Residência RP Pediátrica
Publicação Oficial da Sociedade Brasileira de Pediatria
ISSN-Online: 2236-6814

Submitted on: 02/13/2018
Approved on: 03/25/2018

CASE REPORT

Meckel Diverticulum - a case report

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Keywords:
Pediatrics, Meckel Diverticulum, Laparotomy, Gastrointestinal Hemorrhage.

Abstract

This paper describes the case of a 13-month-old male infant diagnosed with a Meckel diverticulum admitted with acute sinusitis and iron-deficiency anemia progressing to melena. His physical examination showed no signs of alteration. Scintigraphy of the bowel revealed signs of ectopic gastric mucosa consistent with a Meckel diverticulum. The patient underwent an uneventful laparotomy. Diagnosis was confirmed after histopathology.

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Residência Pediátrica 2019;9(3):316-318. DOI: 10.25060/residpediatr-2019.v9n3-24

INTRODUCTION

A Meckel diverticulum (MD) is an embryonic remnant found in 2-4% of the general population. It is the most common of gastrointestinal malformations and accounts for 6% of all known congenital malformations.[3]

Fabricius Hildanus rendered the first description of a diverticulum in the small bowel in 1598. In 1742, Littre reported the case of a small, strangulated diverticulum in a patient with an inguinal herniation. In 1809, Johann Friedrich Meckel published his remarks on the anatomy and embryology of the diverticulum that now carries his name.[5]

It usually presents as a small evagination with a wider end in the antimesenteric border of the terminal ileum located within 40-60 cm of the ileocecal valve.[4]

Most patients are asymptomatic, but in approximately 10% of the cases symptoms such as bowel obstruction, gastrointestinal bleeding, and diverticulitis are observed. Symptomatic MD may occur during childhood, and cases involving neonates have also been reported.[2]

The diverticulum contains its own mucosa, submucosa, and muscular layer. It is lined by typical terminal ileum mucosa and presents ectopic tissue such as gastric, colonic, jejunal, or duodenal mucosa or pancreatic tissue in 50% of the cases. Its blood supply comes from the terminal branches of the superior mesenteric artery.[4]

CASE REPORT

A 13-month-old male infant was admitted to the outpatient ward of the Francisco de Assis Children's Hospital after having fever for one week along with productive cough, prostration, and vomiting. Physical examination revealed he had postnasal drip and acute sinusitis. The patient was started on antibiotics. His admission workup showed drops in hemoglobin (5.6) and hematocrit (18.4) levels without associated complaints of blood loss. The patient received a transfusion of packed red blood cells, but his hemoglobin (6.0) and hematocrit (19.5) levels remained low.

The patient started presenting significant melena on the second day of hospitalization, and since then bleeding episodes would occur daily. A pediatric surgeon assessed him and ordered a barium enema after performing a digital rectal exam and finding the patient did not have polyps. The test result was inconclusive.

Technetium (Tc) 99m pertechnetate scintigraphy of the bowel evinced the presence of ectopic gastric mucosa suggestive of MD (Figure 1). Three days later, an exploratory laparotomy was performed to treat the patient for a symptomatic Meckel diverticulum. A segment of the patient's small bowel was resected and an end-to-end anastomosis was produced. The procedure was uneventful. (Figure 2)

Histopathology of the surgical specimen confirmed the presence of a true MD in the antimesenteric border of the small bowel with a gastric oxyntic mucosa in the inner lining and ulcers in the ileum mucosa.

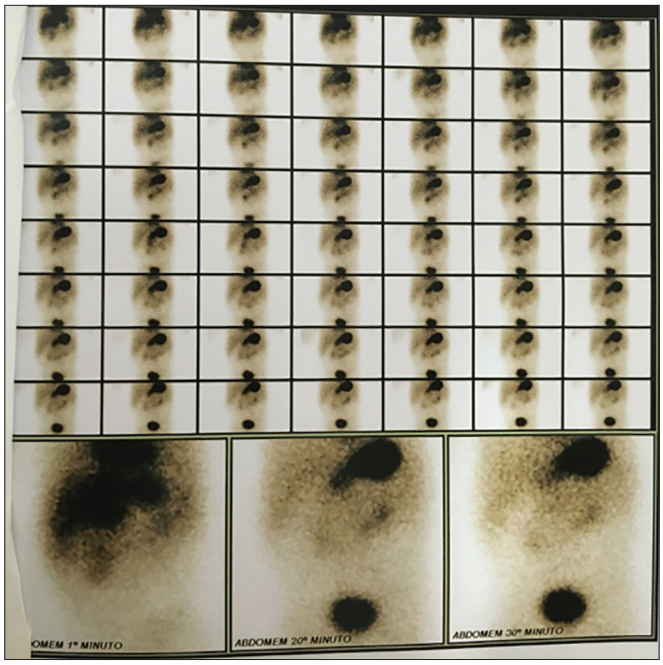

Figure 1. Bowel scintigraphy showing a finding indicative of ectopic gastric mucosa suggesting the presence of a Meckel diverticulum.

