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Inverted Meckel's diverticulum as a leading point for ileoileal intussusception in an adult: case report

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Abstract

Intussusception due to an inverted Meckel's diverticulum is considered a rare occurrence. We present a case of a 37-year-old male with anemia and melena due to an inverted Meckel's diverticulum at the base of an ileoileal intussusception. To our knowledge, this is the first case in which small bowel enema, computed tomography, and magnetic resonance imaging showed the pathology.

Key words: Intussusception—Adult—Meckel's diverticulum—Inverted.

Meckel's diverticulum is the most common congenital anomaly of the gastrointestinal tract, occurring in 1–3% of the population according to autopsy studies [1]. In 1812, Meckel [2] stated that the risk of complications was approximately 25%. More recent investigations have shown that not even 5% of those with Meckel's diverticulum develop complications during their lifetimes [3]. Those complications are bleeding, infection, intussusception, and neoplasm. Gastrointestinal bleeding secondary to peptic ulceration of heterotopic gastric tissue is the most common complication. Although the incidence of Meckel's diverticulum is high, inversion is quite rare and only a few cases have been reported.

Case report

A 37-year-old male was hospitalized with a 4-day history of headache and complaints of fatigue, dyspnea, and retrosternal pain. Melena was mentioned on admission. The patient was not using any specific medication and his medical history did not suggest a major disease. Physical examination showed a pale-looking patient, without abdominal tenderness. Rectal examination found occult blood in the stool and laboratory results showed a hemoglobin level of 5.4 g/dL (normal = 13–16.5 g/dL). Blood values showed normochromic normocytic anemia. Because of the melena, a gastrointestinal cause was sought to explain the patient's hemorrhage.

Upper gastrointestinal endoscopy, colonoscopy, red blood cell count, and Meckel scans were normal. Spiral computed tomography (CT) before and during contrast showed the characteristic "target lesion" in the right lower quadrant, indicating an intussusception (Fig. 1). A submucosal lipoma or an appendicocele was assumed to be the underlying cause. Small bowel enema showed an 5-cm intraluminal mass in the ileum, located 50–80 cm from the ileocecal valve (Fig. 2). Considering the clinical data, inverted Meckel's diverticulum was proposed as the most obvious diagnosis. T1- and T2-weighted images with and without fat suppression and gadolinium-enhanced dynamic T1-weighted images were taken. The loop-in-loop or target lesion was cofirmed, and axial and coronal images showed a polypoid intraileal lesion that was hypointense on T1- and T2-weighted images and without uptake of gadolinium (Fig. 3). Those findings correlated well with the findings from the small bowel enema. The patient's anemia was treated with transfusion and a laparoscopic-assisted partial small bowel resection was performed. At surgery, inverted Meckel's diverticulum was found 60 cm from the ileocecal valve and was the lead point for the ileoileal intussusception. The inverted diverticulum presented as a polypoid mass that was 8 cm long and 3 cm in diameter. Pathologic examination of the specimen confirmed the diagnosis of inverted Meckel's diverticulum and revealed a heterotopic stomach and pancreatic tissue without signs of malignancy.

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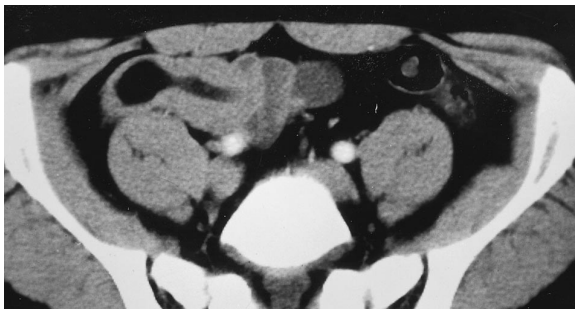

Fig. 1. Contrast-enhanced CT shows the characteristic "target lesion" in the right lower quadrant, indicating an intussusception. Retrospectively, Meckel's diverticulum presents as a hypodense intraluminal mass containing intraluminal air.

Five days after intervention, the patient left the hospital in good health.

Discussion

The ductus omphalomesentericus connects the midgut and yolk sac after 7 weeks of gestation [4]. If this fetal duct does not disappear, it may become an omphalomesenteric fistula, an enterocyst, a fibrous band connecting the small intestine to the umbilicus, or Meckel's diverticulum. The latter is formed when the intestinal end of the duct does not close. Meckel's diverticula account for 90% of all omphalomesenteric duct anomalies [1]. It opens into the antimesenteric side of the ileum at an average distance of 50 cm [5]. When an inverted diverticulum is found as a lead point for intussusception, it is thought that the invagination itself is a primary pathophysiologic process caused by inadequate drainage of secretions caused by irritation and inflammation and is not secondary to the intussusception [6, 7]. Heterotopic pancreatic tissue and coproliths may be another cause of such an invagination [8]. However, inversion of the diverticulum into the lumen of the gut can occur without symptoms or complications [9]. The present case is unique in that barium enema, CT, and magnetic resonance imaging (MRI) were correlated and contributed to the correct preoperative diagnosis.

