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TJS

EDITORIAL

ORIGINAL ARTICLES

CASE REPORTS

ABSTRACTS

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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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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.

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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.

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- 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/.

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(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.

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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 anyway as is necessary for adequate comprehension. Finally, a **Conclusion** summarizes the content in greater detail than the abstract, emphasizing recent developments or future research.

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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.

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Editorial

Siripong Sirikurnpiboon, MD

Editor of The Thai Journal of Surgery

Advancing Surgical Knowledge: From Robust Trials to Pivotal Lessons

As we present this latest issue of our journal, we proudly mark a milestone: the 50th RCST Annual Scientific Congress. This edition continues our mission to disseminate critical medical knowledge while reflecting five decades of dedication to surgical advancement and education. Its contents span the spectrum of surgical inquiry, from controlled trials to lessons from unique clinical encounters.

This issue features three **Original Articles** addressing impactful surgical questions. The first, ***"Efficacy of Preoperative Single Dose Intravenous Dexamethasone in Laparoscopic Cholecystectomy,"*** offers a potential standard for enhancing postoperative recovery. The second, ***"Factors Associated with Thyroid Surgery Complications,"*** identifies risks to improve patient safety in endocrine surgery. The third, ***"Management and Outcome of Fournier Gangrene,"*** provides vital insights from a Nigerian hospital on this life-threatening infection, underscoring global challenges in surgical care.

Complementing these are three **Case Reports** highlighting rare entities every surgeon should recognize: ***a Tailgut Cyst transforming into Mucinous Adenocarcinoma, an Isolated Tracheoesophageal Fistula requiring sophisticated management, and a Neuroendocrine Tumor causing Adult Intussusception***. Each case emphasizes the importance of vigilance and diagnostic precision.

Further enriching this issue are **49 abstracts** from the landmark Congress, showcasing cutting-edge research and innovation from the next generation of surgeons. These works, spanning outcomes research, surgical techniques, and basic science, represent the lifeblood of our specialty's future.

We extend our gratitude to all authors, reviewers, and participants whose dedication ensures this journal remains a vital platform for advancing knowledge, improving patient care, and carrying forward a proud 50-year legacy.

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Original Article

Efficacy of Preoperative Single Dose Intravenous Dexamethasone in Laparoscopic Cholecystectomy: A Randomized Double-Blind Placebo-Controlled Trial

Phaiwit Sriphatphiriyakun, MD
Yada Chumongkhon, MD
Department of Surgery, Suratthani Hospital, Thailand

Abstract

Background: Postoperative pain following laparoscopic cholecystectomy (LC) is complex and influenced by multiple factors. Dexamethasone has been investigated for its potential to reduce postoperative pain and nausea, but its efficacy remains controversial.

Materials and Methods: This prospective, randomized, double-blind, controlled trial included 108 patients undergoing elective LC. Patients were randomly assigned to receive either 5 mg dexamethasone (study group) or 1 ml normal saline (control group) 1–2 hours before surgery. Postoperative pain was assessed using the Visual Analog Scale (VAS) at 0, 2, 6, 12, and 24 hours. Data on analgesic use, postoperative nausea and vomiting (PONV), complications, and length of hospital stay were also collected. Statistical analyses were conducted using SPSS, with a p-value < 0.05 considered significant.

Results: No statistically significant differences in VAS scores were observed between the dexamethasone and control groups at any time point. Morphine use was similarly low in both groups (2.0 ± 2.9 mg vs. 2.2 ± 3.6 mg, $p > 0.05$), with about half of the patients requiring no morphine. PONV was less frequent in the dexamethasone group (5.7% vs. 11.1%), but the difference was insignificant. Length of hospital stay was identical in both groups (2.3 ± 0.5 days).

Conclusion: Dexamethasone did not significantly reduce postoperative pain or morphine use in LC patients with low baseline pain scores. Although PONV was less frequent in the dexamethasone group, the difference was not statistically significant. Future studies with larger sample sizes and standardized postoperative care are needed to clarify its role in LC pain management.

Keywords: Laparoscopic cholecystectomy, Dexamethasone, Postoperative pain

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Corresponding author: Phaiwit Sriphatphiriyakun, MD, Department of Surgery, Suratthani Hospital, Thailand; E-mail: phaiwit3050@gmail.com

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Introduction

Approximately one-fifth of the population has gallstones, and about 20-30% of these individuals require surgical intervention.[1] Both open and laparoscopic cholecystectomy are standard treatments for gallstone disease. Since the introduction of laparoscopic surgery in the 1980s, this technique has become increasingly popular due to its benefits, including smaller incisions, reduced blood loss, less postoperative pain, shorter hospital stays, and fewer major wound complications.[2]

While laparoscopic surgery can reduce postoperative pain, many patients still require strong opioids for pain control. The pain mechanism is complex and involves factors such as incisional (somatic) pain, visceral pain, and referred pain, which are unpredictable. Maximum pain is typically observed on the first day after surgery and gradually decreases over the following days.[3]

The exact cause of post-laparoscopic cholecystectomy pain remains unclear, although the most likely causes include peritoneal inflammation due to carbon dioxide (CO2) and peritoneal stretching.[4-5] Various techniques have been studied to minimize pain, such as preoperative administration of analgesics, local anesthetics, intraperitoneal irrigation with bupivacaine, and suctioning residual gas from the peritoneum before closure.[6-10]

Dexamethasone, with its anti-inflammatory properties and ability to block neural discharge and nociceptor C-fiber transmission, has shown promise in reducing postoperative pain and postoperative nausea and vomiting. Several studies,[11-15] including one conducted in Thailand,[16] have demonstrated the benefits of dexamethasone in postoperative pain reduction without increasing infection rates or delaying wound healing. However, some other trials[17-18] reported no significant reduction in postoperative pain among LC patients receiving dexamethasone, and meta-analyses[19] show that dexamethasone provides small but statistically significant analgesic benefits. We question whether the pain-reducing effects of dexamethasone justify its routine use, particularly given that other non-steroidal anti-inflammatory drugs (NSAIDs) or opioids are also effective for pain control. This raises the debate of whether dexamethasone should be reserved only for patients at high risk for PONV rather than being a blanket recommendation for all undergoing laparoscopic cholecystectomy.

This study aims to evaluate the effectiveness of a single preoperative dose of intravenous dexamethasone in reducing postoperative pain, analgesic requirements, and postoperative nausea and vomiting (PONV) in patients undergoing laparoscopic cholecystectomy. Additionally, the study seeks to identify any associated complications and assess whether the administration of dexamethasone improves overall clinical outcomes following surgery.

Material and Methods

This study is a prospective, randomized, double-blind, controlled trial. The study protocol and methodology were approved by the institutional review board, and written informed consent was obtained from all participants.

Inclusion criteria:

1. Patients scheduled for elective laparoscopic cholecystectomy at Suratthani Hospital
2. Age between 20 and 60 years
3. ASA class I or II

Exclusion criteria:

1. Emergency or urgent cases
2. Conversion to open surgery
3. Patients who required routine use of steroids, other immunosuppressive drugs, or NSAIDs
4. Placement of a drainage tube

A total of 143 patients were included in the study and allocated using a computer-based random integer generator. They were randomly assigned to one of two study groups by research assistants who were not involved in outcome assessment. Patients, surgeons, anesthesiologists, residents, nurses, and the primary researcher remained blinded to group assignments until the end of the study. The intervention group received 5 mg of dexamethasone 1-2 hours before skin incision, while the control group received 1 ml of normal saline (NSS) instead.

LC was performed by multiple surgeons in Surathani Hospital using their preferred technique. Thirty-five patients were excluded due to conversion to open surgery (16 patients), drainage tube placement (13 patients), incomplete data, or surgery cancellation (6 patients). This left 54 patients in each group (Figure 1).

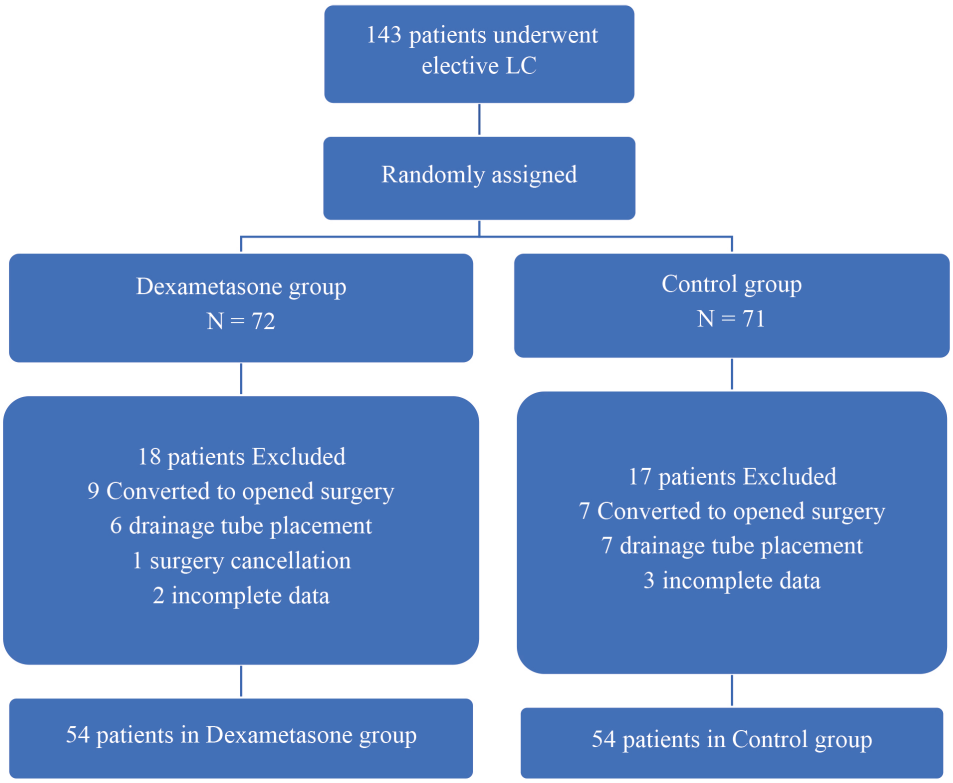

Figure 1 Flow chart

All patients received standardized care, including paracetamol 500 mg orally, as needed every 6 hours, and morphine 2 mg intravenously, as needed every 2 hours, without the use of other analgesics. Postoperative pain was assessed using the Visual Analog Scale (VAS) at 2, 6, 12, 24, and 48 hours after surgery. Additional data collected included the use of antiemetics (e.g., metoclopramide, ondansetron) over 48 hours, complications (e.g., nausea/vomiting, surgical site infection, sedation, respiratory depression), length of hospital stay, bile culture results, and pathology findings.

We use the sample size formula for a two-group comparison (assuming equal group sizes) based on postoperative pain data at 2 hours from Archana Har et al. study.[20]

$$n = \frac{2 \bullet (Z_{\alpha/2} + Z_{\beta})^2 \bullet \sigma^2}{\Delta^2}$$

Significance level (α) = 0.05 (Z = 1.96)
Power ($1 - \beta$) = 0.80 (Z = 0.84)
Estimated standard deviation (σ) = 2.3
Minimum detectable effect size (Δ) = 1.4
n = 49.45

Data were analyzed using SPSS, version 28. Means/medians and standard deviations were calculated for quantitative variables (e.g., age, pain scores), while frequencies and percentages were calculated for qualitative variables (e.g., gender). Differences in patient characteristics were analyzed using a chi-square test for categorical variables (e.g., sex, ASA class, prior surgeries or procedures, local anesthetic use, number of laparoscopic ports, PONV, SSI, bile culture results, pathology) and Student's t-test for continuous variables (e.g., age, BMI, total postoperative opioid use, pain scores, operative/recovery time, length of stay). Statistical significance was set at a p-value < 0.05.

Results

A total of 108 patients were included in the study, with 54 patients assigned to the control group and 54 patients assigned to the study group (dexamethasone group). There were no statistically significant differences between the two groups in terms of age, sex, BMI, ASA classification, diagnosis, history of ERCP, or operative time. However, a higher proportion of patients in the study group had a history of previous abdominal surgery (45% vs. 27%, $p > 0.05$) (Table 1).

