Rare Cases of Two Types of Meckel's Diverticulum

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ABSTRACT

Introduction: Symptomatic Meckel's diverticulum during pregnancy and inverted Meckel's (" windsock ") diverticulum are rare occurrences. Preoperative diagnosis is difficult, and inverted diverticulum can be misdiagnosed as lipoma.

Case Description: We report a case of Meckel's diverticulum during pregnancy, causing a hernia of the small intestine, and a case of inverted Meckel's diverticulum causing an ileocolic intussusception.

Discussion: When dealing with small-bowel obstruction of unknown origin, Meckel's diverticulum is a cause that is easy to miss. Early laparoscopic exploration helps as an auxiliary diagnostic tool and can avoid small-bowl necrosis or intestinal perforation caused by long-standing small bowel obstruction.

Key Words: Bowel malformation, Laparoscopic surgery, Meckel's diverticulum, Pregnancy.

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INTRODUCTION

Meckel's diverticulum is the most common digestive tract malformation, with about a 2% incidence in the general population.[1] The most common location is at 45 to 60 cm of the ileocecal junction. Commonly, Meckel's diverticulum invagination is a projection of the intestinal layers from the lumen into the intestinal wall, but rare cases have inward growth, with the diverticulum bulging into the lumen. This inverted diverticulum is referred to as a "windsock" growth.[2] About only 3.7 to 6.4% of patients with Meckel's diverticulum will manifest symptoms in their lifetime,[1] and symptomatic Meckel's diverticulum during pregnancy is very rare. We report 2 cases of rare Meckel's diverticulum: one diagnosed during pregnancy and leading to recurrent incomplete intestinal obstruction and the other an inverted "windsock" diverticulum with intussusception.

Case 1

A patient, 28 years of age, at 20 weeks' gestation, presented to the Emergency Department with symptoms of recurrent abdominal cramping pain associated with nausea and vomiting for 1 month. Symptomatic treatment was administered with obvious relief, but the symptoms reappeared after meals. Abdominal ultrasonography showed signs of general small-bowel expansion and ascites. Abdominal magnetic resonance imaging showed intraperitoneal bowel expansion with effusion (**Figure 1**). The patient had a history of laparoscopic ovarian cyst enucleation on the right side ovary. Because of the recurrence of symptoms and failure of conservative treatment, laparoscopic exploration under general anesthesia was performed. A fibrous band had formed in the right lower quadrant where a drainage tube had been placed during the laparoscopic ovarian surgery (**Figure 2A**, the arrow shows the fundus of the uterus). A careful dissection of the band was unsuccessful in releasing the herniated small intestine. Further exploration found a linear tissue on the ileum near the ileocecal valve, with the top connected to the ileocecal mesentery. After a successful dissection of the adhesion, the structure was found to be a small-bowel diverticulum (**Figure 2B**, arrow, Meckel's diverticulum;

