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# Laparoscopic management for spontaneous jejunal perforation caused by nonspecific ulcer: A case report



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## ABSTRACT

**INTRODUCTION:** Nonspecific small bowel ulcers are rare and there have been limited reports. We applied laparoscopic surgery successfully for the perforation caused by this disease of jejunum.

**Presentation of case:** A 70-year-old man visited to our hospital with complaint of abdominal pain and fever. He was diagnosed abdominal peritonitis with findings of intraperitoneal gas and fluid. Emergency laparoscopic surgery was performed. A perforation 5 mm in diameter was recognized in jejunum opposite side of mesentery. Partial resection of jejunum with end-to-end anastomosis and peritoneal lavage were performed. Pathologically, an ulcer was recognized around the blowout perforation without specific inflammation. He was discharged uneventfully 12 days after surgery.

**CONCLUSION:** Laparoscopic surgery has diagnostic and therapeutic advantages because of its lower invasion with a good operation view, and in case of the small bowel, it is easy to shift extra-corporeal maneuver.

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## 1. Introduction

Nonspecific small bowel ulcer is a rare disease. A reported incidence is approximately 4 small bowel ulcerations per 100,000 individuals [1]. It was first described by Baillie in 1795 [2], and the etiology remains unknown. The nomenclatures for these conditions differed from case to case, included primary nonspecific small-bowel ulcer, idiopathic ulcer of the small bowel, and nonspecific small-bowel ulcer [3]. Complications resulting from nonspecific small bowel ulcers have been reported previously [1], including intermittent small bowel obstruction, blood loss and acute abdomen. As the diagnosis can only be established after the exclusion of all other possible causes of small bowel ulcer, in case of acute abdomen, diagnosis is seldom made preoperatively. For perforative peritonitis, regardless of the cause, laparotomy has historically represented the gold standard treatment. Recently, however, the use of laparoscopy for abdominal emergencies has gained widespread acceptance due to various diagnostic and therapeutic advantages. Herein, we report a rare case of perforated nonspecific ulcer of small bowel successfully treated by laparoscopic surgery. This case report has been reported in line with the SCARE criteria [4] <http://www.scareguideline.com>.

