Al-Azhar International Medical Journal

Volume 4 | Issue 12 Article 57

2023
Section: General Surgery

MANAGEMENT OF LEAK AFTER GASTROINTESTINAL SURGERIES

Alaa Amer Mohamed El-sayed
MSc General surgery, Faculty of medicine, Al-Azhar University, Cairo. Egypt, dralaaamer00@gmail.com

Mohamed Sobhy Teama
Dr. of General surgery, Faculty of medicine, Al-Azhar University, Cairo. Egypt

Abdulhafz Abdulaziz Abddulhafz
Lecturer of General surgery, Faculty of medicine, Al-Azhar University, Cairo. Egypt

How to Cite This Article

El-sayed, Alaa Amer Mohamed; Teama, Mohamed Sobhy; and Abddulhafz, Abdulhafz Abdulaziz (2023) "MANAGEMENT OF LEAK AFTER GASTROINTESTINAL SURGERIES," *Al-Azhar International Medical Journal*: Vol. 4: Iss. 12, Article 57.
DOI: https://doi.org/10.58675/2682-339X.2151

ORIGINAL ARTICLE

Management of Leak After Gastrointestinal Surgeries

Alaa Amer Mohamed El-sayed*, Mohamed Sobhy Teama, Abdulhafz Abdulaziz Abddulhafz

General Surgery, Faculty of Medicine, Al-Azhar University, Cairo, Egypt

Abstract

Background: **A rate of 4−8% of gastrointestinal surgical complications include fistula and anastomotic leakage (AL) of the upper gastrointestinal tract. When done for cancer, postoperative leaks following esophagectomy and gastroplasty occur in around 7−8% of patients.**

Aim: **The main aim of this study is to reach the ideal management for each leak according to site of the anastomosis. The goal of this update is to present the general principles of diagnosis, and treatment of AL in gastrointestinal surgery, with a specific focus on esophagogastric, bariatric, small bowel and colorectal surgery.**

Patient and method: **This research was carried out on 100 patients suffering from postoperative anastomotic leak. Patients were managed in Al-Azhar University Hospitals.**

Results: **A total of 53 (53 %) patients in the study group had drainage amounts more than 500 c. There were 18 (18 %) research participants with postoperative renal failure. 35 (35 %) of the study population's patients had postoperative oliguria. There were 82 (82 %) study participants with postoperative leukocytosis. 18 individuals, or 18 % of the study group, passed away. In the study population, hospital stays varied from 18 to 33 days, with a mean ± SD of 24.7 ± 2.96.**

Conclusion: **Males had higher risk of developing AL. Postoperative leukocytosis and fever are of concern in AL. The occurrence of postoperative anastomotic leak, which is connected to poor patient outcomes and higher mortality, is influenced by both patient and surgical variables.**

Keywords: Gastrointestinal surgeries, Leak, Management

1. Introduction

A rate of 4−8% of gastrointestinal surgical complications include fistula and anastomotic leakage (AL) of the upper gastrointestinal tract.[1]

When done for cancer, postoperative leaks following esophagectomy and gastroplasty occur in around 7%−8% of patients [Hernández J, Boza C. 2016].

Despite the ongoing advancements in diagnostic techniques and surgical therapies, they may be a significant cause of mortality and morbidity.[2]

With the development of interventional endoscopy over the last 10 years, a number of minimally invasive techniques, including the injection of fibrin glue, the use of endoclips, endoscopic vacuum sponge treatment, and stent implantation, have been suggested to get a nonsurgical repair of anastomotic leaks.[3]

AL often develops early and may have both immediate and long-term effects. Due to septic or hemorrhagic consequences, AL, especially proximal AL with high enzymatic activity, may be fatal in the near term. After gastrointestinal resections, AL is the leading cause of death, with a mortality rate that varies from 18 to 60 %.[4]

Anastomostic stricture is the main long-term effect of AL, and it has functional effects on patient quality of life. Last but not least, the beginning of AL is a predictor of worse long-term overall survival.[5]

The clinical manifestations of AL might range from total symptom absence to life-threatening septic shock. The greatest chance to lessen the

Accepted 23 July 2023.
Available online 12 April 2024

* Corresponding author at: Kasha, Mashtol El-Souk, Sharqia Governorate, Egypt.
E-mail address: dralaaamer00@gmail.com (A.A. Mohamed El-sayed).

https://doi.org/10.58675/2682-339X.2151

clinical severity and effects is to diagnose an illness as soon as possible, even if the symptoms are mild. The patient is often asymptomatic when AL is treated well, and the diagnosis is diagnosed mostly as a result of the unusual problem of digestive fluid clogging the drains. According to the location of the anastomosis, the patient often exhibits systemic symptoms and concomitant thoracic or abdominal symptoms if the AL is poorly drained.[6]

Medical, interventional radiological, endoscopic, or surgical forms of treatment are all possible. The patient's septic condition is the primary factor in the treatment decision. When a patient is asymptomatic, only medical care is provided. In the event that AL is symptomatic but not life-threatening, interventional treatment is considered. Emergency surgery is necessary when AL poses a life-threatening condition, along with intensive care. Although prevention is crucial, AL effects are reduced more quickly and with higher-quality care.[7]

2. Patient and method

The study was carried out on 100 patients suffering from postoperative anastomotic leak. Patients were managed in Al-Azhar University Hospitals for the period from October 2017 to June 2023. The study was controlled prospectively. All patients were consented to participate in the study. A thorough informed consent form and the most recent patient information booklet should be signed by prospectively recruited patients, who should also be able to comprehend the planned tests and treatments.

2.1. Inclusion criteria

Patients with postoperative anastomotic leak at different gastrointestinal sites in any stage and age above 18 years old were included with variable general condition.

2.2. Exclusion criteria

Represented by patients with bile leak, patients with pancreatic fistula and patients below 18 years old.

2.3. Preoperative work up

All patients underwent a history-taking process and a general and local clinical assessment. Laboratory investigation include complete, blood count (CBC), complete liver function, coagulation profile (bleeding Time, prothrombin time and concentration), electrolytes Na and K, kidney function tests, fasting and postprandial blood sugar.

2.4. Radiological investigation

All patients underwent enhanced computed tomography (CT), contrast study, endoscopy, which needs to be performed with minimal insufflation and can help assess the viability of the tissues, abdominal-pelvic ultrasound, and finally a chest radiography to look for any potential risk factors and comorbidities. Others tests were also done represented by Electrocardiography (ECG) for cardiac assessment and consultations as indicated (e.g., respiratory function tests).

2.5. Intraoperative

Includes operative procedure (direct suture, omental patch, stent) and operative findings.

2.6. Postoperative workup

All patients were followed-up after 1 week, 1 month, 3 months and 1 year to evaluate the outcome as regard response to specific therapy and recurrence of fistula.

2.7. Statistical analysis

SPSS 26.0 for Windows was utilized to gather, tabulate, and statistically analyze all of the data (SPSS Inc., Chicago, IL, USA). Number and percentage were utilized to describe qualitative data. The range (minimum and maximum), mean, standard deviation, and median were utilized to characterize quantitative data.

3. Results

Table 1 presented the research population's demographic features. 64 (64 %) of the study

Table 1. Characteristics of the studied population's demographics.

	Study population (n = 100)
Sex	
Males	64 (64 %)
Females	36 (36 %)
Age (y)	
Mean ± SD	42.45 ± 10.16
Median (IQR)	42 (34.75–48.5)
Range (min–max)	45 (21–66)

IQR, interquartile range; SD, standard deviation.

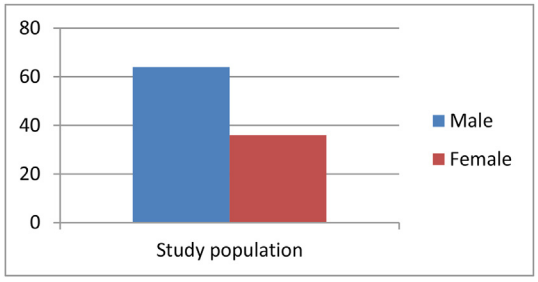

Fig. 1. A bar chart displaying Sex-related research population data.