The mean postoperative pain scores (VAS) in the study group were 3.4 ± 2.8, 3.7 ± 1.4, 3.5 ± 1.5, 2.8 ± 1.3, and 2.7 ± 1.2 at 0, 2, 6, 12, and 24 hours after surgery, respectively. These scores were not significantly different from the control group, which recorded scores of 3.6 ± 2.7, 3.9 ± 1.4, 3.4 ± 1.4, 2.8 ± 0.9, and 2.5 ± 1.1 at the same time points ($p > 0.05$). Similarly, morphine usage was comparable between the two groups (2.0 ± 2.9 mg in the study group vs. 2.2 ± 3.6 mg in the control group, $p > 0.05$) (Table 2).

Postoperative nausea and vomiting (PONV) were less frequent in the study group (5.7% vs. 11.1%), although the difference was not statistically significant. The length of hospital stay was identical in both groups, averaging 2.3 ± 0.5 days. One patient in the study group experienced a superficial surgical site infection at the umbilical port, but this was not significantly different between the groups. No other complications were reported.

Table 1 Patient demographic data

	Group		*P*-value
	Study (N = 54)	Control (N = 54)	
Mean age: year (Mean ± SD)	42.5 ± 10.8	43.9 ± 10.7	0.501
Sex: n (%)			0.681
Male	11 (20.8)	13 (24.1)	
Female	42 (79.2)	41 (75.9)	
BMI: kg/m² (Mean ± SD)	27.4 ± 5.1	26.5 ± 4.7	0.344
ASA class: %			0.634
I	25 (47.2)	23 (42.6)	
II	28 (52.8)	31 (57.4)	
Diabetes malitus	12	13	0.687
Previous abdominal Sx: n (%)	24 (45.3)	15 (27.8)	0.005
Previous ERCP	16 (30.2)	9 (16.7)	0.098
Number of ports: n (%)			0.277
3 ports	20 (37.7)	26 (48.1)	
4 ports	33 (62.3)	28 (51.9)	
Diagnosis			0.413
Symptomatic Gallstone	27	31	
History of cholecystitis	7	8	
Gallstone pancreatitis	3	4	
History of CBD stone	17	11	
Gallbladder polyp	0	2	
Operative time - min (Mean ± SD)	78.4 ± 38.9	69.3 ± 30.1	0.387

Table 2 Outcome

	Group		*P*-value
	Study (N = 54)	Control (N = 54)	
Visual Analogue Pain Score			
0 hr	3.4 ± 2.8	3.6 ± 2.7	0.825
2 hr	3.7 ± 1.4	3.9 ± 1.4	0.594
6 hr	3.5 ± 1.5	3.4 ± 1.4	0.772
12 hr	2.8 ± 1.3	2.8 ± 0.9	0.749
24 hr	2.7 ± 1.2	2.5 ± 1.1	0.454
Total morphine use-mg (Mean ± SD)	2.0 ± 2.9	2.2 ± 3.6	0.864
Postop. nausea/vomiting: n (%)	3 (5.7)	6 (11.1)	0.310
Surgical site infection: n (%)	1 (5.7)	0 (0.0)	0.311
Length of stay-day (Mean ± SD)	2.3 ± 0.5	2.3 ± 0.5	0.915
Pathology report: n (%)			0.547
Acute cholecystitis	2 (3.7)	2 (3.7)	
Chronic cholecystitis	46 (86.8)	44 (81.5)	
Acute & Chronic cholecystitis	5 (9.4)	6 (11.1)	
Benign neoplasm	0 (0.0)	2 (3.7)	

Discussion

Postoperative pain after laparoscopic cholecystectomy (LC) is complex and unpredictable. While several studies have investigated the role of dexamethasone in reducing postoperative pain, its effectiveness remains controversial. Many randomized controlled trials,[11-15] including one conducted in Thailand,[16] have shown that patients administered dexamethasone required less postoperative morphine and reported significantly lower pain scores compared to control groups. However, other trials[10,21] reported no significant reductions in postoperative pain among LC patients receiving dexamethasone. The optimal time of dexamethasone injection is 1–2 hours before surgery to diffuse across the cell membrane and minimize pain and inflammation.[19]

In our study, we found no statistically significant differences in pain scores (VAS) at any time point or in the total dose of analgesic drugs used. This discrepancy may be due to our study's overall lower pain scores compared to other studies. The average pain scores in our study ranged from 3-4 during the first 6 hours post-surgery to 2-3 at 12-24 hours. Similarly, the total morphine dose was minimal, averaging 2.0 ± 2.9 mg in the study group and 2.2 ± 3.6 mg in the control group. Notably, about half of the patients in both groups did not require morphine at all. When compared with other studies, for example, Petra-Evelyn et al.,[21] reported higher postoperative pain scores immediately after surgery (VAS score: 6.9 ± 1.2 vs. 7.5 ± 1.6; $P = 0.001$) and at 6 hours post-operation (VAS score: 5.2 ± 1.0 vs. 6.5 ± 1.4; $P = 0.000$). Similarly, Bisgaard T et al.,11 reported VAS scores of 4.1 and 5.2 in the control group vs. 3.3 and 3.5 in the dexamethasone group at 6 and 12 hours, respectively. These findings suggest that our population may have a higher pain tolerance, potentially diminishing the observable benefits of dexamethasone on postoperative pain.

Regarding postoperative nausea and vomiting (PONV), the incidence was lower in the study group (5.7%) compared to the control group (11.1%), although the difference was not statistically significant ($p > 0.05$). A meta-analysis of 17 placebo-controlled studies demonstrated that combining a 5-HT3 receptor antagonist and a single dose of dexamethasone can reduce PONV. However, the routine use of this combination remains debated, with some studies suggesting it should be reserved for patients with a history of severe nausea and vomiting.[12,18]

In our study, one patient in the study group experienced a superficial surgical site infection at the umbilical port, which caused delayed wound healing. However, this was not significantly different between the groups and is consistent with findings from other studies.[11-18] From a meta-analysis,[19] it was noted that blood sugar levels in the dexamethasone group were significantly higher at 24 hours after surgery. However, our study did not routinely monitor perioperative blood sugar levels in non-diabetic patients. No hyperglycemic crisis was observed in the 12 diabetic patients in the study group and the 13 patients in the control group.

There are several limitations to our study. First, the sample size was relatively small, and the study was conducted at a single center, limiting the findings' generalizability. Second, there were confounding factors, including differences in baseline patient characteristics, particularly the higher prevalence of previous abdominal surgery in the study group. Additionally, there was no standardized perioperative care protocol, including surgical technique, choice of anesthesia, and type of anesthetic drugs used in the induction and maintenance phases. Management of PONV depended on the attending surgeons and anesthesiologists. Future studies with larger sample sizes, consideration of prior abdominal surgeries, and standardized postoperative care protocols are needed to draw more definitive conclusions.

There are several limitations to our study. First, the sample size was relatively small, and the study was conducted at a single center, limiting generalizability. Second, there were confounding factors, including differences in baseline patient characteristics, particularly the higher prevalence of previous abdominal surgery in the study group. Additionally, there was no standardized peri-operative care protocol, including surgical technique, choice of anesthesia, and type of anesthetics drug in the induction and maintenance phase intra-operative, management of PONV, depending on the attending surgeons and anesthesiologist. Future studies with larger sample sizes, consideration of prior abdominal surgeries, and standardized postoperative care protocols are needed to draw more definitive conclusions.

Conclusion

This prospective randomized double-blind controlled trial demonstrated that dexamethasone did not significantly reduce postoperative pain scores or analgesic use following laparoscopic cholecystectomy in our study population. The overall low pain scores and minimal analgesic requirements suggest that the high pain tolerance in this population may have diminished the measurable benefits of dexamethasone. Although there was a lower incidence of postoperative nausea and vomiting (PONV) in the dexamethasone group, the difference was not statistically significant. Further studies with larger sample sizes, standardized postoperative care protocols, and consideration of baseline patient characteristics, such as prior abdominal surgeries, are warranted to evaluate better dexamethasone's efficacy in managing postoperative pain and PONV in laparoscopic cholecystectomy patients.

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Original Article

Factors Associated with Thyroid Surgery Complications at Maharat Nakhon Ratchasima Hospital

Kongsilp Wangsuntia, MD

Department of Surgery, Maharat Nakhon Ratchasima Hospital, Nakhon Ratchasima, Thailand

Abstract

Background: Thyroidectomy is one of the most frequently performed operations for thyroid disease. Thyroidectomy was associated with increased morbidity and even mortality. Potential major complications of thyroid surgery include bleeding (0.3-1%), injury to the RLN (4- 6.6%) if the nerve is not identified), hypoparathyroidism (2-53%), hypothyroidism (5-41.9%), thyrotoxic storm (< 0.5%), injury to superior laryngeal nerve (0-25%), and infection (1-2%). This study assessed the current understanding of factors predicting such complications following thyroidectomy.

Objectives: To investigate factors associated with complications in thyroid surgery.

Materials and Methods: We performed a retrospective analysis of all patients aged > 15 years who underwent thyroid surgery for any thyroid disease at our institution between October 2022 and September 2023. Data was analyzed regarding demographics, clinical features, operative details, postoperative complications, and histopathology results of tissue specimens.

Results: A total of 278 patients were identified, comprising 187 females (67.26%) and 91 males (32.74%). 106 surgical complications were observed in 77 patients (27.7%). The most common complication in the study was hypocalcemia, occurring in 54 cases (19.4%). This was followed by hoarseness in 42 cases (15.1%). The final model revealed that subtotal/total thyroidectomy had a strong and significant association with complications (adjusted RR: 4.15; 95% CI: 2.63-6.55; $p < 0.001$). Similarly, a disease duration exceeding 10 years (adjusted RR: 1.46; 95% CI: 1.09–1.97; $p = 0.012$) and thyroid nodule weight exceeding 200 gm. was also statistically significant adjusted RR: 2.11; 95% CI: 1.05-4.24; $p = 0.035$).

Conclusion: The postoperative complications of thyroid surgery were associated with the subtotal/total thyroidectomy, a disease duration exceeding 10 years, and thyroid nodule weight exceeding 200 gm. Therefore, special caution must be exercised in patients with these characteristics.

Keywords: Thyroidectomy, Postoperative complications, Predictors

Introduction

Thyroidectomy is one of the most frequently performed operations for thyroid disease.[1,2] Although thyroid surgery is the most common and safe operation, complications can occur depending on the thyroid gland's anatomical structure and physiological function.[3] Some complications can be life-threatening.

Potential major complications of thyroid surgery include bleeding (0.3-1%), injury to the RLN (4- 6.6%) if the nerve is not identified), hypoparathyroidism (2-53%), hypothyroidism (5-41.9%), thyrotoxic storm (< 0.5%), injury to superior laryngeal nerve (0-25%), and infection (1-2%).[4]

From a study of complications from thyroid cancer surgery at the Otolaryngology Department, Maharat Nakhon Ratchasima Hospital in 2019, it was found that

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Corresponding author: Kongsilp Wangsuntia, MD, Department of Surgery, Maharat Nakhon Ratchasima Hospital, Nakhon Ratchasima, Thailand; E-mail: kongsilpw@gmail.com

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transient hypocalcemia was found in 50.7% and permanent hypocalcemia in 38.1%. Patients who underwent total thyroidectomy at one-stage surgery had a higher incidence of hypocalcemia than those who underwent two-stage surgery. It was found that 13% of patients with vocal cord paralysis after surgery were temporary, 1.5%, and 11.5% were permanent. Additionally, it was found that in patients who underwent selective neck dissection, a 9.3% incidence of chyle leakage occurred postoperatively.[5] In other studies, it was also found that patients who spent more time in surgery and had large intraoperative blood loss were associated with increased complications of thyroid surgery.[6]

In previous research, the patient's condition, the nature of thyroid disease, and the surgeon's level of expertise have been associated with postoperative complications. In the Thai population or the research institutes, there is still insufficient information on risk factors for complications from thyroid surgery.

This research may lead to improved practice guidelines. Further explorations into the predicting factors of these complications could help develop plans for prevention and proper management of any that may occur.

