Spontaneous Perforation of Meckel’s Diverticulum in 84-Year-Old: A Case Report

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Abstract
We report an unusual presentation of Meckel’s diverticulum, presenting with spontaneous rupture in an 84 year-old female. We review the common presentations and management options, as well as review the literature. This case represents one of the oldest patients described in the literature with spontaneous rupture of a Meckel’s diverticulum.

INTRODUCTION

Case
An 84-year-old female presented to the Emergency Department complaining of a 6 day history of vague, generalized abdominal pain. She described the pain as dull initially, however in the 12 hours prior to presentation the pain became sharp, severe and unremitting. She had vomited twice that morning, non-bloody both times, and had one loose bowel movement. She reported a long-standing history of chronic lower abdominal pain, lasting almost 2 years, which she had always attributed to constipation. No formal workup had ever been performed. Her past medical history was significant for Parkinson’s disease, hypertension and hypothyroidism. She had no prior surgeries, colonoscopies or endoscopies. Her medications included antihypertensives, L-Dopa, levothyroxine and stool softeners daily. She also reported using Ibuprofen daily for arthritic pain and for the abdominal pain that morning. She had never used tobacco, alcohol or illicit drugs.

On examination, the patient was diaphoretic and in obvious pain. Her pulse rate was 110-125 beats-per-minute (bpm), blood pressure 159/59 mmHg and temperature 102.8 Fahrenheit. She had obvious intention tremors but was lucid and able to answer questions appropriately. Apart from a sinus tachycardia, her cardiac and lung exams were unremarkable. Her abdomen was distended and showed guarding and rebound tenderness in the left lower quadrant. Bowel sounds were absent. Rectal exam was unremarkable. Hemoglobin on admission was 13.8 g/dL. White blood cell count (WBC) was 7.8 (x10^9/L) but with 84% neutrophils.

A CT of the abdomen and pelvis performed with contrast showed a modest pneumoperitoneum with significant inflammatory stranding in the vicinity of the sigmoid colon and the middle portions of the small bowel. There was also free fluid noted in the pelvis (Figure 1). The patient was diagnosed as having perforated sigmoid diverticulitis. Fluid resuscitation was immediately initiated using crystalloid solution (Ringer’s lactate) and she was taken emergently for exploratory laparotomy. Intraoperatively, she was found to have purulent fluid in the abdomen. There was a phlegmon involving the distal ileum, which was loosely adherent to the sigmoid colon with fibrinous adhesions. Once these adhesions were lysed, it was clear that the sigmoid colon was intact and without injury. The loop of ileum that was involved in the phlegmon (approximately 24 cm in length) was inflamed, thickened and had a perforation on the mesenteric border, 2 cm in diameter. Although the anatomy was distorted, there appeared to be a diverticulum on the antimesenteric border of the inflamed segment. Measurement showed this anomaly

Figure 1 CT image of the abdomen showing inflammatory changes affecting the ileum and sigmoid colon (arrow), transverse cut.
to be 55 cm from the ileocecal valve. The affected segment was resected (Figure 2) and primary anastomosis was performed. A general inspection of the abdomen was performed and was found to be unremarkable. Following irrigation with antibiotic/normal saline solution, the abdomen was closed with a closed-suction drain left in the pelvis. Post-operatively, the patient recovered gastrointestinal function within 4 days, and was able to resume her regular diet. The drain was removed thereafter. However, her overall mobility and strength were impaired and she was transferred to a physical rehabilitation facility on post-operative day 7. She is currently residing at a nursing facility. Pathology reports on the specimen showed ulcerated mucosa with transmural defect located on the mesenteric border of the ileum directly opposite to the diverticulum (Figure 2). There was gastric epithelium identified within the "pouch"/diverticulum region, consistent with a Meckel’s diverticulum.

