



Early small bowel obstruction as a complication of abdominal drain in colon cancer surgery: a case report and literature review

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Introduction: Early postoperative small bowel obstruction (EPSBO) is an obstruction that occurs within 4 weeks after the initial surgery. Routine prophylactic abdominal drainage does not provide any benefit in colon cancer surgery. The cause of EPSBO due to the abdominal drainage tube is infrequent.

Case presentation: A 72-year-old male patient was diagnosed with sigmoid carcinoma and underwent laparoscopic left colectomy. A surgical drain was placed in the pouch of Douglas through the incision of the right iliac fossa trocar site. On the fourth day, he began to flatus, and the abdominal pain decreased. However, on the ninth day after surgery, the patient had more abdominal pain, could not pass gas and defecate, and the abdomen was more distended. An abdominal computed tomography (CT) scan showed a dilated loop of the small intestine above the transition site with a drainage sonde and no dilation of the loop below the sonde. The patient was indicated to remove the sonde. He could pass gas and defecate the next day again and was relieved of the abdominal distention.

Discussion: Once an EPSBO is considered, it is essential to think of the bowel obstruction caused by the drainage tube in the case of abdominal drainage. It is necessary to have a contrast CT scan to examine.

Conclusion: EPSBO due to intra-abdominal drainage is a rare condition that presents a challenge in diagnosis and treatment. Diagnosis usually begins on the fourth postoperative day, mainly in operations in the lower transverse mesentery, including drainage placement after laparoscopic surgery.

Keywords: abdominal drain, case report, colectomy, laparoscopic, small bowel obstruction

Introduction

Early postoperative small bowel obstruction (EPSBO) is an obstruction that occurs within 4 weeks after the initial surgery. EPSBO is a rare (incidence 0.69%) but severe postoperative complication with relatively high mortality (17.8%). This complication often occurs in surgery below the transverse mesentery^[1]. EPSBO is often challenging to diagnose, and symptoms may be masked by incision pain, the use of analgesics, abdominal distention, and the presence of postoperative adynamic ileus. And the other symptoms, such as pain, nausea, and obstipation, may be normal findings immediately postoperative^[1,2].

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HIGHLIGHTS

- Early small bowel obstruction as a complication of abdominal drain is rare.
- Early small bowel obstruction is often tricky and can be overshadowed by signs that appear normal after surgery, especially those involving the gastrointestinal tract.
- When the diagnosis is identified, the catheter should be removed as soon as possible.

There are many risk factors for EPSBO according to clinical characteristics such as age, hypothyroidism, ASA (American Society of Anesthesiologists) classification, laparotomy, preoperative antibiotics, time of first postoperative feeding, time to maintain drainage tube, etc.^[3]. Routine prophylactic abdominal drainage does not provide any benefit after colon cancer surgery^[4]. EPSBO is also more common after colectomy, small bowel resection, and exploratory laparotomy^[5]. Pathophysiology and causes are adhesions, internal hernia, inflammation, intussusception, and intramural bowel hematoma^[6]. The cause of EPSBO due to the abdominal drainage tube is infrequent, with only eight cases reported for this cause in the literature^[7–14].

Early bowel obstruction often presents a therapeutic challenge with high mortality. Therefore, any patient in this high-risk group presenting with this clinical picture should be presumed to have a mechanical small bowel obstruction, and early surgery should be considered^[1]. However, the timing of the choice of surgery is still controversial^[2]. Some authors recommend re-exploration within 1 week if symptoms do not improve. Others even delay up to

2 weeks if no signs of evident intestinal ischemia exist^[5]. The laparoscopic approach has many advantages, with reduced post-operative intestinal adhesions and other serious complications, even at the time of re-operation after 2 weeks^[15]. This case report followed SCARE guidelines^[16].

Case presentation

A 72-year-old male patient was admitted to our hospital because of hematochezia lasting 7 months, a history of open appendectomy with Mc Burney's incision 20 years ago, and a history of treatment for pulmonary tuberculosis 30 years ago. The patient had symptoms on admission, including abdominal pain, weight loss, anemia, constipation, bloody stools, and loss of appetite. Clinical examination revealed a palpable tumor in the abdomen in the left iliac fossa. The current general condition of the patient with the ASA scoring system was ASA1, BMI was 17.78. The patient had three negative Acid-Fast Bacillus tests. The computed tomography (CT) scan detected an irregular thickening of the sigmoid colon, and the tumor's tissue protruded into the colon's lumen with intense heterogeneous enhancement, causing incomplete narrowing. Chest X-ray and CT scan showed old fibrous scar lesions on both sides of the apex of the lungs. A pulmonary function measurement was moderate obstructive syndrome. A colonoscopy revealed a sigmoid colon tumor occupying three-fourth of the colon's circumference, and histopathological results showed invasive adenocarcinoma. The patient underwent laparoscopic left colectomy with complete mesocolic excision. An end-to-end stapled anastomosis was performed. The operative time was 130 min, and the intraoperative blood loss was 30 ml. The patient had no complications during surgery. A 20 Fr soft polyvinyl chloride surgical drain was placed in the pouch of Douglas through the incision of the right iliac fossa trocar site.

