Clinical Case Report

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Short bowel syndrome caused by laparoscopic loop enterostomy of the jejunum in an adult with undiagnosed intestinal malrotation

A case report

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Abstract

Rationale: Failure to recognize intestinal malrotation in adults can cause complications during surgeries, especially those with a limited operative field. We report a case of short bowel syndrome caused by mistaken creation of a loop enterostomy in the jejunum due to undiagnosed intestinal malrotation.

Patient concerns: A 72-year-old man underwent a laparoscopic right hemicolectomy and ileocolostomy because of complicated diverticulitis. Six days after the surgery, he received laparoscopic exploration because of anastomotic leak, and a laparoscopic loop ileostomy was also performed as a protective diversion stoma. One month after surgery, he complained of severe diarrhea from the enterostomy after food and water intake. An upper gastrointestinal and small bowel series revealed that the duodenojejunal junction (DJJ) did not cross the midline and there was a short distance between the DJJ and the enterostomy in the right lower quadrant.

Diagnoses: Short bowel syndrome caused by mistaken creation of a loop enterostomy in the jejunum due to undiagnosed intestinal malrotation.

Interventions: Total parental nutrition was used and the loop enterostomy was closed 3 months after the initial surgery.

Outcomes: The patient was discharged uneventfully 2 weeks after the loop enterostomy.

Lessons: Intestinal malrotation in adults is often encountered during routine radiological examinations. However, it may cause complications during surgery if ignored. Radiologists should keep in mind that complications may occur if a complete presurgical evaluation of intestinal malrotation is not performed, and surgeons should take caution when performing surgeries, especially those with a limited operative field.

Abbreviations: CT = computed tomography, DJJ = duodenojejunal junction, IRB = Institutional Review Board, SB = small bowel, UGI = upper gastrointestinal.

Keywords: complication, duodenojejunal junction, intestinal malrotation, laparoscopic loop ileostomy, short bowel syndrome

1. Introduction

Intestinal malrotation is a congenital anomaly usually diagnosed in the neonatal period, whereas the diagnosis of asymptomatic intestinal malrotation in adults is rather uncommon.[1] Intestinal malrotation results from incomplete rotation and fixation of the midgut during embryonic development.[2] The altered anatomy causes symptoms during the first year of life in 90% of cases, and it is conventionally described as a condition in infancy.[3] Although less common, intestinal malrotation in adulthood can either have no symptoms and seen as an incidental finding during routine radiological examinations or present as emergent conditions. Few recent reports described the manifestation in adolescent and adults, as both emergency conditions and chronic gastrointestinal symptoms.[4–6]

We report a case of intestinal malrotation that was not recognized preoperatively and caused short bowel syndrome as a surgical complication. As far as we know, no similar cases have been reported before. The aim of this case report was to increase knowledge concerning this diagnosis and surgeons should be aware of the possibility of asymptomatic intestinal malrotation.

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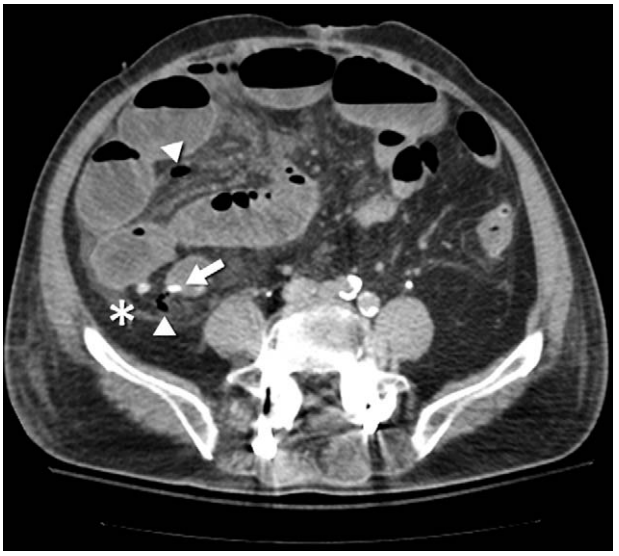

Figure 1. Intraperitoneal fluid (*) and free air (arrowheads) near the anastomosis (arrow), consistent with anastomotic leak.