Materials and Methods

Objectives

The main goal is to investigate factors associated with complications in thyroid surgery. In addition, complications were compared between different surgical methods. There may be an association between risk factors, such as disease duration, the size or weight of the thyroid gland, and the type of surgery, etc.

Study design, setting, and patients

This retrospective cohort study was conducted between October 2022 and September 2023. 278 consecutive patients underwent thyroid surgery for various thyroid diseases at Maharat Nakhon Ratchasima Hospital (MNRH). Data were retrospectively retrieved from the hospital's medical electronic database. Per the protocol, preoperative evaluations include physical examinations, thyroid function tests, cervical ultrasonography, and thyroid scintigraphy. Fine-needle aspiration biopsy (FNAB) was performed for clinically palpable dominant thyroid nodules.

Inclusion criteria

All patients over 15 years of age who underwent thyroid surgery for any thyroid disease during the study were included.

Exclusion criteria

Patients with preoperative evidence of recurrent laryngeal nerve problems and patients presenting with symptoms of hypocalcemia or low serum calcium level during the preoperative evaluation.

Patients who underwent laparoscopic thyroidectomy.

Surgical technique

Staff surgeons performed all operations, specializing in General surgery and Head, Neck, and Breast surgery.[7]

Total thyroidectomy: This procedure involves the removal of both lobes and the isthmus. No thyroid tissue is left to produce the thyroid hormone.

Subtotal thyroidectomy: This procedure removes an entire lobe, the isthmus, and a part of the other lobe. A piece of one lobe of the thyroid will remain.

Left lobectomy: This procedure involves the removal of the entire left lobe of the thyroid.

Right lobectomy: This is the removal of the entire right lobe of the thyroid.

Intraoperatively, efforts were made to identify and preserve the recurrent laryngeal nerves, identifying at least one parathyroid gland during lobectomy and at least two parathyroid glands for subtotal or total thyroidectomy. Following the completion of thyroidectomy, a drainage tube will be inserted.

The anesthesiologist associated the vocal cords during intubation with an Ear, Nose, and Throat (ENT) specialist in case of postoperative symptoms developing.

Clinical diagnosis of thyroidectomy complications

This study highlighted frequent complications, including injury to the recurrent laryngeal nerve, which causes hoarseness, and hypoparathyroidism, which causes a low calcium level.

Serum calcium levels were usually assessed the day after surgery. Hypocalcemia was identified by a serum calcium level under 8.0 mg/dL, and an oral calcium supplement was administered. Assessment of symptoms associated with hypocalcemia, such as perioral numbness, extremity numbness, or spasm. The presence of

involuntary contraction of muscles in the hand and wrist occurs after an individual wears a blood pressure cuff inflated over their systolic blood pressure for 2-3 minutes (Trousseau's sign) or twitching of facial muscles in response to tapping over the facial nerve (Chvostek's sign). Permanent hypoparathyroidism is the requirement of calcium supplementation and/or vitamin D to maintain eucalcemia for six months postoperatively.[2,3]

An assessment of Recurrent Laryngeal Nerve Injury (RLNI) was conducted through postoperative patient interviews, where symptoms were recorded in medical progress notes. If the patient has hoarseness, loss of voice while speaking, choking or coughing while drinking water or eating, or a noisy voice during breathing.[8,9]

Other immediate complications after thyroid surgery that are commonly found include hematoma, infection, and airway obstruction.

Hematoma is caused by the accumulation of blood at the surgical site.

The signs and symptoms, such as swelling, bruising, and neck discomfort. In severe cases, it can compress the airway. The management is to immediate surgical evacuation of the hematoma.

Infection is caused by a bacterial infection at the incision site—signs and symptoms such as redness, warmth, swelling, pain, and fever.

Airway Obstruction is caused by swelling, bleeding, or hematoma formation compressing the airway. The signs and symptoms include difficulty breathing and stridors. The management is to emergency airway management and possible reoperation.

The occurrence of complications was the primary endpoint of the study. The patient's age and gender, the extent of resection, estimated blood loss, operative time, the identification of the RLN-parathyroid gland, postoperative serum calcium level, pathological results, and specimen weight (extracted from the pathology file) were also assessed as risk factors for the development of the above complications.

Sample size

The sample size was determined based on histopathological tissue results (carcinoma) from a pilot study with 14 samples. Patients with carcinoma exhibited a 2.1-fold higher risk of complications compared to those without carcinoma. The proportion of complications was 0.3. The base rate, the proportion of carcinoma in the group without complications, was estimated to be 0.46. The variance of this factor, explained by the regression relationship with other covariates, was 0.4. Using G*Power Version 3.1.9.7 with the Z-test family for Poisson regression, the required sample size was calculated to be at least 165 cases, with a significance level set at $\alpha = 0.05$ and $\beta = 0.2$.[10]

Statistical analysis

General demographic data from patient medical records were collected, including variables such as age, gender, underlying diseases, diagnosis, surgical procedures, blood loss during surgery, duration of surgery, postoperative serum calcium levels, complications, and histopathological results of tissue specimens.

Personal data and clinical data from both sample groups will be analyzed using descriptive statistics, including frequency, percentage, mean, and standard deviation. Differences between groups will be assessed using appropriate statistical methods, such as Fisher's exact test, *t*-test, or Mann-Whitney test, depending on the nature and distribution of the data.

Factors associated with postoperative complications will be analyzed using Poisson regression with robust variance in a full model strategy. Statistical significance will be determined at $P < 0.05$.

RESULTS

A total of 278 patients were selected from the electronic medical database during the study period. The baseline characteristics, clinical features, and complications of the study populations are summarized in Tables 1 and 2. The majority of patients in both groups were female: 90.9% in the complication group and 89.3% in the non-complication group ($p = 0.814$). The mean age was higher in the complication group (51.2 years, SD 16.1) compared to the non-complication group (48.6 years, SD 14.2). Underlying diseases were slightly more common in the complication group (39.0%) than in the non-complication group (32.8%), but the difference was not statistically significant ($p = 0.372$). Estimated blood loss > 100 ml was significantly higher in the complication group (27.3% vs. 9.9%, $p = 0.002$).

Table 1 Demographics and clinical characteristics

Factors	Complication n = 77 (%)	No complication n = 201 (%)	*P*-value
Female	70 (90.9)	117 (89.3)	0.814
Mean age, yrs. (SD)	51.2 (16.1)	48.6 (14.2)	
Age > 70 yrs.	12 (15.6)	7 (5.3)	0.023
Underlying disease	30 (39.0)	43 (32.8)	0.372
DM	14 (18.2)	9 (6.9)	0.020
HT	19 (24.7)	29 (22.1)	0.734
Subtotal/ Total thyroidectomy	57 (74.0)	24 (18.3)	< 0.001
Pathology (carcinoma)	40 (52.0)	37 (28.2)	0.001
Estimate blood loss > 100 ml.	21 (27.3)	13 (9.9)	0.002
Medians estimate blood loss, ml. (IQR)	50.0 (30.0, 150.0)	30.0 (20.0, 50.0)	NA
Duration of operation, min., mean (SD)	123.4 (65.3)	85.2 (30.6)	< 0.001
Weight of thyroid nodule > 200 gm.	5 (6.6)	7 (5.4)	0.064
Median weight of thyroid nodule (IQR)	37.8 (25.1, 82.0)	32.3 (18.1, 64.0)	NA
Duration of disease > 10 yrs.	4 (5.2)	1 (0.8)	0.064
Parathyroid identified	29 (37.7)	50 (38.2)	1.000
Identified LRN	57 (74.0)	89 (67.9)	0.433

SD = standard deviation, IQR = interquartile range, DM = Diabetic mellitus, HT = Hypertension, LRN = Recurrent Laryngeal Nerve

Table 2 Postoperative complications

Complications	n# (%)
Hematoma	1 (0.94)
Hoarseness	42 (39.63)
Vocal cord paralysis	1 (0.94)
Hypocalcemia	54 (50.94)
Others	8 (7.55)

n = Number of complications occurring (Total 106 events)

These studies indicated that patients over 70 years of age experience more surgical complications than younger patients (15.6% vs. 5.3%). Patients with underlying conditions, particularly diabetes, have higher complication rates compared to non-diabetic patients (18.2% vs. 6.9%). Surgical techniques involving extensive thyroid glands were associated with a higher likelihood of complications. However, surgery for large thyroids (thyroid tissue weight > 200 gm) did not show a significant difference in complication rates. Hermann's study found that thyroid tissue weight > 200 gm is a factor that can cause more complications,[11] so we take it to see the relationship in the Multivariable regression model again. Longer surgical duration and carcinoma diagnosis were linked to a higher risk of complications. In the complications group, the average surgical time was 123.4 minutes, compared to 85.2 minutes in the non-complication group. Patients with carcinoma had more complications than those without carcinoma (52% vs. 28%).

In contrast, factors such as disease duration, intraoperative blood loss, and identifying the parathyroid gland or the Recurrent Laryngeal Nerve did not significantly affect complication rates.

A total of 106 surgical complications were observed in 77 patients (27.7%). The most common complication in the study was hypocalcemia, occurring in 54 cases (19.4%). This was followed by hoarseness, found in 42 cases (15.1%). All complications were temporary and resolved after treatment. Other complications included chyle leakage (1 case), sepsis (1 case), pneumonia (3 cases), tracheal injury (1 case), hypopharyngeal injury (1 case), and lung atelectasis (1 case). There were no deaths among the patients who underwent surgery.

As reported in Table 3, factors associated with postoperative complications included unadjusted and adjusted relative risks (RRs) with 95% confidence intervals (CIs) and *p*-values for seven factors. The final model revealed that subtotal/total thyroidectomy had a strong and significant association with complications (adjusted RR: 4.15; 95% CI: 2.63–6.55; $p < 0.001$). Similarly, a disease duration exceeding 10 years was significantly associated with complications (adjusted RR: 1.46; 95% CI: 1.09–1.97; $p = 0.012$). Although estimated blood loss greater than 100 ml showed a trend toward significance (adjusted RR: 1.34; 95% CI: 0.98–1.83; $p = 0.066$), it did not reach statistical significance. Conversely, thyroid nodule weight exceeding 200 g was significantly associated with complications, although this association was not statistically significant in the univariate analysis. (adjusted RR: 2.11; 95% CI: 1.05–4.24; $p = 0.035$).

Table 3 Multivariable regression model of factors associated with postoperative complications

Factors	Unadjusted RR (95% CI)	Adjusted RR[#] (95% CI)	*P*-value
Age > 70 yrs.	1.84 (1.23, 2.73)	1.10 (0.81, 1.50)	0.525
DM	1.79 (1.22, 2.63)	1.23 (0.83, 1.82)	0.311
Subtotal/total thyroidectomy	4.47 (2.91, 6.85)	4.15 (2.63, 6.55)	< 0.001*
Pathology (carcinoma)	1.84 (1.30, 2.61)	1.09 (0.78, 1.51)	0.617
Duration of disease > 10 yrs.	2.22 (1.38, 3.58)	1.46 (1.09, 1.97)	0.012*
Estimate blood loss > 100 ml.	1.92 (1.36, 2.70)	1.34 (0.98, 1.83)	0.066
Weight of thyroid nodule > 200 gm.	0.88 (0.36, 2.19)	2.11 (1.05, 4.24)	0.035*

[#] Each RR and 95% CI is adjusted for all other covariates listed in the model, *Statistically significant $p < 0.05$

Discussion

Postoperative complications following thyroid surgery can include hypoparathyroidism, represented by hypocalcemia, RLN injury or palsy, and hematoma. The incidence of transient hypoparathyroidism has been reported to range from 0.3-49%, and that of permanent from 0-13%. In addition, the incidence of RLN palsy has been found to range from 0-5% and hematoma from 0-3%.[4]

Hypoparathyroidism is the most common complication after thyroidectomy. Patients often develop transient hypocalcemia due to ischemia of the parathyroid glands. Permanent hypoparathyroidism is rare and requires lifelong treatment with calcium and vitamin D.

