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TAMIS repair within a structured multimodal management pathway for colorectal anastomotic leaks: surgical technique and outcomes

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Abstract

Aim We describe the transanal minimally invasive surgerical (TAMIS) procedure for the elective repair of colorectal anastomotic leaks (AL) within a structured management pathway based on early leak detection and selective adjunctive therapy. We also report the clinical outcomes of this multimodal approach, along with an operative video illustrating the surgical technique step by step.

Method Data on patients who underwent TAMIS for AL at our centre were collected. The operative video demonstrates each step of the technique, highlighting its advantages and feasibility.

Results Thirteen patients underwent the TAMIS approach to treat colorectal AL between 2016 and 2024, with a median age of 55 (range: 14–84) years. Anastomosis was repaired and rescued in 12 (92.31%) patients. The median length of hospital stay was 20 (14–38) days. All but one patient (92.31%) with long-term anastomotic healing achieved closed ileostomies.

Conclusions Within a structured multimodal management pathway, TAMIS is a safe and feasible option for selected patients with colorectal anastomotic leaks.

Limitations This is a single-centre study with a small sample size.

Keywords Colorectal anastomosis · Anastomotic leakage · Transanal minimally invasive surgery (TAMIS) · Anastomotic leak

Introduction

Anastomotic leak (AL) is still a major complication after colorectal surgery. Although several risk factors for AL have been identified and preventive measures proposed, the likelihood of colorectal AL can still reach 10–15% [1–6]. Transanal minimally invasive surgery (TAMIS) has emerged as a useful technique to manage postoperative complications after rectal surgery [7]. The primary goal of this article is to illustrate the surgical technique for

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AL management using TAMIS, step by step. The secondary outcome is to evaluate its feasibility and safety as part of a multimodal approach to AL.

Methods

We present our case series of 13 patients who underwent an elective TAMIS approach for colorectal AL, with a step-by-step video showing the surgical technique. Data were collected retrospectively, based on a prospective database, including patients between 2016 and 2024, with annual follow-up. This study has been approved by the ethical committee of our center and is reported according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) recommendations [8].

Technique description: clinical case

We present a 41-year-old female patient with suspected inflammatory bowel disease of the large bowel, who presented to the emergency department with an intestinal obstruction caused by a high rectal lesion, suspected to be neoplastic. At surgery, a high rectal tumour infiltrating the uterus and the left adnexa was identified. A total colectomy with high anterior rectal resection and partial mesorectal excision, hysterectomy, and left adnexectomy was performed, with an ileorectal anastomosis and loop ileostomy.

Based on our AL detection program [9], CRP on postoperative day (POD) 3 was 237 mg/l, and CRP and procalcitonin on POD 4 was 184 mg/l and 0.48 mg/ml, respectively. Following our programme, a CT scan with intravenous and rectal contrast was performed, which revealed an AL. A surgical revision of the anastomosis was planned using a TAMIS approach (Supplementary Material 1).

Surgical technique

Patient positioning

The patient is placed in lithotomy position.

Preparation, port placement, and pneumorectum

We begin by exposing the anal canal using cardinal sutures. The anal canal is gently dilated to prevent sphincteric trauma. The Gelpoint® Path is then introduced and secured in place. The cap is positioned, and the access ports are inserted in a triangle, as far out as possible within the Gelpoint® to maximize mobility. Airseal® is used to maintain a constant air pressure, which is initially established at 12 mmHg but can be increased up to 15–18 mmHg [10].

Surgical steps

At surgery, a dehiscence involving < 25% of the total anastomosis circumference is identified, accompanied by a small cavity, with no signs of ischaemia of the rectal or ileal mucosa. A limited Friedrich's debridement of the edges of the dehiscence is carried out, and the cavity is irrigated and cleaned. After cleaning the cavity, a primary closure is attempted. The patient had a diverting stoma, which is important for conservative management of a leaked anastomosis. A loop ileostomy is recommended for patients who did not receive one at index surgery.

If cleansing of the cavity cannot be achieved, a vacuum therapy is recommended (i.e., Endosponge®) before attempting subsequent primary closure with TAMIS [11].

A 3/0 V-Loc® absorbable suture is used to close the anastomotic defect. The closure is carried out using a caudal-to-cranial approach. Notably, the initial sutures are easier to place, while the final sutures are more challenging because of technical difficulty and limited space.

The patient had an uneventful postoperative recovery and was discharged on postoperative day 20. The pathology report showed an extensively abscessed, fistulized low-grade colon adenocarcinoma, pT4bN0 (0/59 lymph nodes), with perineural invasion, findings consistent with moderately active ulcerative colitis. The patient completed adjuvant chemotherapy treatment (CAPOX) and underwent ileostomy closure 9 months after the anastomotic repair, with good recovery.

Results

Between 2016 and 2024, 13 patients with AL were treated using a TAMIS approach, including 6 females (46.15%), with a median age of 55 (14–84) years. The clinicopathological characteristics are summarized in Table 1.