2. Case presentation

A 72-year-old man presented with hematochezia for 2 days. He had a medical history of controlled diabetes mellitus. The results of the initial physical examinations were normal. Blood tests revealed a slightly low level of hemoglobin (12.3 g/dL). Colonoscopy revealed colonic diverticular bleeding 80 cm above the anus (over the hepatic flexure). In the following 2 days, repeated hematochezia and a further decrease in hemoglobin level (9.1 g/dL) occurred, and the patient underwent emergency surgical intervention.

Laparoscopic right hemicolectomy with ileocolostomy was performed using the single-port laparoscopic technique. Six days after surgery, the patient complained of progressive abdominal fullness and bloody turbid pus from the drainage tubes. Enhanced abdominal computed tomography (CT) revealed suspicious anastomotic leakage and diffuse dilation of the small intestine (Fig. 1). Exploratory laparoscopy revealed leakage from the distal portion of the ileocolostomy, causing an abscess. A loop ileostomy with minilaparotomy was performed as a protective diversion stoma. The patient was transferred to another hospital on postoperative day 3.

One month after surgery, the patient returned to the emergency room complaining of severe diarrhea from the enterostomy for 2 weeks. According to the patient's statement, undigested food came from the enterostomy after oral intake. An upper gastrointestinal (UGI) and small bowel (SB) series showed that the duodenojejunal junction (DJJ) did not cross the midline and there was a short distance between the DJJ and the enterostomy in the right lower quadrant of the abdomen (Fig. 2 A, B). Based on this, we diagnosed his condition as short bowel syndrome caused by the enterostomy in the jejunum. Total parental nutrition was applied and the loop enterostomy was closed 3 months after the initial right hemicolectomy and ileocolostomy.

The case report was approved by the Chang Gung Medical Foundation Institutional Review Boards (IRBs), Taoyuan, Taiwan. The patient consent was waived by the IRB.

3. Discussion

Intestinal malrotation is a congenital anomaly resulting from incomplete rotation and fixation of the midgut and is classified as true malrotation, nonrotation, or atypical malrotation. In many cases, true malrotation represents symptomatic intestinal malrotation seen in infancy, whereas nonrotation represents most cases identified in the older population.[7]

