

Unusual Case of Small Bowel Volvulus and Small Bowel Obstruction: Meckel’s Diverticulum in Older Patient; Case Report and Literature Review

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INTRODUCTION:

Meckel’s Diverticulum is a remnant of the omphalomesenteric duct, which is responsible for connecting the midgut to the yolk sac of the fetus. Typically, this duct regresses and involutes between the fifth and sixth week of gestation as the bowel moves into the abdominal cavity. Failure to involute results in a variety of anatomic defects including cysts, fistulae, fibrous bands, and most commonly, a diverticulum without additional attachments.

Typically, symptomatic Meckel’s diverticulum presents early in childhood and adolescence, with symptoms of gastrointestinal bleeding and rare complications including intestinal obstruction, intussusception, hernia, inflammation, and perforation [5]. Similar complications may occur later in life, but are less frequent and often missed on initial workup. The following report is an uncommon presentation of small bowel volvulus causing an obstruction due to a Meckel’s diverticulum band found in a 76 year-old patient.

Case report

A 76- year old male presented to Sharon Regional Medical Center in the late morning hours, with acute onset of upper and mid abdominal pain that woke him out of sleep, at approximately five o’clock in the morning. The patient described the pain as being severe, unrelenting, and worsening. The pain began on the right side of the abdomen and progressed to midline, with radiation to the entire abdomen. The pain was exacerbated by walking with nothing reported as being able to relieve it. The patient had not been able to eat or drink anything since the symptoms began other than some sips of water with his morning pills. The patient had associated nausea but no vomiting, and two episodes of diarrhea. There was no history of hematochezia, melena, or change in stool color. His last colonoscopy was five years prior and revealed a few benign polyps that were removed via polypectomy. The pain had not been experienced by the patient before, and he had no prior history of abdominal surgery.

Medical history was significant for Coronary Artery Disease (CAD) with Valvular Heart disease (VHD). The patient reported being a candidate for open valvular repair which was to be scheduled over the upcoming weeks prior to his presentation to the ED. The patient also had a history of Atrial Fibrillation (A fib), Benign Prostatic Hyperplasia (BPH), Cerebral Vascular Accident (CVA), Gastroesophageal Reflux Disease (GERD), Gout, gastrointestinal bleed, Hyperlipidemia (HLD), and Type 2 Diabetes Mellitus. Past surgical history was significant for back surgery and Coronary Artery Bypass Graft (CABG) in 2003. Family history was significant for a father with CAD. The patient was a former lifetime smoker who quit several years ago, occasionally drank alcohol, and denied any recreational drug use.

Case report

Upon physical examination the patient was well appearing, in some acute distress, no other abnormalities noted except on abdominal examination. The patient’s abdomen was soft, slightly distended, with some tenderness to palpation in the epigastric area. Bowel sounds were decreased in all four quadrants. No peritoneal signs were noted at this time.

A CT scan of the abdomen and pelvis was obtained in the ED showing evidence of a high-grade, mid, small bowel obstruction and multiple dilated loops of the small bowel were present in the right hemiabdomen. The loops of the bowel appeared predominantly fluid-filled with edema that was noted in the associated mesentery. The distal small bowel was non-dilated with no colonic dilation noted. There was a twisting appearance of the mesentery suggesting a midgut volvulus [Figure 1 and 2].

Labs obtained, showed a leukocytosis of 12.9 with no other abnormalities in the complete blood count (CBC) or basic metabolic panel (BMP). Lactic acid was obtained and resulted as being 2.2 and continued to increase to 2.7 and 3.4 on hospital day 1.

The decision was made to take the patient to the operating room for a diagnostic laparoscopy. General anesthesia was used and a left upper quadrant incision was made creating a 12 mm Optiview port. After pneumoperitoneum was achieved, a second 5 mm port was placed 8cm inferior to the first port in the left abdomen. Minor manipulation revealed necrotic tissue of the small bowel in the right upper quadrant. At this time, it was decided to convert the procedure to an open exploratory laparotomy. An upper midline incision was made with a 10-blade scalpel and deepened through with electrocautery. The peritoneum was entered and a large amount of serosanguineous ascitic fluid was suctioned out. The bowel was exteriorized, and the adhesions of the omentum to the distal small bowel were divided using a LigaSure. The necrotic tissue of the bowel was identified and appeared to be due to the omentum being wrapped around the small bowel and was adhered to the 2 cm Meckel’s diverticulum, causing a closed-loop obstruction. The bowel was run from the ligament of Treitz to the ileocecal valve. The necrotic bowel was seen to extend from the distal jejunum to the proximal ileum [Figure 3]. The healthy bowel was measured to be 250 cm and the colon was intact and healthy. The bowel was divided using a GIA 55 blue load stapler. The mesentery of the necrotic bowel was divided using LigaSure. Once the specimen was removed, a side-to-side functional end-to-end anastomosis was created using a single fire of the GIA 55 blue load stapler. The staple line was reinforced using 3-0 silk sutures in a Lambert fashion. Copious irrigation was carried out until the fluid return was clear. A nasogastric (NG) tube was placed and confirmed. Hemostasis was obtained, and the abdomen was closed using #1 looped PDS. The patient tolerated the procedure well. There were no complications and the patient was transferred to the PACU in stable condition.

