CASE REPORT

Hemorrhagic Shock: A Meckel Diverticulum Rare Presentation

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Abstract

Meckel diverticulum is the most frequent congenital malformation of the gastrointestinal tract. The diagnosis is challenging and often incidental as it is commonly asymptomatic. Symptomatic presentation occurs more frequently during the first decade of life and complications are more prevalent in the first two years, decreasing thereafter. Complications include ulceration with hemorrhage, perforation, bowel occlusion, and neoplasm. The authors report on a case of hemorrhagic shock as a rare presentation of a Meckel diverticulum in adolescence, along with a brief literature review.

Keywords: Adolescent; Meckel Diverticulum/complications; Meckel Diverticulum/diagnosis; Meckel Diverticulum/surgery; Shock, Hemorrhagic/etiology

Introduction

Meckel diverticulum is the most frequent congenital malformation of the gastrointestinal tract, with a prevalence of 2%-4%.[1] It is a true diverticulum containing all three layers of the intestinal wall, and originates from the incomplete involution of the omphalomesenteric duct, which establishes the communication between the yolk sac and the primitive intestine, up to the fifth to seventh weeks of fetal life.[1,2] As this obliteration fails, several malformations can occur, such as residual fibrous cord, umbilical sinus, omphalomesenteric cyst, omphalomesenteric fistula or, more commonly, Meckel diverticulum. It is located on the antimesenteric border of the ileum, approx. 46-91 cm from the ileocecal valve.[3] It may contain inclusions of heterotopic mucosa, particularly gastric (20%-57%), but also duodenal, colic, pancreatic, Brunner glands, hepatobiliary, or endometrial tissue.[1,2]

The diagnosis is frequently incidental but, when it becomes symptomatic (more often in the first decade), it may present with abdominal pain, intestinal obstruction, and gastrointestinal bleeding. About 2%-4% of patients present with complications,[2] typically before the age of 2 years, decreasing subsequently.[1] Gastrointestinal bleeding is generally related to the presence of ectopic gastric mucosa, and painless rectal hemorrhage is the most frequent presentation in children. A massive intestinal hemorrhage secondary to this congenital malformation is a rare event in the pediatric population.[4] The authors present the case of an adolescent with a Meckel diverticulum complicated with hemorrhagic shock due to massive lower gastrointestinal bleeding, and a brief review of the literature is performed.

Case Report

A 16-year-old male with a background of intussusception at 2 years of age with spontaneous resolution presented at the emergency department with 36 hours of hematochezia, vomiting, and several episodes of collpase. On physical examination, he presented a Glasgow Coma Score (GCS) of 13, with no further abnormalities on neurological examination. He was pale, tachycardiac, and hypotensive (blood pressure of 86/44 mmHg), and with a capillary reperfusion time of 4s. The abdomen was prominent with audible bowel sounds, painless, without palpable masses, or peritoneal reaction. No other abnormalities were found in the digital rectal test apart from digested blood. A bolus of 20 mL/kg of saline was given. A nasogastric tube was inserted, and no bleeding content was aspirated.

The blood tests revealed normocytic normochromic anemia with hemoglobin of 8.7 g/dL, leukocytosis of 17,470 cells/µL with neutrophilic predominance, a negative C-reactive protein, and a metabolic acidosis with lactates of 41 mg/dL.

Full hemodynamic stabilization was observed after two packed red blood cells transfusions and bleeding was controlled with an infusion of pantoprazole (80 mg followed by 40 mg every 12 hours).

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An urgent abdominal computed tomography (CT) revealed the thickening and enhancement of the wall of a diverticulum and densification of the surrounding fat, suggestive of Meckel diverticulitis (Fig. 1), without signs of pneumoperitoneum or active bleeding. In this context, a technetium-99m pertechnetate scintigraphy was made, which confirmed the diagnosis (Fig. 2).

The patient underwent a laparoscopy that identified a Meckel diverticulum with a fibrous extension to the anterior abdominal wall, and a video-assisted segmental enterectomy involving the diverticulum was performed (Fig. 3).

The postoperative period was uneventful, and he was discharged on the sixth postoperative day, clinically well, and remaining asymptomatic at two years of follow-up. The histopathology of the specimen confirmed a Meckel diverticulum with heterotopic gastric mucosa, ulcerated appearance, and free resection margins.

