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Colon perforation caused by transanal decompression tube after laparoscopic low anterior resection: A case report

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ABSTRACT

INTRODUCTION: The effectiveness of transanal decompression tube (TDT) to prevent anastomotic leakage after rectal surgery has been widely accepted in recent years. However, a rare complication of intestinal perforation due to TDT has been also reported.

PRESENTATION OF CASE: A 88-year-old woman underwent laparoscopic low anterior resection for rectal cancer. An abdominal drainage tube adjacent to the colorectal anastomosis and a TDT were placed. The patient experienced abdominal pain, nausea and elevated inflammatory markers on postoperative day 6. Enema and computed tomography demonstrated colonic perforation due to the TDT, and emergency laparotomy was performed. Perforation of the anterior sigmoid colon located at the proximal side of the colorectal anastomosis was seen, and the TDT was exposed to the abdominal cavity. Therefore, primary closure of the perforation site, peritoneal lavage, drainage tube placement and transverse colostomy was performed.

DISCUSSION: In our case, TDT seemed to compress the anterior wall of the colon and lead to perforation. The looseness of the remaining oral intestinal tract depressed in the pelvis was compressed by the TDT.

CONCLUSION: TDTs should be very carefully placed to avoid complication. The length and looseness of the oral intestine and the relationship between the TDT to be inserted might be important.

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1. Introduction

Anastomotic leakage after rectal surgery is a serious complication, with a recently reported incidence of 3.9–13.1% [1–7]. To prevent anastomotic leakage, various attempts have recently been performed during surgery, such as the usage of a transanal decompression tube (TDT), the application of a polyglycolic acid sheet to reinforce staple lines of the rectal stump and/or the use of a powered circular stapler [4–9].

In particular, many studies have described the effectiveness of a TDT for preventing anastomotic leakage, and it has become widely accepted in recent years [1–5,7]. However, the type of TDT to be used as well as its proper position and duration of placement are controversial. In addition, complications of intestinal perforation due to the TDT have also been rarely reported [1,2]. Therefore, ways to manage the negative aspects of a TDT should be discussed.

We herein report a case of colon perforation caused by a TDT after laparoscopic low anterior resection for rectal cancer. This work has been reported in line with the SCARE criteria [10].

2. Presentation of case

An 88-year-old woman was admitted to the hospital with bloody feces and body weight loss. She had a history of hypertension, angina pectoris, paroxysmal atrial fibrillation, cerebral infarction and Caesarean section. Laboratory studies showed anemia (hemoglobin: 11.0 g/dl.) and decreased serum albumin (3.6 g/dl). A diagnosis of rectal cancer (Stage I: T1, N0, M0 according to the TNM classification of the UICC 8th edition) and gallbladder cancer (Stage I: T1, N0, M0 according to the TNM classification of the UICC 8th edition) was made, and laparoscopic low anterior resection with D3 lymph node dissection and laparoscopic cholecystectomy was performed. Before the surgery, mechanical bowel preparation with magnesium citrate and sodium picosulfate hydrate was performed.

The tumor was located at the anterior left wall of the upper rectum. Rectal anastomosis was performed using the double-stapling technique. An abdominal drainage tube adjacent to the colorectal anastomosis and a TDT were placed. Ten millimeter of the SILASCON® duple drain (Kaneka Medix) was used as a TDT. The tip of the tube was located 5 cm from the proximal side of the anastomosis. TDT was fixed at the anal skin using 3–0 nylon and cut short 2 cm from the anal verge. Anastomosis was performed 3.5 cm from

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Fig. 1. Computed tomography showed that the transanal decompression tube was exposed from the intestine (**a, b**: sagittal plane)(white arrowhead: transanal decompression tube, arrow: abdominal drainage tube, dotted line: intestinal wall, black arrowhead: anastomotic site).

the anal verge. The operation time was 6 h and 21 min, and blood loss was 20 mL. The operation was uneventful.

The TDT was expected to be removed on postoperative date (POD) 6. However, the patient experienced slight abdominal pain, nausea and elevated inflammatory markers (white blood cells: 13,200/ μ L, C-reactive protein: 19.77 mg/dL) without rebound tenderness or defense on POD6. Computed tomography (CT) demonstrated no findings of abscess or collection of a large amount of fluid at the anastomotic site. In addition, no stool was observed in the effluent from the abdominal drain. Therefore, antibiotics were administered.