The incidence of identification and non-identification of parathyroid glands during surgery showed no differences between groups. This result revealed that more extended surgery caused more ischemic changes to parathyroid glands, leading to hypoparathyroidism.[12,13] Therefore, identification of the parathyroid gland may not prevent the development of hypocalcemia after surgery. However, calcium supplements should be considered for patients at high risk of developing this condition.

Similar to hypoparathyroidism, injury to the RLN may occur by severance, ligation, or traction.[14] Intraoperative RLN monitoring techniques are being increasingly used during thyroid surgery. Both continuous monitoring using endotracheal tube electrodes and intermittent monitoring by periodic stimulation and laryngeal palpation are used. The incidence of RLN injury was 7.6% in cases where the nerve was not identified.[15] This study found that identifying RLN did not significantly affect the incidence of complications.

In 1991, Hermann et al.[11,16] published monocentric data of 7,566 patients, demonstrating that an increasing resected thyroid weight correlated significantly with postoperative vocal cord paralysis in patients after thyroidectomy. Resection of > 200 gm thyroid tissue resulted in a vocal cord palsy rate of more than 12%. In our series, the rate of transient RLN palsy, which causes hoarseness, is the second most common complication. However, no statistically significant difference was found between the groups that identified and did not identify the RLN during surgery.

Acute respiratory distress or failure due to hematoma formation is lethal unless the hematoma is immediately removed. Meticulous hemostasis is, therefore, mandatory in thyroid surgery.[17] In our series, 1.3% of the patients experienced postoperative hematoma. The incidences of this complication were also unrelated to the extent of surgery. Postoperative surveillance should be conducted for 24 hours, and assessment guidelines should be followed to prevent complications.

Other complications include chyle leakage or fistula (1 case). The most common cause of chyle fistula is thoracic duct injury, mainly on the left side (responsible for 75-92% of cases).[18] Most (75%) are detected during or after surgery.[19,20] Chyle fistula is indicated by milky drainage, a sudden increase in drainage volume, a bulging supraclavicular fossa, and induration or erythema of the skin.[20,21] Most patients respond to administering a high-protein and low-fat diet supplemented with medium-chain triglycerides, total parenteral nutrition, compression dressing on the supraclavicular fossa, and using somatostatin analogs.[22-24] Patients who do not respond require surgical intervention for direct closure of the fistula.[25,26]

Our study found that chyle fistula occurred postoperatively in large goiter surgery with extensive blood (800 mL), and patients can be treated with non-operative management.

Other postoperative complications, such as sepsis 1 case, pneumonia 3 cases, and lung atelectasis 1 case, are found in elderly patients (> 65 years) with pre-existing diseases (such as diabetes mellitus, hypertension, dyslipidemia, chronic kidney disease, etc.) All patients recovered, and there were no deaths.

In other cases, such as a trachea injury (1 case) and a hypopharynx injury (1 case). This is found in the surgery of large thyroid glands that are tightly attached to adjacent organs due to inflammation or previous neck surgery. All of them underwent surgical repairs and made a complete recovery.

The study's final results found that factors associated with complications from thyroid surgery include the extent of the surgery, patients with large thyroid glands (> 200 gm), and a disease duration of more than 10 years. The cause may be a large thyroid gland that has been present for a long time and is attached to nearby organs. This makes surgery difficult and increases the chance of parathyroid gland ischemia. The more extensive the surgery performed, the greater the chance of nerve and parathyroid gland injury or ischemia.

Due to the limitations of this research, which is a retrospective study. There may be selection bias and information bias. In addition, long-term follow-up has not been performed because some complications may appear several months after surgery, and each surgeon's skills may differ, affecting the complications.

Conclusion

The result of our study suggests that the extent of thyroid surgery (subtotal or total thyroidectomy) increased the risk of surgical complications, particularly hypoparathyroidism, represented by hypocalcemia and transient RLN palsy that causes hoarseness. In addition, thyroid surgery was found to have more complications in patients with large thyroid glands (> 200 gm) and a disease duration of more than 10 years. Therefore, special caution must be exercised in patients with these characteristics.

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Original Article

Management and Outcome of Fournier Gangrene in a Nigeria Hospital

Najeem Adedamola Idowu, MBBS[1]
Stephene Oluwatosin Ilori, MBBS[2]
Peter Olalekan Odeyemi, MBBS[1]
Stephen Ishola Adedokun, MBBS[1]

[1] *Division of Urology, Department of Surgery, Ladoke Akintola University of Technology Teaching Hospital Ogbomoso, Nigeria*
[2] *Department of Surgery, Plastic and Reconstructive Surgery Unit, Ladoke Akintola University of Technology Teaching Hospital Ogbomoso, Nigeria*

Abstract

Background: Fournier gangrene is a polymicrobial soft tissue infection of the genito-perineal region of the body. It is relatively rare but life-threatening.

Objective: This study aimed to discuss the management and outcome of Fournier gangrene.

Materials and Methods: The records of patients managed as cases of Fournier gangrene between 2020 and 2024 were retrieved from the hospital medical record department. The information collated from these files includes socio-demographic data, clinical features, modality, and treatment outcome. Descriptive analysis was done using SPSS version 23.

Results: Although 15 patients were admitted and managed as Fournier gangrene, only 13 patients had complete data and were analyzed. The age distribution was between 21-80 years, with a mean of 41.1 ± 15.7 SD. All the patients were male, and all of them presented in emergency with clinical features of sepsis identified in 3 patients. The wound culture of the remaining 7 patients (53.8%) could not be retrieved. The investigated subjects ' Fournier gangrene severity index (FGSI) score showed a range of 2-12 with a mean of 7.6 ± 3.1 SD. Concerning definitive wound care, six patients (46.2%) had spontaneous wound closure due to the relatively small size of the defect. Five patients (38.5%) had primary wound closure under spinal anesthesia. The remaining two patients with FGSI scores of 9 and 11 underwent reconstructive procedures: scrotal advancement flaps + gracilis muscle flap + split-thickness skin graft.

Conclusion: The average FGSI score was 7. There was no mortality. The most commonly involved part was the scrotum, while the rarest was the penis. Prompt response and adequate resuscitation are required for good outcomes, as observed in this study.

Keywords: Fournier gangrene, Management, Mortality

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Corresponding author: Najeem Dowu, MBBS, Urology Division, Department of Surgery, Ladoke Akintola University of Technology Teaching Hospital Ogbomoso, Nigeria; E-mail: idowunajeem0@gmail.com; Telephone: 08025974216

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Introduction

Fournier gangrene is a polymicrobial soft tissue infection of the genito-perineal region of the body. It is relatively rare but life-threatening.[1] It affects both genders and is commonly seen in adults. This disease process involves necrosis of the subcutaneous tissues and the fascia of the genito-perineal region. It may spread along the fascia plane of this region up to the superficial fascia of the anterior abdominal wall.[2] Although it is essentially caused by the synergistic effect of both aerobic and anaerobic bacterial infections, some risk factors have been implicated. These include uncontrolled diabetes mellitus, chronic hypertension, chronic alcohol intake, chronic steroid use, retroviral infection, cutaneous infection, and all curses of bladder outlet obstruction, among others.[3] The common causes of Fournier gangrene are perinea abscess and periurethral abscess. Patients with Fournier gangrene are often present in emergencies with sepsis and open genito-perineal wounds as focus. The diagnosis of Fournier gangrene is clinical. Diagnosis may be challenging in some cases, especially if it is seen early in the hospital. The severity of this disease and extent of tissue involvement is determined following complete blood count, electrolyte urea and creatine, urinalysis, urine culture and sensitivity, blood culture, wound swab culture, and fasting blood sugar, among others.[4] Ultrasound and computed tomography may support these investigations. Other specific investigations may also be needed depending on the suspected background etiology.[5] Fournier gangrene severity index score has been established as one of the predictors of morbidity and mortality of Fournier gangrene. A score of > 9 has been strongly correlated with high mortality.[6] It has a mortality rate of 20-30%.[7] The initial care of Fournier gangrene includes aggressive fluid resuscitation, administration of broad-spectrum antibiotics, and thorough wound evaluation. Definitive wound care may consist of healing by secondary intention, primary closure, or reconstructive procedures using either skin graft or muscle flaps. This is critical in the principle of management to achieve good outcomes. The outcome of patients with Fournier gangrene depends on rapid diagnosis and the promptness of this care. This study aimed to discuss the management and outcome of Fournier gangrene, and our objective was to determine the pattern of presentation, diagnosis, treatment, and outcome of this clinical condition.

Materials and Methods

This was a retrospective hospital-based study. This study was conducted in the Urology Division, Department of Surgery, Ladoke Akintola University of Technology Teaching Hospital Ogbomoso, Nigeria. The hospital is a tertiary health center located in the southwestern part of Nigeria. The record of patients that were managed as cases of Fournier gangrene as defined by necrotizing fasciitis of the perineum and or genitalia between 2020-2024 was retrieved from the hospital medical record department. The information collated from these files included socio-demographic data, the pattern of presentation, vital signs and status of the wound at presentation, and investigations done, which included complete blood count, electrolyte urea, and creatinine wound swab culture, among others. Other information gathered was initial care at presentation and definitive wound care, including the outcome of the patients. Fournier gangrene severity index score was estimated. Patients with incomplete data and those discharged against medical advice were excluded from the study. A descriptive analysis was done using SPSS version 23. The information was presented in a tabular form.

Results

Although 15 patients were admitted and managed as Fournier gangrene, only 13 patients had complete data and were analyzed. The age distribution was between 21-80 years, with a mean of 41.1 ±15.7 SD (Table 1). All the patients were male, and all of them presented in emergency with clinical features of sepsis. The wound evaluation at presentation showed an open scrotal wound (8 patients, 61.5%), perineal wound (3 patients, 23.1%), and scrotal wound plus perineal wound (2 patients, 15.4%). All the patients reported an antecedent history of scrotal itching and or perineal boil with subsequent development of an ulcer, which later progressed to a full-thickness open wound. Predisposing factors identified in 76.9% (10 patients) of the study group were diabetes mellitus (5 patients), perinea boil (3 patients), and urethral stricture (2 patients), while no factor was identified in 3 patients. Results of wound culture in 46.2% (6 patients) of the study group showed a mix of Escherichia coli + staph aureus in 3 patients while pseudomonas spp, klebsiella, and enterococcus were isolated in 3 patients. The wound culture of the remaining 7 patients (53.8%) could not be retrieved. The investigated subjects ' Fournier gangrene

severity index (FGSI) score showed a range of 2-12 with a mean of 7.6 ± 3.1 SD. The initial urgent care of all the patients included adequate fluid administration based on the level of dehydration and administration of broad-spectrum antibiotics, which were a combination of third-generation cephalosporin and metronidazole. All of them had successful urethral catheterization except the patients with urethral stricture who had suprapubic urinary diversion. These were continued following sensitivity results. The patients with an FGSI score of 12 had 3 pints of fresh whole blood on account of a park cell volume of 15%. All the patients had serial wound debridement, honey dressing, and sitz baths. Debridement was majorly by the bedside with the use of a surgical scalpel under the administration of pentazocin. This surgical debridement's frequency depended on the depth of the devitalized tissues. The lowest frequency of debridement was three times. Concerning definitive wound care, six patients (46.2%) had spontaneous wound closure due to the relatively small size of the defect. Five patients (38.5%) had primary wound closure under spinal anesthesia. The remaining two patients with FGSI scores of 9 and 11 underwent reconstructive procedures: scrotal advancement flaps + gracilis muscle flap + split-thickness skin graft. The basic data of these cases, including risk factors, site of involvement, FGSI scores, and type of wound care, are shown in Table 2 and the treatment algorithm used in our patients (Figure 1). The average duration of hospital stay was 10-21 days. There was no mortality. The outcome was satisfactory.

Table 1 Age distribution of the studied group

S/N	Age group	Frequency n = 13	Percentage (%)
1	20-29	2	15.3
2	30-39	4	30.7
3	40-49	4	30.7
4	50-59	1	7.6
5	60-69	1	7.6
6	70-79	0	0
7	80-89	1	7.6

Table 2 Shows the study patients' basic data, risk factors, sites, FGSI scores, and definitive wound care.

