10.4 ± 4.5 and 11.7 ± 6 yrs ($P = 0.12$). Major etiology contributing to AP at the Thailand center were medications (39.2%) followed by choledochal cyst (8.9%). In the UK surgical center - gall stones (21.4%), and medications (16.7%) were leading factors ($P < 0.01$). Pancreatitis was confirmed and evidenced by imaging in 67.9 % (Thai) and 62.9% (UK) patients ($P = 0.47$). Ultrasonography was deployed more frequently in the UK vs Thai center (74.3% vs 49.1%; $P < 0.01$). Most patients at both centers had mild grade pancreatitis (95% Thai vs 90.5% UK; $P = 0.28$) while 12.7% of Thai and 19% of UK patients progressed to develop pancreatitis related complication ($P = 0.37$). Overall mortality rate (%) was higher in the Thai vs UK center (27.8% vs 9.5%; $P = 0.02$).

Conclusions: Ethnicity impacts the etiology of acute pediatric pancreatitis in the UK and Thailand. Timely diagnosis and health care pathways may be driven by local patient related factor(s). The higher mortality (%) in Thailand vs UK in the comparative 'tale of two cities' study was directly linked to underlying index medical condition(s) in patients rather than the severity of pancreatitis per se.

Keywords: Acute pancreatitis, Pediatric, Diagnosis, Mortality, Severity score

ASSOCIATION OF PELD SCORE WITH PERIOPERATIVE AND POSTOPERATIVE OUTCOMES IN PEDIATRIC LIVER TRANSPLANTATION

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Background: Pediatric End-stage Liver Disease (PELD) score is the widespread score for evaluation the severity of chronic liver failure in children. The higher PELD score represents the inferior pre-liver transplantation status. Therefore, the higher PELD score may affect to the perioperative and postoperative outcomes after liver transplantation.

Objectives: To determining the association of PELD score and perioperative and postoperative results.

Methods: The medical record review was performed among patients under 12 years with end-stage liver disease who underwent liver transplantation at Ramathibodi Hospital between August 1990 and December 2021. The PELD score on transplantation date, perioperative outcomes and postoperative outcomes within 30 days after transplantation were collected. ROC curve analysis was performed to identify PELD score that determine the perioperative and postoperative outcomes. Chi-square and Fisher Exact test were calculated.

Results: We reviewed 170 patients with mean age of 15.8 months (IQR 13, 30). The most common etiology was biliary atresia (80.6%). Mean PELD score is 17.6 (SD 7.4) and the cut off PELD score that affected the outcomes is 18 (AUC 0.85). Patients with PELD score > 18 have the significantly higher risks of operative blood loss (2,600 ml vs 1,250 ml, $P = 0.000$), mean intraoperative red cell, fresh frozen plasma, and platelet transfusion [1,175 ml vs 700 ml, 523 ml vs 243 ml, 186 ml vs 50 ml respectively (all $P < 0.000$)], ICU stay (11 days vs 7 days, $P = 0.014$), intubated period (6.5 days vs 3.9 days, $P = 0.0014$), days of positive pressure ventilation (9 days vs 6 days, $P = 0.001$), cytomegalovirus reactivation (30.9% vs 16.3%, $P = 0.024$) and intra-abdominal infection (60.7% vs 45.4%, $P = 0.045$).

Conclusions: PELD score > 18 at transplant in children with end-stage liver disease is associated with increased health care utilization and infection. Considering liver transplantation in children with less severe liver disease may provide the better perioperative and post-operative outcomes. Cost-effectiveness analysis may determine the potential benefit of early transplantation.

Keywords: PELD score, Liver transplantation, Pediatric, Outcome

CLINICAL CHARACTERISTICS OF PATIENTS WITH MECKEL'S DIVERTICULUM

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Background: Meckel's diverticulum (MD) is the most common congenital anomaly of gastrointestinal tract with the prevalence of 0.3-3%. Patients with MD may present with various manifestations including GI bleeding, gut obstruction, diverticulitis, or umbilical problems. However, MD can be incidentally found during the operations.

Objectives: The objectives were to describe and to compare clinical features of patients with MD in terms of demographic data, clinical presentation, investigations, treatment, histopathologic results, and post-operative complications between pediatric and adult patients. This study would concentrate more on pediatric patients.

Methods: Patients with MD were retrospectively reviewed from 2 tertiary-care hospitals; the first hospital (2002-2021) and the other hospital (2015-2021). These included patients with symptomatic MD and patients whose MD incidentally found during the operations. Demographic data, clinical presentation, investigation, treatment, histopathologic results, and postoperative complications were reviewed.

Results: Total of 123 cases with MD were studied. There were 93 males (75%), 67 pediatric patients (54%, age < 15 years), and 78 patients with symptomatic MD (63%). For children with symptomatic MD (46 cases),

GI bleeding was the most common presentation (54%), followed by obstruction (28%), umbilical problems (11%) and diverticulitis (7%). For adults with symptomatic MD (32 cases), diverticulitis was the most common presentation (47%) followed by obstruction (31%), GI bleeding (19%) and umbilical problems (3%). For children with bleeding MD (25 cases), Meckel scan was an important investigation to confirm the diagnosis with positive predictive value of 91%. For incidentally found MD, 80% were resected. Interestingly, ectopic gastric tissue was found in 19% of the resected MD specimens. Moreover, there was no significant difference in postoperative complications between patients with symptomatic MD and patients with incidentally found MD.

Conclusions: Meckel's diverticulum presents a variety of clinical presentations. The most common symptom was GI bleeding in children and diverticulitis in adults. Meckel scan is an important tool to investigate bleeding MD. Since ectopic gastric tissue was found in 19% of asymptomatic MD, therefore, our findings seem to support the concept of resection of MD incidentally found during the operations.

Keywords: Meckel's diverticulum, Clinical presentation, Diagnosis, Thailand

FACTORS ASSOCIATED WITH THE FALSE-NEGATIVE RESULTS OF CONTRAST ENEMA FOR DIAGNOSIS OF HIRSCHSPRUNG'S DISEASE

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Background: Contrast enema is the most frequently used test to diagnose Hirschsprung's disease. Reported factors associated with the false-negative results of contrast enema were the age of the first contrast enema, location of the transitional zone, days of PR, and days of NSS irrigated before contrast enema.

Objectives: This study aims to report the false-negative results and these identified associated factors. How to diminish the false-negative results was considered.

Methods: Patients with Hirschsprung's disease treated with abdominal assisted TERPT or TERPT between November 2006 and January 2021 at Siriraj hospital were studied. Patients who did not receive definitive surgery or performed colostomy without contrast examination or with anorectal malformation were excluded.

Results: Thirty of 190 patients with contrast enema had false-negative results (17.4%). The sensitivity of contrast enema was 82.6%. To study the associated factors, we divided patients into two groups: the positive contrast enema group and the false-negative group. The age of the first contrast enema between the two groups was similar (27.5 days vs. 23.1 days, respectively). Most transitional zones were found at the rectosigmoid junction (46%), rectum (15.1%), and sigmoid (14.5%). The other zones were defined as a long transitional zone (24.4%). Whether it was a short or long transitional zone, it showed no statistically significant difference between the two groups. (66.3% vs 80% in a short T-zone, *P*-value = 0.2 and 22.5% vs 20% in a long T-zone, *P*-value = 0.95).

The too-short interval of PR and NSS irrigation before contrast enema made more false-negative rates of contrast enema. PR within two days before contrast enema increased the false-negative results from 39.4 to 56.0% (*P*-value = 0.2) and NSS irrigation within one day before contrast enema increased the false-negative results from 48.8 to 66.7% (*P*-value = 0.22).

Conclusions: Although all associated factors showed no statistically significant association with the false-negative results of contrast enema, too short interval of PR and NSS irrigation before contrast enema could affect the false-negative rate clinically.

Keywords: Hirschsprung's disease, Contrast enema, Transitional zone, Per rectal examination, NSS irrigation

FACTORS ASSOCIATED WITH UNFAVORABLE OUTCOME IN PEDIATRIC HEPATOBLASTOMA

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Background: Hepatoblastoma is the most common malignant liver tumor and the third common intra-abdominal solid tumor in children. Currently, there are various strategies for hepatoblastoma treatment, including the chemotherapy, liver resection and liver transplantation, which result in an excellent outcome.