However, after starting antibiotic therapy, the inflammatory markers remained high (white blood cells: 8000/ μ L, C-reactive protein: 35.61 mg/dL) at POD8. An enema using amidotrizoic acid confirmed communication between the TDT, sigmoid colon and abdominal cavity. In addition, CT revealed the perforation of the intestine, located at the proximal side of the colorectal anastomosis, and the TDT had broken through the intestinal wall (Fig. 1a, b). The diagnosis of peritonitis due to perforation of the colon caused by the TDT and paralytic small bowel obstruction was made, and emergency laparotomy was performed.

The operative findings demonstrated that the colorectal anastomosis was intact. However, perforation of the anterior sigmoid colon located at the proximal side of the colorectal anastomosis was seen, and the TDT was exposed (Fig. 2). The size of the perforation was 1 cm and the perforation site was located 4.5 cm from the anastomotic site. Therefore, primary closure of the perforation site with simple interrupted suture using 3–0 Vicryl, peritoneal lavage, drainage tube placement and transverse colostomy were

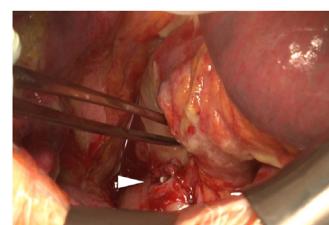


Fig. 2. Intra-operative findings. Perforation was seen at the anterior sigmoid colon located at the proximal side of the site of colorectal anastomosis, and the transanal decompression tube was exposed (arrowhead).

performed. After the treatment, the patient recovered and was discharged on POD60 after reoperation.

3. Discussion

TDTs are now widely used to prevent anastomotic leakage after rectal surgery [1–7]. It was reported that the TDT presented non-inferiority in preventing anastomotic leakage, less operation time and blood loss, no difference in early postoperative complications and less incidence in late complication compared to the ileostomy [11]. The role of a TDT is to aid in reducing the endoluminal pressure as well as diverting feces, resulting in a protective effect on anastomotic healing [3]. In addition, one of the mechanisms underlying anastomotic leakage is considered to be pressure at the anastomotic site due to insufficient bowel preparation [6]. A previous report showed that the usage of a TDT significantly reduced the rate of anastomotic leakage after rectal cancer surgery compared to non-use (2.7–10.7% with TDT vs. 9.1–26.1% without TDT) [1–5]. However, while rare, complications due to TDTs have been reported [1,2]. Nishigori et al. reported that colonic perforation due to TDT on POD5 after intersphincteric resection [1]. The TDT was originally placed 15 cm from the anal verge and the posterior wall located over the pelvic surface of the sacrum was perforated. Lee et al. also experienced the colonic perforation on POD5 after low anterior resection and urgent re-laparotomy and found a 1-cm-sized perforation due to a TDT at the right lateral side, which was 10 cm proximal site from the anastomotic site [2]. Since we introduced TDTs for colorectal surgery in June 2008, we have experienced intestinal perforation due to a TDT only once as of December 2020 among 235 consecutive patients who received TDT for colorectal surgery (0.4%). Among the case of 235 colorectal cancer patients who underwent TDT placement, 18 patients (7.7%) experienced anastomotic leakage.

In our case, the tip of the TDT seemed to compress the anterior wall of the colon and led to ischemia and necrosis followed by perforation. In addition, three-dimensional CT suggested that the looseness of the remaining oral intestinal tract depressed in the pelvis was compressed by the TDT. Therefore, the length and looseness of the oral intestinal tract and their relationship with the TDT to be inserted is important. When placing a TDT, the tube should be placed after simulating the intestinal tract falling into the pelvis. Otherwise, the tip of the TDT may compress the anterior wall of the intestine, which is located at the proximal side of the anastomosis (Fig. 3a). While not related to the present case, we also believe that the relationship between the tip of the tube, the proximal side of the intestine and the sacrum is also important for avoiding placing pressure on the posterior wall of the intestine with the tip of the tube (Fig. 3b). To prevent compression of the intestine between the tube tip and the sacrum, the TDT tip, intestine and sacrum should be placed in a relatively parallel relationship (Fig. 3c). Therefore, we have recently begun to place the tip of the TDT around the first sacrum below the promontorium to achieve a relatively parallel position with the TDT, intestine and sacrum. In cases of laparoscopic surgery with obese and/or male patients with

