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A case of single-incision laparoscopic surgery for a bleeding Meckel's diverticulum diagnosed pre-operatively by double-balloon endoscopy



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ABSTRACT

INTRODUCTION: Meckel's diverticulum (MD) is a congenital true diverticulum that is residual yolk duct tissue, and some cases with complications require surgery. It has been reported that laparoscopic surgery is effective for patients with an MD.

PRESENTATION OF CASE: A 79-year-old man with melena visited our hospital. Upper gastrointestinal series and colonoscopy showed no bleeding lesion. Double-balloon endoscopy was then performed to examine the small intestine. The examination showed a large diverticulum 80 cm proximal to the ileocecal valve and a circular ulcer. MD resection was performed using single-incision laparoscopic surgery (SILS) technique through a 3-cm zig-zag incision in the umbilicus. Three ports were inserted for the scope and forceps devices. The MD was located 80 cm proximal to the ileocecal valve. There were no other intestinal lesions. From the wound, the lesion could be easily moved outside the body. The MD including the ulcer lesion was then resected. The patient's postoperative course was good, and he rarely felt wound pain. He started dietary intake three days after surgery and was discharged from hospital eight days after surgery.

DISCUSSION: SILS technique has attracted attention in the field of laparoscopic surgery. Using a single port with multiple working channels, SILS can reduce the number of incisions and the rates of incisional hernia port site-related complications, as well as improve cosmesis.

CONCLUSION: A definite diagnosis of an MD was made by double-balloon endoscopy preoperatively. The SILS approach was effective for cosmesis, postoperative pain, and a shortened hospital stay.

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1. Introduction

Meckel's diverticulum (MD) is a common anomaly of the gastrointestinal tract [1]. Most patients with MD are asymptomatic, but some patients develop bleeding, inflammation, and perforation that requires surgical treatment [2]. In general, it has often been reported that the diagnosis of MD is difficult [2]. However,

with improvements in endoscopic technique, the rate of a confirmed diagnosis of MD may increase [3,4]. In regard to the surgical approach, less invasive surgery, such as laparoscopic surgery, is reported to be effective for patients with MD [5]. A case of bleeding due to MD that was diagnosed preoperatively using double-balloon endoscopy and in which single-incision laparoscopic surgery (SILS) was performed is reported. The work has been reported according to the SCARE criteria [6].

Abbreviations: SILS, single port laparoscopic surgery; MD, Meckel's diverticulum; CT, computed tomography.

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2. Presentation of case

A 79-year-old man with anemia and melena visited our hospital. He had received chemotherapy for diffuse large B-cell lymphoma. In the emergency room, his blood pressure and heart rate were 105/55 mmHg and 108/min, respectively. He had pain in the left side of the abdomen. There was no muscular guarding or rebound tenderness. Laboratory data showed severe anemia, and his hemoglobin level was 7.4 g/dl (Table 1). Abdominal computed tomography (CT) showed a high density of bowel fluid in the dis-

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Table 1
Laboratory data on admission.

Peripheral blood	
RBC	2.39 × 10 ⁴ /mm ³
Hg	7.4 g/dl
Hct	22.8%
WBC	3900/mm ³
Plt	10.4 × 10 ⁴ /mm ³
Biochemistry	
T-Bil	0.4 mg/dl
AST	23 IU/l
ALT	18 U/l
LDH	274 IU/l
ALP	245 U/l
Na	139 mg/dl
K	4.7 mg/dl
Cl	105 mg/dl
BUN	17 mg/dl
Cr	1.18 mg/dl
TP	6.2 g/dl
Alb	4.1 g/dl
CRP	6.2 g/dl



Fig. 1. Abdominal CT on admission. Abdominal CT shows high-density bowel fluid in the distal side of the ileum. There is no ascites, and no other suspicious bleeding points are seen.

tal side of the ileum (Fig. 1). Upper gastrointestinal series and colonoscopy were performed first, but no bleeding lesion, such as a gastric ulcer or a colonic diverticulum, was found. Thus, double-balloon endoscopy was performed to examine the small intestine. The examination showed a large diverticulum, 80 cm proximal to the ileocecal valve, and there was also a circular ulcer at the entrance of the diverticulum (Fig. 2a). No bleeding could be seen, but naked vessels were seen and clipped (Fig. 2b). The patient was diagnosed with bleeding due to an MD. The MD was then resected using SILS technique.

