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IMAGES IN SURGERY

A Rare Internal Herniation in Adult: Meckel's Diverticulum

Y. Narjis · H. Halfadl · A. Agourram · K. Rabbani · B. Finech

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Abstract Intestinal obstruction due to Meckel's diverticulum is the most common presentation in adults. There are various mechanisms by which it can cause intestinal obstruction such as volvulus of small intestine around a fibrous band extending from Meckel's diverticulum to umbilicus, intussusception, and Littre's hernia. We report the case of a young adult operated on emergency for acute intestinal obstruction. The CT scan suggested a nonspecific internal herniation. Surgical exploration confirmed a rare type of obstruction due to Meckel's diverticulum.

Keywords Meckel's diverticulum · Obstruction · CT scan

Introduction

Meckel's diverticulum (MD) is named the remnant of the omphalomesenteric duct (vitelline duct), which is normally obliterated by the fifth week of gestation. It was first described by Fabricius Hildanus in 1598. The name is derived from a German anatomist Johann Friedrich Meckel who described the embryological and pathological features in 1809 [1]. The main complications of MD are volvulus or small bowel obstruction [2], bleeding [3], perforation [4], and acute inflammation [5].

Y. Narjis · H. Halfadl · A. Agourram · K. Rabbani · B. Finech
Department of General Surgery,
Universitary Hospital Mohamed VI, Cadi Ayad University,
Marrakech, Morocco

Y. Narjis (✉)
Faculté de médecine et de pharmacie de Marrakech,
BP: 7010, Sidi Abbad,
40000 Marrakech, Morocco
e-mail: y.narjis@yahoo.fr

Case Report

A 24-year-old male patient suffering from abdominal pain, nausea, vomiting, and dyspeptic complaints over the past 4 days was admitted to our emergency department. He denied any surgery or intra-abdominal inflammatory process.

Abdominal examination revealed tenderness of the entire abdomen which was distended, but no mass was palpated. We recorded normal findings at digital rectal examination.

The laboratory data were not contributing, except an increase in the white blood cell count (14,000/mL) with a neutrophilic predominance (80 %). Abdominal X-ray demonstrated dilated small bowel loops (Fig. 1a and b). An emergency CT examination suggested an internal herniation but could not define the exact type of this herniation (Fig. 2a and b). We made a preoperative diagnosis of internal hernia, but we did not know the exact type of this herniation.

On laparotomy, we found that a 10 cm long noncyanotic segment of the small bowel was strangulated by a complete Meckel's diverticulum, at a point 50 cm proximal to the ileocecal valve. We reduced the small bowel and did a small bowel resection with Meckel's diverticulum (Figs. 3a and b and 4). The postoperative course was uneventful and the patient recovered quickly 6 days postoperatively. The histological examination showed no abnormalities.

Discussion

Meckel's diverticulum is the remnant of the prenatal yolk stalk (vitello-intestinal duct). The yolk sac of the developing embryo is connected to the primitive gut by the yolk stalk or vitelline (i.e., omphalomesenteric) duct. This structure normally regresses between the fifth and seventh weeks of fetal life. If this process of regression fails, various anomalies can

