Inverted Meckel’s Diverticulum as a Source of Lower Gastrointestinal Bleeding: a case report

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Meckel’s diverticulum is the most common congenital abnormality of the gastrointestinal tract, occurring in about 2-3% of the population. It is the remnant of omphalomesenteric (vitelline) duct, which is usually located within 100 cm of the antimesenteric border of the terminal ileum. Meckel’s diverticulum rarely causes symptoms, but sometimes it may invert or invaginate into the intestinal lumen, causing intussusception, obstruction, or intestinal bleeding. We present a rare case of Meckel’s diverticulum inverting into the ileal lumen causing vague abdominal pain and lower gastrointestinal bleeding.

Key words: Gastrointestinal bleeding; Meckel’s diverticulum

CASE REPORT

A 31-year-old man presented to our hospital because of the passage of bloody stool for 4 days. He had vague abdominal pain, as well as distention, malaise, and dizziness for 1 week, which prompted him to consult a primary care physician. Endoscopy and colonoscopy showed negative results. The patient’s signs and symptoms persisted and were accompanied by bloody stool. Hence, he was transferred to our hospital.

Upon evaluation, the patient denied any previous episodes of lower gastrointestinal bleeding. He was a heavy smoker and drank alcohol. On physical examination, the patient was pale, but his vital signs were stable. His blood hemoglobin level was 10.3 g/dl, with a hematocrit of 31.7%. Other laboratory results were unremarkable.

Computed tomography (CT) showed an edematous ileal wall with a fat-containing intraluminal mass and dilatations of the proximal part of the small bowel (Fig. 1). Initial CT scan lead to an impression of intraluminal ileal lipoma associated with ileocolic intussusception and mechanical small-bowel obstruction. Labeled-red blood cell (RBC) scanning was done by intravenous injection of cold pyrophosphate modified with in vivo labeling of RBCs with 15 mCi technetium-99m pertechnetate. These scans revealed abnormal tracer accumulation in the lower abdomen on the 75th min image of series, which suggested an active bleeding focus, more likely in the distal small intestine (Fig. 2). Angiography of the superior mesenteric artery was then performed and showed a dilated, anomalous branch arising from the proximal portion of ileocolic artery, which was suggestive of a vitelline artery and confirmed the presence of Meckel’s diverticulum. No definite evidence of contrast extravasation suggesting active hemorrhage was identified, probably due to slow bleeding rate (Fig. 3). However, the initial impression was retained because Meckel’s diverticulum solely could not explain the CT finding of the fat-containing intraluminal mass.

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On the patient’s third hospital day, a repeat check revealed decreased hemoglobin and hematocrit values of 9.6 g/dl and 28.9% respectively. The patient also had intermittent abdominal pain, and fresh blood was noted in his stool. His signs and symptoms persisted; therefore, laparotomy was indicated and small bowel resection with end-to-end anastomosis was performed. Gross pathology revealed an elongated mass measuring $8 \times 1.5 \times 1.5$ cm protruding into the lumen of the ileum without ileoileal intussusception. Microscopically, it showed a picture of inverted Meckel’s diverticulum predominantly of the small intestinal type with marked hypertrophy of the circular muscle layers. A focal area revealed gastric mucosa with ulceration and hemorrhage. Post-operative recovery was uneventful and patient was discharged on the 14th hospital day.

**DISCUSSION**

A congenital diverticulum is a true diverticulum containing all three intestinal layers [1]. An inverted Meckel’s diverticulum is thought to be rare, but Pantongrag-Brown et al [2] suggested that it is more common than previously recognized. Compared with most patients with Meckel’s diverticulum, these patients tend to be older and have a more chronic course of the disease.

Complications of Meckel’s diverticulum have been reported in 19% of cases [3, 4]. In order of decreasing frequency, complications include bleeding, intestinal obstruction, perforation, bowel strangulation, diverticulitis, intussusception, volvulus, tumor originating in the diverticulum, and enterolith formation [3, 4]. Bleeding is believed to have multiple causes. The lesion might contain heterotrophic gastric mucosa.

