Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

Early-Onset Adhesive Small Bowel Obstruction After Abdominoperineal Resection for Rectal Cancer: Impact of Preoperative Chemoradiotherapy

Daisuke Fujimori
Kouseiren Takaoka Hospital
Masanori Kotake
kotake628@gmail.com

Kouseiren Takaoka Hospital
Shin Isumi
Kouseiren Takaoka Hospital
Hiroki Kitabayashi
Kouseiren Takaoka Hospital
Kazuki Kato
Kouseiren Takaoka Hospital
Masato Hayashi
Kouseiren Takaoka Hospital
Takahiro Yoshimura
Kouseiren Takaoka Hospital
Koichiro Sawada
Kouseiren Takaoka Hospital
Hironori Hayashi
Kouseiren Takaoka Hospital
Kaeko Oyama
Kouseiren Takaoka Hospital
Takuo Hara
Kouseiren Takaoka Hospital
Noriyuki Inaki
Kanazawa University Hospital

Research Article

Keywords:

Posted Date: July 24th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-9221190/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: No competing interests reported.

Abstract

Background

Adhesive small bowel obstruction (ASBO) is a significant postoperative complication following rectal cancer surgery. However, the impact of preoperative chemoradiotherapy (CRT) on early postoperative ASBO after abdominoperineal resection (APR) remains unclear.

Methods

This retrospective single-center study included patients who underwent APR for rectal cancer between January 2020 and December 2025. Patients were divided into CRT and non-CRT groups. Postoperative ASBO was diagnosed based on clinical and radiological findings. Patient characteristics, perioperative factors, and clinical outcomes were compared between the two groups.

Results

A total of 37 patients were included, 13 of whom received preoperative CRT. ASBO occurred in four patients (10.8%), with a higher incidence in the CRT group than in the non-CRT group (23.1% vs. 4.2%). All ASBO cases developed during the early postoperative period (postoperative days 6–15) and were attributed to severe pelvic adhesions. Conservative management was unsuccessful in all three ASBO cases in the CRT group, necessitating surgical intervention with intestinal bypass. Lateral lymph node dissection was not associated with the occurrence of ASBO.

Conclusions

Preoperative CRT may be associated with early-onset, treatment-resistant ASBO after APR for rectal cancer. Careful postoperative monitoring is warranted in patients receiving CRT.

INTRODUCTION

Preoperative chemoradiotherapy (CRT) has been established as a standard treatment for patients with locally advanced rectal cancer, improving local control compared with postoperative chemoradiotherapy[1]. Current clinical practice guidelines, including those from the European Society for Medical Oncology (ESMO), recommend preoperative CRT for selected patients with localized rectal cancer to reduce local recurrence and facilitate surgical resection[2]. Subsequent clinical studies have also demonstrated improved local recurrence-free survival with preoperative CRT compared with postoperative treatment[3].

Abdominoperineal resection (APR), including the Miles procedure and Hartmann's operation, remains an essential surgical approach for selected patients with low rectal cancer. However, postoperative small bowel obstruction (SBO) is a well-recognized complication after colorectal surgery. Adhesive small bowel obstruction (ASBO) is the most common cause of SBO in this setting and is generally managed

initially with conservative treatment, such as bowel rest, gastrointestinal decompression, and parenteral nutrition[4–6].

Large population-based studies have reported that ASBO occurs in a substantial proportion of patients following colorectal cancer surgery and may occasionally require surgical intervention[7]. Furthermore, pelvic surgery and pelvic irradiation are known to induce inflammatory changes and fibrosis, potentially increasing the risk of severe intra-abdominal adhesions[8]. Despite these concerns, the association between preoperative CRT and early postoperative ASBO after APR has not been fully elucidated.

Therefore, the aim of this study was to investigate the incidence, clinical characteristics, and management of ASBO following APR, with particular focus on the impact of preoperative CRT.