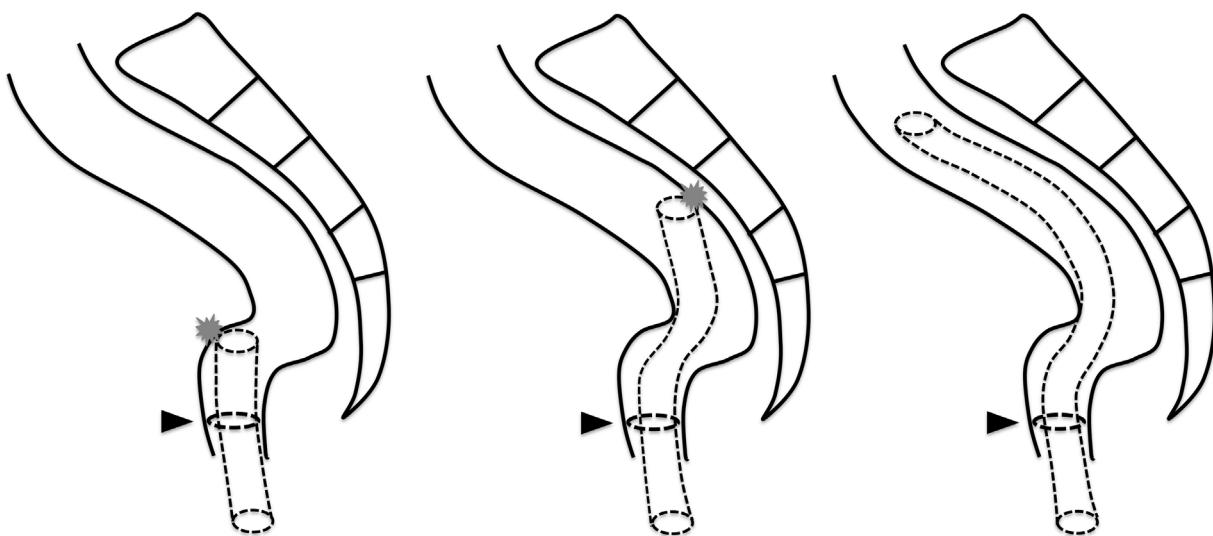


Fig. 3. Schematic illustration of the placement of the transanal decompression tube (**a, b, c**). The relationship between the transanal decompression tube, intestine, anastomotic site and sacrum (black arrowhead: anastomotic site).

a limited pelvic space, confirming the positioning of the TDT may be difficult. Therefore, the placement of the TDT, especially its tip, should be made very carefully.

The kind of tube, size, material, site and length of placement and duration are still controversial. In most studies, a silicon rubber tube was used [1–4,7], and the tube size ranged from 24 to 32 Fr (about 8–10 mm) [1,3,4,7]. Luo et al. compared different types of TDT, such as a 32-Fr silicone tube, 24-Fr silicone tube and 24-Fr latex tube [7]. Although no significant difference was noted in the occurrence of anastomotic leakage among the different tubes (1.23% with the 32-Fr silicone tube, 5.56% with the 24-Fr silicone tube, 6.38% with the 24-Fr latex tube), the 32-Fr silicon tube showed a significantly earlier time of first drainage and defecation than the other types [7]. The authors concluded that the 32-Fr silicon tube was flexible but not easy to bend or fold due to its large diameter, so it might not be prone to distortion or obstruction after compression, making it the best choice [7]. The duration of TDT placement has ranged from 3 to 7 days, with 5 days seeming to be the most frequent duration, and the TDT tip is usually placed 3–10 cm proximal of the anastomotic site [1,3,4,7]. These conditions for TDT placement should be discussed in the future to obtain the best outcomes.

4. Conclusion

We experienced a case of colon perforation caused by a TDT after laparoscopic low anterior resection. TDTs should be very carefully placed to avoid complications due to these tubes. We recently use the 10 mm of the SILASCON® dupe drain as a TDT. It is placed around the first sacrum below the promontorium to achieve a situation in which the TDT, intestine and sacrum are relatively parallel. It is fixed at the anal skin using 3–0 nylon and cut 2 cm from the anal verge. However, the proposal for the placement the TDT is based on a single experience from a single institution. Thus, this topic should be discussed following the accumulation of more experience and study in the future.

Declaration of Competing Interest

The authors declare that they have no competing interests.

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None.

Ethical approval

This case report is not research study. That is not applicable in this case report.

The case report is exempt from ethical approval.

Consent

Informed broad consent and written informed consent for images were obtained from the patient. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contribution

All of the authors contributed to the diagnosis and treatment of the patient. Masatsugu Hiraki contributed in drafting the manuscript. Masatsugu Hiraki and Toshiya Tanaka edited the manuscript. Toshiya Tanaka and Kenji Kitahara supervised and made the final approval of the manuscript. All authors read and approved the final manuscript.

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