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Case Report

Meckel's diverticulum: Unusual cause of significant bleeding in an adult male [☆]

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ABSTRACT

Meckel's diverticulum is a common congenital gastrointestinal malformation affecting 2% of the general population. Most affected patients are asymptomatic, and excessive bleeding causing a significant drop in hemoglobin count is an uncommon complication of Meckel's diverticulum, especially in adult patients. Herein, we present an adult case of Meckel's diverticulum that nearly led to hemodynamic instability. Laparotomy and segmental small bowel resection were critical in treating the patient.

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Introduction

Meckel's diverticulum (MD) is the most common congenital malformation of the gastrointestinal (GI) tract [1]. The "Rule of 2s" is often used to remember many characteristics of MD (Table 1) [1].

The incomplete obliteration of omphalomesenteric duct during the embryological stage results in the formation of MD in the small intestine [2]. Most of the cases are asymptomatic, with only 4%–9% of patients becoming symptomatic, often at a young age [3]. Acid production within a MD can result in complications like bleeding, ulceration, obstruction, intussuscep-

tion [4]. Such complications can occur at any age, but they are more common in children [4].

Case report

A 44-year-old male with no significant past medical history presented to the emergency department with sudden onset of significant rectal bleeding and pre-syncope symptoms. Vital signs on presentation were significant for tachycardia. Hemoglobin on presentation was 12.1 g/dL, dropping to 9.4 g/dL 12 hours later after volume resuscitation with intravenous crystalloids and one unit of packed red blood cells.

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Table 1 – Rule of 2s for Meckel's diverticulum.

- 2% of the population
- 2:1 male to female ratio
- Most commonly presents by 2 years of age
- 2 feet from ileocecal valve
- 2 inches long
- 2 types of mucosal lining

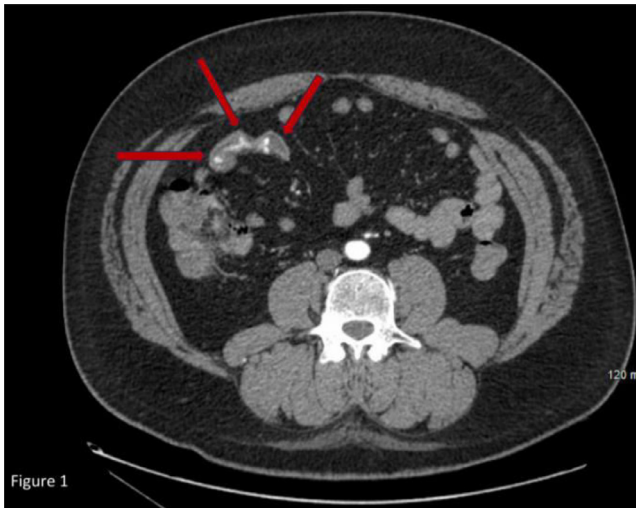


Fig. 1 – Representative axial CT scan slice of the abdomen in the arterial phase of a patient presenting with lower gastrointestinal bleeding, presyncope, and a drop in hemoglobin, demonstrating an area of active contrast extravasation from a blind-ending structure communicating with the terminal ileum, consistent with a bleeding MD.

Multiphase computed tomography (CT) of the abdomen and pelvis (Fig. 1) demonstrated active arterial bleeding/extravasation from the ileum with no small or large bowel distention. On the portal venous phase, the extravasated blood was noted to disperse downstream into the terminal ileum (Fig. 2). Careful evaluation of the focus of bleeding indicated that it originated from what appeared to be a blind-ending pouch (Fig. 3) near the terminal ileum consistent with bleeding from a MD.

An Interventional radiologist was consulted and recommended a Meckel technetium-99m sodium pertechnetate (Tc-99m) scan along with a surgical consult. Upon surgical evaluation, a gastroenterologist was consulted, and a colonoscopy was performed. The scope was able to traverse approximately 20 cm of ileum. No colonic or active terminal ileal bleeding was noted.

Following the administration of an appropriate dose of Tc-99m, a Meckel scan was performed (Fig. 4). Focal radiotracer



Fig. 2 – Representative axial CT scan slice of the abdomen in the portal venous phase of the same patient, demonstrating dispersion of the arterial bleed from that MD.