METHODS

Study design and patients

This retrospective single-center study included patients who underwent abdominoperineal resection (APR) for rectal cancer at our institution between January 2020 and December 2025. Patients who underwent emergency surgery or had a history of small bowel obstruction were excluded.

Preoperative chemoradiotherapy (CRT) was administered according to institutional protocols and current clinical practice guidelines[1, 2]. All clinical data were retrospectively extracted from electronic medical records.

Surgical procedures

All surgical procedures were performed using a robotic-assisted approach. The extent of surgery, including lateral lymph node dissection (LLND), was determined based on tumor location, clinical staging, and multidisciplinary team discussion.

APR was performed according to standard oncologic principles, including total mesorectal excision and creation of a permanent end colostomy. Prophylactic anti-adhesion materials were not routinely used.

Definition and management of ASBO

Postoperative small bowel obstruction was diagnosed based on clinical symptoms and radiological findings. ASBO was defined as bowel obstruction without evidence of tumor recurrence, internal hernia, or other mechanical causes.

Initial management of ASBO consisted of conservative treatment, including bowel rest, gastrointestinal decompression using a nasogastric or long intestinal tube, and parenteral nutritional support. Surgical intervention was considered when conservative management failed or when clinical deterioration occurred.

Data collection

Collected variables included patient demographics (age, sex, and body mass index), perioperative factors (operative time, blood loss, and performance of LLND), clinical tumor stage, administration of preoperative CRT, postoperative complications, and occurrence of ASBO.

Postoperative complications were graded according to the Clavien–Dindo classification, with grade III or higher considered major complications. The timing of ASBO onset, treatment modality, and clinical outcomes were also evaluated.

Statistical analysis

Continuous variables are presented as medians with interquartile ranges (IQRs), and categorical variables as numbers and percentages. Comparisons between the CRT and non-CRT groups were performed using the Mann–Whitney U test for continuous variables and Fisher's exact test for categorical variables. A two-sided p value <0.05 was considered statistically significant. Statistical analyses were performed using SPSS software (IBM Corp., Armonk, NY, USA).

Ethical approval

This study was approved by the institutional review board of Koseiren Takaoka Hospital (approval number: 20260129008).

Informed consent was obtained using an opt-out approach, and the requirement for written informed consent was waived due to the retrospective nature of the study.

RESULTS

Patient characteristics

total of 37 patients who underwent APR for rectal cancer were included. Thirteen patients received preoperative CRT, and 24 did not. Baseline patient characteristics are summarized in Table 1.

No significant differences were observed between the CRT and non-CRT groups with respect to sex, body mass index, operative time, intraoperative blood loss, or the frequency of LLND. All procedures were completed using a robotic-assisted approach.

The median postoperative hospital stay was 14 days (IQR: 12–20.3).

Postoperative complications

Major postoperative complications (Clavien–Dindo grade ≥III) occurred in seven patients (18.9%). The incidence of major complications did not differ significantly between the CRT and non-CRT groups.

Incidence and timing of ASBO

ASBO occurred in four patients (10.8%) during the postoperative period. Three cases occurred in the CRT group (23.1%), whereas one case occurred in the non-CRT group (4.2%).

All ASBO cases developed during the early postoperative period, between postoperative days 6 and 15, and were attributed to severe pelvic adhesions.

The incidence of ASBO was not associated with the performance of LLND.

Management and outcomes of ASBO

In the CRT group, conservative management was attempted in all three ASBO cases but was unsuccessful. Consequently, all three patients required surgical intervention. Due to severe pelvic adhesions within the pelvic cavity, adhesiolysis was considered unsafe, and intestinal bypass surgery was performed in all surgically treated patients.

In the non-CRT group, one patient developed ASBO and died the day after symptom onset due to aspiration pneumonia, precluding evaluation of the response to conservative management.

Details of the clinical course and management of patients with ASBO are summarized in Table 2.

DISCUSSION

In this study, ASBO occurred exclusively during the early postoperative period after APR and was observed more frequently in patients who received preoperative CRT. All ASBO cases were attributed to severe pelvic adhesions, suggesting a potential role of CRT-associated pelvic fibrosis in the development of early postoperative bowel obstruction.