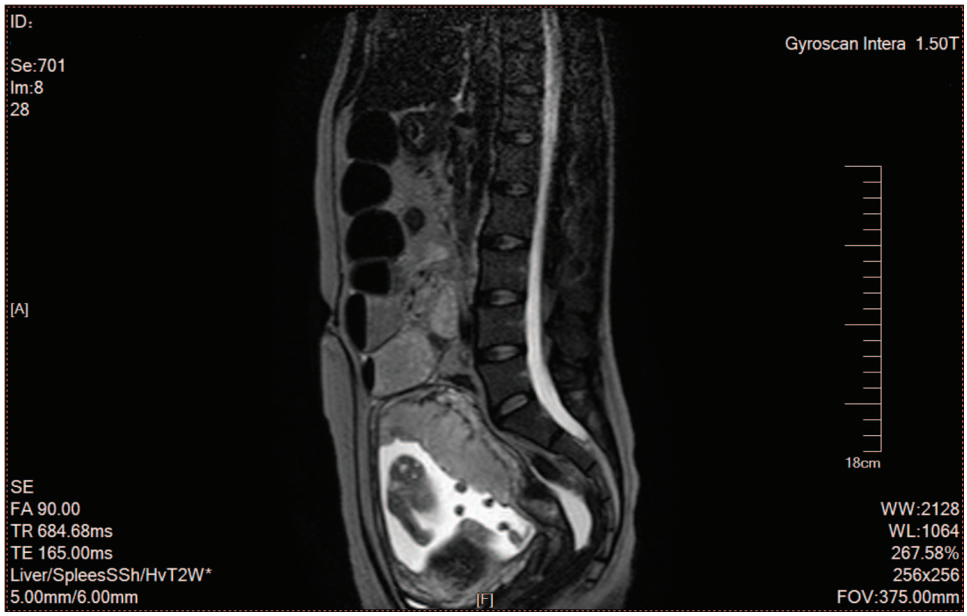

Figure 1. Abdominal magnetic resonance imaging showed intraperitoneal bowel expansion with effusion.

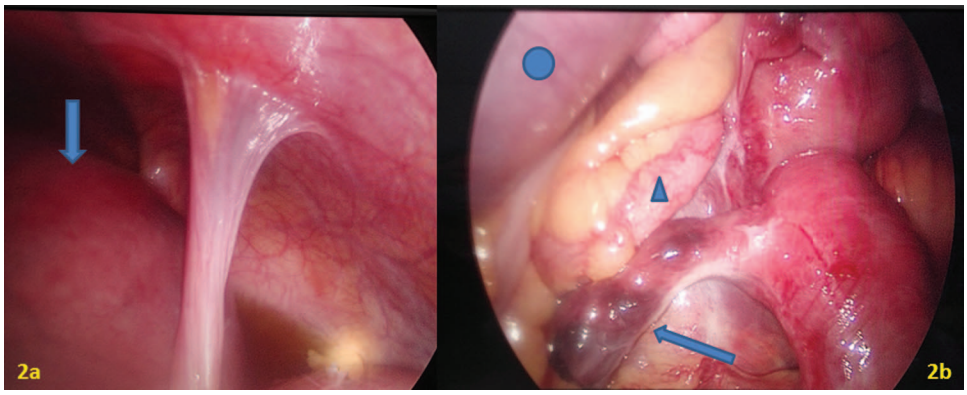

Figure 2. The fibrous band had formed in the right lower quadrant where a drainage tube had been placed during the laparoscopic ovarian surgery. The arrow shows the fundus of the uterus (Fig 3A). After a successful dissection of the adhesion, the structure was found to be a small-bowel diverticulum. The arrow shows Meckel's diverticulum. The arrowhead shows the appendix. The circle shows the uterine fundus (Fig 3B).

arrowhead, the appendix, circle, the uterine fundus). A laparoscopic resection of the diverticulum was performed, no drainage tube was left in, and the patient was discharged after 3 days.

Case 2

A male patient, 14 years of age, was brought to the Emergency Department for right lower quadrant abdominal pain of 8 days' duration. Abdominal computed tomography (CT) showed ileocolic intussusception (**Figure 3A**, yellow arrow). Colonoscopy revealed a polyp lesion (**Figure 3B**, yellow arrow), and biopsy of the intestinal mucosa showed inflammatory changes (**Figure 3C**). On intraoperative exploration, an ileocolic intussusception was found near the ileocecal valve (**Figure 4A**, yellow arrow). After the nested section was released, at a distance of ~25 cm from the ileocecal valve, a mushroom shaped structure was seen to protrude from the small-bowel wall into the lumen; a biopsy showed normal intestinal mucosa (**Figure 4B**, yellow arrow, diverticulum inverted into the lumen).