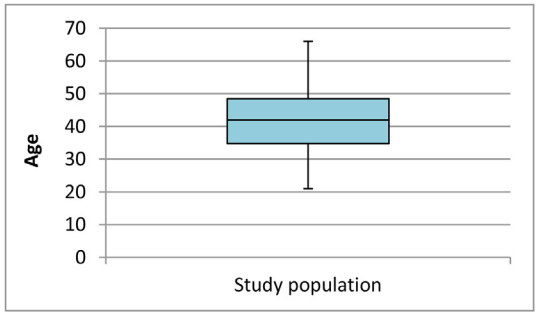

Fig. 2. Box-plot depicting Age data for the study population.

population's patients were men. The research population's age varied from 21 to 66, with a mean ± SD of 42.45 ± 10.16, respectively (Figs. 1 and 2).

Table 2 showed type of surgery among the study population. Number of patients who had Intra-peritoneal anastomosis surgery in the study population was 98 (98 %). Number of patients who had Esophageal Procedure in the study population was 2 (2 %). Number of patients who had elective operation in the study population was 72 (72 %). Number

Table 2. Surgery type in the research population.

	Study population (n = 100)
Type of surgery	
Intraperitoneal anastomosis	98 (98 %)
Intrathoracic anastomosis	2 (2 %)
Procedure	
Esophagus	2 (2 %)
Sleeve	45 (45 %)
Bypass	29 (29 %)
Small bowl	34 (34 %)
Type of operation	
Elective	72 (72 %)
Emergency	28 (28 %)
Diagnostic tools	
CT	82 (82 %)
Intraperitoneal drain	67 (67 %)
Abdominal U/S	100 (100 %)

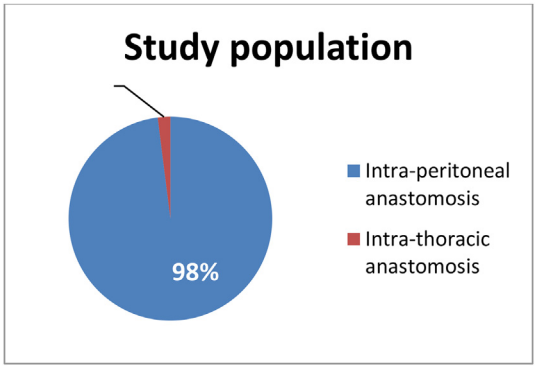

Fig. 3. Pie chart showing research population data as regard type of surgery.

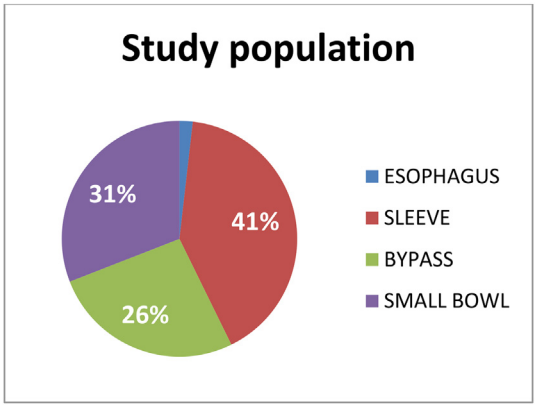

Fig. 4. Pie chart showing research population data as regard procedure.