On the day following the procedure, the patient developed acute kidney injury responsive to fluids. This was later complicated by pulmonary congestion and edema on post op day two. By post op day four, the patient’s oxygen saturation began dropping and he went into a sporadic ventricular arrhythmia, and pulses were lost. Despite chest compressions, resuscitative efforts, and life saving measures the patient expired.

Is this a result of the procedure or did he have a pre-existing kidney insult?

Histopathology report findings were consistent with a portion of small bowel that measured 90 cm in length. It appeared black, necrotic and ischemic, through the entire length of the bowel, with the resected margins appearing grossly viable 1 cm from the ischemic portion. The diverticulum noted is 1.5 cm from one resection margin that measures 2 cm in length and grossly appeared viable. Opening of the specimen revealed necrotic appearing bowel mucosa with no masses identified.

Discussion

Meckel’s diverticulum, a remnant of the omphalomesenteric duct, is a true diverticulum. This means that it contains all layers of the intestinal wall. This type of diverticulum is typically found within 100cm of the ileocecal valve, and is an average of 3 cm in length. The classic description of the essential features of Meckel’s diverticulum is described in the “rule of two’s.” It states that there is a prevalence of approximately 2% in the general population with a male to female ratio of 2:1. It is usually located within two feet of the ileocecal valve, and approximately two inches in length [5]. It is reported that up to 60% of Meckel’s diverticulum harbor heterotopic mucosa, of which more than 60% is gastric mucosa. Other heterotopic tissues include pancreatic acini, Brunner’s glands, pancreatic islets, colonic mucosa, endometrium and hepatobiliary tissue [6].

The most common clinical manifestation of a Meckel’s diverticulum is gastrointestinal bleeding due to ectopic gastrointestinal mucosa. However, this is mostly seen in the pediatric population. Although less common, Meckel’s diverticulum may also become symptomatic in adults, presenting as obstruction, intussusception, ulceration, hemorrhage, volvulus, and rarely, vesicodiverticular fistulae or tumor [5]. This wide variety of presentation makes the preoperative diagnosis of Meckel’s diverticulum very challenging, and is the reason it is often misdiagnosed or undiagnosed.

In conclusion, the chances of having an intestinal obstruction due to a Meckel’s diverticulum can range from 30% to 56% of symptomatic cases. Other causes of documented mechanisms of obstruction are adhesions, bowel cancer, Littre’s hernia, internal hernias, strictures, volvulus, and intussusception [4]. When Meckel’s diverticulum causes not only a small bowel obstruction, but also a volvulus, this becomes a surgical emergency that needs to be treated immediately due to the risk of bowel demise secondary to decreased perfusion.

One retrospective review of Meckel’s diverticulum performed by the Mayo Clinic, reported 5.5% of adult symptomatic patients with obstruction also presented with a small bowel volvulus [3]. Volvulus occurs when the intestine twists around a fibrous cord or band, such as the one found connecting the tip of a Meckel’s diverticulum to the peritoneal lining of the anterior abdominal wall [1,2]. A second incident of Meckel’s diverticulum causing small bowel volvulus, demonstrated the diverticulum adhering to the umbilical port following laparoscopy [2]. In the case of our patient, there was a fibrous remnant of the omphalomesenteric duct from the Meckel’s diverticulum that provided the focal point for rotation. Like any other management of a small bowel obstruction or volvulus that has failed conservative management and has an increasing lactic acid, the next best step, if the patient is in stable condition, is a diagnostic laparoscopy. Ultimately, an exploratory laparotomy would be needed for treatment in order to identify and resect any necrotic or dying bowel, as well as to preserve as much viable bowel as possible, and to create an anastomosis.

References:

