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Case Reports of Atypical Presentation of Meckel's Diverticulum

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Abstract

Meckel's diverticulum is an embryonic vestibule of the vitelline duct which normally disappears completely between the fifth and seventh week of gestation. It is located at the anti-mesenteric ileal border approximately 60 cm from the ileocecal valve. Its incidence is 2% in the general population with a 2:1 male:female ratio. It has the same layers as the intestinal wall but contains ectopic tissue in approximately half of all cases: gastric tissue in 60% to 82%, pancreatic tissue in 1% to 16% and gastric and pancreatic tissue in 5% to 12% of cases. It is often asymptomatic and is most frequently found during laparotomies and autopsies. While it is true that the vast majority of cases manifest as low gastrointestinal bleeding, there are less frequent forms of presentation such as intestinal obstruction and intestinal perforation. Intestinal obstruction associated with the Meckel's Diverticulum can occur as a result of herniation or intussusception around the fibrous cord that extends from the abdominal wall to the diverticulum, mesentery, or intestinal segment, which can lead to severe obstructive torsion that sometimes causes necrosis and perforation.

We present five cases of patients with Meckel's diverticulum with atypical presentations, two with internal hernias, one with intestinal invagination and two with blocked perforation.

Keywords

Meckel's diverticulum, obstruction, intestinal, children.

INTRODUCTION

Meckel's diverticulum is an embryonic vestige of the omphalomesenteric duct. Frequently "the rule of two" is used to describe it. (1)

- Meckel's diverticulum present ins approximately 2% of the population.
- The male/female ratio 2: 1
- It is located 2 feet (60 cm) from the ileocecal valve.
- It frequently measures 2 cm in diameter and 2 inches (5 cm) in length.
- It may contain 2 types of ectopic tissue (commonly gastric and pancreatic).
- It is most frequently found before 2 years of age.

Meckel's diverticulum is usually asymptomatic throughout life and causes symptoms in only 1% of patients. Although it most commonly manifests as low gastrointestinal bleeding, there are less frequent forms of presentation such as intussusception, intestinal obstruction, diverticulitis, and intestinal perforation.

We present 5 cases of patients with Meckel's diverticulum with atypical presentation. These patients were seen at two hospitals in the city of Chiclayo, Peru between January and April 2015.

CLINICAL CASE 1

This patient was a 1-year-old male who was admitted to the pediatric emergency room following 24 hours of vomiting.

Tests done upon admission showed leukocytosis, unaltered coagulation and preserved renal function. An abdominal x-ray revealed radiopacity in the lower right quadrant, with scarce amounts of air-fluid. He was evaluated by a surgeon, diagnosed with an intestinal obstruction, and underwent surgery which revealed a Meckel's diverticulum 80 cm from the ileocecal valve. It was completely necrotic and had a flange at the distal end that connected it to the abdominal wall.

The flange section and the 6 cm of ileum which contained the Meckel's diverticulum were resected with posterior end-to-end ileal anastomosis. The patient's postoperative evolution was good.

CLINICAL CASE 2

This patient was an 8-month-old girl with a history of chronic malnutrition who had been admitted to the pediatric emergency room after three days of vomiting and abdominal distension. An abdominal x-ray showed dilatation of intestinal loops and air-fluid levels. Exploratory laparotomy searching for an intestinal obstruction found a Meckel's diverticulum 65 cm from the ileocecal valve with a flange at the distal end that connected it to the mesentery and created a ring within the distal ileum. Resection of the ileal segment containing the diverticulum (Figure 1) and creation of an intestinal anastomosis were done in a single session. Anatomic and pathological studies revealed a Meckel's diverticulum with ectopic gastric mucosa. During the evolution of partial anastomosis, a second new surgical procedure was required for drainage and to create and ileostomy. Four months later, intestinal transit began again with a favorable outcome.

