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CLINICAL VIGNETTE

Meckel's Diverticular Bleed

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“Meckel's diverticulum is frequently suspected, often looked for and seldom found”
Charles Horace Mayo¹

Case Presentation

A 29-year-old female was admitted to the hospital with hematochezia. She had no prior gastrointestinal complaints. One day before admission, she reported onset of crampy abdominal pain that ran across her upper abdomen. Pain was described as colicky, associated with passage of dark blood colored stool. She was able to sleep throughout the night, but passed maroon stool in the morning.

She had no history of abdominal trauma, and was not on any medication except for ibuprofen for her menstrual cramps. She denied any fever or chill but reported abdominal cramp. Her brother had intestinal surgery for bleeding, but she did not know his diagnosis.

Her physical exam was remarkable for normal vital signs and mild generalized abdominal tenderness without any rebound or rigidity. Her hemoglobin was 12.5, she had normal chemistries and CT of abdomen and pelvic was unremarkable.

Colonoscopic examination revealed normal colonic mucosa with red blood in the cecum, and transverse colon. Fresh blood was seen in the terminal ileum up to 15 cm. Upper endoscopy revealed no abnormality.

Suspecting Meckel's diverticular bleed, a Meckel's scan was performed. There was a small focus of abnormal accumulation in the right lower quadrant of the abdomen, which persisted on delayed images. This was suspicious for Meckel's diverticulum, but there was also activity in the proximal small bowel suggesting upper gastrointestinal bleeding.

She was taken to surgery where a Meckel's diverticulum was found 50 cm from the ileocecal valve. She had laparoscopic segmental resection of the the ileum. Pathology confirmed a 3 cm Meckel's diverticulum. She was later discharged with no recurrent bleeding.

Discussion

Meckel's diverticulum (MD) is the most common congenital malformation of the gastrointestinal tract. Meckel's diverticulum is a true diverticulum, containing all layers of the small

intestine. It is a congenital blind pouch that results from an incomplete obliteration of the vitelline duct during the fifth week of gestation. It was first described by a German surgeon Wilhelm Fabricius Hildanus in 1598, but was named after Johan Freidrich Meckel the Younger in 1809 when he reported on its anatomy and embryology.² It is estimated to occur in 2-4% of the population,¹ although a systemic review reported average prevalence of 1.2% in seven autopsies series.³

The “rule of twos” is the classic description of Meckel's diverticulum.^{1,4} It states that MD occurs in approximately 2% of the population with a male to female ratio of 2:1, is located within two feet of the ileocecal valve, and is two inches in length. Approximately 2-4% of patients develop a complication throughout their lives, often before the age of two. Zani et al had estimated lifetime incidence of symptomatic MD to be 4.2%.³ The risk of symptomatic MD is four times higher in males.³

Symptomatic MD can present with small bowel obstruction, gastrointestinal bleeding, and abdominal pain. Presenting symptoms are dependent on the age of the patients. Intestinal obstruction is the most common presentation in pediatric age group 46.7%, followed by hemorrhage in 25.3%, and 19.5% inflammation.⁵ Park et al reported that bleeding was the most common presenting symptoms in adults 38% in his review of Mayo Clinic experience.⁶ The frequency of symptomatic MD decreases with age in both pediatric and adult age groups.

Bleeding can be chronic or acute and massive. Transfusion is not often required. Children often present with hematochezia while adults usually present with melena. Pathogenesis of bleeding is due to acid secretion from the ectopic gastric mucosa lining the diverticulum. Ectopic tissues are present in 4.6 to 71% of symptomatic MD, the majority is gastric mucosa followed by pancreatic mucosa.⁵ The bleeding site is not the diverticulum itself but due to mucosal ulceration and inflammation downstream to the diverticulum. In addition, recurrent intussusception may contribute to inflammation, erosion and bleeding.¹

Small bowel obstruction is often due to volvulus, intussusception or diverticulitis. MD can act as a leading point of intussusception and should be suspected in children with recurrent small bowel obstruction. The intestine can twist around the fibrous band associated with MD leading to volvulus. The inflammation surrounding Meckel's diverticulitis may contribute to small bowel obstruction.

Acute abdominal pain can be result from inflammation of MD or perforation of MD leading to peritonitis. Entrapment of enteroliths within MD can lead to ischemia has been reported.⁷

Preoperative diagnosis remains a challenge. A high index of suspicion should be given to children less than 10 with painless hematochezia, or in adults, younger than 40 years of age with no identifiable source found on endoscopic procedure.

Meckel's scan is a nuclear medicine study in which 99m technetium pertechnetate, which has an affinity for gastric mucosa, is injected intravenously. The technetium is picked up by ectopic gastric mucosa in the MD, which occurs in less than 25% of the cases.⁶ Therefore, MD lacking ectopic gastric mucosa will not be detected by Meckel's scan. Meckel's scan has a sensitivity of 85 to 97% in pediatric patient but has a lower value in adults, 60 %.⁸ Cimetidine promotes retention of pertechnetate in the gastric mucosa and can be used to augment an initially negative scan.⁹

Arteriography may be appropriate in those bleeding briskly. A diagnosis of MD can be made based on the finding of an anomalous superior mesenteric artery branch feeding the diverticulum. Wireless capsule endoscopy is now commonly used to evaluate obscure gastrointestinal bleeding. However, He and colleagues reported a high missed rate compared to double balloon endoscopy. In 26 patients who underwent both studies for obscure gastrointestinal bleeding, diagnostic yield of double balloon endoscopy was 84.6% compared to 7.7% in capsule endoscopy.¹⁰

Surgery is performed for symptomatic MD. MD can be excised at the base of the diverticulum or performing a segmental small bowel resection with primary anastomosis.¹¹ Segmental resection removes ectopic gastric mucosa within the diverticulum and the mucosal ulceration adjacent to the diverticulum.

There is no consensus on what to do with asymptomatic MD found incidentally during abdominal exploration. Zani et al reported postoperative morbidity to be 5.3%, with wound infections being the most common complication.³ Mortality from the resection was low (.001%), but among those who died, 94% were older than 44 year of age.¹¹ Based on 806 resected asymptomatic MD, Park et al recommended surgery in anyone with any of the following risk factors: age younger than 50, male sex, diverticulum longer than 2 cm, and ectopic or abnormal features within a diverticulum.⁶

Conclusion

Our patient is a healthy 29-year-old female with no prior gastrointestinal history who presents with abdominal pain and hematochezia. With normal endoscopic, and colonoscopic finding, MD bleeding was suspected. Therefore, we chose to perform Meckel's scan over video capsule endoscopy. Fortunately, she had ectopic gastric mucosa in her MD that took up technetium, strengthened the preoperative diagnosis of MD bleed.

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