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Giant Meckel's Diverticulum in a 9-Year-Old Boy: An Unusual Presentation With Isolated Faltering Growth

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Abstract: Meckel's diverticulum is the most common congenital gastrointestinal abnormality. Clinical presentation is normally in childhood with either hemorrhage or an acute surgical abdomen. The much rarer giant Meckel's diverticulum is associated with a more varied clinical presentation. In this case report, we provide a unique example of presentation with isolated faltering growth related to a giant Meckel's diverticulum in a young boy. We discuss the diagnostic process, imaging modalities, and subsequent surgical procedure.

Key Words: faltering growth, giant Meckel's diverticulum, growth failure, malnutrition, Meckel's diverticulum

INTRODUCTION

Meckel's diverticulum is the most common congenital gastrointestinal (GI) anomaly, affecting 2% of the population and usually presents in childhood either with hemorrhage or an acute surgical abdomen necessitating emergent operation. Below we present a unique case of a giant Meckel's diverticulum presenting with isolated faltering growth in a young boy.

CASE REPORT

A 7-year-old boy was referred to our service with a history of faltering growth. His family report that at the age of 4 years old, he appeared to stop growing and had hardly gained weight from this time. They described him as a picky eater who only ate very small meals, yet despite this appeared to have a bloated distended abdomen frequently. His bowel motions were regular, although appeared to be oily and mucus-filled at times. He had no background of rectal bleeding or melena nor did he report any abdominal pain. Family history revealed a cousin with celiac disease; however, no other associations with autoimmune disorders or GI disease.

At the time of initial assessment, aged 7 years and 3 months, he weighed 18.06 kg (z score –1.61) and was 106 cm tall (z score –3.11). On examination, he was thin with a mildly distended abdomen that was soft and nontender to palpate. During the year of investigation and imaging leading up to surgery, the child's weight fluctuated between 18 and 20 kilograms.

Initial investigations revealed an iron deficiency anemia with hemoglobin level of 78 g/L (normal range [NR], 113–145 g/L) and ferritin of 7 μg/L (NR, 15–150 μg/L). A low albumin of 22 g/L (NR, 32–48 g/L) and fecal calprotectin of 1190 μg/g (NR <50 μg/g) raised the possibility of autoimmune GI disease. However, a normal panendoscopy with negative biopsies largely ruled out both inflammatory bowel and celiac disease. A subsequent magnetic resonance enterography study, investigating for isolated small bowel Crohn's, noted a large cystic structure within the abdomen as well as an incidental coarctation in the descending thoracic aorta. The latter was confirmed on echocardiogram and cardiac MRI and was thought not to require immediate cardiothoracic intervention.

The abdominal cyst was further investigated with an upper GI contrast study, which confirmed a large structure that gradually filled with contrast, extending from the right upper quadrant to left iliac fossa when entirely filled; possibly representing a large colonic duplication cyst (Figs. 1 and 2).

An exploratory laparotomy was performed, unexpectedly finding a giant Meckel's diverticulum (Fig. 3). The diverticulum was 24 cm in length with a diameter of 15 cm, found on the anti-mesenteric border of the ileum, 50 cm from ileocecal valve. Macroscopic features on the mesentery and serosal surface appeared suggestive of intermittent torsion and adhesions. The Meckel's diverticulum had free communication with the rest of bowel. Primary resection and anastomosis was performed with 10 cm of small bowel resected along with the Meckel's diverticulum.

The child had an uneventful recovery, with a total inpatient stay of 5 days. Histopathology of the specimen confirmed giant Meckel's diverticulum, with full thickness small bowel and areas of marked active inflammation and ulceration extending into muscularis propria without perforation. No heterotopic mucosa was identified. From weighing 18.6 kg immediately postoperatively, the patient gained 2.15 kilograms over the next 6-week period. At a dietetic follow-up, his family reported, he had significantly increased his food portions and no longer had early satiety. Furthermore, he continued to have regular bowel motions with no further mucus.

DISCUSSION

Meckel's diverticulum is the most common congenital GI abnormality, affecting approximately 2% of the population, caused by failed closure of the vitellointestinal duct during weeks 5–7 of fetal growth (1,2). The resulting diverticulum is made up of all 4 layers of the intestinal tract, and in 50% of cases, has additional ectopic gastric or pancreatic tissue; these tissues are linked with the more common presentations of ulceration, perforation, and hemorrhage (1,3).