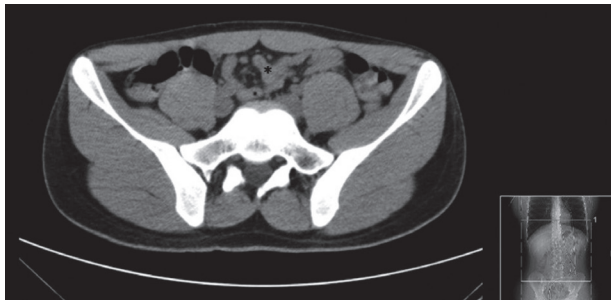

Figure 1. Abdominal computed tomography with an image compatible with Meckel diverticulum (marked by *) with thickening and enhancement of the wall of the diverticulum and densification of the surrounding fat.

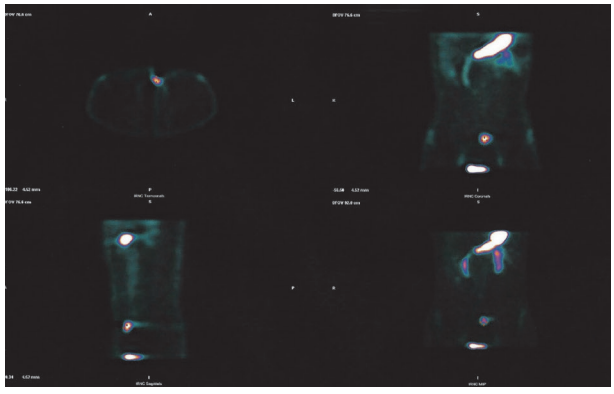

Figure 2. Scintigraphy with technetium-99m pertechnetate showing a 2 cm focal hyperfixation in the hypogastric area, left paramedian region. Fixation of the marker in ectopic gastric mucosa is compatiblVe with Meckel diverticulum.

Discussion

Lower gastrointestinal bleeding is common in the pediatric population but usually as a transiently self-limited hemorrhage. The clinical case reported illustrates a rare event, as indicated in a review of rectal bleeding causes, where only 4.2% presented with life-threatening events and, of these, only one secondary to a Meckel diverticulum.[5]

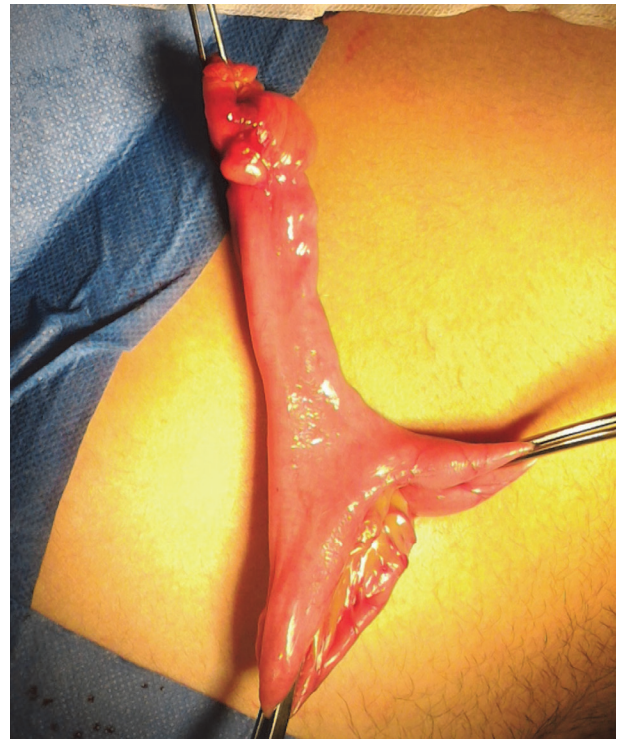

Figure 3. Surgical specimen image showing the segmental enterectomy involving the diverticulum.

The investigation of a lower gastrointestinal hemorrhage in a pediatric patient should be guided by the child's age. Symptomatic presentations of Meckel's diverticulum more commonly occur within the first decade of life. Older patients present more frequently with gastrointestinal bleeding, and younger children with obstructive symptoms.[6,7] When intussusception is the cause of obstruction, contrary to the one reported by our patient, it tends to be recurrent and atypical.