Most patients underwent surgery due to rectal adenocarcinomas (75%). Other indications for surgery included two high-grade ovarian carcinomas (15.38%), one diverticulitis (7.69%), and one rectal involvement of a small-cell desmoplastic tumour (7.69%). Six patients (46.15%) had neoadjuvant treatment, of whom 5 (38.46%) received long-course chemoradiotherapy and 1 (7.69%) received short-cycle radiotherapy only. Tumours were located in the upper third of the rectum in eight cases (61.54%), in the middle third in four (30.77%), and in the lower third in one (7.69%). Surgical procedures included high anterior rectal resection in 11 patients (84.62%), 1 total colectomy with high anterior rectal resection and ileo-rectal anastomosis (7.69%), and 1 low anterior resection (7.69%). Notably, patients with AL that could be addressed transanally (in the lower rectum), without the use of TAMIS, were managed with the same multimodal approach described in this article, but are not included in this analysis. TAMIS was employed exclusively in cases where the defect was not amenable to transanal surgery because of its distance from the anal margin. Therefore, only one patient in our series underwent a total mesorectal excision in the index procedure. Tumour characteristics and surgical details are summarized in Table 2.

The median time to detect AL was 4 (2–26) days. Seven patients (53.85%) had a defect involving < 25% of the circumference, 5 (38.46%) 25%, and 1 (7.69%) 50%. Eight patients (61.54%) received negative pressure therapy (Endosponge®) before definitive repair, while five (38.46%) underwent direct suture closure. This decision depended on the cleanliness of the surgical field, the presence of intestinal diversion, the patient's haemodynamic stability, and the size of the anastomotic defect. Patients with direct suture closure may have been diagnosed

Table 1 Patient characteristics

	N = 13 (%)
Gender, female, *n* (%)	6 (46.15)
Age, median (range)	55 (14–84)
Active smoking, *n* (%)	3 (23.08)
High blood pressure, *n* (%)	4 (30.77)
Dyslipidaemia, *n* (%)	5 (38.46)
Diabetes mellitus, *n* (%)	3 (23.08)
ASA classification, n (%)	
I	2 (15.38)
II	8 (61.54)
III	3 (23.08)

ASA American Society of Anesthesiologists

Table 2 Tumour characteristics and surgical details

	N = 13 (%)
Tumour type, n (%)	
Intestinal adenocarcinoma	9 (69.23)
High-grade ovarian carcinoma	2 (15.38)
Benign disease	1 (7.69)
Small cell desmoplastic tumour	1 (7.69)
Neoadjuvant treatment, n (%)	
Chemoradiation therapy	5 (38.46)
Short-course radiotherapy	1 (7.69)
Surgery, n (%)	
High anterior rectal resection	11 (84.62)
Low anterior rectal resection	1 (7.69)
Total colectomy + high anterior rectal resection and ileorectal anastomosis	1 (7.69)
Mesorectal excision, n (%)	
Partial mesorectal excision (PME)	12 (91.67)
Total mesorectal excision (TME)	1 (8.3)
Approach, n (%)	
Open	4 (30.77)
Laparoscopic	4 (30.77)
Robotic	5 (38.46)
Endosponge®, *n* (%)	8 (61.54)
Length of hospital stay, days, median (range)	20 (15–38)

earlier than those needing negative pressure therapy before definitive anastomotic repair, but our sample size is too small to support this assumption.

For the eight patients treated with Endosponge® therapy, one (12.5%) required four Endosponge® replacements until the final closure was achieved, another (12.5%) required two, four patients (50%) required one replacement, and two (25%) did not require replacements and the closure was achieved in the next surgical revision. We aim to minimize the number of negative pressure device replacements and proceed with the definitive closure of the anastomotic defect as soon as possible. In our experience, the more replacements performed and the longer the time until definitive closure, the greater the fibrosis grade and the added technical difficulty.

The median hospital stay was 20 (15–38) days. Anastomotic healing was achieved in 12 patients (92.31%). One patient had very fibrotic tissues at TAMIS, and healing of the anastomosis could not be achieved, requiring a posterior proctectomy. One of the patients with anastomotic healing had correct short-term anastomotic healing but stopped treatment at 8 weeks after the TAMIS procedure because of causes unrelated to the intervention. Of the 12 patients with long-term anastomotic healing, all but one (92.31%) had their ileostomies closed after CT with rectal contrast-confirmed healing. The patient without ileostomy closure had a progressive disease and had to receive adjuvant treatment. However, the favourable outcomes should be interpreted in the context of a multimodal strategy combining early diagnosis, faecal diversion, selective Endosponge® therapy, appropriate patient selection, and definitive TAMIS repair.

Our case series has several limitations. The inclusion of a single patient with an ileorectal anastomosis introduces heterogeneity and should be considered when interpreting these results; however, we applied the same selection criteria and structured management pathway as for patients with colorectal anastomoses. In addition, the small sample size limits the ability to draw definitive conclusions regarding the safety and effectiveness of this approach.

Conclusions

Within a structured multimodal management pathway, TAMIS represents a safe and feasible option for carefully selected patients with colorectal AL, particularly for defects involving up to one-quarter of the anastomotic circumference and located in the upper rectum. The favourable outcomes observed should be interpreted in the context of a multimodal strategy and appropriate patient selection. Larger prospective studies are warranted to further validate these findings.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s10151-026-03443-0.

Author contributions CCT and MKC designed the study and edited the supporting video. CCT, MKC, GP, and EE were responsible for data analysis and interpretation. All authors reviewed and approved the final manuscript.

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Data availability No datasets were generated or analysed during the current study.

Declarations

Conflict of interest The authors declare that they have no conflict of interests.

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