A Meckel's diverticulum is usually found within 60 cm (2 feet) of the ileocecal valve, with an average size of 5 cm (2 inches) (2). It occurs with a 2:1 male predominance and has a 2% risk of lifetime complication, usually before the age of 2 (4). Conveniently, when using the imperial measurements, the recurring theme of the same number has led to the clinical "rule of twos" (4). However, diverticula have been reported up to 100 cm long; therefore, once >5 cm in length, they are classified as giant Meckel's diverticula, with 90%

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The authors report no conflicts of interest.

Informed consent from the guardian of the patient has been gained to write this case report and for publication.

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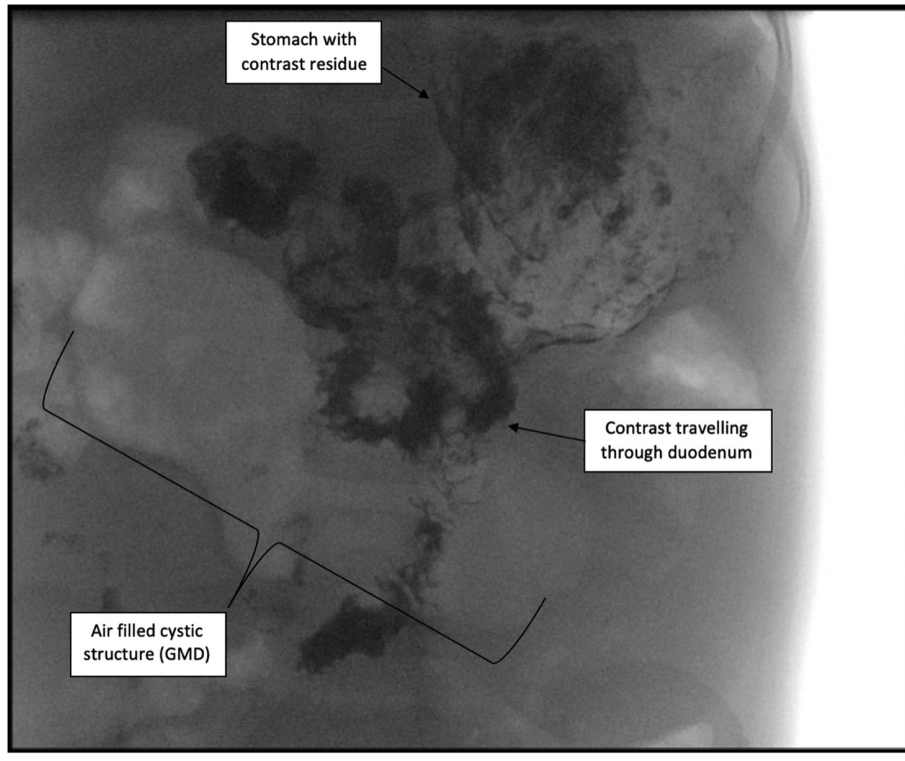

FIGURE 1. Contrast study—initial imaging showing air-filled cystic structure in the right upper quadrant as contrast passes through the duodenum. GMD = giant Meckel's diverticulum.

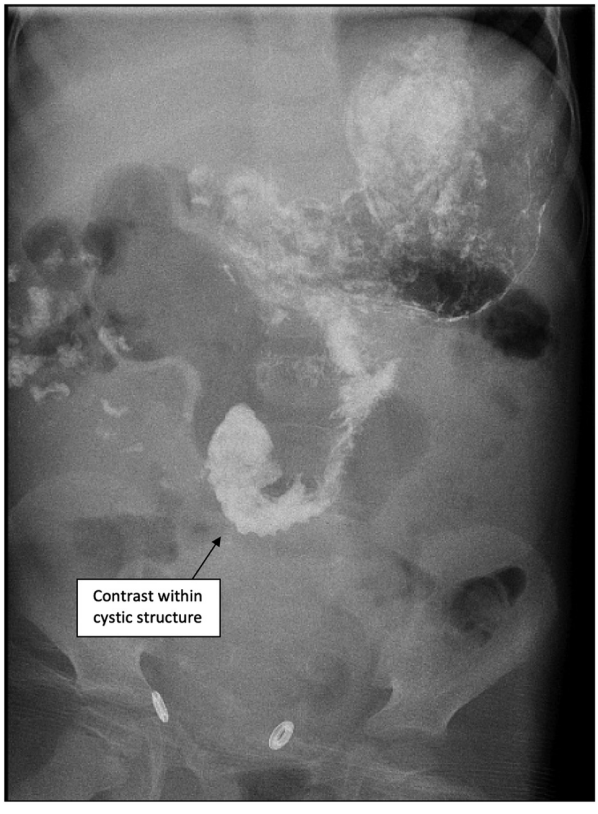

FIGURE 2. Post-contrast abdominal x-ray—showing contrast within the cystic structure.

of cases falling between 1 and 10 cm in size (4). A giant Meckel's diverticulum is more prone to complications (3,4).