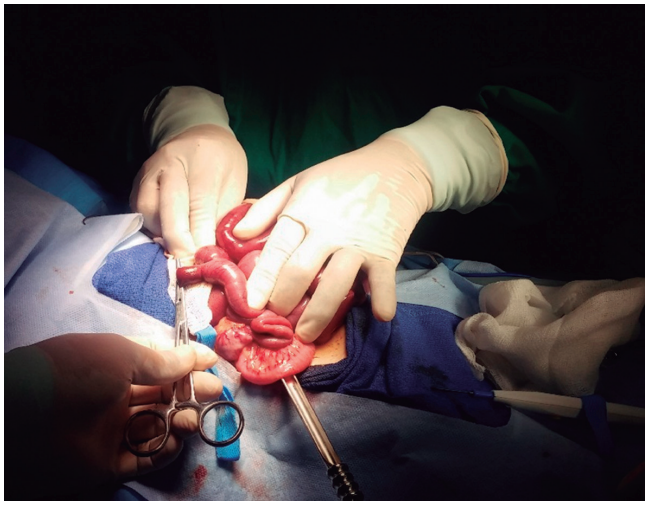

Figure 1. Meckel's diverticulum with flange at distal end connecting it to the mesentery and creating a ring within which the distal ileum was found.

CLINICAL CASE 3

This patient was a 10-month male who was admitted to the pediatric emergency department after two days of vomiting and abdominal distension. An abdominal x-ray showed intestinal dilatation and air-fluid levels (Figure 2). The patient's condition was diagnosed as an intestinal obstruction. Surgery revealed an intestinal invagination with a Meckel's diverticulum at the head of the invagination. Manual disinvagination was combined with resection of the intestinal segment containing the diverticulum and creation of an end-to-end anastomosis. The patient's postoperative evolution was favorable.

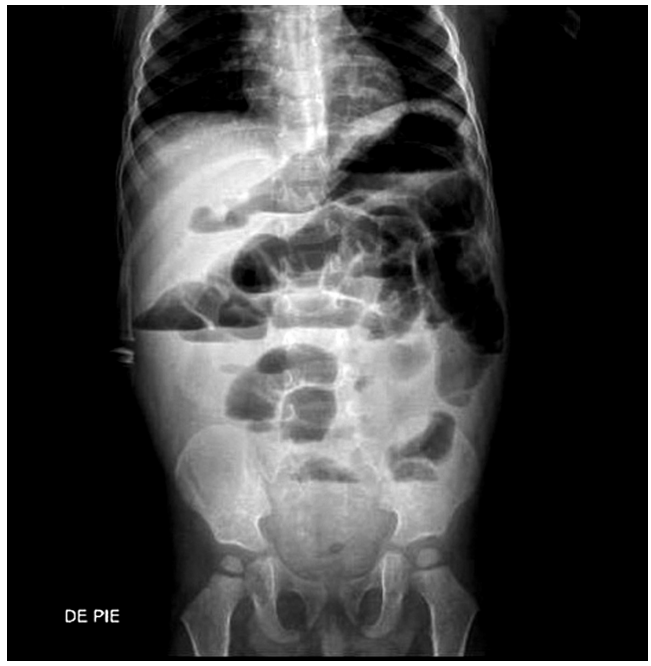

Figure 2. Anteroposterior abdominal x-ray shows dilation of intestinal loops and air-fluid levels.

CLINICAL CASE 4

The patient was a 1-year-old male who was admitted to the pediatric emergency room after 36 hours of abdominal distention, pain, nausea and vomiting.

The abdominal x-ray showed air-fluid levels and absence of gas in the rectal ampulla. He entered the operating room with a diagnosis of acute abdomen. A Meckel's diverticulum was found 60 cm from the ileocecal valve together with a blocked perforation which had caused intestinal obstruc-

tion. The Meckel's diverticulum was resected and an end to end anastomosis created. The patient's subsequent development was favorable. The anatomical and pathological studies concluded this Meckel's diverticulum was composed of ectopic gastric mucosa tissue (Figure 3).

CLINICAL CASE 5

This patient was a 5-month-old girl who was admitted to the pediatric emergency department after 5 days of pain and progressive abdominal distension, two days of vomiting and unquantified fever. Upon physical examination, her abdomen was distended and difficult to depress. She experienced diffuse pain on palpation. She was diagnosed with a bowel obstruction and underwent surgery which showed a perforated Meckel's diverticulum and an inflamed mass. These were resected and an anastomosis was created. The patient's subsequent development was favorable (Figure 4).