S/N	Sex	Risk Factor	Site	FGSI scores	Wound care	Hospital stays
1	Male	Diabetes mellitus	Scrotum	9	Secondary intention	3 weeks
2	Male	Diabetes mellitus	Perineum	9	Primary closure	4 weeks
3	Male	Diabetes mellitus	Scrotum	11	Tissue reconstruction	3 weeks
4	Male	Diabetes mellitus	Scrotum	4	Primary closure	3 weeks
5	Male	Diabetes mellitus	Scrotum	12	Primary closure	3 weeks
6	Male	Urethral stricture	Scrotum & Perineum	2	Secondary intention	5 weeks
7	Male	Perineal boil	Perineum	9	Primary closure	3 weeks
8	Male	Urethral stricture	Scrotum	6	Primary closure	6 weeks
9	Male	Perineal boil	Perineum	8	Secondary intention	4 weeks
10	Male	Perineal boil	Scrotum & Perineum	2	Secondary intention	5 weeks
11	Male	Idiopathic	Scrotum	8	Secondary intention	-
12	Male	Idiopathic	Scrotum	9	Tissue reconstruction	-
13	Male	Idiopathic	Scrotum	10	Secondary intention	-

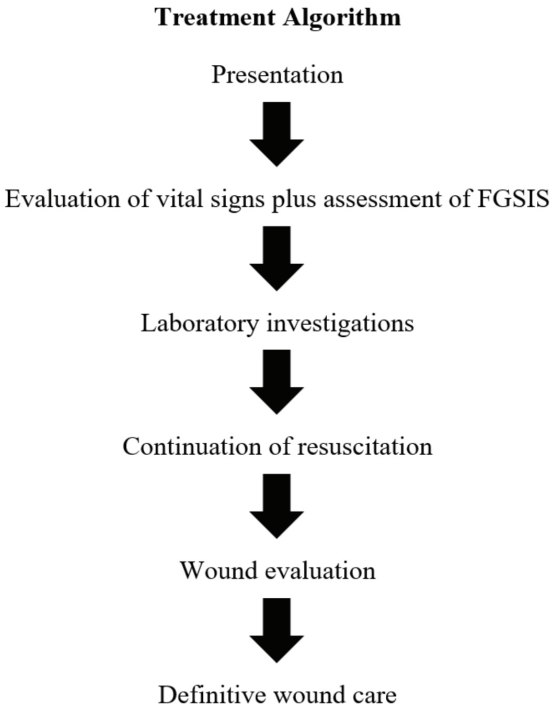

Figure 1 Flow of the treatment protocol

Discussion

This study illustrated our experience in successfully managing some cases of Fournier gangrene seen in our center. A review of only 13 instances managed throughout five years points to the rarity of this pathology. This has further supported the rarity of this clinical condition, as stated in the medical literature. The disease's global incidence has been estimated to be 1.6 in 100,000.[8] In a similar study conducted at Port-Harcourt and Zaria, 22 and 31 cases were seen, respectively, over the same period as ours.[9,10] The gender distribution observed in this study is not different from that observed in other similar series. Although all our patients were male, the disease can also occur in females. Although, this is a rarity. In a similar retrospective review of 27 cases by Mesut Garidal et al. in an article titled Predisposing Factors and Treatment Outcome in Fournier Gangrene.[11] All of them were male except one. The male-to-female ratio, as reported in the literature, is 10:1. The age distribution of patients discovered in this study was not dissimilar to the findings from previous studies on Fournier gangrene.

The majority of cases of Fournier gangrene are seen in an emergency with sepsis, thus life-threatening. Some studies have reported severe sepsis at presentations; however, in our cases, none of the patients was noted with severe sepsis. The reason for this observation may not be unconnected to early presentation, although the duration of symptoms was not determined in this study. We observed that the scrotum was the most common focus of this infection. This conforms with a previous similar study. The reason for this may be a result of the anatomical location of the scrotum and the possibility of repeated frictional wounds between the thigh and subsequent bacterial infection. Some other series have reported Fournier gangrene of the penis and anterior abdominal wall.

No predisposing factor was identified in some patients, which may explain why some pathogenesis has been termed idiopathic in literature. This review showed that the most common predisposing factor was diabetes mellitus.[3] Although the profile of the blood sugar variation and glycemic index were not determined, however poor glycemic control has been strongly correlated with the risk of development of Fournier gangrene. In fact, uncontrolled diabetes is the most common predisposing factor. Other predisposing factors reported in the literature are alcohol abuse, renal insufficiency, and spinal cord injury, among others.

The wound culture report of less than half of the study population was known. Others were missing in their case files. Polymicrobial infection was noted in half of them. This is a consonance with a similar series, although some have reported polymicrobial infections in the entire study group. This study may not adequately establish the distribution of isolated microorganisms due to the relatively small number of patients with complete wound culture; however, Escherichia coli + staph aureus was seen in most of the cultures done, which is in tandem with the existing literature. Other previous studies had established streptococcus as the most common isolate.[12]

One of the major predictors of the severity of this clinical condition, which is established in medical literature, is the Fournier gangrene severity index score. A score of > 9 is well correlated with mortality.[13] The majority of the study group had a score of < 9. This score indicated that most of the patients had good prognoses at presentation. The observation of a score of more than 9 in others reflects the life-threatening risk of this condition. Some of the similar series have alluded to this fact. In a study conducted by Cem Ozden et al.,[14] It was observed that pathology survivors had an FGSI score of 3, while non-survivors had an average score of 12.

All the patients did well and were discharged satisfactorily, as there was no mortality. This contrasts with several other studies that have reported some rate of mortality. A mortality rate of 20-88% has been reported globally, while 16.1% and 9.5% were reported in Zaria and Port-Harcourt, respectively.[8] Also, E-Villanueva et al. reported a mortality of 10 out of 28 cases in a retrospective series titled Experience in the Management of Fournier Gangrene.[15] This better outcome may be due to less severe disease at presentation, as evidenced by the lower average FGSI score and prompt aggressive management.

Wound healing by secondary intention was observed in the majority of the study subjects, while some of them underwent primary closure. This was due to the relatively small size of the defect. This is usually the situation in this clinical condition, as seen in the existing report. A large wound defect may necessitate some reconstructive procedures, such as the use of skin grafts and or muscle flaps. This was the situation with two of our patients. We preferred the gracilis muscle flap because it is pliable, versatile, and reflects the natural feeling of the scrotum, and the result was satisfactory.[16] It must, however, be stated that there is no general consensus on the best method of wound reconstruction in Fournier. Other adjuncts of wound care that have been stated in the literature are hyperbaric oxygen therapy and negative pressure wound therapy, among others. There was no need for any of these in our patients.

Conclusion

This study reviewed the management outcome of 13 cases of Fournier gangrene retrospectively. The average FGSI of patients was 7. There was zero mortality. The most commonly involved part was the scrotum, while the rarest was the penis. All the patients had serial wound debridement, honey dressing, and sitz baths. The outcome of this study further demonstrated the efficacy of honey as a good dressing agent.

Recommendation

Fournier gangrene is a urological emergency with reported high morbidity. Prompt and adequate resuscitation is critical in the management of Fournier gangrene to achieve a good outcome, as observed in this study.

Conflict of interest

All authors have declared no conflict of interest.

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Authorship Contribution

The list of authors' contributions, credits, and other information are as follows: *Najeem Adedamola Idowu* (conception and design of the work; data analysis, and interpretation of data for the work), *Stephene Oluwatosin Ilori* (drafting the work and revising it critically for important intellectual content; manuscript preparation; final approval of the version to be published; and agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved), *Peter Olalekan Odeyemi* (manuscript reviewing and editing; literature review, editing and critical appraisal for intellectual content and final approval of the version to be published), *Stephene Ishola Adedokun* (data acquisition and literature review).

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Case Report

A Rare Case of Tailgut Cyst Turning into Mucinous Adenocarcinoma: Case Report

Deepak Kumar, MS
Vivek Kumar, MS
Tiyasa Santra, MS

Department of General Surgery, University College of Medical Sciences & Guru Teg Bahadur Hospital, Delhi, India

Abstract A tailgut cyst is an embryological remnant of the posterior intestine and is usually benign in nature. Malignant transformation is very rarely seen. We report a case of a tailgut cyst transforming into a mucinous adenocarcinoma. An 18-year-old gentleman presented to our healthcare center with progressive pain and heaviness in the lower abdomen and lower back for 1 year. Contrast-enhanced computed tomography reveals a cystic mass in the presacral region. The patient underwent transabdominal excision of the cyst in toto, and histopathological evaluation revealed mucinous adenocarcinoma. The patient underwent adjuvant chemo-radiotherapy, and after one year, contrast-enhanced computed tomography revealed no residual or recurrence. Tailgut cysts carry the risk of fecal incontinence, fecal fistula, neurogenic bladder, and malignant transformation. Hence, complete excision followed by adjuvant treatment is advised. Excision can be done by transabdominal, posterior (Presacral/ Pre-coccygeal), or combined approach.

Keywords: Tailgut cyst, Malignant transformation, Mucinous adenocarcinoma of tailgut cyst

Introduction

Tailgut cysts are rarely seen entities.[1] They are remnants of the posterior intestinal duct embryologically.[2] They occur mainly in middle-aged, predominantly female individuals, and are usually detected incidentally.[3] Most of them are benign in nature; however, malignant transformation has been seen.[4] They are usually asymptomatic, and if symptomatic, then due to compression from a large mass, i.e., heaviness and pain in the lower abdomen and back, tenesmus, chronic constipation, infection, fecal fistulas, and obstructive urinary symptoms.[3]

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Corresponding author: Vivek Kumar, MS, Department of General Surgery, University College of Medical Sciences & Guru Teg Bahadur Hospital, Delhi, India; Email: vivekdharmasya@gmail.com

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Case report

An 18-year-old male with complaints of gradually progressive heaviness, pain in the lower abdomen and back, on-off constipation for one year, and recently worsening lower urinary tract obstructive symptoms. The patient had a history of congenital anal atresia with a diversion stoma followed by reconstruction done during infancy. On palpation, a non-tender, immobile, firm mass of size 10 × 10 with a smooth surface was present in the hypogastrium. Digital rectal examination reveals a cystic mass along the posterior wall of the rectum, causing luminal narrowing. Contrast-enhanced computed tomography of the abdomen revealed a 14 × 9 × 8 cm presacral homogenous cystic mass, compressing the left ureter, causing proximal hydroureter and multiple hemivertebrae (Figures 1 and 2), and no other lymph node was enlarged. Left-side DJ stenting was done preoperatively to decompress the left kidney ureter system. Intraoperatively (Figure 3), the cystic mass of size 14 × 9 × 9 cm (Figure 4) with serosanguinous fluid was present in the presacral region with positional compression on the rectum and left ureter, and no communication with the rectum, ureter, and rest of the viscera. Subsequently, the patient underwent complete surgical excision of the cystic mass in toto. Histopathology shows some "signet ring" cells with high mitotic activity and atypical hyperplasia infiltrating columnar epithelium in glandular or cribriform pattern in lakes of mucin, suggestive of Tail gut cyst with mucinous adenocarcinoma transformation (Figure 5). The patient received adjuvant chemo-radiotherapy. Follow-up contrast-enhanced abdomen computed tomography after 1 year shows no residual disease.