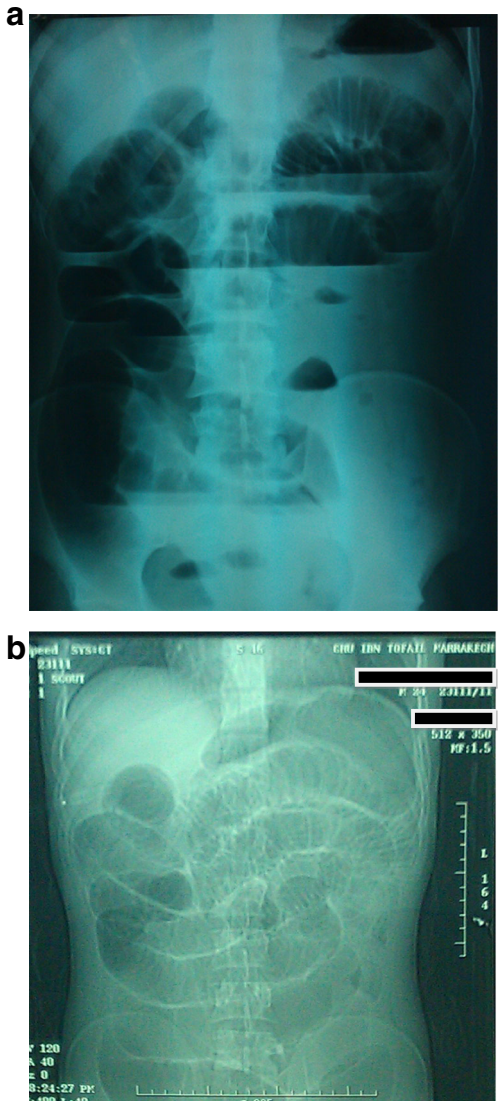

Fig. 1 **a** and **b** Abdominal X-ray showing dilated small bowel loop

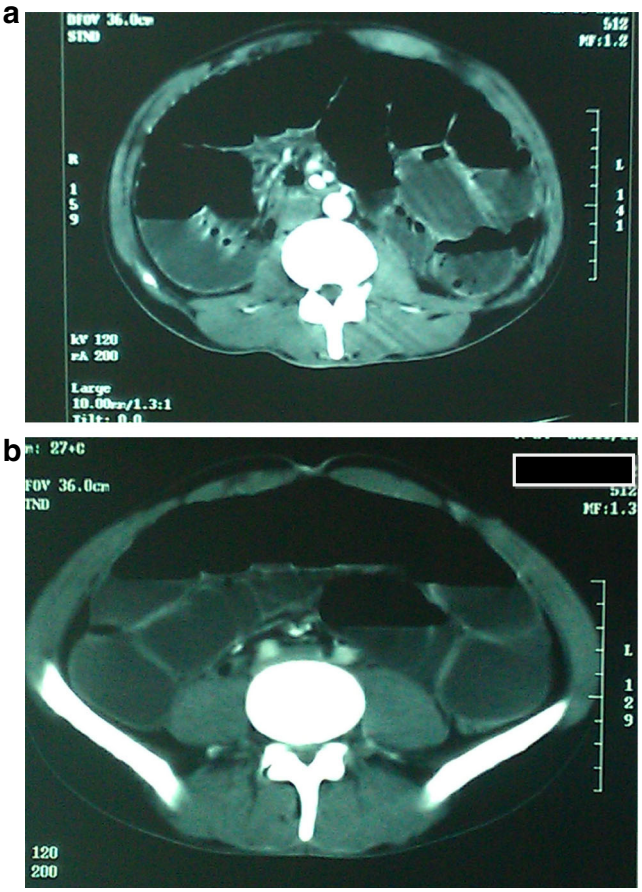

Fig. 2 **a** and **b** CT scan suggesting internal herniation

occur. The spectrum of defects includes Meckel's diverticulum, a fibrous cord attaching the distal ileum to the abdominal wall, an umbilical intestinal fistula, a mucosa-lined cyst, or an umbilical sinus. Of these, Meckel's diverticulum is the most common congenital anomaly of the gastrointestinal tract in humans occurring in approximately 2 % of the population with equal incidence in males and females [6].

The three most common complications of Meckel's diverticulum are bleeding, obstruction, and inflammation. Meckel's diverticulum is commonly more complicated in children. In adults, it usually remains asymptomatic.

There are various mechanisms by which it can cause intestinal obstruction [7]:

- Volvulus of small intestine around a fibrous band extending from Meckel's diverticulum to umbilicus, like in our patient.
- Intussusception: Meckel's diverticulum sags into the bowel lumen and then serves as a lead point to allow telescoping of the small intestine into first the distal ileum and then into the large intestine causing ileoileal and ileocolic types of intussusception.
- Littre's hernia: Incarceration of the diverticulum in hernia (inguinal and femoral) causing intestinal obstruction.
- Entrapment of small bowel beneath the blood supply of the diverticulum, also known as a mesodiverticular band.
- Stricture secondary to chronic diverticulitis.
- Meckel's diverticulum lithiasis: The formation of stones in Meckel's diverticulum can cause small bowel obstruction by two mechanisms: (1) it can cause impaction in the terminal ileum after its extrusion from the diverticulum and (2) by promoting local inflammation of the diverticulum and intussusception
- Band extending between the diverticulum and the base of the mesentery, forming a loop in which a part of ileum may get stuck causing obstruction.