DISCUSSION

Meckel's diverticulum is the most common congenital abnormality of the gastrointestinal tract. It was reported by Guilhelmus Fabricius Hildanus in 1598, reported again by Levator in 1671 and Ruysch in 1730. and then described in detail by Johann Friedrich Meckel in 1808, and now bears his name. (2)

It has the same layers as the intestinal wall, but approximately half of the cases contain ectopic tissue: gastric in 60% to 82%, pancreatic in 1% to 16% and both in 5% to 12%. Neoplasms such as carcinoid tumors, adenocarcinomas, desmoplastic tumors of small round cells and benign mesenchymal tumors (lipomas, hemangiomas and hamartomas) have also been found. (4) Meckel's diverticulum is usually asymptomatic and usually diagnosed following complications such as digestive hemorrhaging (20% -30%) intussusception, and intestinal obstructions due to volvulus, internal hernias, diverticulitis or perforations. (5, 6) Digestive hemorrhaging occurs as the result of peptic ulceration and occurs frequently in children younger under two years of age. (7)

Mortality in patients with Meckel's diverticulum is reported to range from 6% to 7.5% while morbidity is reported to be between 6% and 30%. (3)

Intestinal obstructions are commonly encountered in pediatric emergency services. (8) In cases of Meckel's diverticulum, obstructions can occur as the result of intestinal invagination with a Meckel's diverticulum at the head or as the result of internal hernias. Some diverticula have a fibrous cord that joins them to the navel, and this can lead to severe obstructive twisting which often results in necrosis and perforation. Obstructions may also be due to flanges and adhesions secondary to perforation. Although cases one and two had Meckel's diverticula complicated by internal hernias, this condition is extremely uncommon, (5, 9, 10) and the most common locations are paraduodenal, in the foramen of Winslow, transmesenteric and transmesocolic. In the case of strangulation of the hernia, early diagnosis and treatment are essential because of the high mortality rate (approximately 50%) due to hemodynamic decompensation. (11, 12) Malnutrition causes intestinal involvement, alteration of tissue absorption and regeneration which increases the risk of postoperative complica-

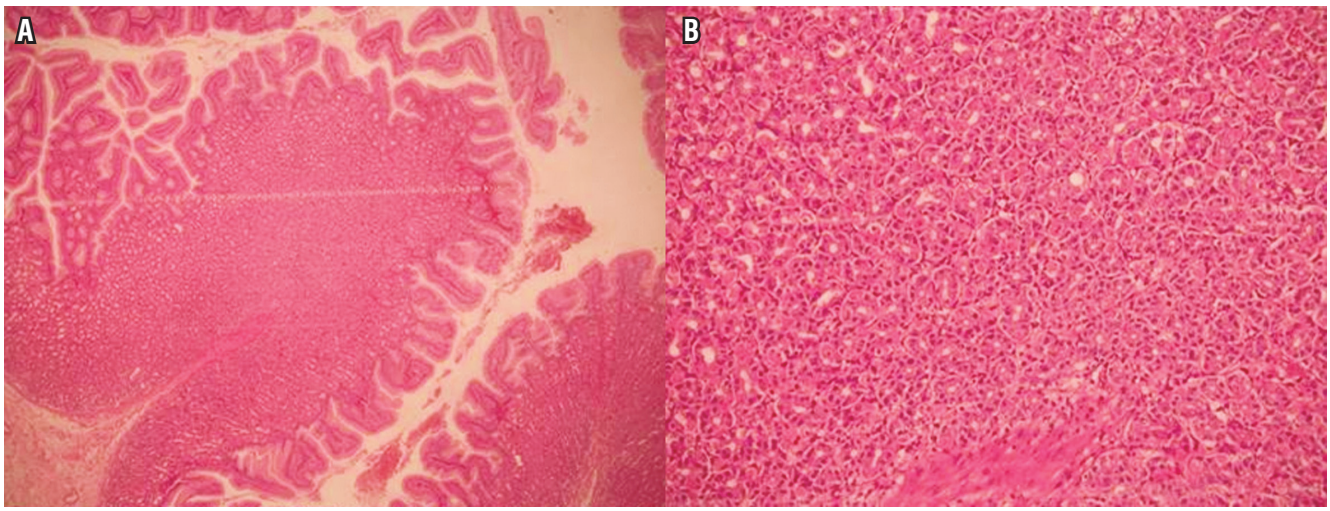

Figure 3. Histopathology of Meckel's diverticulum. A: Ectopic gastric mucosa. B: Parietal cells are observed at higher magnification (hematoxylin eosin staining).