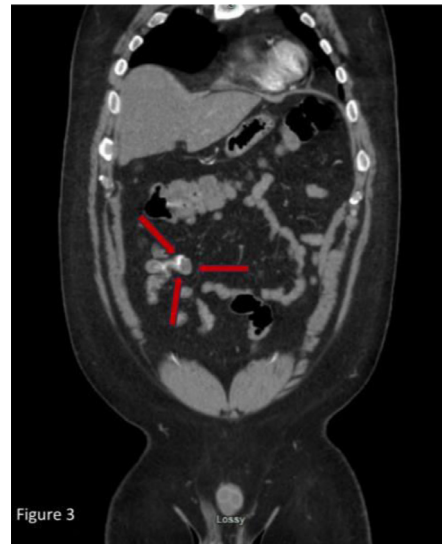


Fig. 3 – Representative coronal image of the abdominopelvic CT in the portal venous phase demonstrating thickening of the mucosa of the MD.

uptake in the right lower quadrant was noted, which upon further evaluation with (SPECT) after CT (Figs. 5 and 6) showed activity within a blind tubular structure near the distal small bowel. Findings were consistent with ectopic gastric mucosa and MD.

The patient underwent an exploratory laparotomy and successful segmental small bowel resection with visualization of the MD. Patient was discharged after being deemed clinically stable and was seen in clinic 3 weeks later with no recurrent bleeding.

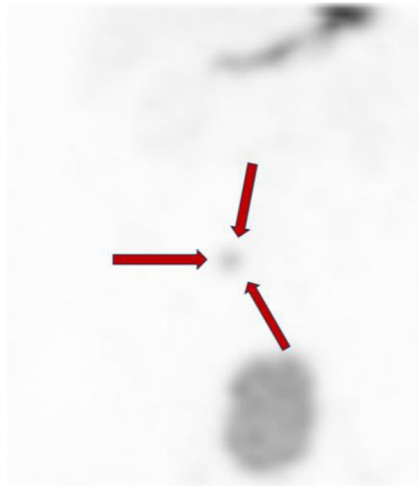


Fig. 4 – Planar image 20 minutes following the uneventful administration of technetium-99m labeled sodium pertechnetate intravenously, demonstrating a focal area of abnormal uptake in the expected region of the CT abnormality, confirming the diagnosis of ectopic gastric mucosa in the distal small bowel.

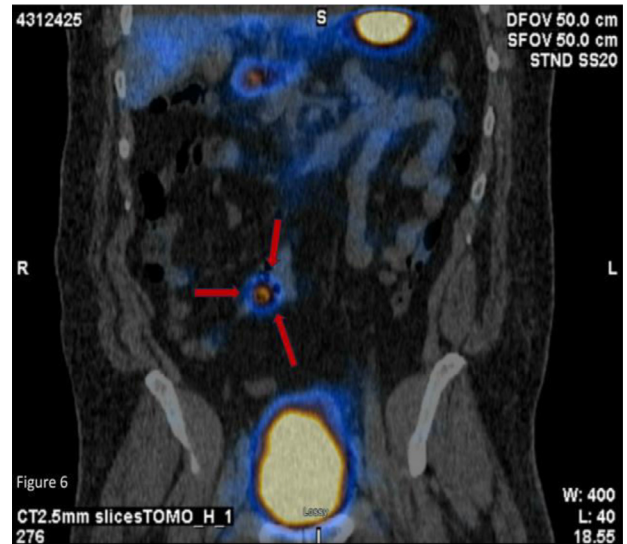


Fig. 6 – SPECT-CT was obtained (representative coronal slice), localizing the area of abnormal pertechnetate uptake to the blind-ending structure described on CT, confirming the diagnosis of a MD.

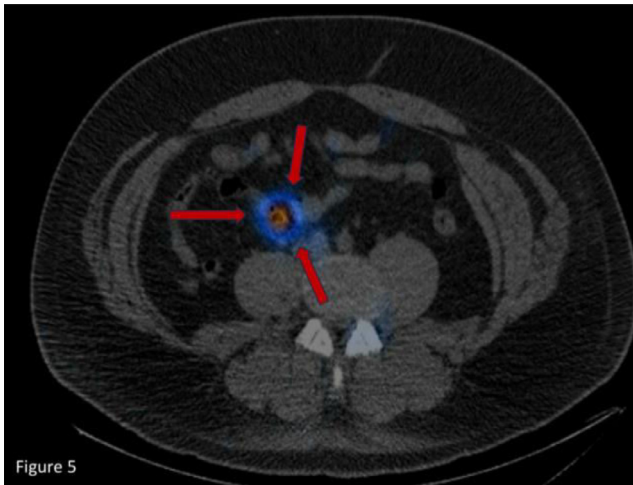


Fig. 5 – SPECT-CT was obtained (representative axial slice), localizing the area of abnormal pertechnetate uptake to the blind-ending structure described on CT, confirming the diagnosis of a MD.

