

## Case Report

# Five-millimeter Trocar Site Hernia with a Parastomal Hernia Sac: A Case Report

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### Abstract

Here, we report our experience with a 5-mm trocar site hernia (TSH) near a stoma. This is the first report describing the relationship between TSH and extraperitoneal colostomy. A 72-year-old man underwent laparoscopic abdominoperineal resection with extraperitoneal sigmoid colostomy and partial hepatectomy for rectal cancer accompanied by synchronous liver metastasis (pT3N1aM1a Stage IVA Union for International Cancer Control [UICC] 8th edition). The surgical procedures were completely performed without morbidity. After 1 year, he presented to our hospital with sudden nausea. Computed tomography (CT) revealed small bowel obstruction due to a 5-mm TSH, 1 cm from the stoma. The patient underwent laparoscopic hernia repair. The incidence of a 5-mm TSH is low. However, an abdominal wall vulnerability caused by the extensive exfoliation of the retroperitoneum due to the construction of the colostomy was observed, and the extraperitoneal colostomy influenced the onset of the 5-mm TSH. When the port and hernia sites are located in close proximity to each other, even a 5-mm trocar site may increase the incidence of TSH.

### Keywords

laparoscopic surgery, 5-mm trocar site hernia, extraperitoneal colostomy

J Anus Rectum Colon 2021; 5(2): 197-201

## Introduction

In recent decades, laparoscopic surgery has been refined and has become the standard treatment for various surgical conditions. Trocar site hernia (TSH) is a potentially serious major complication that can lead to considerable morbidity following laparoscopic surgery, which requires surgical intervention. The incidence of TSH is estimated to be approximately 0.6% following laparoscopic colorectal surgery for cancer[1]. It usually occurs in  $\geq 10$ -mm trocar sites; a 5-mm TSH is extremely rare[2].

Herein, we report a case of a 5-mm TSH located in close proximity to a colostomy, indicating that the location of the stoma site should be considered during the selection of a trocar site.

## Case Report

A 72-year-old man was admitted to our department for laparoscopic abdominoperineal resection (APR) with extraperitoneal sigmoid colostomy, bilateral lateral lymph node dissection (BiLLND), and partial hepatectomy of segment 6 for rectal cancer accompanied by synchronous liver metastasis (pT3N1aM1a Stage IVA UICC 8th edition). At the time of surgery, he was 167-cm tall, weighed 71 kg, and had a body mass index (BMI) of 25.5 kg/m<sup>2</sup>. His prognostic nutrition index (PNI) was 48.2, which was in the normal range. He had a history of laparotomy due to cholecystectomy. A total of 10 trocars were inserted: one 12-mm umbilical trocar *via* the open technique; three additional 12-mm trocars in the

right and left hypochondria and right iliac region; and six additional 5-mm trocars in the epigastric region 5 cm below the xiphoid in the right and left hypochondria and right and left lateral regions and left iliac region under direct visualization. All 12-mm fascial incisions were closed with two interrupted 0 polyglactin sutures at the end of the procedure; no 5-mm incisions were closed. Extraperitoneal sigmoid colostomy was performed between the 5-mm trocars in the left lateral and iliac regions (Figure 1). The patient was able to tolerate the procedure well with an operative time of 812 min (APR + BiLLND, 404 min; hepatectomy, 408 min). None of the trocars were continuously used for APR +

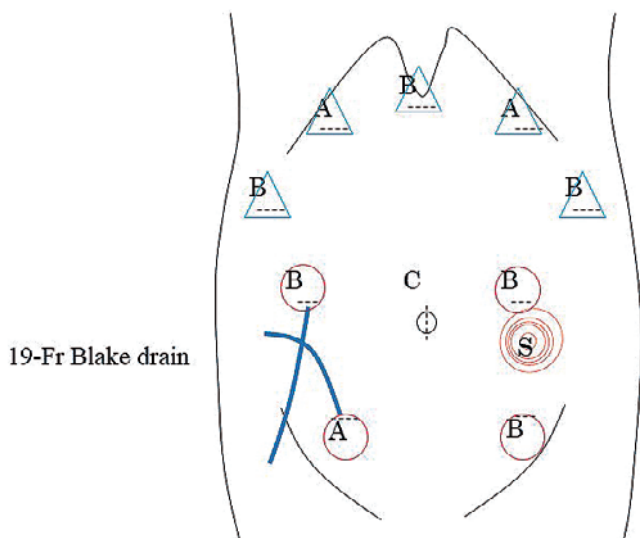
BiLLND and hepatectomy. Furthermore, during hepatectomy, the trocars used in APR had already been removed. The patient was discharged on day 16 without any morbidity.