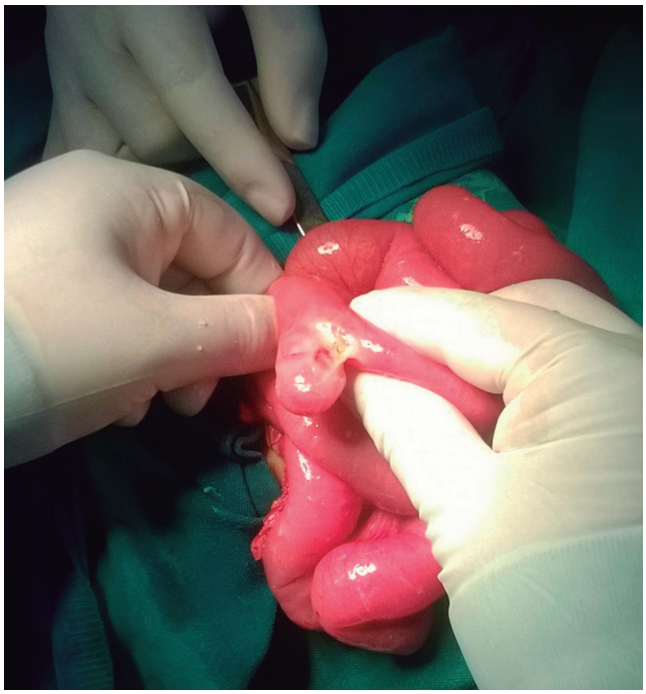

Figure 4. Perforated Meckel's diverticulum had formed an inflamed mass that caused an intestinal obstruction.

tions such as dehiscence of anastomosis which was observed in Case 2.

Idiopathic intussusception is most frequent in cases of intestinal invagination that occur between 3 months and 3 years of age, but almost half of the cases of intussusception secondary to Meckel's diverticulum occur in patients over 3 years old. (6, 13) The infant in Case 3 had intestinal invagination due to Meckel's diverticulum. This was not only an uncommon age group for this pathology, but the patient also had an intestinal obstruction without the classic finding of enterorrhagia. Several studies report that Meckel's diverticulum is a trigger for intussusception in more than 2.8% of all pediatric cases. (14-16) Nevertheless, these data are not applicable to infants, since their samples did not focus on this group. It is known that in children over two years of age these anatomical alterations occur more frequently which could be the reason for an overestimation of incidence.

Perforations and peritonitis secondary to Meckel's diverticula usually occur due to a peptic ulcer caused by the secretion of acid and pepsin by ectopic gastric mucosa or alkaline secretion produced by pancreatic ectopic tissue. Treatment consists of immediate surgical intervention and resection of the diverticulum or the segment of the ileum that surrounds it. This was done in Cases 4 and 5. In addition, in patients with bleeding, segmental intestinal resection is required because the site of hemorrhaging is usually the ileum adjacent to the diverticulum. (17)

A Meckel's scan with technetium 99 is a diagnostic tool that is widely used to identify ectopic gastric mucosa. However, for patients with obstructive symptoms, radiographic or ultrasound studies are preferred, despite their low specificity, because Meckel's diverticulum is an uncommon cause of intestinal obstruction. (6)

In recent years, laparoscopy has become an important tool for diagnosis and treatment of Meckel's diverticulum in pediatric patients. It is considered to be a safe procedure for performing diverticulectomy even in complicated cases. (18) Extracorporeal diverticulectomy is preferred to intracorporeal because segmental resection of a Meckel's diverticulum can be performed without the use of expensive laparoscopic staples. In addition, it allows complete removal not only of the diverticulum, but also of the adjacent intestinal tissue containing the ectopic mucosa which minimizes the possibility of recurrence. (19)

There have also been reports of the use of double balloon stereoscopy with ileal canalization during an initial diagnostic colonoscopy when a Meckel's diverticulum was suspected. (20)

In conclusion, although the great majority of patients with Meckel's diverticulum have low digestive hemorrhaging, there are other less frequent forms of presentation that must be taken into account in the differential diagnosis.

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