![Figure 1](image1a.png) ![Figure 1](image1b.png) ![Figure 1](image1c.png) ![Figure 1](image1d.png)

**Figure 1.** Sequential contrast-enhanced CT scan at different levels show an edematous ileal wall with a fat-containing intraluminal mass (arrows) associated with dilatations of the proximal small bowel. a is the most cephalic; d is the most caudal.
tissue that produces acid leading to subsequent ulceration of the adjacent ileum [5], as in our patient.

Several examinations can contribute to the diagnosis of inverted Meckel’s diverticulum. The inverted Meckel’s diverticulum is depicted as a central area of fat attenuation surrounded by a thick collar of soft-tissue attenuation. This appearance results pathologically from entrapment of stromal remnant of the omphalomesenteric duct and mesenteric fat within the inverted diverticular sac [2, 6]. The differential diagnosis of an elongated, fat-containing mass in the distal ileum (with or without intussusception) includes lipoma, inflammatory fibroid polyp, and other pedunculated polyps such as those associated with Peutz-Jeghers syndrome and familial adenomatosis polyposis syndrome [2]. On small-bowel series, the diverticulum appears as an oblong filling defect with smooth margins. The mass is often mobile and pedunculated, and may serve as a leading point for intussusception [5]. Radioisotope scanning relies on 99mTc-pertechnetate uptake by ectopic gastric mucosa in the diverticulum and is a sensitive investigation in children [7]. However, in adults, this technique has a 63% sensitivity and a 2% specificity for Meckel’s diverticulum at best [8]. In our patient, abnormal tracer accumulation was observed in the lower abdomen on the 75th image of series suggesting an active bleeding focus, more likely in the distal small intestine.

**Figure 2.** Labeled-red blood cell (RBC) scan using cold pyrophosphate modified with in vivo labeling of RBCs with 15 mCi technetium-99m pertechnetate revealed abnormal tracer accumulation in the lower abdomen on the 75th image of series suggesting an active bleeding focus, more likely in the distal small intestine.

**Figure 3.** Angiograms of the superior mesenteric artery in the arterial a. and venous a. phases show a dilated anomalous branch arising from the proximal portion of ileocecal artery (arrows in a). This finding is suggestive of a vitelline artery. No definite evidence of contrast extravasation suggests active hemorrhage.
[9] reported that angiography shows a persistent vitellointestinal artery in most individuals with chronic gastrointestinal bleeding. However, recognition of this artery may be difficult because of overlying vessels, and superselective catheterization of distal ileal arteries may be necessary. Huang et al [10] reported that the extravasation of contrast medium into the bowel lumen is an expected finding in patients with an actively bleeding Meckel’s diverticulum. However, bleeding at a rate of more than 0.5 ml/min is generally required to reveal extravasation in adult patients. Furthermore, a higher rate of bleeding may be needed to detect extravasation in children.

In conclusion, inverted Meckel’s diverticulum is difficult to diagnosis prior to surgery. However, angiography and Tc-99m pertechnetate Meckel’s scan are mandatory imaging modality to verify the diagnosis pre-operatively. If a young adult presented with acute or chronic intermittent GI bleeding on clinical manifestation and fat-containing mass in the distal ileum (with or without intussusception) on CT, inverted Meckel’s diverticulum should be highly suspected.

REFERENCES

反轉梅克爾氏憩室引發下消化道出血：病例報告

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據文獻記載，反轉梅克爾氏憩室發生率甚低，它可能造成臨床併發症有：出血，腸阻塞，腸穿孔，腸絞勒，腸扭轉及腸套疊等。出血因素為異位性胃黏膜潰瘍所造成。電腦斷層攝影可發現卵黃管遺跡似脂肪密度腫塊充填於腸腔內。而於血管攝影可發現永存的卵黃動脈，且可同時偵測是否有活動性出血。在此我們報告一病例，經手術證實反轉梅克爾氏憩室引發腸胃道出血，並呈現其影像學上之表現。

關鍵詞：腸胃道出血；反轉梅克爾氏憩室