Discussion

Diagnosis

The preoperative diagnosis of MD is challenging, especially in adult patients, with an accuracy rate of <50% [5]. In unclear cases, laparoscopy is the diagnostic modality of choice [6]. In clear cases, Meckel's scan is more reliable and has a higher sensitivity in children (80%-90%) [7] than in adults (62.5%) [8]. One of the disadvantages of Meckel's scan is that it may also be positive for gut duplication cyst as it is specific for ectopic

gastric mucosa and not just for MD [9]. Furthermore, Meckel's scan diagnostic accuracy is low in the adult population. In a retrospective study conducted between 2005 and 2012, the diagnostic accuracy for BAE (balloon-assisted enteroscopy) was found to be higher than that of Meckel's scan ($P = .001$) [5]. Given the low diagnostic accuracy of Meckel's scan within the adult population, BAE is considered the preoperative diagnostic modality of choice in adult patients with suspected diagnosis of MD and small bowel bleeding [5]. There are only a few published cases about the role of capsule endoscopy in the detection of MD [10,11]. Several radiologic imaging modalities can help in the diagnosis of MD. CT is not often used in the diagnosis of uncomplicated cases of MD as it is usually mistaken for small bowel loop [12]. In patients diagnosed with MD, CT can detect MD in around 47.5% of all patients [13]. Furthermore, MD is more often detected in symptomatic patients than in asymptomatic patients and its detection is affected by the amount of peritoneal fat pad [13]. On barium imaging, MD can be visualized as a blind-ending tubular or saccular structure that arises from the terminal ileum [14]. Another imaging modality called the digital subtraction angiography can help in detecting a persistent vitellointestinal artery in the case of a bleeding Meckel's diverticulum [15]. Only a few reports have already been published on the utility of MRI and ultrasonography in imaging MD [12,16,17]. One case report reported the use of MRI and CT in the diagnosis of an inverted MD leading to ileoileal intussusception [18]. It is likely that CT and MR enterography, or endoscopic techniques, will be the principal means in diagnosing MD in the future.

Management and treatment

The best treatment for symptomatic MD is surgical resection [5]. This procedure can be performed either by diverticulectomy or by segmental bowel resection and anastomosis when

there is an ectopic tissue at the diverticular-intestinal junction [3]. It is difficult to determine whether a MD, found during an operation, will have complications. The lifetime rate of MD causing complications is 4.0% with a male to female ratio ranging anywhere between 1.8:1 and 3:1 [19]. Risk factors for complications include male gender, age less than 40, diverticulum longer than 2 cm, or diverticulum containing ectopic mucosa [20]. One source has suggested the removal of ectopic MD in males younger than 50 years, when diverticulum size is larger than 2 cm, and when there is abnormal histological tissue to prevent complications [21]. The largest study conducted by Ymaguchi et al. [22] showed the following complication rates in order from the highest to the lowest: obstruction at 36.5%; intussusception, which often presents as obstruction, at 13.7%; inflammation or diverticulitis and perforation, 12.7% and 7.3%, respectively; hemorrhage at only 11.8% (compared to over 50% in children) [23]; malignancy at 3.2%; and fistula at only 1.7%. Most studies suggest that the incidence of MD ranges between 0.6% and 4% [4]. Given that the lifetime risk of MD complications is 4.0% [19], hemorrhage represents only 11.8% of all complications, and that MD occurs in children younger than 10 years [14], the clinical presentation of MD in our case report is statistically very rare.

Conclusion

Our case report emphasizes the need to consider MD among the differentials especially in adult males presenting with significant painless bleeding and drop in hemoglobin level. In this case, appropriate and timely diagnostic imaging allowed for prompt surgical intervention to stop GI bleeding.

Patient consent

Written informed consent for the publication of this case report was obtained from the patient.

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