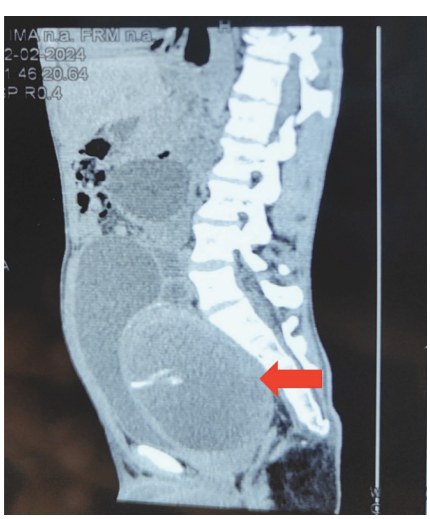

Figure 1 The sagittal section shows a large homogenous cystic mass in the presacral region (Arrow)

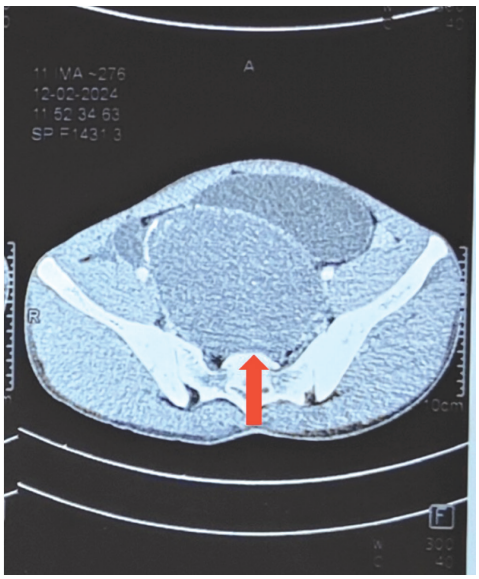

Figure 2 Axial section showing presacral cystic mass (Arrow)

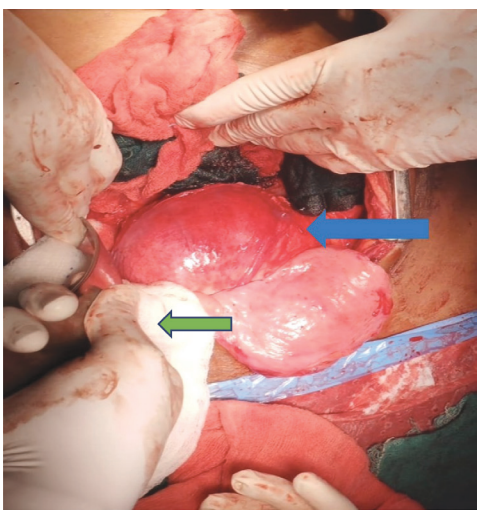

Figure 3 Intra-op showing presacral cystic mass (blue arrow= cystic mass, green arrow=rectum)

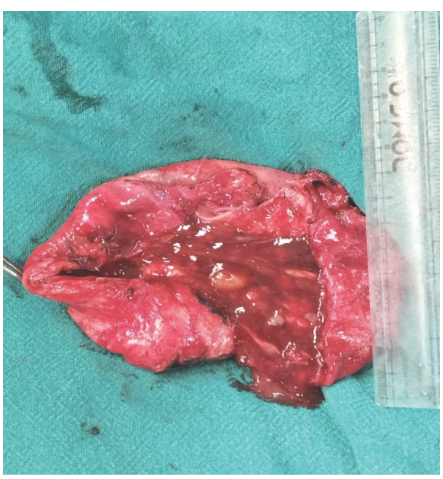

Figure 4 Cystic mass of size 14 × 9 × 8 cm with serosanguinous fluid in it

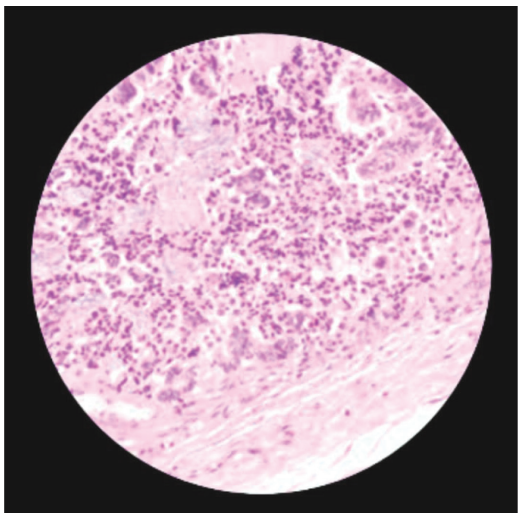

Figure 5 Histopathological evaluation showing feature of tailgut cyst with mucinous adenocarcinoma

Discussion

We present a rare case of mucinous adenocarcinoma developing from a tailgut cyst. Approximately more than 28 cases of Tailgut cyst adenocarcinoma have been reported. Tailgut cysts are congenital pathologies that develop from the remnant of the posterior intestinal duct in the presacral space. They are usually thin-walled cysts that can be single or multiloculated in nature and contain all three germinal layer tissues. They may be asymptomatic or present with non-specific symptoms due to compression by a large mass.[2] It can cause several complications, i.e., fecal incontinence, internal fecal fistula, bowel obstruction, neurogenic bladder, or malignant transformation.[5,6] Most Tailgut cysts are benign, but malignant transformation has been reported, the most common being the adenocarcinomas, and others include neuroendocrine, endometrioid, adenosquamous, and squamous cell carcinomas.[7] On Magnetic resonance imaging (MRI), Cystic tumors with smooth, well-defined boundaries and no infiltrative or gadolinium enhancement are generally considered benign. In contrast, cysts with thickened and irregularly enhancing cyst wall boundaries, which inflammatory changes may even surround, are usually malignant.[8] Core needle biopsy or FNAC is not recommended in resectable tumors due to the risk of the possibility of tumor seeding.[9] When imaging shows malignant features, serum carcinoembryonic antigen (CEA) acts as a surrogate tumor marker, and its level decreases post-treatment and helps identify recurrence. The treatment of choice is complete R0 resection due to the risk of malignant transformation. The surgical approach depends on tumor location, which includes a posterior approach for tumors extending below S4, and for tumors above S4, the abdominal or abdominal-perineal approach is advisable.[9] When tailgut cysts show a feature of malignancy, treatment should include adjuvant radiation and chemotherapy.[4,10-12] Capecitabine and oxaliplatin (CapeOX) chemotherapy has been used in previous case reports.[8] Strict patient follow-up is advised by radiological investigation, including (Magnetic resonance imaging, contrast-enhanced computed tomography) and serum CEA levels, which help detect recurrence.[12] Compared with neuroendocrine tumors, adenocarcinomas arising from TCs have a poorer prognosis and carry a risk of local recurrence and metastasis.[13]

Conclusion

Tailgut cysts are usually asymptomatic and present with non-specific symptoms or are detected incidentally. They are usually benign in nature, but malignant transformation (the most common being Adenocarcinoma) has been seen. Tailgut cyst malignancy diagnosis is preoperatively done by radiological investigation, especially by Magnetic resonance imaging (MRI) and high serum carcinoembryonic antigen (CEA). The malignancy nature is identified by histopathology. Complete excision in toto is recommended, followed by adjuvant treatment. Follow-up is necessary to detect recurrence or residual using radiological investigation and tumor markers.

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Case Report

Diagnosis and Management of Isolated Tracheoesophageal Fistula: A Case Report

Sasabong Tiyaamornwong, MD[1]
Jirameth Yiambunya, MD[1]
Kaimook Boonsanit, MD[2]
Kulpreeya Sirichamratsakul, MD[1]
Surasak Sangkhathat, MD[1,3]

[1] *Department of Surgery, Faculty of Medicine, Prince of Songkla University, Hat Yai, Songkhla, Thailand*
[2] *Department of Surgery, Vachira Phuket Hospital, Phuket, Thailand*
[3] *Translational Medicine Research Center, Faculty of Medicine, Prince of Songkla University, Hat Yai, Songkhla, Thailand*

Abstract Isolated tracheoesophageal fistula (TEF) or H-type TEF is a rare congenital malformation of the esophagus in which a fistula between the lower trachea and the membranous part of the esophagus may lead to choking precipitated by feeding. Because of its rareness, diagnosis and surgical management of this anomaly can be challenging. A 2-month-old male infant presented with frequent cough and occasional choking during breastfeeding, beginning from his 3 days of life. At 2 weeks of age, the infant developed tachypnea and fever and was diagnosed with aspiration pneumonitis. His symptoms improved after feeding via an NG tube. An esophagogram at the local hospital suspected a tracheoesophageal fistula with a faint shadow of the fistulous tract, 2 centimeters above the clavicular level. With a high index of suspicion, the child was scheduled for a rigid tracheo-bronchoscopy. After the fistula, located 2 centimeters above the carina, was identified and catheterized, a transcervical division of the fistula was performed. The child had an uneventful postoperative course and could catch up with standard growth within six months of follow-up.

Keywords: Tracheoesophageal fistula, Esophageal malformation, H-type

Introduction

Tracheoesophageal fistula (TEF) is a rare congenital anomaly characterized by abnormal communication between the trachea and the esophagus. It occurs in approximately 1 in 2,500 to 4,500 live births.[1-3] The most common type of TEF is esophageal atresia, with a distal tracheoesophageal fistula accounting for around 85% of cases.[4] Isolated tracheoesophageal fistula, without esophageal atresia, is a much rarer entity, representing less than 5% of all tracheoesophageal malformations.[5,6] Vogt's classification of tracheoesophageal fistula (1929) classified this type as Type 4, later re-classified in the Gross schema (1953) as Type E. However, considering its anatomical feature, it is known as H-type or N-type TEF.[6]

H-type TEF typically presents respiratory symptoms such as coughing, choking, or cyanosis during feeding. These symptoms are often subtle and can be mistaken for other respiratory conditions, leading to delays in diagnosis.[7] Diagnosing H-type TEF can be challenging

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Corresponding author: Surasak Sangkhathat, MD, PhD, Department of Surgery, Faculty of Medicine, Prince of Songkla University, Hat Yai, Songkhla, Thailand 90110; E-mail: surasak.sa@psu.ac.th

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and often requires a combination of imaging studies and endoscopic procedures.

In this case report, we present a 2-month-old infant with an isolated tracheoesophageal fistula who presented with an intermittent cough during feeding. We discuss this rare condition's diagnostic challenges, surgical management, and postoperative outcomes. This case highlights the importance of considering H-type TEF in the differential diagnosis of infants with respiratory symptoms, particularly those associated with feeding.

Case Presentation

A 2-month-old boy presented with a history of intermittent coughing and vomiting during feeding, beginning at 3 days of age. His gestational age was 38 weeks. He occasionally experienced cyanosis during coughing episodes but did not have abdominal distension or dysphagia. At 2 weeks of age, he developed dyspnea following a coughing episode, and the severity of his cough progressively worsened. He was initially taken to a primary-care hospital, where he was diagnosed with aspiration pneumonitis and treated with intravenous antibiotics. Due to suspicion of a tracheoesophageal fistula (TEF), an esophagogram was performed, which revealed the presence of contrast material in the trachea and bilateral bronchial trees during swallowing, suggestive of a possible thin TEF tract fistula at the lower cervical level above the thoracic inlet (Figure 1). The patient was treated with intravenous antibiotics for aspiration pneumonia at the primary-care hospital for 2 weeks, then was referred to our hospital at 2 months of age for further evaluation and management.

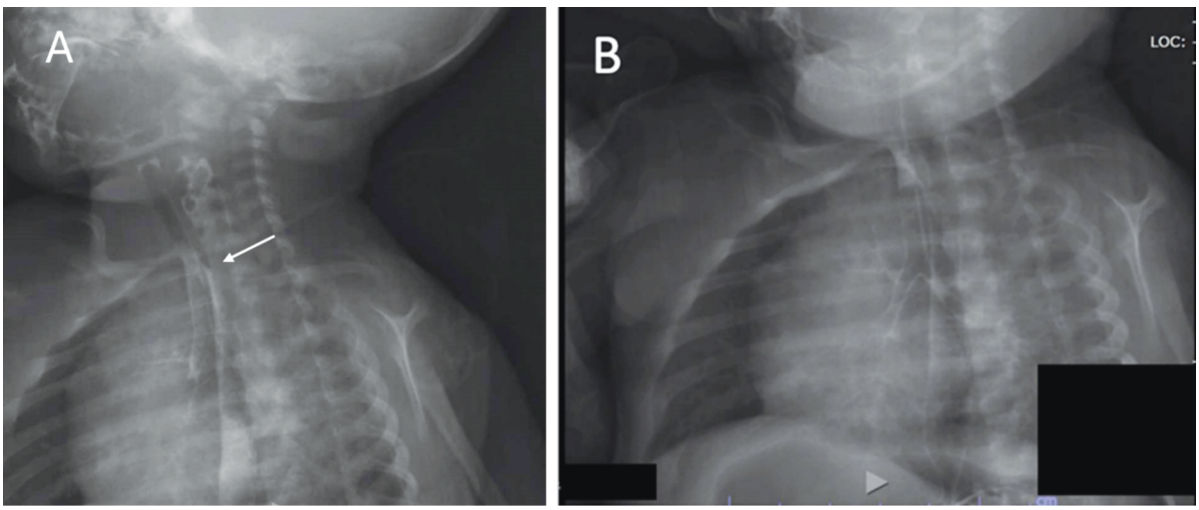

Figure 1 Water-soluble contrast esophagograms showing A) the presence of contrast in the trachea and B) the bronchi. The suspected fistula was at the lower cervical level, above the thoracic inlet (white arrow).