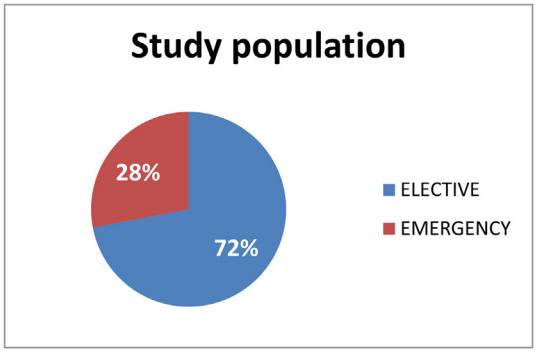

Fig. 5. Pie chart showing research population data as regard type of operation.

of patients who had CT as a diagnostic tool in the study population was 82 (82 %) (Figs. 3–6).

Table 3 showed drain amount/day and onset of Leak among the research population. Number of patients with high output more than 500 ml drain amount/day in the research participants was 63 (63 %). Number of patients with low output less than 500 ml Onset of Leak in the study population was 24 (24 %) (Figs. 7 and 8).

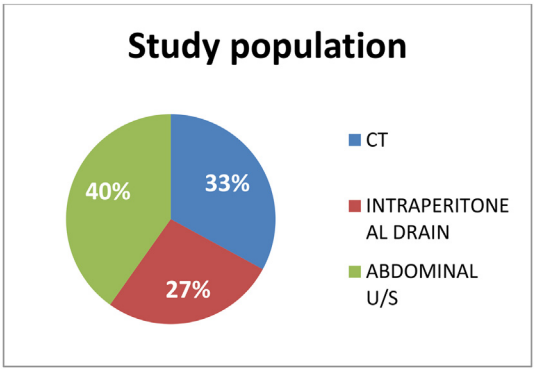

Fig. 6. Pie chart showing research population data as regard diagnostic tools.

Table 3. Drain amount/day and onset of leak among the research population.

	Study population (n = 100)
Drain amount/day	
High output more than 500 Ml	63 (63 %)
Low output less than 500 Ml	37 (37 %)
Onset of Leak	
Early presentation less than 72 h	24 (24 %)
Late presentation more than 72 h	76 (76 %)

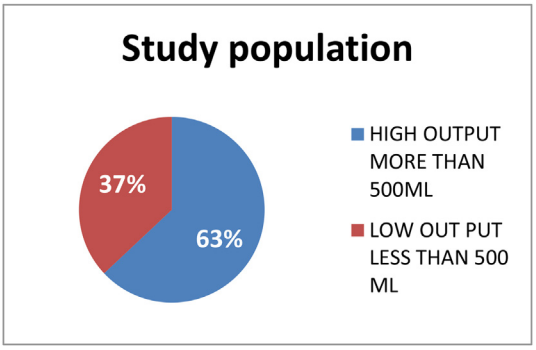

Fig. 7. Pie chart showing research population data as regard drain amount/day.

Table 4 showed the intra-thoracic anastomosis population clinical presentation. Number of patients with Sepsis in the research participants was 1 (50 %). Number of patients with arrhythmia in the research participants was 2 (100 %). Number of patients with subcutaneous emphysema in the research population was 2 (100 %). Number of patients with Thoracic pain in the research participants was 1 (50 %). Number of patients with Pneumothorax in the research participants was 1 (50 %). Finally, number of patients with Pleural effusion in the research participants was 1 (50 %).

Table 5 showed intrathoracic anastomosis population therapeutic strategy and outcome. Number of

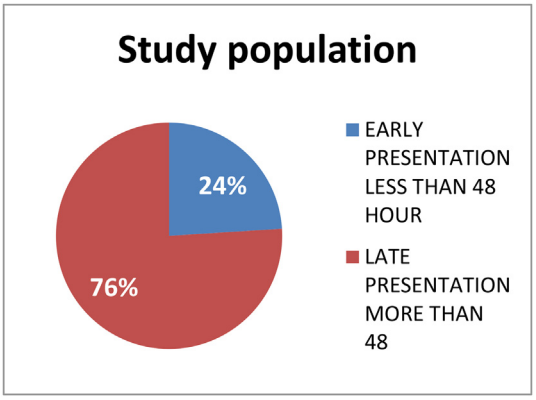

Fig. 8. Pie chart showing research population data as regard Onset of Leak.

Table 4. Intrathoracic anastomosis population clinical presentation.

	Intrathoracic anastomosis population (n = 2)
Sepsis	1 (50 %)
Arrhythmia	2 (100 %)
Subcutaneous emphysema	2 (100 %)
Thoracic pain	1 (50 %)
Pneumothorax	1 (50 %)
Pleural effusion	1 (50 %)

Table 5. Intrathoracic anastomosis population therapeutic strategy and outcome.

	Intrathoracic anastomosis population (n = 2)
Therapeutic strategy	
Conservative management	0 (0 %)
Double pig-tail catheter drainage and esophageal stent	1 (50 %)
Esophageal T tube	1 (50 %)
Clinical outcome	
Clinical success	1 (50 %)
Technical failure	1 (50 %)
Leakage-related death	0 (0 %)

patients who had conservative management as the therapeutic strategy in the research participants was 0 (0 %). Number of patients with Clinical success in the research participants was 1 (50 %).

Table 6 showed Intraperitoneal anastomosis population clinical presentation. Number of patients with Pain in the research participants was 77

Table 6. Intraperitoneal anastomosis population clinical presentation.

	Intraperitoneal anastomosis population (n = 98)
Pain	77 (78.57 %)
Peritoneal irritation	60 (61.22 %)
Rebound tenderness	38 (38.78 %)
Guarding.	21 (21.43 %)

Table 7. Intraperitoneal anastomosis population therapeutic strategy and outcome.

	Intraperitoneal anastomosis population ($n = 98$)
Therapeutic strategy	
Anastomosis reconstruction	44 (44.90 %)
Conservative treatment	18 (18.37 %)
Pig tail insertion	21 (21.43 %)
Stenting	15 (15.31 %)
Clinical outcome	
Clinical success	90 (91.84 %)
Technical failure	4 (4.08 %)
Leakage-related death	4 (4.08 %)

(78.57 %). Number of patients with peritoneal irritation in the research participants was 60 (61.22 %). Number of patients with Rebound tenderness in the research participants was 38 (38.78 %). Number of patients with Guarding in the research participants was 21 (21.43 %).

Table 7 showed Intraperitoneal anastomosis population therapeutic strategy and outcome. Number of patients who had anastomosis reconstruction as the therapeutic strategy in the research participants was 44 (44.90 %). Number of patients with Clinical success in the research participants was 90 (91.84 %).

Finally, the main results of this study regarding demographic characteristics among the study population were that the majority of the studied patients were males 64 (64 %) with ages ranged from 21 to 66 with mean ± SD = 42.45 ± 10.16.

4. Discussion

Both elective and emergency general operations often include bowel anastomoses. Anastomotic leaking was described as the presence of leakage indicators, which were then validated by radiographic inspection, notwithstanding various variances in the term. Leukocytosis, peritonitis, stomach discomfort, soreness, fever, fecal discharge from the pelvic drain, and pelvic abscess were some of the leakage symptoms.[8]

Three grades of AL exist: Grade A requires no active therapy intervention, Grade B requires active therapeutic intervention but is manageable without re-laparotomy, and Grade C, also known as clinical anastomotic leakage, is a severe form of AL that necessitates re-laparotomy.[9]

One of the worst problems for surgeons and nurses is the emergence of clinical anastomotic leakage (CAL) after intestinal surgery. This is due to the increased morbidity and mortality, as well as its detrimental impact on the length of hospital stay, functional results, and oncologic outcomes, as well as higher mortality and morbidity rates.[10]

Intestinal surgery is often linked to a lengthy hospital stay (5 days for laparoscopic surgery and 8 days for open surgery), a 20 % increase in the likelihood of surgical site infection, and a hefty price tag. In individuals who have specific risk factors, the probability of perioperative nausea and vomiting (PONV) during the hospital stay following optional colorectal surgery may be as high as 80 %. Readmission rates after colorectal surgery have been reported to be as elevated as 35.4 %.[11]