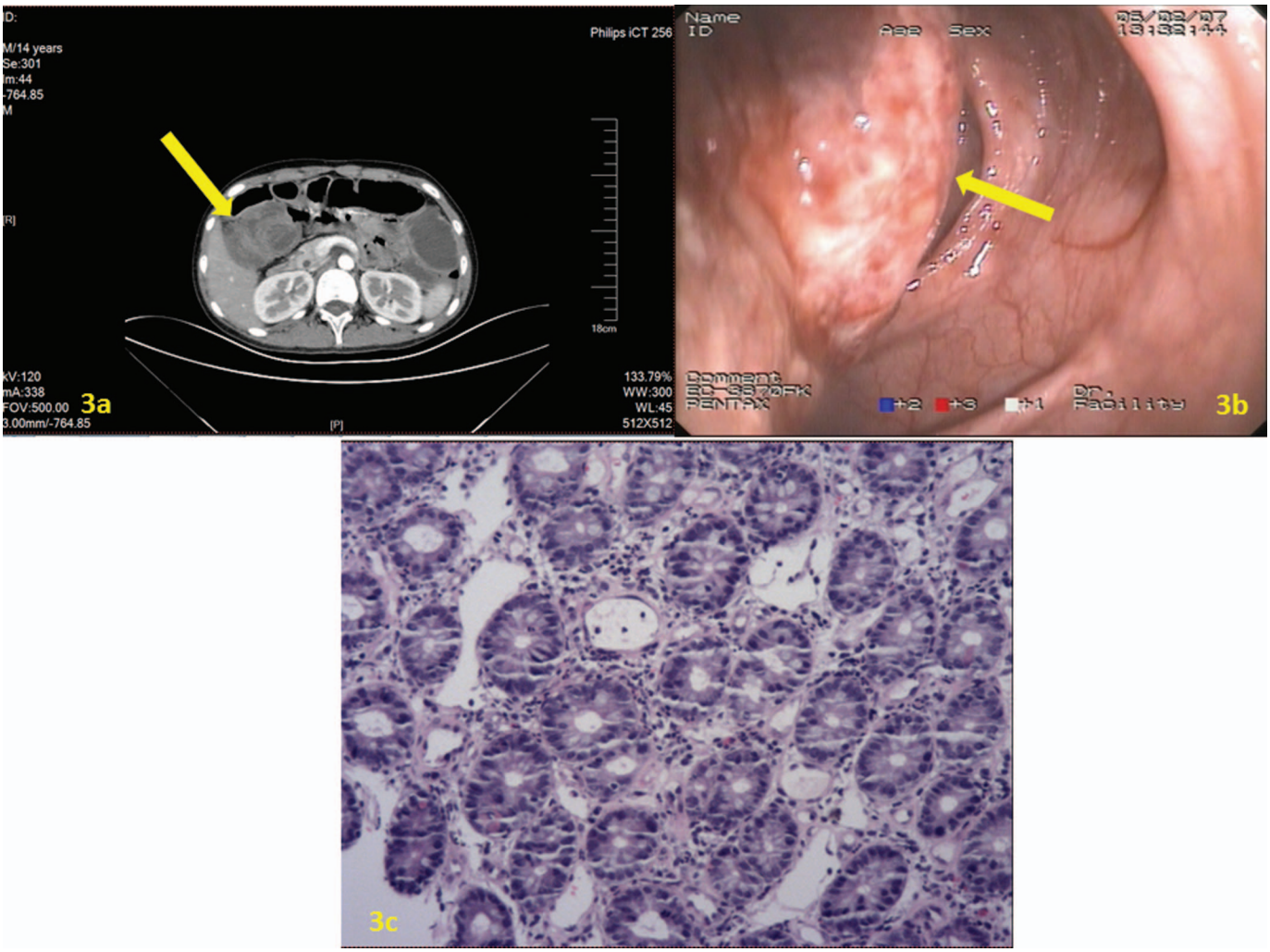

Figure 3. Abdominal computed tomography (CT) showed ileocolic intussusception (Figure 3A, yellow arrow). Colonoscopy revealed a polyp lesion (Figure 3B, yellow arrow). Biopsy of the intestinal mucosa showed inflammatory changes (Figure 3C).