CT is rarely used when Meckel's diverticulum is suspected because distinction between a diverticulum and

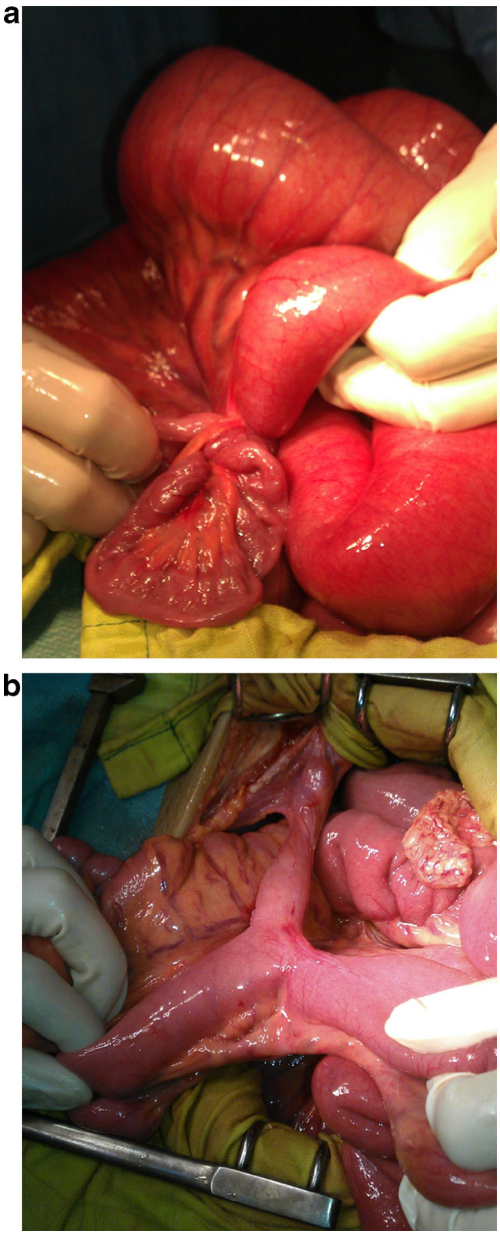

Fig. 3 **a** and **b** Preoperative views showing Meckel's diverticulum strangulating the small bowel

intestinal loops is usually impossible, even though CT is more specific than US. An invaginated Meckel's diverticulum, especially if it is associated with an intussusception, appears as an intraluminal mass composed of a central lesion with the attenuation of fat (representing the entrapped mesenteric fat of the inverted diverticulum) surrounded by a collar of soft tissue attenuation [8].

Laparoscopy is a safe diagnostic and therapeutic tool that can overcome all diagnosis problems. It decreases the time spent for diagnosis and theoretically avoids the morbidity and mortality of a delayed diagnosis while keeping costs at a minimum [9].

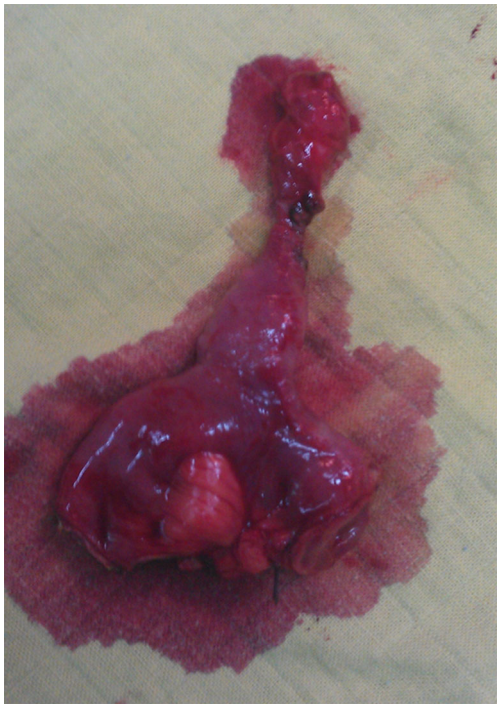

Fig. 4 The small bowel including Meckel's diverticulum resected

Conclusion

Complicated Meckel's diverticulum in adults is rare. The preoperative diagnosis by CT examination is rarely possible. Laparoscopy may help in diagnosis and treatment of this rare pathology.

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