Even if surgical techniques and experiences have improved, this is still one of the most serious side effects. In addition to the acute clinical effects such sepsis, peritonitis, intra-abdominal abscess, and elevated morbidity and mortality in hospitals. Additionally, it contains long-term complications that might lead to permanent stomas, decreased pelvic organ function, higher local cancer recurrence, and cancer-specific mortality. It also has a poor prognosis risk factor.[12]

The large intestine (50.9 %) had the most intestinal anastomosis, and the rates of anastomotic leak depend on the type of anastomosis, with entero-enteric having the lowest rate (1–2%) and colorectal/coloanal having the greatest rate (4–26 %), Ileocolic (1–4%), ileorectal (3–7%), colo-colic (2–3%), and ileoanal pouch (4–7%).[13]

Leak risk has been demonstrated to be directly correlated with surgical risk variables such the location of the anastomosis, laparoscopic vs open methods, and handsewn versus stapled anastomoses. Patient risk factors include male gender, older age, diabetes (increased hemoglobin A1c and perioperative hyperglycemia), smoking, weight loss, serum albumin less than 4, anemia, chemo-radiation, blood transfusion, mechanical bowel preparation, perianastomotic drain placement, tumor size, preoperative chemotherapy, longer operative time, emergency surgery, and intraoperative transfusion. These factors were all strongly connected with a higher probability of adverse outcomes.[14]

Early detection and modification of modifiable risk factors, especially in elective settings, cumulative and clinical judgment by the surgeon, ideal preoperative care, enhanced operative approaches, and early detection of leaks using clinical signs and biochemical markers are key to decreasing anastomosis leaks. Each patient's risk for the leak must be assessed at the time of surgery, and decisions about anastomosis and the application of proximal diversion should be made in light of those results.[15]

In line with the current study[16] stated that intra peritoneal anastomosis presentation includes abdominal signs that may be non-specific, but pain was usually intense, associated with peritoneal irritation, rebound tenderness or guarding.

Comparable with the current study[17] revealed that Overall mortality was 5.9 % (17/287) among patients with anastomotic leak.

Higher than the current study[18] reported that the Mortality rate was (29.41 %) 5/17 among patients with gastrointestinal anastomotic leak.

In agreement with the current study[19] stated that some leaks are present in a subtle fashion, often late in the postoperative period.

In agreement with the current study[18] revealed that the type of surgery was elective in 73 (66.36 %) patients and emergency in 37 (33.64 %) patients. Surgical technique: was open in 90 (81.82 %) patients, laparoscopic in 15 (13.64 %) patients and converted in 5 (4.54 %) patients. The study revealed type of surgery elective versus emergency ($P < 0.05$) was found to be significantly affecting the outcome of anastomosis.

4.1. Conclusion

Postoperative gastrointestinal anastomotic leak is a very serious complication that has great clinical impact on patients, putting surgeons in dilemmas of detection and management. The presentation of AL varying from severe peritonitis and leakage of bowel content through the wound or from the drain to asymptomatic (small pelvic abscess).

Early diagnosis is a crucial and challenging clinical target to decrease leakage-associated complications and mortality. However, the shift from on-demand assessment toward the adoption of a routine imaging approach appears not justified, particularly considering its limited clinical value in asymptomatic patients and the required resource allocation.

Diagnosis timing still remains a bottleneck for an efficient management. The diversity of presentation and severity of leakage, in combination with a number of available diagnostic and therapeutic techniques, make optimal management challenging.

Recent trends in AL treatment notice a shift toward a more conservative management compared with the past, along with an increasing adoption of endoscopic intervention Mostly for esophagogastric leak (mainly EVAC technique, stenting) while surgery reserved for the most severe cases.

Funding

No funds.

Conflicts of interest

No conflict of interest.