Despite the availability and wide use of modern imaging techniques, such a specific preoperative diagnosis of Meckel's diverticulum is rare because of the poor pathognomonic signs and symptoms of complications. Only a few cases of inverted Meckel's diverticulum have been described, and these presented bleeding or melena and usually caused obstruction. Our patient presented minimal abdominal symptoms and was bothered chiefly by his anemia.

Plain films usually are nonspecific. Radiographic signs were reported first in 1968 by Fetterman who described a polypoid mass during small bowel enema [10].

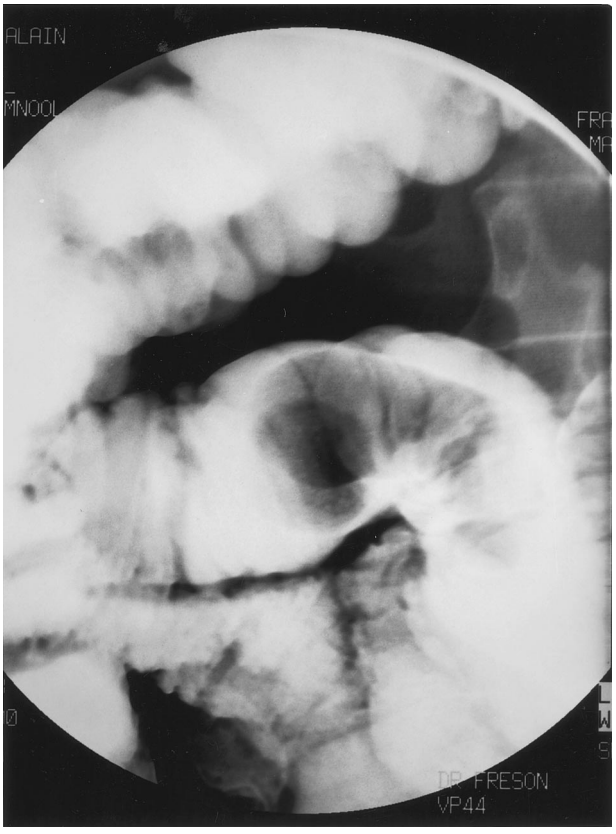

Fig. 2. Small bowel enema shows a polypoid intraluminal mass of approximately 5 cm in the ileum, approximately 50–80 cm from the ileocecal valve.

On barium examination, the diagnosis is suggested by secondary findings such as intussusception or mass effect and the diagnosis should be made only when the characteristic oblong filling defect is identified in the distal ileum.

CT findings usually are nonspecific because distinguishing between a diverticulum and intestinal loops is impossible in most cases. CT images are specific only if the serosal fat of the inverted diverticulum is seen in the center of the intussusception [11].

MRI was the only technique to clearly visualize the characteristic oblong ileal filling defect of the inverted diverticulum and the classic target sign compatible with ileoileal invagination.

Although CT is an excellent modality to diagnose intussusception, an underlying cause usually remains speculative. In patients with anemia and melena or an intussusception and, if the patient's condition allows it, a small bowel enema might be the imaging modality of choice to diagnose the underlying pathology as an inverted Meckel's diverticulum. Although MRI showed the intussusception and its cause, its overall benefit in the search for complications of Meckel's diverticulum is un-

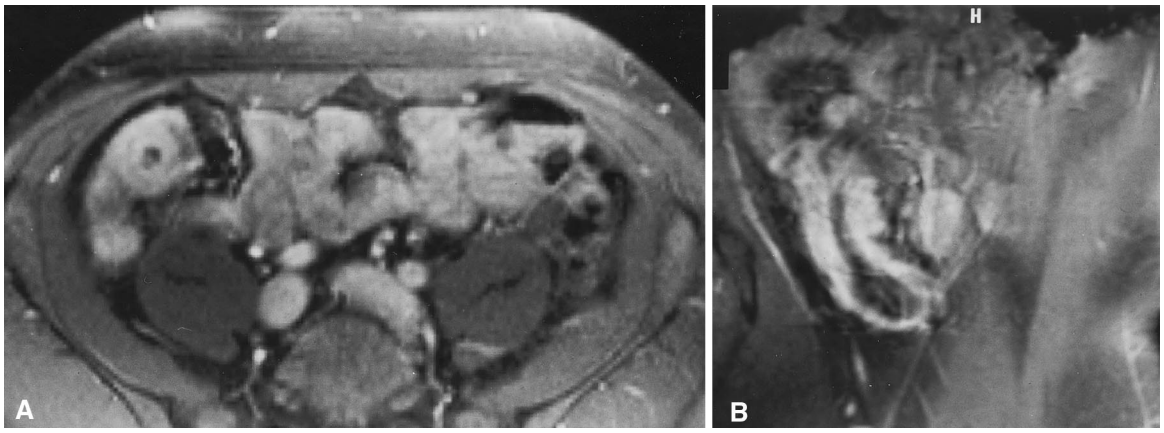

Fig. 3. T1-weighted contrast-enhanced (**A**) axial and (**B**) coronal images with fat-suppression technique confirms the loop-in-loop or target lesion on the axial image. The hypointense, noncontrast filling defect is visible.

clear because we did not find any comparative study in the literature.

Despite the availability and wide use of classic and modern techniques, the diagnosis of inverted Meckel's diverticulum remains a challenge.

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