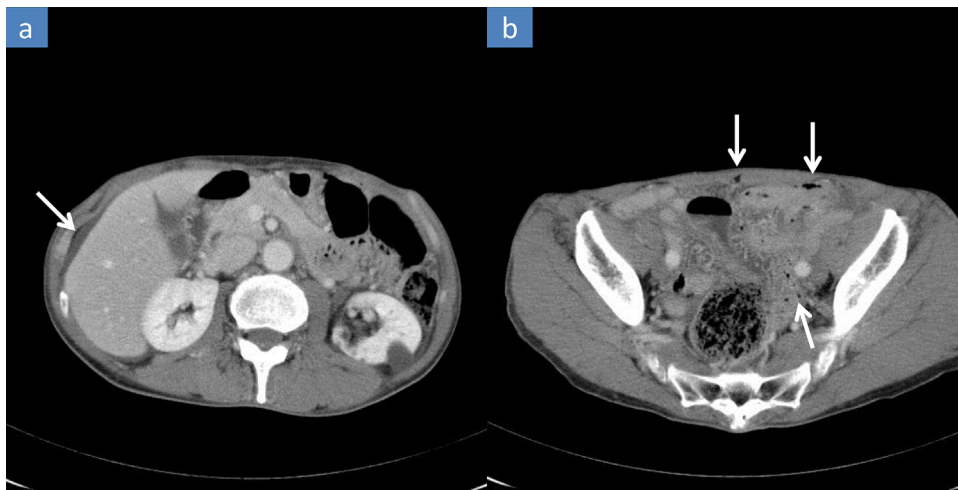
## 2. Presentation of case

A 70-year-old man visited his family physician for evaluation of a high fever. He was prescribed diclofenac sodium and clarithromycin for 5 days. However, he returned to his doctor 7 days later because of acute-onset abdominal pain and nausea; he was then referred to our department. He had a medical history of laparoscopic right hemicolectomy for ascending colon cancer 3 years previously. Upon admission, the patient's temperature was 38.8°C, blood pressure was 96/61 mmHg, pulse rate was 82/min, and respiratory rate was 20/min. His BMI was 18.6 kg/m<sup>2</sup>. Physical examination revealed board-like rigidity and tenderness throughout the whole abdomen. Laboratory data showed a white blood cell count of 12,900/mm<sup>3</sup> with no other remarkable findings. CT showed fluid on the surface of the liver and a small amount of free gas in the pelvis (Fig. 1). The patient was diagnosed with bowel perforation and acute peritonitis.

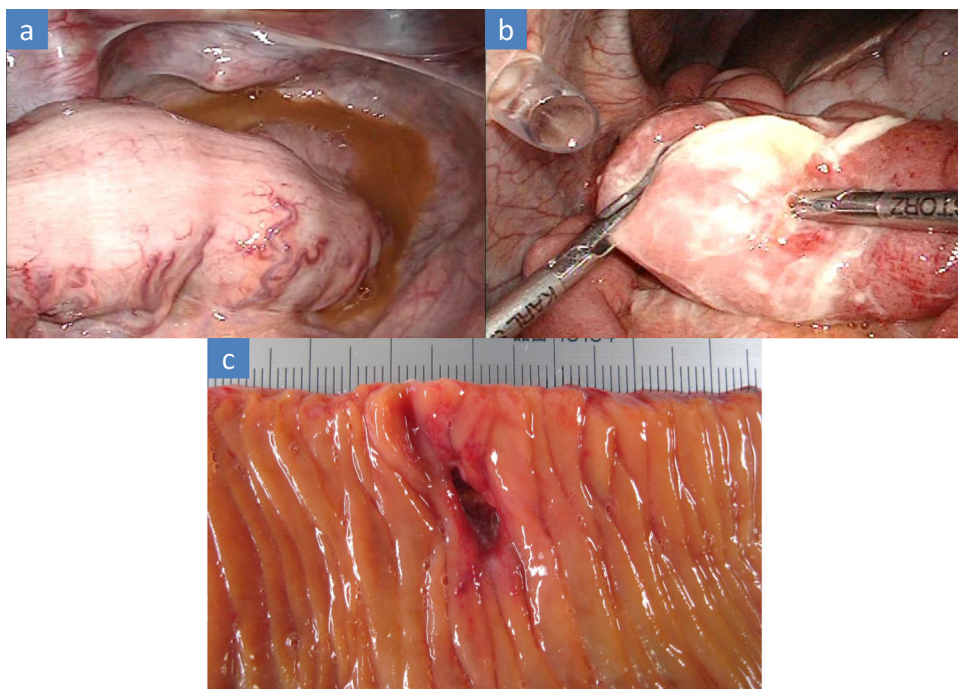
Emergency laparoscopy was performed by our established laparoscopic surgery team under general anesthesia with endotracheal intubation. A 12-mm trocar was inserted into the abdominal cavity through an umbilical incision using an open technique. A flexible 10-mm laparoscope was introduced into the abdomen via this trocar, and pneumoperitoneum was established at an intra-abdominal pressure of 12 mmHg. Two 5-mm trocars were placed in the right and left suprapubic region for forceps insertion. Exploratory laparoscopy revealed purulent fluid in the right subphrenic and pelvic region. The jejunum 80 cm distal to the ligament of Treitz was swollen and covered with pus (Fig. 2a). A 5-mm isolated perforation was detected at this site (Fig. 2b). No perforations

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**Fig. 1.** Enhanced computed tomographic images. (a) Fluid was present on the surface of the liver (arrow). (b) A small amount of free gas was observed in the pelvis (arrows).