Clinical presentation of a standard Meckel's diverticulum in childhood tend to be with either chronic or acute hemorrhage caused by ulceration from the heterotopic gastric the diverticulum as the lead point. Other cases have presented with intussusception, the diverticulum acting as the lead point (3,5). A common presentation in both pediatric and adult populations is bowel obstruction, with rarer cases including volvulus, diverticulitis or Littre's hernia (1,5). Giant Meckel's diverticula have a more varied presentation, ranging from classical intestinal obstruction, diverticular torsion to compression of mesenteric root and ileal ischemia (4–6). We have not found any evidence in the literature of presentation with faltering growth and minimal other GI symptoms as is seen in our case.

Our hypothesis in this case is that this massive diverticulum regularly filled with significant volumes of digestive matter causing partial obstruction and extrinsic stomach compression limiting volume tolerance. Also, the redundant diverticulum would have contributed to significant bacterial overgrowth and abnormal bowel motility—all of which significantly impairs capacity for nutrient extraction. Additionally, the chronic inflammatory process of ulceration would have contributed to the iron deficiency anemia, the high fecal calprotectin level (7), and an overall malnutrition as is commonly associated with chronic disease.

In conclusion, this case represents, we believe, the first example of significant isolated growth failure due to a giant Meckel's diverticulum.

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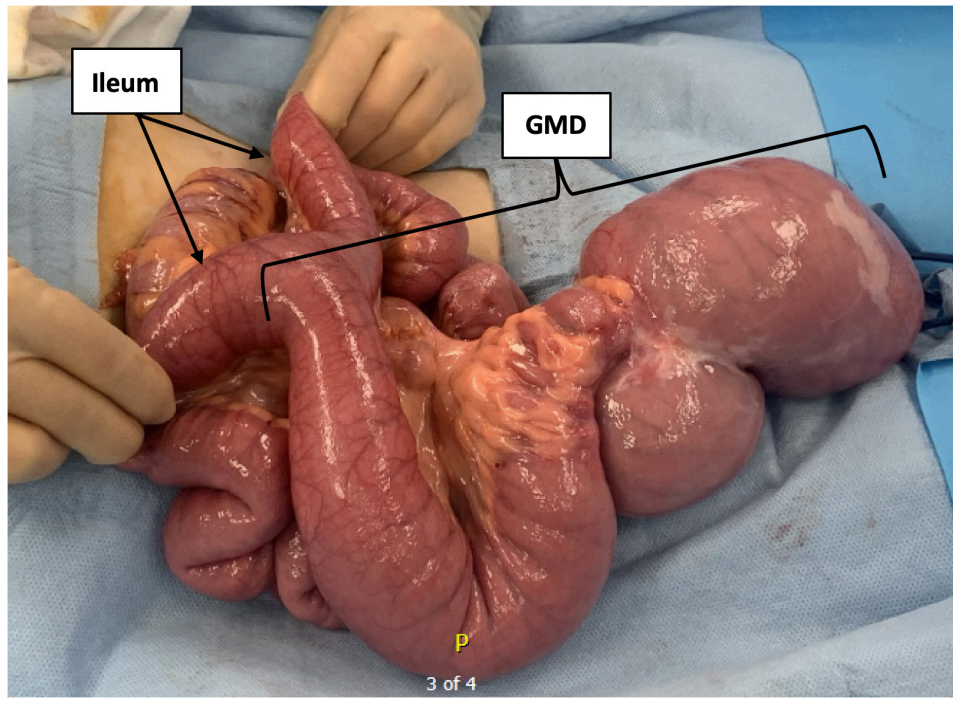

FIGURE 3. Intraoperative photo showing the GMD: Ileum seen on the left held by the surgeon, with the 24 cm diverticulum extending to the right. GMD = giant Meckel's diverticulum.

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