The rarity of this case is based on the complication described, which is uncommon in the patient age range, and when it occurs, it is usually less severe. According to the literature, males present a three to fourfold increased risk for complications.[1]

The diagnosis may be challenging even in symptomatic cases. A previous study reported a correct diagnosis in 88% of hemorrhagic presentations *versus* 11% in non-hemorrhagic ones.[8] In doubtful situations, in a hemodynamically unstable patient, an emergent exploratory laparotomy has to be performed.[4] In contrast, if hemodynamically stable, the exam of choice is a technetium-99m pertechnetate scintigraphy (which is a gastric mucosa tracer) that has a diagnostic accuracy of 90% in children.[9] Alternative imaging methods are the mesenteric arteriography (usually negative if bleeding < 0.5 mL/min), angio-CT which detects hemorrhages up to 0.3 mL/min, but has the disadvantage of using ionizing radiation, enterography

by magnetic resonance, endoscopic capsule, and double balloon enteroscopy.[1,10-13]

The treatment of Meckel diverticulum is guided by the clinical picture. There is considerable controversy in the literature regarding the indications for the excision of an asymptomatic, incidentally found diverticulum,[1,2] and there are no available international guidelines. On the other hand, surgical resection is the definitive treatment for a symptomatic Meckel diverticulum.

The initial management of an unstable patient involves intravenous fluid resuscitation and packed red blood cells transfusion, when clinically justifiable. In patients with gastrointestinal bleeding, proton pump inhibitors should be started, without the compromise of the scintigraphy result.[14] In the case presented, these measures contributed to the hemodynamic stabilization of the patient, avoiding an emergent surgery.

Surgical resection by laparotomy, laparoscopy, or video-assisted technique has similar satisfactory results.[4,15] Either diverticulectomy or segmental enterectomy involving the Meckel diverticulum can be made, the latter indicated whenever there is a risk of intestinal stenosis, in the presence of ischemia or perforation, if palpable changes are found in the base of the diverticulum or when the base of the diverticulum is larger than 2 cm.[1,16] In the presence of a gastrointestinal hemorrhage, segmental enterectomy is theoretically safer by resecting any possible ileal ulcers bordering the diverticulum base, and this was the procedure chosen for our patient.

The morbidity of the resection of a symptomatic diverticulum (up to 33%) is higher than in asymptomatic cases (0%-6%).[1] Mortality is rare, with an estimated incidence of 0.001%.[17] In this regard, cases such as the one presented, which may be life-threatening, are becoming less frequent.

Meckel diverticulum is an uncommon finding in adolescence and even rarer is a massive hemorrhage associated with shock as clinical presentation. The gold-standard treatment for symptomatic patients is the surgical resection of the lesion and marginal intestinal segments. In incidental asymptomatic diagnoses, surgery indication remains controversial.

WHAT THIS CASE REPORT ADDS

- Gastrointestinal bleeding can be the presentation of the Meckel diverticulum but hemorrhagic shock is rare.
- Gastrointestinal bleeding occurs generally due to the presence of ectopic gastric mucosa at the Meckel diverticulum.

Conflicts of Interest

The authors declare that there were no conflicts of interest in conducting this work.

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Consent for publication

Consent for publication was obtained.

Confidentiality of data

The authors declare that they have followed the protocols of their work centre on the publication of patient data.

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Choque Hemorrágico: Uma apresentação Rara de Divertículo de Meckel

Resumo

O divertículo de Meckel é a malformação congénita mais frequente do trato gastrointestinal. O seu diagnóstico é desafiante e frequentemente incidental, sendo geralmente assintomático. A apresentação sintomática é mais frequente na primeira década de vida e as complicações são mais prevalentes nos primeiros dois anos, decrescendo posteriormente. As complicações incluem ulceração com hemorragia, perfuração, oclusão intestinal e neoplasia. Os autores relatam um caso clínico de choque hemorrágico como forma rara de apresentação de um divertículo de Meckel, num adolescente e fazem uma breve revisão da literatura.

Palavras-Chave: Adolescente; Choque Hemorrágico/etiologia; Divertículo Ileal/diagnóstico; Divertículo Ileal/cirurgia; Divertículo Ileal/complicações