**Fig. 2.** Exploratory laparoscopy. (a) Purulent fluid was present in the right subphrenic and pelvic region. (b) A jejunal perforation was detected 80 cm distal to the ligament of Treitz. (c) The resected specimen contained an isolated 5-mm perforation.

were observed in the stomach, duodenum, ileum, or colon. A 4-cm incision was made over the umbilical port to retrieve the perforated jejunum, which was extracorporeally repaired by partial resection. Irrigation was performed using 10L of saline under laparoscopic guidance with drainage flowing into the right subphrenic gutter, right paracolic gutter, and pelvis. The patient recovered and was uneventfully discharged from the hospital 12 days postoperatively.

Pathological examination revealed an ulcer around the perforation with nonspecific inflammation, leading to a diagnosis of nonspecific ulcer of the jejunum (Fig. 3). Capsule endoscopy was performed 1 month postoperatively, and no signs of ulcer were found in the small bowel (Fig. 4). No recurrence was found at the 6-month follow-up.

### 3. Discussion

Spontaneous, nontraumatic perforation of the small bowel is uncommon. The annual incidence is reportedly 1 case per

350,000 individuals [5]. Spontaneous small bowel perforation requires prompt diagnosis and surgical treatment in the absence of specific or reliable clinical or radiological findings [6]. The causes of nontraumatic perforation include immune-mediated disease, infection, medication, congenital disorders, metabolic disturbances, vascular conditions, and neoplasia. Traumatic small bowel perforation, on the other hand, may be caused by abdominal injury, foreign body ingestion, endoscopic studies, and surgical treatments. Regardless of the cause, patients with intestinal perforation typically present with acute-onset abdominal pain with associated symptoms including fever, nausea, and vomiting. Physical examination typically reveals diffuse tenderness on palpation. Laboratory test results are nonspecific and only help to guide preoperative resuscitation [7]. The most common radiologic findings are ileus, fat stranding, and pneumoperitoneum that occur as localized gas bubbles in the mesentery adjacent to the perforation [8–10]. However, precise diagnosis is difficult even with computed tomography (CT) because a small amount of peritoneal

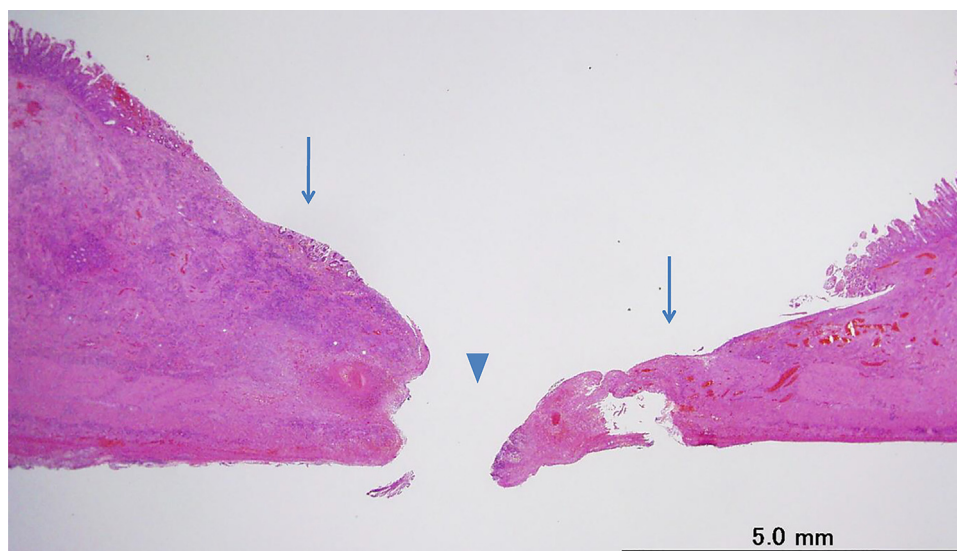


Fig. 3. Histological examination. An ulcer (arrows) was recognized around the perforation (arrowhead) without nonspecific inflammation.