Objectives: The aims of this study are to investigate the treatment outcome of hepatoblastoma in Ramathibodi Hospital which is the largest center of pediatric liver transplantation center in Thailand, and to identify the association of determining factors that affect the treatment outcome of hepatoblastoma.

Methods: Twenty-two patients who diagnosed with hepatoblastoma between January 2014 and September 2020 were recruited. Three patients were excluded due to incomplete medical record. A total number of 19 patients were included in this study. Retrospective and prospective chart review was designed in single center. The demographic data, pre-treatment data, treatment strategies, post-operative outcome, 1-year-survival rate and 5-year-survival rate were collected and analyzed. The survival rate is calculated using Cox's regression analysis.

Results: Of 19 patients, 9 patients were male (47.4%). The mean age at diagnosis was 27 months (interquartile range 9.5, 33.5). There was no immediate post-operative mortality, whereas the immediate post-operative complication rate was 36.8% (7/19): bile duct injury (4), intestinal obstruction (2) and hemoperitoneum (1). The 1-year-survival rate was 95.2%. The 5-year-survival rate was 85.7%. The overall death was 4 patients (21%), including from recurrent tumor (1), sepsis (1), upper gastrointestinal bleeding (1), and palliative care (1). There was no factor that is significantly associated with post-operative complication. However, length of stay after the surgery was significantly associated with survival rate (both 1- and 5-year survival rate).

Conclusions: The overall treatment outcome of pediatric hepatoblastoma is excellent in immediate post-operation, 1-and 5-year survival rate. There was no factor indicating post-operative outcome, and the length of stay after surgery affected the survival rate.

Keywords: Children, Hepatoblastoma, Liver resection, Liver transplantation, Survival rate

OPTIMAL SALINE IRRIGATION FOR PREOPERATIVE BOWEL PREPARATION REDUCING POST-OPERATIVE INFECTION IN HIRSCHSPRUNG'S DISEASE

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Background: Transanal endorectal pull-through is a gold standard treatment for Hirschsprung's disease. An adequate preoperative bowel preparation is one of important factors. Basically, in Siriraj Hospital, bowel preparation was performed using rectal NSS irrigation about 30-50 ml/kg twice a day at least three consecutive days. However, there was no scientific evidence of optimal amount of NSS.

Objectives: The objectives of our study were how long and how much of appropriate volume of NSS irrigation related to surgical complications following the operation.

Methods: The children with Hirschsprung's disease were performed Transanal endorectal pull-through, with or without laparotomy, between 2006 to 2020 at Siriraj Hospital. Patients' characteristics were analyzed by general statistics and ROC was applied to demonstrate optimal NSS value.

Results: All 131 Hirschsprung's patients, whether had complications or not, had similar demographic characteristics between two groups. The 99 (75.6%) patients were performed transanal endorectal pull-through, while 32 (24.4%) patients underwent abdominal assisted pull-through. Complications occurred in 23 patients including 22 anastomosis strictures (16.8%), 3 anastomotic leakages (2.3%), and 2 intra-abdominal collections (1.5%). The average amount of NSS irrigation using for patients with post-operative complications was 38 ml/kg/day, whereas for ones without complication was 39.46 ml/kg/day (p = 0.945). The median duration for rectal NSS irrigation in patients of both groups was the same (seven days).

The minimal amount of rectal NSS irrigation in Hirschsprung's disease without complication in this study was 16.19 ml/kg. There was no statistically significant correlation between postoperative anatomotic leakage complications and amount of rectal NSS irrigation (p-value = 0.622). Despite increasing NSS volume, the risk of hyponatremia was unaffected (p-value = 0.573). There amount of rectal NSS irrigation *w*as no statistically significant correlate with the overall complications (p-value = 0.634).

Conclusion: In summary, there was no statistically significant correlation between postoperative complications and amount of rectal NSS irrigation. However, in this study had few complication rates of recruited cases, further study should be conducted in a larger population.

Keywords: Hirschsprung's disease, Complication, Bowel preparation

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