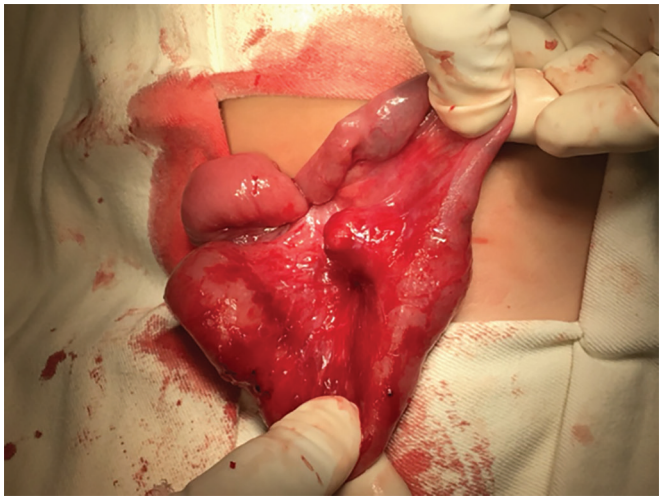

Figure 2. Exploratory laparotomy showing a diverticulum.

The patient was discharged and referred to outpatient follow-up four days after surgery.

DISCUSSION

MD is an anomaly stemmed from failed obliteration of the omphalomesenteric duct in the 5th-8th week of fetal life during midgut development. It is a true diverticulum with all layers of the ileum wall.[1,6] MD is the most common congenital malformation of the gastrointestinal tract and accounts for 90-96% of all yolk sac malformations, with prevalence in the 2-4% range in the general population.[5,6] It rarely involves neonates, although cases have been reported in children.[1,2] It is often located in the terminal ileum, within 40-100 cm of

the ileocecal valve. Therefore, it must be considered in the differential diagnosis of diseases involving the right iliac fossa such as appendicitis.[6]

The incidence of MD increases in neonates affected by other anomalies such as cleft palate, bicornuate uterus, annular pancreas, esophageal atresia, rectal atresia, imperforate anus, and central nervous system and cardiovascular malformations.[5]

Most of the individuals with MD remain asymptomatic for life. Symptom onset is an indication of complication.[5] The most common complications in pre-pubertal and adult individuals are obstruction, inflammation, and tumor. Therefore, it must be considered in the differential diagnosis of abdominal diseases such as acute appendicitis.[6]

Clinical manifestations vary and appear during the first decade of life (more commonly in the first and second years of life), and 50-60% are associated with the gastric mucosa of the diverticulum in the point where the ileum and the ectopic gastric mucosa meet, causing bleeding episodes due to ulceration. When the ectopic mucosa is made of pancreatic tissue, patients tend to develop bowel obstruction.[1]

MD may be accidentally detected through laparotomy. The most common symptom is painless hematochezia, but manifestations such as hematemesis, change in bowel habits, and/or abdominal pain may indicate the presence of associated complications including perforation, intussusception, volvulus, bowel obstruction, and diverticulitis.[5,6]

MD is difficult to diagnose and most cases are unintentionally found during surgery. Complementary examination shows changes secondary to complication. Imaging - abdominal ultrasound, abdominal computed tomography, scintigraphy, and arteriography - improves diagnostic accuracy when considered in combination with clinical manifestations.[3,5]

Plain abdominal X-rays are often unspecific. Signs of peritonitis are usually observed in patients with inflammation. Pneumoperitoneum is easily visualized in horizontal views in patients with a perforated diverticulum.[5]

Ultrasound (US) examination is a relevant diagnostic method free of ionizing radiation that becomes particularly useful when patients are treated for symptoms in emergency units. One of the features of MD picked up in US examination is the absence of peristalsis in the involved site in relation to adjacent bowel loops. A hemorrhagic MD may contract and hamper detection. Color Doppler US examination often finds sings of hyperemia on the wall of the diverticulum with inflammation and the presence of a nurturing vessel.[6]

Computed tomography tends not to help diagnosis, unless patients have associated inflammation or obstruction. Diagnosis of MD by computed tomography is mostly fortuitous.[3,5]

The gold standard diagnostic method for patients with bleeding digestive tracts and MD is technetium (Tc) 99m pertechnetate scintigraphy. The effectiveness of this method is based on the assumption that many bleeding diverticula contain an ectopic gastric mucosa, which in children yields a sensitivity of 85% and specificity of 95%; in adults, however, these values drop to 62.5% and 9% respectively. Cimetidine, glucagon, ranitidine, and pentagastrin have been used to increase the sensitivity and specificity of the method.[1,3]

Arteriography may be used to detect bleeding sites and vascular anomalies. Since it is an invasive method, it should be indicated only to selected patients or when previous tests had normal results.[5]

Despite the progress seen in complementary workup, preoperative diagnosis of MD is extremely difficult and requires a significant level of clinical suspicion. Laparoscopy is a safe and efficient method that can be used with diagnostic and therapeutic intent. But since it is an invasive method, it is usually reserved for cases in which all other diagnostic attempts have failed. Nonetheless, given its therapeutic properties, patients may be diagnosed and have the lesion resected in the same procedure.[3]

Surgery with an abdominal access performed via laparoscopy or laparotomy is the definitive treatment for MD. The procedure for patients with asymptomatic Meckel diverticula found accidentally during surgery is not clearly defined. Some authors prefer not to resect the diverticulum, while others have elected to do it as a form of prevention. Resection is indicated for patients with symptomatic MD.[3,5]

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