The histopathological findings revealed that radical resection could be radically performed for both the liver and rectum. The patient did not receive adjuvant chemotherapy. He was followed up with contrast-enhanced computed tomography (CT) and tumor marker measurement every 3 months. There were no obvious findings of abdominal incisional hernia.

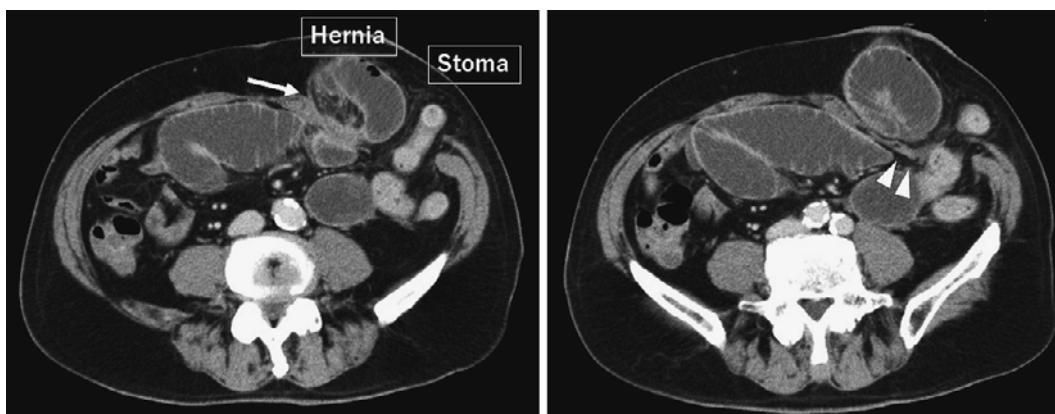
One year later, he presented to the hospital with sudden nausea and no passage of flatus. Physical examination revealed a palpable mass in the parastomal region that was easily reducible. Abdominal X-ray revealed dilated small bowel loops with gas-fluid levels. These findings suggested parastomal hernia; however, CT revealed the presence of an abdominal wall between the stoma and hernia. Based on this image finding, we diagnosed the patient with TSH (Figure 2). As a contrasting effect on the intestinal wall was observed with contrast-enhanced CT, we managed to successfully return the intestine to the abdominal cavity.

After hospitalization, the patient often experienced incarcerated hernia at the site. The hernia did not return naturally and thus had to be returned manually each time it occurred. He underwent laparoscopic hernia repair as an elective operation. At the time of surgery, he weighed 67 kg and had a BMI of 24.9 kg/m<sup>2</sup>, which was almost the same as at the time of the previous surgery. His PNI was 48.3, which was still in the normal range.

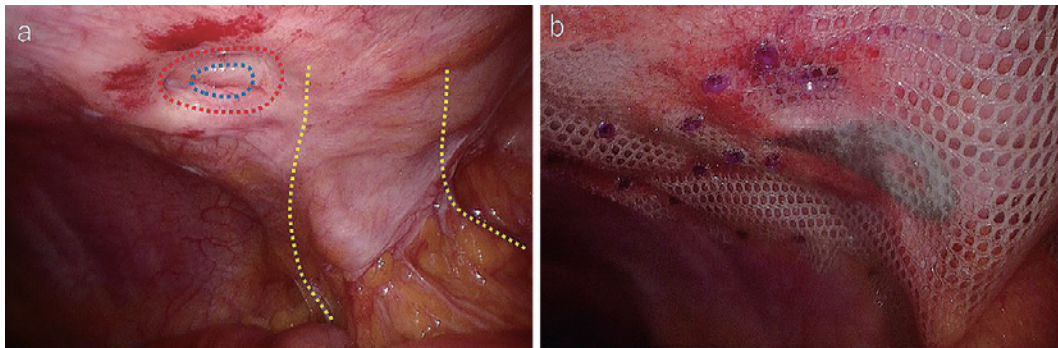
A three-port technique was employed: one 12-mm trocar and two additional 5-mm trocars were inserted in the right lower quadrant region to facilitate surgical manipulation. Intraoperatively, the hernia orifice was definitely identified over the 5-mm trocar site in the left lateral region. An abdominal wall between the hernia and stoma was observed,



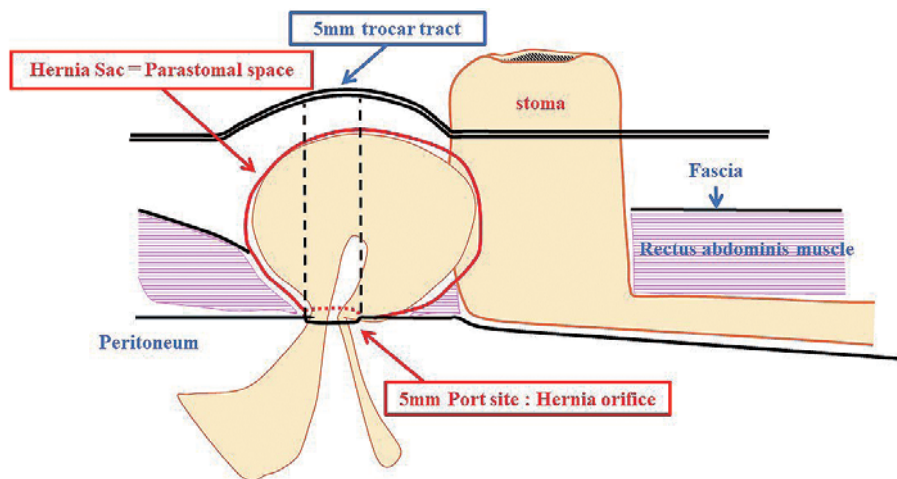
**Figure 1.** A simple diagram showing the port and colostomy placement in relation to laparoscopic abdominoperineal resection with extraperitoneal sigmoid colostomy and partial hepatectomy for rectal cancer accompanied by synchronous liver metastasis. A: 12-mm trocar. B: 5-mm trocar. C: Camera port. S: Colostomy. ○ : For rectal surgery. △ : For hepatectomy.



**Figure 2.** Abdominal CT revealed suspected small bowel herniation (arrow) at the left lateral region close to the extraperitoneal colostomy. Although it was not proven on any of the images, the CT images suggested the presence of an abdominal wall between the hernia and stoma (arrowhead).



**Figure 3.** Laparoscopic view. a: The hernia orifice (red line) over the 5-mm trocar site (blue line) in the left lateral region was located extremely close to the extraperitoneal colostomy (yellow line). b: A 20 × 15-cm Symbotex™ composite mesh (Covidien) covering the orifice fixed to the abdominal wall with AbsorbaTack™ (Covidien) *via* the double-crown method.



**Figure 4.** Schematic illustration of this hernia. The hernia orifice matched the 5-mm trocar site, and the hernia sac spread from the parastomal site.

which is consistent with the CT image. We ensured that there were no abnormal findings indicating a hernia around the pathway of the extraperitoneal stoma (Figure 3). We determined the hernia orifice to be the 5-mm trocar site, and based on intraoperative findings and preoperative CT, the hernia sac was located in the parastomal part (Figure 4).

A 20 × 15-cm Symbotex™ composite mesh (Covidien) was utilized to cover the orifice. It was secured to the abdominal wall using AbsorbaTack™ (Covidien) *via* the double-crown method (Figure 4). Postoperatively, the patient made an uneventful recovery and was discharged on day 7 in a good condition.

Institutional approval for this study was obtained from the Ethical Advisory Committee of Yokohama City University School of Medicine (IRB number: B180900043).

## Discussion

Laparoscopic surgery has become the preferred approach

for various conditions. The increased application of laparoscopy has resulted in increased rates of specific complications, such as TSH, which is defined as incisional hernia occurring through a fascial defect created by a trocar[3]. The prevalence of THS following laparoscopic colorectal surgery for cancer is estimated to be approximately 0.6%[1]. By definition, TSH can develop with a trocar of any size; however, in most reported cases, it is induced by trocars of ≥10 mm. In practice, a systematic review reported that 5-mm TSH accounts for 4% of all TSH cases[2]. Through our search of the PubMed database for relevant studies published between 1980 and 2019, we found 34 cases of 5-mm TSH. The relationship between TSH and stoma has never been evaluated. Given the extreme rarity of the present TSH case, we evaluated the cause of its onset and potential preventive measures.

Several risk factors for the development of TSH, both patient-related and technical, have been reported[4,5]. Patient-related factors include age, obesity, and wound infec-

tion, whereas technical factors include the trocar size, trocar manipulation, surgery duration, and fascial closure after the procedure. One report suggested that the most important predisposing factor for 5-mm TSH is excessive trocar manipulation. It stretches the fascial defect to a considerable size while the skin opening remains 5 mm[6].

The clinical presentation of TSH is variable and depends on the characteristics of the herniated contents. When the bowel becomes involved, patients may present with gastrointestinal symptoms, such as nausea, vomiting, abdominal pain, abdominal distention, and no passage of flatus. During the physical examination, our patient had a palpable bulge and abdominal tympanic sounds. Bowel involvement can result in serious conditions, such as strangulation or obstruction[4,7]. However, asymptomatic TSH has also been described. A recent literature search revealed that 52.1% of TSH cases were symptomatic, whereas 39.1% were asymptomatic[8].

Imaging is needed for the diagnosis of TSH. CT is reported to be the most useful imaging modality for the detection of incarcerated small bowel, and ileus from small bowel obstruction occurs through the fascial defect at the trocar site[8,9].

Only a few reports with small sample sizes have described TSH cases. Thus, the treatment and prevention strategies remain controversial. Bowel incarceration and obstruction require surgical intervention for resolution. There are two surgical approaches, namely, laparotomy and laparoscopy, and the types of procedure vary, including fascial closure by suture or with mesh[10]. The general recommendation for prevention involves fascial closure of all  $\geq 10$ -mm and 5-mm trocar sites in cases of prolonged and difficult surgery with excessive trocar manipulation[4,5,8]. However, TSH may also develop as a result of insufficient suturing[4].

With regard to the causes and treatment, excessive trocar manipulation was considered to be one cause; however, the colostomy procedure itself had the greatest influence on TSH development. As can be seen from Figure 1, the 5-mm trocar was located extremely close to the colostomy site. While the incidence of parastomal hernia is lower in patients with an extraperitoneal stoma, in the present case, a wide separation between the fascia and peritoneum was required to guide the colon to the outside of the body through the extraperitoneal pathway. This might have caused vulnerability to the preperitoneal area. Due to this vulnerability, we determined that the hernia orifice was the 5-mm trocar site, and the hernia sac was located in the parastomal part, as presented in Figure 4. However, the operation time for APR + BiLLND was quite long. As a result, the occurrence of a hernia orifice may have been caused by the 5-mm TSH port site, which may have expanded due to the long operation time.

We considered that it would have been better to increase

the distance between the trocar and stoma sites if possible. TSH and parastomal hernia may occur when a trocar is placed in close proximity to a stoma site. When a stoma is constructed *via* an extraperitoneal pathway, the trocar site should be kept at a site separate from the area for the pathway. If the area is limited and an appropriate distance cannot be maintained, considering the addition of peritoneal-fascial sutures may be necessary, even at the 5-mm trocar site. Alternatively, in some cases, it may be feasible to make the trocar and stoma construction sites the same.

Through the present case, we were able to recognize that TSH may also occur at a 5-mm trocar site if the port and hernia sites are located in close proximity.

#### Conflicts of Interest

There are no conflicts of interest.

#### Author Contributions

Masahiro Fuse, Mayumi Ozawa, Atsushi Ishibe and Seiya Sato performed clinical management of this patient. Koki Goto, Yusuke Suwa, and Jun Watanabe conducted a case study. Itaru Endo summarized this case.

Masahiro Fuse conceived and designed the sturdy and edited the manuscript. All authors read and approved the final manuscript. Masahiro Fuse and Mayumi Ozawa contributed equally to this study.

#### Approval by Institutional Review Board (IRB)

Institutional approval for this study was obtained from the Ethical Advisory Committee of Yokohama City University School of Medicine (IRB number: B180900043).

#### Informed Consent

The patient provided his informed consent for the publication of this case report and the accompanying images. The patient's anonymity has been preserved.

#### References

1. Lumley J, Stitz R, Stevenson A, et al. Laparoscopic colorectal surgery for cancer: intermediate to long-term outcomes. *Dis Colon Rectum*. 2002 Jul; 45(7): 867-72; discussion 872-5.
2. Helgstrand F, Rosenberg J, Bisgaard T. Trocar site hernia after laparoscopic surgery: a qualitative systematic review. *Hernia*. 2011 Apr; 15(2): 113-21.
3. Pilone V, Di Micco R, Hasani A, et al. Trocar site hernia after bariatric surgery: our experience without fascial closure. *Int J Surg*. 2014 May; 12 Suppl 1: S83-6.
4. Swank HA, Mulder IM, la Chapelle CF, et al. Systematic review of trocar-site hernia. *Br J Surg*. 2012 Mar; 99(3): 315.
5. Huang BS, Seow KM, Tsui KH, et al. Small trocar site hernia after laparoscopy. *Gynecol Minim Invasive Ther*. 2013 Aug; 2(3): 79-84.
6. Yamamoto M, Minikel L, Zaritsky E. Laparoscopic 5-mm trocar site herniation and literature review. *JLS*. 2011 Mar; 15(1): 122-

- 6.
7. Wells A, Germanos GJ, Salemi JL, et al. Laparoscopic surgeons' perspectives on risk factors for and prophylaxis of trocar site hernias: a multispecialty national survey. *JLS*. 2019 Apr-Jun; 23(2).
8. Owens M, Barry M, Janjua AZ, et al. A systematic review of laparoscopic port site hernias in gastrointestinal surgery. *Surgeon*. 2011 Aug; 9(4): 218-24.
9. Rammohan A, Naidu RM. Laparoscopic port site Richter's hernia—an important lesson learnt. *Int J Surg Case Rep*. 2011 Jan; 2(1): 9-11.
10. Lambertz A, Stuben BO, Bock B, et al. Port-site incisional hernia—a case series of 54 patients. *Ann Med Surg*. 2017 Feb; 14: 8-11.

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