On admission to our hospital, the patient was in stable condition, afebrile, and without dyspnea. He was maintained on nasogastric (NG) tube feeding to prevent aspiration pneumonia. His body weight was 4.4 kg (< 3rd percentile for Thai children), and his height was 54.5 cm (< 3rd percentile for Thai children). A review of the previous esophagogram revealed inconclusive findings, and a repeat esophagogram was not performed to minimize the risk of aspiration. A rigid tracheo-bronchoscopy was scheduled in the operating room with a standby for surgical intervention if a TEF was identified. The tracheo-bronchoscopy was performed by the ENT team and revealed a tracheoesophageal fistula located 2 centimeters above the carina, near the cervical esophagus. A guidewire was inserted through the fistula from the trachea (Figure 2) to facilitate intraoperative identification. After the fistula was identified and catheterized, an esophagoscopy was performed by the Pediatric surgical team to confirm the tip of the wire.

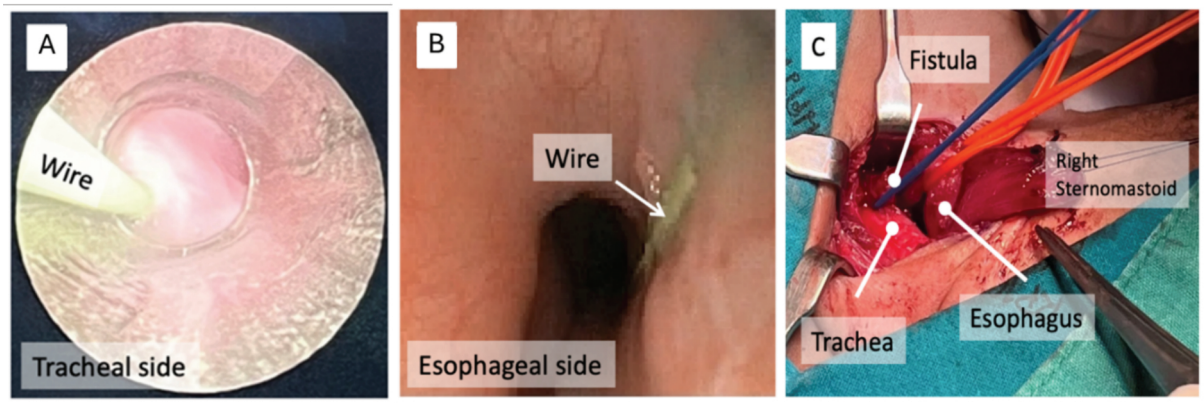

Figure 2 Endoscopic and operative findings in this patient. A) The wire was passed via a rigid tracheo-bronchoscopy. B) An esophagoscopy showed a wire within the esophageal lumen C) A craniocaudal view of the operative field, showing the fistula identified by palpating the wire.

The NG tube was inserted, and the right cervical approach was utilized for the surgical division of the TEF. The esophagus and trachea were identified (Figure 2) and carefully dissected to locate the fistula. The TEF was successfully divided, and the tracheal side was closed with a vertical polypropylene suture line. The esophageal side was closed with a transverse suture line using absorbable polyglactin sutures (Figure 3). An interposition muscle graft from the sternocleidomastoid muscle was placed between the esophagus and trachea to minimize the risk of recurrence.

The patient's postoperative course was uneventful. He has had an indwelling NG tube for 7 days, and the feeding via the NG tube was started one day postoperatively, and oral feeding was initiated on postoperative day 8. He was extubated on postoperative day 3 and discharged home on postoperative day 10. Searching for associated anomalies by urinary tract ultrasonography reported negative results. At the follow-up visit, his body weight had increased to 6 kilograms one month after surgery (a gain of 1.6 kg) and 9 kilograms six months after surgery (a gain of 4.6 kg). He also tolerated oral feeding without difficulty.

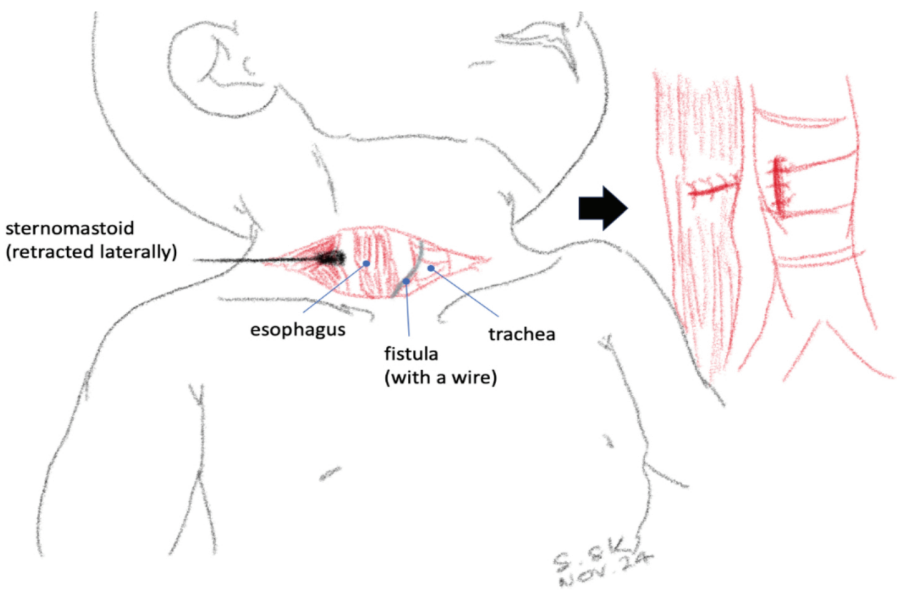

Figure 3 Drawing pictures explaining the surgical anatomy of this patient. Through a transverse incision on the right neck above the clavicle, the esophagus was identified by retracting the right sternomastoid to the lateral side. The fistula could be identified by palpating the wire passed from the trachea to the esophagus. Note that the suture lines on the trachea and the esophagus were not in the exact alignment, which reduced the chance of recurrence.

Discussion

An isolated tracheoesophageal fistula typically presents with cough or choking with oral feeding, especially with liquid meal. Aspiration pneumonitis can result from the bronchial aspiration of the food content. Although our patients presented with those classic symptoms of tracheoesophageal fistula, other differential diagnoses of infant aspiration, including gastroesophageal reflux disease (GERD), oropharyngeal incoordination, esophageal web, and foreign body obstructing the esophagus should be ruled out. Isolated TEF can present in late childhood or even in an adult with recurrent pneumonia.[8,9]

When congenital tracheoesophageal fistula was suspected, the video-fluoroscopic esophagogram was a modest initial radiologic investigation to simultaneously study esophageal anatomy and physiology. Fortunately, the study demonstrated a fistula between the trachea and the esophagus, just above the clavicle. It should be emphasized that the contrast used in the study should be low osmolar water-soluble contrast to prevent a risk of lung injury caused by aspiration during the study.[10,11] Before the surgical management, searching for associated congenital anomalies, such as those in the cardiovascular, genitourinary, vertebral, and gastrointestinal systems, was part of the evaluation for the VACTERL association.[12,13]

Identification of the fistula is crucial to operative planning, as a low-lying fistula below the thoracic inlet requires a thoracotomy. Although a contrast swallowing esophagogram gave a sensitivity of TEF detection up to 63-87% in some studies, there was a report of a fistula missing in more than 50% of a series.[7,14] In cases where the TEF cannot be demonstrated on contrast esophagography, multiple repetitions of the study or the use of special techniques that may enhance the reflux of contrast into the fistula, such as pulling back tube esophagogram or distal balloon technique, were reported.[15] Moreover, the infant's position is important; they should be placed in the prone Trendelenburg position to increase diagnostic sensitivity.[13] With an awareness of the limitations of the radiologic study, direct visualization of the fistula by an endoscopy study is recommended. An esophagoscopy alone has even lower sensitivity in fistula detection because the opening in the esophageal side is usually small, subtle in the mucosa, and caudal to the tracheal side (Figure 2). A combination of rigid tracheo-bronchoscopy and esophagoscopy is the current gold standard in fistula identification.[7] Rigid tracheo-bronchoscopy is the most suitable equipment for identifying TEF and passing a guide wire through the fistula. In our case, an esophagogram revealed the presence of contrast material in the trachea and bilateral bronchial trees during swallowing, suggesting a possible thin TEF tract at the lower cervical level above the thoracic inlet. However, it could not definitively diagnose TEF, so a double endoscopy technique was used to confirm the diagnosis and pass a guidewire through the fistula. This helped determine the surgical approach and localization of the fistulous tract during surgical exploration. An alternative technique to double endoscopy is the use of real-time fluoroscopy to detect the wire passed through the tracheal side to the course of the esophagus and stomach.[13] Although the investigation suggested that the pathology is above the thoracic inlet, backup preparation for a thoracotomy is advisable.

We chose a transverse incision on the right clavicular fossa parallel to the clavicle for cosmetic purposes. The esophagus was approached by retracting the right sternomastoid laterally. Care should be taken not to injure the vagus nerve and the recurrent laryngeal nerve. Choices of fistula occlusion are division, clipping, or ligation. However, a nationwide survey from Italy reported that clipping or ligation was associated with a higher recurrence rate.[7] It could be emphasized that the suture lines on the trachea and the esophagus should not be in the same direction to reduce anastomotic kissing that might cause recurrence. An intercalation with a muscle flap is a good technique to reduce this complication. As a low-pressure contrast study has limited sensitivity, most surgeons do not perform a routine esophagogram during the postoperative period.[7] Potential postoperative complications include stridor and hoarseness caused by neurapraxia of the recurrent laryngeal nerve, which is usually transient. However, some institutes recommended a routine laryngoscopy after surgery.[7] In our case, the patient had no postoperative complications and could drink milk, so a routine postoperative esophagogram was not performed.

In conclusion, we presented a case of isolated TEF successfully corrected with surgery. Although the esophagogram was not very clear, a high index of suspicion led to an endoscopy and localization of the lesion. The fistula was successfully managed using the cervical approach division.

Ethical Approval

In this case, the Human Research Ethics Committee of the Faculty of Medicine, Prince of Songkla University, has approved the report and use of clinical materials.

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Case Report

Neuroendocrine Tumor, A Rare Cause of Adult Intussusception: A Case Report

Olushola Kayode Fasiku, FWACS[1]
Ramat Olayinka Faro-Tella, FMCpath[2]
Kafayat A Ajibade-Oduyebo, MBBS[3]
Sakiru Adeyemi Waheed, FWACS[3]

[1]*Department of Surgery, University of Ilorin Teaching Hospital, Ilorin, Nigeria*
[2]*Department of Anatomic Pathology, Federal Medical Centre, Abeokuta, Nigeria*
[3]*Department of Surgery, Federal Medical Centre, Abeokuta, Nigeria*

Abstract Adult intussusception is a rare condition occurring only in about 5% of adults. When it occurs, it usually involves a pathological lead point, which may be benign or malignant. The malignant conditions are commoner, with adenocarcinoma taking the lead. Preoperative diagnosis is usually challenging due to the absence of the classical signs, among which is the passage of red-currant jelly stool that is present in children. We present a 49-year-old man with ileocolic intussusception as a result of a neuroendocrine tumor.