During the postoperative time, he presented with delayed gastrointestinal function recovery. The patient chewed gum on the first operative day to return to bowel function. On the fourth day, he began to pass gas, the abdominal pain decreased, and the visual analog score (VAS) gradually decreased from 6 on the first day to 3 on the fourth day after surgery (scale of 10). The patient had not defecated, the abdomen was not distended, the abdominal ultrasound showed no abnormality, and the small bowel was 22 mm in

diameter. The drain output was light yellow to clear on the post-operative days. However, the drain outputs were changed and gradually decreased from about 150 ml on the first to 25 ml on the fourth postoperative day. The amount increased again on day 5 to about 100 ml and 400 ml of clear fluid on day 6, then gradually decreased. Postoperative day 7, the patient got more abdominal pain, presented with abdominal distension, and no defecation. Physical examination revealed moderate tenderness at the hypogastric region. The patient was diagnosed with a suspected anastomosis leakage. A complete blood count (CBC) was taken, and he had a normal-range white blood cell count of 9.0. He had an electrolyte imbalance with a K⁺ of 2.48. The albumin and protein blood tests were average values. Abdominal ultrasound showed a normal bowel caliber, and no fluid accumulation around the anastomosis was found. Drainage monitoring showed no abnormal discharge. Therefore, the patient was observed with rehydration electrolytes and total parenteral nutrition.

On the ninth day after surgery, the patient had more abdominal pain, could not pass gas and defecate, and the abdomen was more distended. The abdominal ultrasound revealed a dilated small intestine of 35 mm and suspected small bowel obstruction. Abdominal CT scan showed a small bowel obstruction with a diameter of 47 mm, no fluid collection around the anastomosis, a little fluid next to the ascending colonic sulcus, and abdominal drainage that was free of fluid. Specialists worked together to review the CT scan images. The images showed a dilated loop of the small intestine above the transition site with a drainage sonde and no dilation of the loop below the sonde (Figs 1 and 2). The patient was diagnosed with an early bowel obstruction due to the drain sonde that had probably compressed the small bowel. The patient was indicated to remove the sonde. He could pass gas and defecate again the next day and was relieved of the abdominal distention. The patient then resumed oral feeding, returned to a stable postoperative state, and was discharged early.

Discussion

Diagnosis

The clinical signs of a patient who initially demonstrated a return of intestinal function and the beginning of feeding but the later loss of bowel function with abdominal distension and pain are the

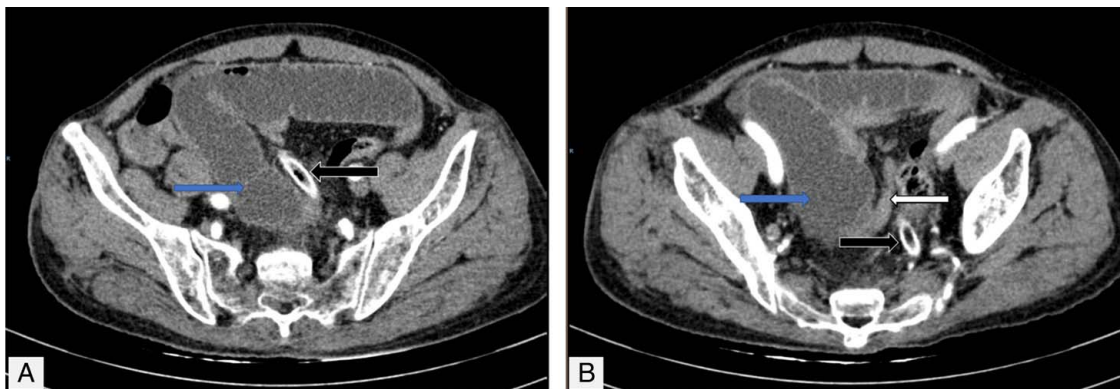


Figure 1. Contrast-enhanced axial computed tomography (CT). The dilated loop of the small bowel (blue arrow), the drainage sonde (black arrow), and the collapsed bowel loop below the transition zone (white arrow). (A) CT showed a 47-mm dilated loop of the bowel proximal to the drainage sonde and the sonde position at the transition site. (B) The image revealed the dilated bowel loops continued with collapsed ones at the transition site.



Figure 2. Contrast-enhanced computed tomography (CT). The drainage sonde (black arrow) and the collapsed bowel loop (white arrow). (A) The sagittal plane showed the collapsed bowel loop anterior to the drain sonde and dilated loop. (B) The coronal plane illustrated the drain sonde between the dilated bowel above and the collapsed bowel on the left side of the sonde.

most characteristics of EPSBO^[1]. The small intestine restores motility 4–8 h after surgery, followed by the stomach in about 24–48 h, and the colonic function returns at the latest 48–72 h^[17]. Therefore, EPSBO is often tricky, with typical intestinal obstruction, but can be overshadowed by signs that appear normal after surgery, especially those involving the gastrointestinal tract. These symptoms are often associated with a postoperative ileus with multiple pathogenic mechanisms that must be distinguished from EPSBO^[1,17]. In several studies, repeated clinical follow-up examinations within 6 days or at least 10–14 days were necessary to detect EPSBO^[2,6,13]. We recommend that daily clinical examination until the patient is stable and can be discharged from the hospital is necessary to detect postoperative complications.