A 3-cm zig-zag incision was placed in the umbilicus. Then, EZ access® (Hakko-medical, Tokyo, Japan) was inserted through the wound. Three ports were used, one for the scope and two for handling forceps (Fig. 3a). First, the whole abdomen was observed; there was no ascites or adhesions. The ileum end was then identified, and the oral side of the ileum was examined gently. A Meckel's diverticulum was found 80 cm proximal to the ileocecal valve (Fig. 3b). There were no other abnormal lesions in the remaining intestine. The MD was easily elevated to the abdominal wall, and the pneumoperitoneum and intra-abdominal activity were thus stopped. From the first 3-cm wound, the lesion was easily moved outside the body. The wall of the middle of the diverticulum was hard due to the ulcer. The vitelline artery and vein were identified and ligated. The MD including the ulcer lesion was then resected

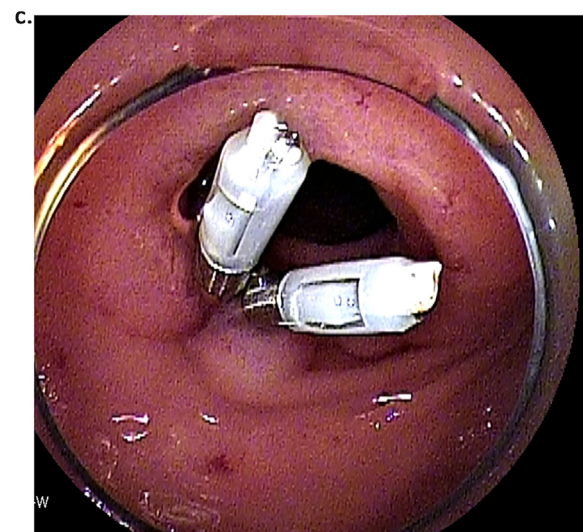
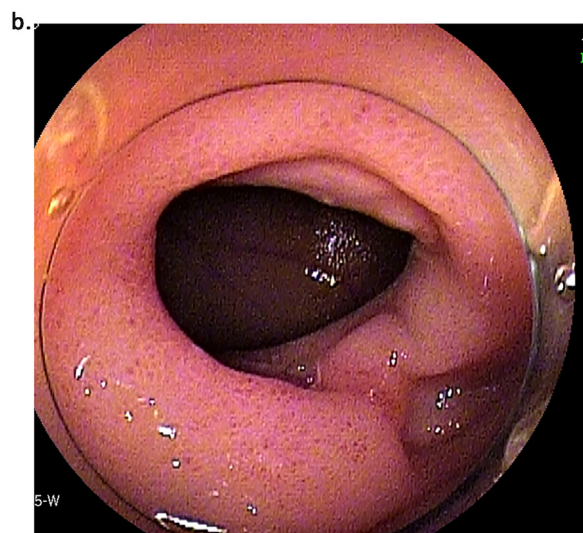
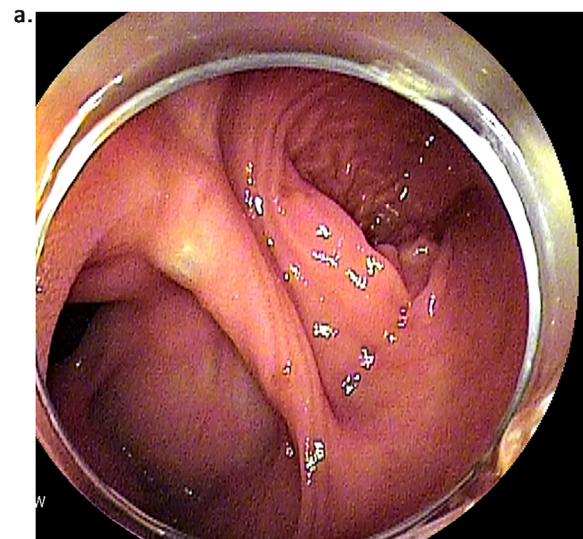


Fig. 2. Double-balloon endoscopy. Double-balloon endoscopy shows the large diverticulum 80 cm oral to the ileocecal valve (Fig. 2a). There is a circular ulcer at the entrance of the diverticulum. Naked vessels are seen, and the vessels are clipped (Fig. 2b, c).

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