Keywords: Neuroendocrine tumor, Adult intussusception

Introduction

Relative to the pediatric age group, where intussusception is only second to acute appendicitis as a cause of acute abdomen,[1] its occurrence in adults is rare, and the diagnosis is also challenging.[2,3] Adult intussusception makes up about 5% of all cases of intussusception and about 1% of the causes of bowel obstruction.[4] The etiology of intussusception in adults may involve pathologic lead points, and these are mainly from tumors that may be malignant or benign. They may include carcinomas, Meckel's or colonic diverticuli, and sometimes polyps.[5,6] Intussusception may lead to intestinal obstruction, bowel ischemia, perforation, and sometimes peritonitis. In children, however, the majority of the cases of intussusception have no specific cause.[7] The clinical and radiological diagnoses are also challenging pre-operatively in the adult because the classic triad of abdominal pain, bleeding per rectum, and a palpable abdominal mass are rarely seen. Despite the availability of imaging techniques, there are still missed diagnoses.[8,9] Affordability and accessibility are equally contending issues. Surgery is traditionally considered the primary treatment option, and this can be through open or laparoscopic procedures where the facilities are available.[10,11] Surgical exploration is needed to ascertain the cause and to exclude an underlying tumor. However, there is no consensus about indications for intra-operative reduction and the extent of intestinal resection.[12,13]

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Corresponding author: Olushola Kayode Fasiku, FWACS, Department of Surgery, University of Ilorin Teaching Hospital, P.M.B 1459, Ilorin, Nigeria; E-mail: solafasikuu@yahoo.com; Telephone: +234-803720-6572

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We present a case of adult intussusception (AI) with a pathologic lead point that was histologically confirmed as a neuroendocrine tumor.

Case Report

A 49-year-old male presented with a four-day history of colicky abdominal pain located at the right lower abdomen and radiating toward the back. There is usually an associated mass noticed by the patient at the peak of the abdominal pain, with some relief when the mass reduces spontaneously. He had episodes of vomiting that contained recently ingested meals. There was no abdominal distension and no passage of bloody or mucoid stool. He has had several episodes of similar pain in the past that were relieved with the use of analgesics and intravenous fluids, and sometimes, the pain resolved spontaneously. No co-morbidities and no family history of similar condition.

On examination, he was conscious and alert, in painful distress, not pale, and afebrile (T-36.9°C), but had tachycardia with a pulse rate of 104 per minute. The abdomen was full and moved with respiration. There was tenderness and rebound tenderness with guarding at the right iliac fossa and a vaguely palpable mass found at the right iliac fossa. Digital rectal examination was unremarkable. He had leucocytosis with a white cell count of 13,000/mm^3, and the serum electrolytes were essentially normal. Abdominopelvic ultrasonography was suggestive of ileocolic intussusception with the presence of the target sign. He had an emergency laparotomy. Intraoperatively, an ileocolic intussusception, which was difficult to reduce, was found (Figure 1A). However, further attempts achieved a reduction, which revealed a palpable pale mass about 1 × 1 cm, about 6 cm from the ileocaecal junction (Figure 1B). He had a right hemicolectomy with end-to-end ileocolic anastomosis. Postoperative recovery was uneventful, and he was discharged on postoperative day 7.

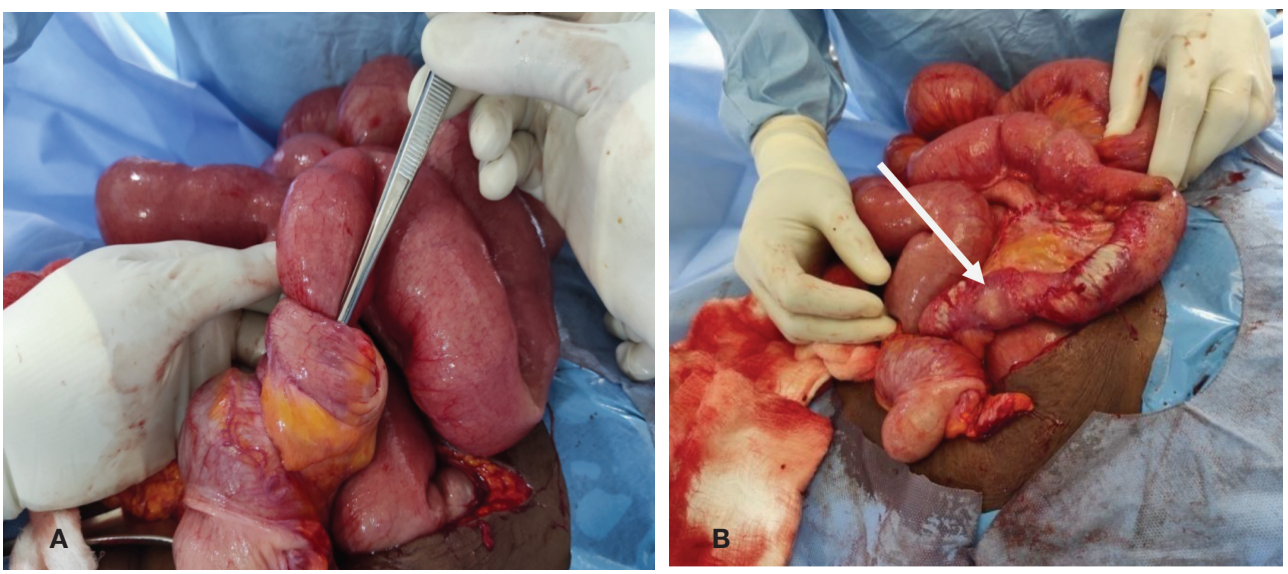

Figure 1 (A) Ileum looping into the caecum and ascending colon.
(B) Shows a mass at the terminal ileum, about 6 cm from the ileocaecal junction.

The histopathologic diagnosis was well-differentiated neuroendocrine carcinoma, as several sections from the ileal mass showed extensive ulceration of the lining of the epithelium by malignant neuroendocrine cells. It was infiltrated by sheets and nests of small round cells with scanty cytoplasm, hyperchromatic nuclei with stippled chromatin patterns, and indistinct nucleoli. Atypical mitotic figures and apoptotic bodies were noted. Tumour cells were seen invading the subserosa, and there are many areas of lymphovascular invasion. The resection margins were free. (Figures 2A and 2B). Immunohistochemistry was positive for chromogranin A (Figure 3).

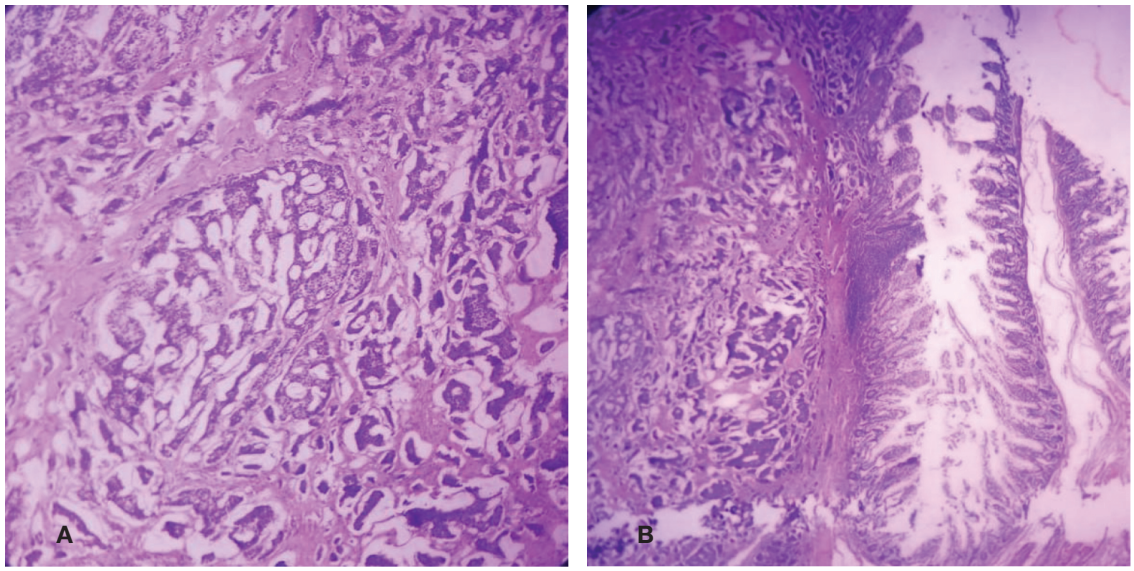

Figure 2 (A) Photomicrograph shows a nest of tumor cells infiltrating through the submucosa to the subserosa. Haematoxylin and Eosin (H&E) stain × 40
(B) Photomicrograph shows the muscular propia and subserosa invasion by tumor cells with stippled chromatin nuclei pattern. Haematoxylin and Eosin (H&E) stain × 400

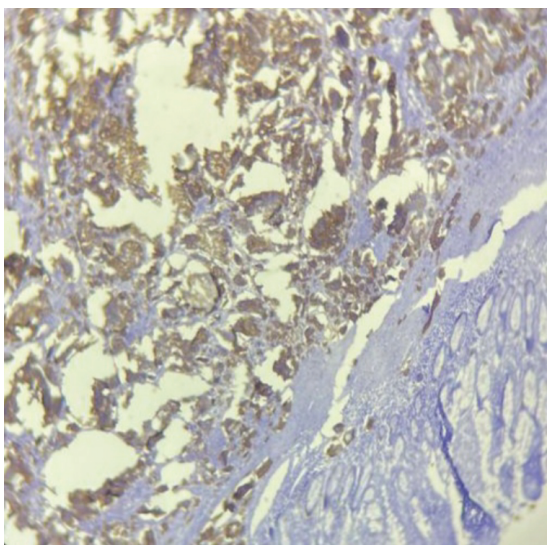

Figure 3 Chromogranin A (CgA) positive tumor cells invading the submucosa × 100

The patient has been on regular follow-up without any complaints.

Discussion

The telescoping of a segment of the bowel into an adjacent one is described as intussusception.[14] A large percentage of adult intussusception occurs in the small and large bowel, while about 10% occur in the stomach or a surgically created stoma.[15] Compared to children, intussusception presents with the classical triad of intermittent abdominal pain, vomiting, and red currant jelly stool, which are not pathognomonic to adult intussusception. Adults may present with non-specific symptoms, which may be acute or chronic, and sometimes with features suggestive of intermittent bowel obstruction.[16] As seen in our patient, the most common symptom is abdominal pain, which may be intermittent vomiting with or without associated nausea.[17] These symptoms may linger from days to years, buttressing the challenge of preoperative diagnosis of adult intussusception.[18]

Radiological investigations play a pivotal role in the preoperative assessment of patients. Abdominal ultrasound may reveal classical images such as target sign or pseudo-kidney sign that may be highly suggestive of intestinal invagination.[18] Computed tomography (CT) scan of the abdomen has also proven helpful in diagnosing intussusception, as it may show a central intussusceptum and an outer intussuscipiens with satisfactory accuracy. However, it has limited value in distinguishing a benign from a malignant or idiopathic lead point.[19] Many studies have reported that more than half of them are malignant. The most common being adenocarcinoma, carcinoid tumors, and leiomyosarcoma.[14,20]

The clinical diagnosis is usually confirmed at surgery, which may be done as open laparotomy or laparoscopy. Laparoscopic surgery for adult intussusception is feasible, safe, and preferred in experienced hands.[21] The choice of either laparoscopic or open technique should, therefore, be based on the clinical status of the patient as well as the surgeon's ability to perform the procedure safely and effectively.

The patient in this report had open laparotomy and reduction of the intussuscipiens followed by resection of the bowel with a rare form of lead point. There is no consensus about what should be done at surgery: en bloc resection against initial reduction followed by a more limited resection.[12,13] Reduction at surgery is thought to help avoid unnecessary bowel resection. Although theoretically, it may increase the risk of potential intra-luminal seeding or venous tumor embolization.[22]

The outcome of surgery in adult intussusception is generally good. However, the long-term prognosis depends on whether the underlying causative pathology is malignant or benign.[23]

Conclusion

Adult intussusception as a result of neuroendocrine tumors is not a common occurrence in day-to-day clinical practice, and the non-specific symptoms it presents with further make the diagnosis difficult. Although computed tomographic scan is the investigation of choice in diagnosing AI, which is not easy to access, abdominal ultrasonography is of benefit. Surgical resection and histological diagnosis are still the preferred and definitive treatment choice.

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