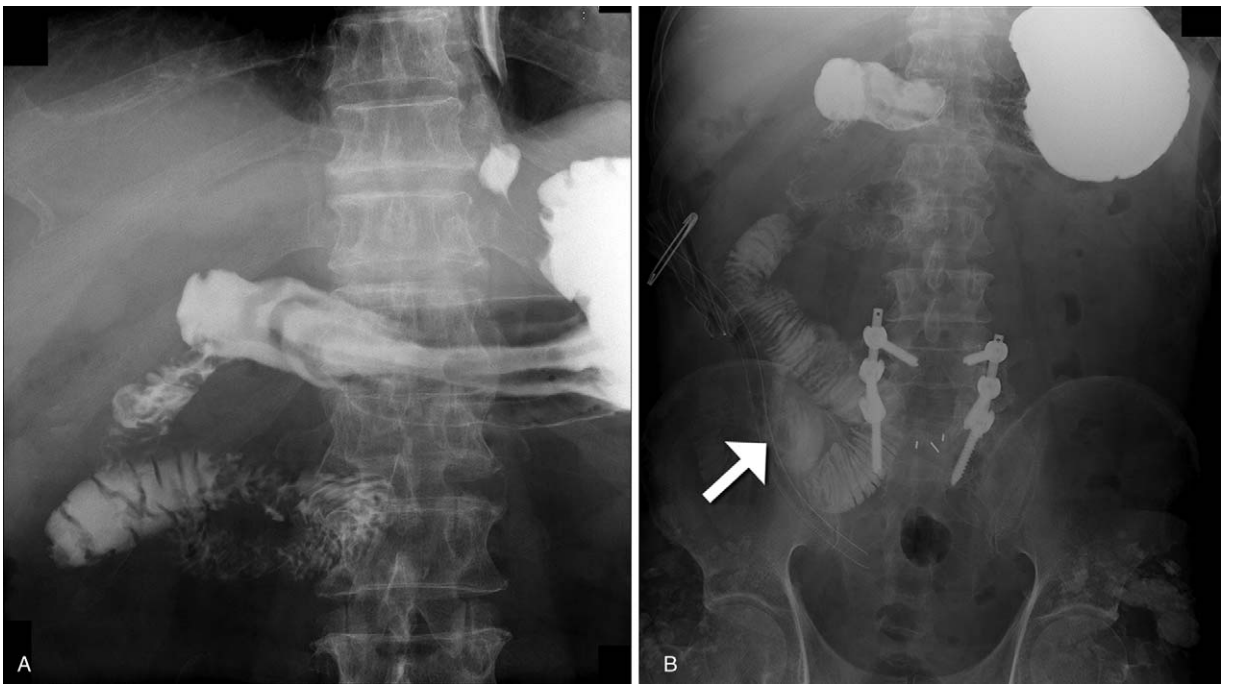

Figure 2. A, An upper gastrointestinal and small bowel series showed that the duodenojejunal junction (DJJ) did not cross the midline and (B) there was a short distance between the DJJ and the enterostomy (arrow). Short bowel syndrome was diagnosed.

The actual incidence of intestinal malrotation is unknown. Patients are diagnosed primarily in the first month of life, whereas asymptomatic cases are generally undetectable after childhood. The incidence of malrotation in adults is approximately 0.2%.[8] Autopsy studies suggest that malrotation is present in 0.5% to 1% of the adult population.[2] Most malrotation in adults can be detected by imaging tests or during surgery.[9]

A UGI and SB series remains the standard for diagnosing malrotation. The site of DJJ or the duodenojejunal flexure should be precisely evaluated as it is the anatomical landmark.[9] The normal position of the DJJ is typically lateral to the left pedicle of the vertebral body at the level of the duodenal bulb in coronal view. CT can determine the variant of malrotation; however, many radiologists do not describe these findings in their daily reports.

Obviously, undiagnosed malrotation was the cause of short bowel syndrome in this case (Fig. 3A, B). In the record of the initial laparoscopic right hemicolectomy, the surgeon stated that it was difficult to identify the ileocolic artery and vein. The altered relative position of the superior mesenteric artery and vein is suggestive of intestinal malrotation.[10] Furthermore, the changed location of the cecum and terminal ileum is a clue to the surgeon when mobilizing these structures. However, the cecum and terminal ileum were in almost the normal position in this case (Fig. 3C). Considering the second laparoscopic operation for loop ileostomy, lack of anatomical landmark as reference and