References

1. Hernández J, Boza C. Novel treatments for complications after bariatric surgery. *Ann Surg Innovat Res*. 2016;10:3.
2. Manta R, Magno L, Conigliaro R, et al. Endoscopic repair of post-surgical gastrointestinal complications. *Dig Liver Dis*. 2013;45:879–885.
3. Gastinger I, Marusch F, Steinert R, et al. Protective defunctioning stoma in low anterior resection for rectal carcinoma. *Br J Surg*. 2005;92:1137–1142.
4. Lang H, Piso P, Stukenborg C, et al. Management and results of proximal anastomotic leaks in a series of 1114 total gastrectomies for gastric carcinoma. *Eur J Surg Oncol*. 2000;26:168–171.
5. Freeman RK, Vyverberg A, Ascioti AJ. Esophageal stent placement for the treatment of acute intrathoracic anastomotic leak after esophagectomy. *Ann Thorac Surg*. 2011;92:204–208.
6. Gonzalez R, Sarr MG, Smith CD, et al. Diagnosis and contemporary management of anastomotic leaks after gastric bypass for obesity. *J Am Coll Surg*. 2007;204:47–55.
7. Wedi E, Gonzalez S, Menke D, et al. One hundred and one over-the-scope-clip applications for severe gastrointestinal bleeding, leaks and fistulas. *World J Gastroenterol*. 2016;22:1844–1853.
8. Tutone S, Hill AG. Anastomotic leak after colonic resection. *Dis Colon Rectum*. 2019;62:9–11.
9. Rahbari NN, Weitz J, Hohenberger W, et al. Definition and grading of anastomotic leakage following anterior resection of the rectum: a proposal by the International Study Group of Rectal Cancer. *Surgery*. 2010;147:339–351.
10. Wallace B, Schuepbach F, Gaukel S, Marwan AI, Staerkle RF, Vuille-Dit-Bille RN. Evidence according to cochrane systematic reviews on alterable risk factors for anastomotic leakage in colorectal surgery. *Gastroenterol Res Pract*. 2020;2020:9057963. Published 2020 Jan 3. https://doi.org/10.1155/2020/9057963.
11. Carmichael JC, Keller DS, Baldini G, et al. Clinical practice guidelines for enhanced recovery after colon and rectal surgery from the American society of colon and rectal surgeons and society of American gastrointestinal and endoscopic surgeons. *Dis Colon Rectum*. 2017;60:761–784.
12. Degiuli M, Elmore U, De Luca R, et al. Risk factors for anastomotic leakage after anterior resection for rectal cancer (RALAR study): a nationwide retrospective study of the Italian Society of Surgical Oncology Colorectal Cancer Network Collaborative Group. *Colorectal Dis*. 2022;24:264–276.
13. Bracale U, Peltrini R, De Luca M, et al. Predictive factors for anastomotic leakage after laparoscopic and open total gastrectomy: a systematic review. *J Clin Med*. 2021;11:5022.
14. Voron T, Bruzzi M, Ragot E, et al. Anastomotic location predicts anastomotic leakage after elective colonic resection for cancer. *J Gastrointest Surg*. 2019;23:339–347.
15. Zemenfes D, Tamirat E. Prevalence and factors associated with anastomotic leakage among surgical patients at 2 teaching hospitals in Addis Ababa, Ethiopia. *East and Central African Journal of Surgery*. 2019;24:89–93.
16. Girard E, Messager M, Sauvanet A, et al. Anastomotic leakage after gastrointestinal surgery: diagnosis and management. *Journal of visceral surgery*. 2014;151:441–450.
17. Sieda B, Abdelhady W, Baghdadi M. Independent perioperative predictive risk factors for the anastomotic leak after emergency bowel resection anastomosis. *International Surgery Journal*. 2019;6:2258–2266.

18. El-Badawy HAAE. Anastomotic leakage after gastrointestinal surgery: risk factors, presentation and outcome. *The Egyptian Journal of Hospital Medicine*. 2014;57:494–512.

19. Sakr A, Emile SH, Abdallah E, et al. Predictive factors for small intestinal and colonic anastomotic leak: a multivariate analysis. *Indian J Surg*. 2017;79:555–562.