Once an EPSBO is considered, it is essential to think of the bowel obstruction caused by the drainage tube in the case of abdominal drainage. It is necessary to have a contrast CT scan to examine a dilated loop of the bowel above the transition site and a collapsed bowel loop below the transition site concerning the drain tube^[2,6,13]. Recent opinions suggest that an abdominal drain should not be placed unless considered essential. And there should be no more than two side holes inside the catheter, and it is necessary to place the drainage tube in a low-cavity position, not near the small bowel loops^[8,12,18]. Our clinical case belongs to the high nutritional risk group (Nutrition Risk Score NRS-2002: 4 points). The patient received high-energy nutritional supplements 1 week before surgery and had their preoperative weight reassessed. The patient was determined to be at higher risk of an anastomotic leak, so we performed prophylactic drainage of the pouch of Douglas. Such placement of drainage is not routinely recommended in colon cancer surgery^[4].

Treatment

There is a tendency to blame the failure of bowel function recovery on postoperative ileus rather than EPSBO, and thus delay the time of surgical intervention for the patient. However, this can cause many adverse effects for patients with symptomatic treatment, such as nasogastric tube placement and parenteral nutrition. An EPSBO should be considered as early as the fifth postoperative day to detect a mechanical bowel obstruction, as distinguished from the ileus. The causes of EPSBO vary, including adhesions, internal hernias, infections, abscesses, intussusceptions, and intestinal hematoma. Therefore, expect 10–14 days to clarify the diagnosis before intervention^[6]. However, for causes due to abdominal drainage, it is essential to remove the drain immediately after diagnosis^[12–14]. Alternatives after drain removal for EPSBO should consider the option of a laparoscopic approach. Although our literature review only had one laparoscopic surgery out of four open cases, Goussous *et al.*^[15] found that laparoscopic surgery had fewer complications and adhesions after surgery than the open approach, even if the intervention time is after 2 weeks.

Literature review

In our literature review of nine cases, the mean age was 61.6 years (range 30–82), the finding day of EPSBO was 4.4 days (1–9), 66.7% drainages after initial laparoscopic surgery, and 77.8% surgery in below transverse mesentery; the interventions include 44.4% of drain removal, 44.4% of open surgery, and 11.1% of laparoscopic surgery, in which 1 case (11%) requires bowel resection (Table 1).

In our case, at age 72, EPSBO was detected late on day 9, later than in the other studies. This case was a complication of abdominal drainage after laparoscopic surgery and surgery in the lower level of the transverse mesentery. Prophylactic drainage is not routinely recommended and should be removed early to avoid

Table 1
All reported cases in the literature of EPSBO are due to abdominal drainages

Author/Nation	Year	Age/Gender	Surgery	Finding day	Treatment
Nehme/USA ^[14]	1973	72/M	Open/Ileal conduit urinary diversion	7	Pull out Hemovac tubings
Rogers/USA ^[12]	2007	42	Lap/Roux-en-Y gastric bypass	1	Catheter removal
Poon/China ^[8]	2009	82/M	Lap/Anterior resection	4	Lap. drain removal
Shah/USA ^[7]	2014	78/M	Open/1st: low anterior resection/2nd: Washout + JP drain	N.A	Open/small bowel resection
Salati/Saudi Arabia ^[10]	2015	62/M	Open/Transurethral resection of invasive bladder tumor	2	Open
Al Khaldi/Canada ^[9]	2019	30/M	Open/Hepatectomy + Roux-en-Y hepaticojejunostomy	4	Open/sonde removal
Koh/Australia ^[13]	2021	39	Open/Uterine myomectomy	3	Drain removal
Bogiatzopoulos/Greece ^[11]	2023	78/M	Open/Abdominoperineal resection	5	Open/drain removal
This report	2023	72/M	Lap. colectomy	9	Drain removal

JP, Jackson Pratt (silicone drain); Lap., laparoscopic; M, male; NA, not available.

unnecessary complications such as early postoperative bowel obstruction in this case. Drain removal can be performed first to avoid the need for re-operation.

Conclusion

EPSBO due to intra-abdominal drainage is a rare condition that presents a challenge in diagnosis and treatment. Diagnosis usually begins on the fourth postoperative day, mainly in operations in the lower transverse mesentery, including drainage placement after laparoscopic surgery. Once a mechanical bowel obstruction caused by this catheter has been identified, the catheter should be removed as soon as possible.

Ethical approval

Institutions of authors do not require ethical approval for a case report.

Consent

Written informed consent was obtained from the patient to publish this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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Author contribution

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Conflicts of interest disclosure

The authors have no conflicts of interest to declare.

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