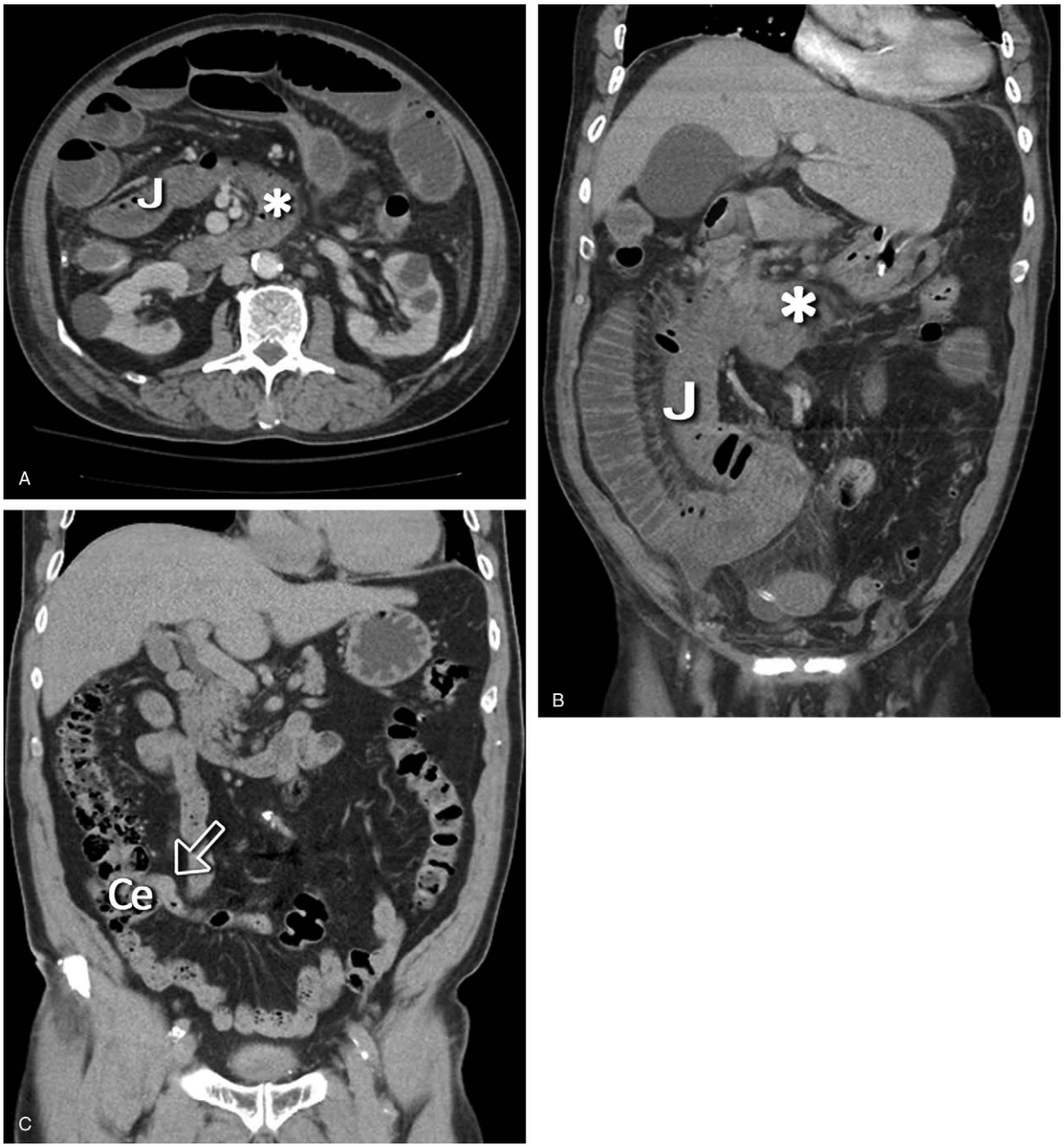

Figure 3. Axial (A) and coronal images (B, C) of the initial computed tomography scan showed that the duodenojejunal junction (DJJ; * in A, B) did not cross the midline, and the jejunum (J) was located over the right abdomen. However, the cecum (Ce) and terminal ileum (open arrow) were in almost the normal position.

utilizing single-port laparoscopic technique with limited inspect, both of which attributed to the mistake.

The major limitation of this condition is that the primary diagnosis of asymptomatic intestinal malrotation is easily ignored. With the increasing use of minimally invasive surgery, especially for surgical procedures with limited surgical field of view, such as laparoscopy and Da Vinci robotic surgery, a similar situation is more likely to occur. In addition, some conditions, such as anastomotic leak, infection, peritoneal carcinomatosis, adhesion may further worse the situation. Preoperative CT scans are helpful and the radiologists should conduct a comprehensive assessment of gastrointestinal vasculature, intestinal anatomy, and viability in their reports. In selective case of suspected intestinal malrotation, an additional study of UGI and SB series is recommended.

In conclusion, asymptomatic intestinal malrotation in adults is often ignored during routine radiological examinations and may result in complications during surgery. Radiologists should keep in mind that complications may occur if a complete presurgical evaluation of intestinal malrotation is not performed, and surgeons should take caution when performing surgeries, especially those with a limited operative field, such as laparoscopy and da Vinci robotic surgery.

Author contributions

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Writing – review and editing: Li-Sheng Hsu, Wen-Shih Huang, Jun-Cheng Weng, Chien-Wei Chen.

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