**DISCUSSION**

Meckel’s diverticulum (MD) represents the most frequent congenital malformations of the gastrointestinal tract. It is a true diverticulum that originates from the vestigial remnant of the omphalomesenteric or vitelline duct. It derives its name from Johann Friedrich Meckel, who described its embryological origin in 1809. It is commonly remembered for its “Rule of two’s” – it occurs in approximately 2% of the population; it resides approximately 2 feet (60-100cm) from the ileocecal valve; it usually contains 2 types of ectopic tissue (gastric and pancreatic); it is only symptomatic approximately 2% of the time [1,2]. A Meckel’s diverticulum will most likely present in early childhood if at all. The most common presentation at that time includes hematochezia, anemia and abdominal pain. The bleeding is due to ulceration of the adjacent ileal mucosa from the gastric or pancreatic secretions from the ectopic mucosa of the diverticulum [3,4].

There are a number of ways MD can become complicated and cause symptoms. It can serve as a lead-point for intussusception, or persistent vitelline bands can cause mechanical intestinal obstruction. It can also become inflamed and present as acute diverticulitis, closely mimicking acute appendicitis in presentation. Less commonly, it can undergo malignant transformation of the mucosa, with carcinoid tumors being the most common malignancy discovered. Unusual complications, such as the Littre hernia in which a Meckel’s diverticulum becomes incarcerated within an inguinal hernia, are also possible. By far the most frequent complication remains bleeding, both in children and adults [2,5].

Symptomatic MD in adulthood is rare. Spontaneous perforation is even more uncommon. The patient is this case is noteworthy for presenting in the 9th decade of life with a perforation; the oldest patient described with such a complication in our literature review. She complained of a chronic lower abdominal pain which had been attributed to constipation. It is possible that the pain may have been due to ulceration of the ileal mucosa from ectopic gastric secretions, preceding a perforation [3,6]. Although MD is usually discovered incidentally, if suspected the most sensitive test available is scintigraphy scanning. A “Meckel’s scan” typically refers to a 99mTc-pertechnate scan which specifically targets the heterotopic gastric mucosa. It can be augmented by the administration of Pentagastrin, Cimetidine and Glucagon. The sensitivity of scintigraphic scanning decreases after adolescence, as the area of heterotopic gastric mucosa decreases with age. Some studies report that these scans are unreliable in patients aged older than 40 years. The overall sensitivity, including in children, is approximately 85%, with a specificity of greater than 95%. Alternative methods of visualization including CT scan, ultrasound and angiography all carry significantly lower accuracy measures. In the modern era, laparoscopy is advocated as an alternative to radiologic and nuclear scanning in adults suspected of having MD. The accuracy of laparoscopy approaches 100% [7,8].

The management of MD depends on the clinical scenario. When discovered incidentally during surgery, there is still some controversy as to best practice. Supporters of resection argue that the risks of potential complications outweigh the risks associated with resection. Opponents counter that the number needed to treat (NNT) is too high to justify the risks and potential complications of routine excision. There is universal agreement however that symptomatic MD should be treated surgically with excision. The recommended approach is laparoscopic. Techniques vary slightly depending on the presentation of the MD. If bleeding is the presenting complaint, or there is a high likelihood of ileal mucosal ulceration, then segmental resection of the affected segment of ileum including the diverticulum is recommended. A primary anastomosis of the remaining ileal segments would then follow. This would remove the ulcer and mitigate future complications such as recurrent bleeding and perforation. For patients who present with obstructive complications, without evidence of bleeding, a diverticulectomy with linear stapling devices would be adequate therapy. This approach negates the need for an intestinal anastomosis. The exception to this rule would be in cases of intussusception, where a segmental resection of the affected area is recommended [4,9].

In cases of perforation, both open and laparoscopic approaches have been described. We used an open approach in this patient because her initial scan suggested perforated diverticulitis and
Hartmann’s procedure was planned. In hemodynamically stable patients, laparoscopic resection is feasible and carries good success rates. Perforation of the ileum does tend to occur at the adjacent to the diverticulum and along the antimesenteric border. Segmental resection is required in all cases of perforation [9]. Prognosis following surgery is generally good, as long as the patient presents early and pre-operative sepsis is controlled.

REFERENCES