Fig. 4. Capsule endoscopy. No signs of ulceration were observed.

fluid may be the only sign of perforation [11]. Urgent surgical intervention is required for many patients in a severely toxic state. Bowel resection, primary suture repair, or ostomy may also be utilized depending on the intraoperative findings [8–10].

Laparoscopy has the advantage of providing a superior overview of the abdominal cavity with a minimal incision compared to laparotomy. Furthermore, its diagnostic and therapeutic capabilities allow for a timely diagnosis without therapeutic delay and avoidance of unnecessary laparotomy [12]. However, the clinical potential of laparoscopy for this condition has not been thoroughly discussed because clinical experience is limited [13]. Spontaneous perforation of the small intestine may also be a good indication for laparoscopic management. Small bowel perforations can be repaired intracorporeally or by bringing the loop of perforated bowel out through a small incision. Mathonnet et al. [14] demonstrated that laparoscopy has higher sensitivity and specificity for blunt perforations of the small bowel than does CT. Streck et al. [15] found that the mean operating time, time to initiation of an oral diet, and time to discharge after laparoscopic bowel repair compared favorably between pediatric patients with small bowel injuries managed by laparoscopy versus laparotomy. On the other hand, the risks of emergency laparoscopy include delay of definitive

open surgical treatment, missed diagnoses, and procedure-related complications. High intra-abdominal pressure and lengthening of the operation time are crucial factors to consider for hemodynamically unstable patients undergoing laparoscopic surgery. Severe peritoneal contamination, distended bowel loops, or adhesion may cause difficulty performing the laparoscopic examination; in such cases, conversion to open surgery should be considered to ensure complete irrigation and avoid overlooking other perforations.

A few studies have evaluated the laparoscopic approach for treatment of spontaneous small bowel perforation. Spasojevic et al. [16] reported the data of 200 patients treated for perforated midgut diverticulitis (excluding Meckel's diverticulitis). Only 2.7% to 5.5% of patients underwent laparoscopic treatment. Although open surgery was performed more frequently than laparoscopy, the authors concluded that laparoscopy with lavage and drainage could be attempted with satisfactory results. Ding et al. [17] reported the outcomes of 15 patients with a perforated Meckel's diverticulum who underwent exploratory laparoscopy. They concluded that laparoscopy is a safe and effective surgical modality for both diagnosis and therapy and provides an excellent cosmetic result. Sinha et al. [18] described 20 patients with typhoid ileal perforation who underwent laparoscopic exploration and found that minimally invasive surgery is beneficial in terms of limiting sepsis-related wound complications.

Matsumoto et al. [3] noted that some nonspecific small bowel ulcers are caused by thiazides, potassium tablets, or nonsteroidal anti-inflammatory drugs. Our patient used diclofenac for only 5 days. Maiden [19] reported that 2 weeks of diclofenac use resulted in the formation of mucosal breaks in 29% of volunteers as shown on capsule endoscopy. In the present case, the use of diclofenac was much shorter and the possibility of multiple lesions prompted us to perform postoperative capsule endoscopy.

#### 4. Conclusions

We report a case of small bowel perforation caused by nonspecific ulceration. The laparoscopic approach is considered safe and feasible for both diagnosis and treatment of spontaneous perforation of the small bowel in selected patients.

#### Conflicts of interest

The authors declare that they have no competing interests.

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None.

**Ethical approval**

This paper was not a research study, so ethical approval not required.

**Consent**

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

**Author contribution**

KT made substantial contribution to conception, and TS conducted a literature search and drafted the manuscript. KN conducted the contribution for acquisition of graphic data. MK reviewed the manuscript and gave final approval for publication. All authors read and approved the final manuscript.

**Guarantor**

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