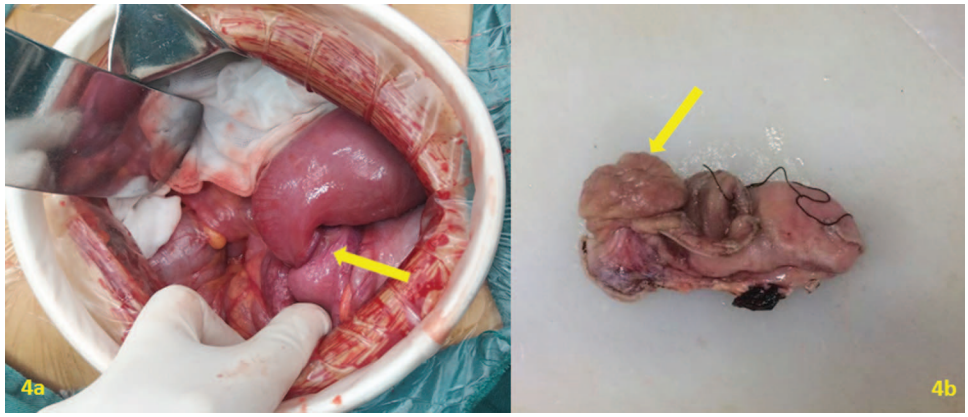

Figure 4. An ileocolic intussusception was found near the ileocecal valve (Figure 4A, yellow arrow). The diverticulum inverted into the lumen (Figure 4B, yellow arrow).

Six days after intestinal resection and anastomosis, the patient was discharged from the hospital.

DISCUSSION

The clinical manifestations of Meckel's diverticulum are not specific. They can resemble appendicitis, cholecystitis, renal colic, or gastrointestinal symptoms of ulcer disease. Small bowel obstruction is the most common manifestation of Meckel's diverticulum, accounting for ~40% of all cases.[3] A small-intestine hernia in Meckel's diverticulum commonly causes small-bowel obstruction. Rudloff et al[1] reviewed the existing literature on symptomatic Meckel's diverticulum during pregnancy from 1949 to 2005. They found 22 cases, all reported individually.[1] After 2005, only 1 case report has been published.[4]

In case 1 reported herein, the patient was in her second trimester of pregnancy, the uterine fundus height was considerable, and a decision was made to use laparoscopic exploration to reduce trauma to both the patient and fetus. With her history of surgery, we thought the small-intestine hernia was caused by a fibrous band, formed by the healing scar of the drainage tube incision, and the main lesion was almost ignored. In laparoscopy, fully free and mobile loops of bowels are a mark of a successful hernia reduction. Recently, the safety of laparoscopic surgery in early and mid pregnancy has been established and received wide acceptance.[5–7] Studies have shown that there is no statistically significant difference between the odds of abortion after laparoscopic appendectomy in early and mid pregnancy and the odds after open appendectomy during the same period.[6] The advantages of laparoscopic surgery during pregnancy are obvious. It plays an important role, especially in abdominal lesions and exploration and diagnosis of abdominal pain of unknown origin. In addition, laparoscopic surgery during pregnancy provides direct vision of the uterine body and helps to avoid manipulating the uterus, while enabling exploration of the entire abdomen, thus providing a reliable basis to formulate the best treatment plan.

Case 2 is an inverted type of Meckel's diverticulum, known as a windsock diverticulum. Such diverticula are mostly seen in the duodenum and are incidentally found when patients are undergoing duodenal endoscopy.[5] Inverted Meckel's diverticulum of the small bowel is easy to misdiagnose as lipoma.[2] In this case, a colonoscopy found a mass, and pathology showed inflammatory changes of the intestinal mucosa. Thus, the diagnosis of windsock Meckel's diverticulum was made. The value of laparoscopy in intestinal diverticulum surgery has received wide recognition,[7] but ours was a case of ileocecal intussusception, shown by preoperative CT. Taking into consideration the difficulty of laparoscopic reduction, we adopted an open method. During surgery, intussusception of the terminal ileum up to the hepatic flexure was found. The lesion was bimanually reduced, alternating hands in squeezing the ileum out of the ascending colon. Though simple, this move is effective in reducing the intussusception and would prove to be difficult if performed laparoscopically.

Preoperative diagnosis of Meckel's diverticulum is difficult because it often lacks specific clinical symptoms and imaging findings. In the author's experience, a sudden small-bowel obstruction with no apparent cause (such as a history of abdominal surgery), with imaging (especially whole-abdomen enhanced CT) showing a partly enlarged small bowel and finding no obvious space-occupying lesions, is commonly caused by hernia into the small bowel lumen of a Meckel's diverticulum and often requires surgery. Early in the obstruction, laparoscopic exploration is effective in discovering the etiology, and early surgery can avoid complications caused by long-standing small bowel obstruction, such as intestinal necrosis or bowel perforation.

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