Conservative management is widely recommended as first-line therapy for ASBO[4–6]. However, previous studies have indicated that conservative treatment may be less effective in patients with extensive adhesions following colorectal surgery[4]. In the present cohort, conservative management failed in all CRT-associated ASBO cases, necessitating surgical intervention. In contrast, the single ASBO case in the non-CRT group could not be adequately evaluated due to early mortality. These findings suggest that ASBO following CRT may represent a more refractory clinical entity.

Pelvic radiation therapy induces chronic inflammation, microvascular injury, and progressive fibrosis, leading to dense pelvic adhesions[8]. These pathological changes may explain both the early onset of ASBO and the poor response to conservative treatment observed in the CRT group. Consistent with this mechanism, adhesiolysis was deemed unsafe in all surgically treated patients, and intestinal bypass procedures were selected.

Although minimally invasive approaches have been associated with improved short-term outcomes compared with open surgery[9], all procedures in the present study were performed using a robotic-

assisted approach, minimizing variability related to surgical access. Therefore, differences in operative technique are unlikely to account for the observed association between CRT and ASBO.

This study has limitations, including its retrospective design and small sample size. Nonetheless, the consistent clinical pattern of early-onset, treatment-resistant ASBO in patients receiving CRT provides novel insight into a potentially underrecognized complication of APR. Larger multicenter studies are warranted to further clarify risk factors and establish optimal management strategies.

Declarations

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Data availability

The datasets generated and/or analyzed during the current study are not publicly available due to patient privacy concerns but are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

References

1. Sauer R, Becker H, Hohenberger W, et al (2004) Preoperative versus postoperative chemoradiotherapy for rectal cancer. N Engl J Med 351:1731–1740. https://doi.org/10.1056/NEJMoa040694
2. Hofheinz R-D, Fokas E, Benhaim L, et al (2025) Localised rectal cancer: ESMO Clinical Practice Guideline for diagnosis, treatment and follow-up. Ann Oncol 36:1007–1024. https://doi.org/10.1016/j.annonc.2025.05.528
3. Bosset J-F, Collette L, Calais G, et al (2006) Chemotherapy with preoperative radiotherapy in rectal cancer. N Engl J Med 355:1114–1123. https://doi.org/10.1056/NEJMoa060829
4. Jeong WK, Lim S-B, Choi HS, Jeong S-Y (2008) Conservative management of adhesive small bowel obstructions in patients previously operated on for primary colorectal cancer. J Gastrointest Surg 12:926–932. https://doi.org/10.1007/s11605-007-0423-5
5. Tong JWV, Lingam P, Shelat VG (2020) Adhesive small bowel obstruction - an update. Acute Med Surg 7:e587. https://doi.org/10.1002/ams2.587
6. Ten Broek RPG, Krielen P, Di Saverio S, et al (2018) Bologna guidelines for diagnosis and management of adhesive small bowel obstruction (ASBO): 2017 update of the evidence-based

guidelines from the world society of emergency surgery ASBO working group. World J Emerg Surg 13:24. https://doi.org/10.1186/s13017-018-0185-2

7. Sakari T, Sköldberg F, Dietrich CE, et al (2024) Incidence of adhesive small bowel obstruction after surgery for colorectal cancer in Sweden 2007–2016. Colorectal Disease 26:300–308. https://doi.org/10.1111/codi.16845
8. Morris KA (2015) Pelvic radiation therapy: Between delight and disaster. WJGS 7:279. https://doi.org/10.4240/wjgs.v7.i11.279
9. Veldkamp R, Kuhry E, Hop WCJ, et al (2005) Laparoscopic surgery versus open surgery for colon cancer: short-term outcomes of a randomised trial. Lancet Oncol 6:477–484. https://doi.org/10.1016/S1470-2045(05)70221-7

Tables

Tables 1 and 2 are available in the supplementary files section

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- Tables.docx