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Abdominal Peritonitis Secondary to a Perforated Meckel's Diverticulum Case Report and Literature Review

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ABSTRACT

Meckel's diverticulum is the most common congenital malformation of the gastrointestinal tract. This is a true diverticulum as it contains all the layers of the intestinal wall. It is usually asymptomatic and discovered as an incidental finding during surgery for another cause. In adults, its complication is rare and clinically indistinguishable from an appendiceal condition. It has a risk of complications ranging from 2 to 40%, the most frequent being gastrointestinal bleeding, intestinal obstruction and acute abdomen (diverticulitis or diverticular perforation). We present the clinical case of a 21-year-old male with an initial diagnosis of perforated appendicitis who, upon undergoing exploratory laparoscopy, found diffuse peritonitis secondary to Meckel's diverticulum perforation. This patient underwent laparoscopic surgery for intestinal resection of the segment where the diverticulum was located and an end-to-end enteroanastomosis coupled with an appendectomy, due to presenting intense abdominal pain, cramping/oppressive in the lower hemiabdomen, evidence of peritoneal irritation, alteration of the formula white in laboratory studies and findings suggestive of appendicitis and perforation in the abdominal cavity in imaging studies. Therefore, it is concluded that in cases of acute abdomen, the differential diagnosis of Meckel's diverticulum should be taken into account in those patients who present symptoms related to its complications.

KEY WORDS: Meckel's diverticulum; acute appendicitis; Peritonitis; Acute abdomen; Complications.

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INTRODUCTION

The omphalomesenteric duct (yolk duct) is an embryonic structure that communicates the primitive midgut with the yolk sac until the seventh week of intrauterine life; then it becomes a thin fibrous band that disintegrates by the tenth week. Incomplete resolution of the omphalomesenteric duct results in a variety of anomalies such as: a) umbilico-ileal fistula; b) sinus of the omphalomesenteric (umbilical) duct; c) omphalomesenteric duct cyst; d) fibrous cord and e) Meckel's diverticulum, which represents 98% of all abnormalities of the omphalomesenteric duct, [2] therefore it is the most frequent congenital anomaly of the gastrointestinal tract.

Meckel's diverticulum is a true diverticulum, since it is made up of all the layers of the intestinal wall (serous, muscular, submucosa, and mucosa), which differentiates it from pulsion diverticula, which only have mucosa and submucosa. [4]

EPIDEMIOLOGY

The characteristics of Meckel's diverticulum are commonly described through the "rule of 2": it has an average incidence of two percent in the general population, it is twice as common in men than in women (especially the presence of complications). , anatomically it is located approximately 2 feet (60 cm) from the ileocecal valve, on the antimesenteric border and measures about 2 cm in diameter and 2 inches (5 cm) in length, it can contain two types of ectopic tissue (mainly gastric and pancreatic), in addition, most are diagnosed in the first two years of life.[1,8]

RISK FACTOR'S

According to various medical case reports, it was found that statistically the conditions most commonly associated with symptomatic Meckel's diverticulum are patients under 50 years of age, male, with a diverticulum larger than 2 cm and the presence of ectopic tissue.[7] Of these, del 60% to 85% correspond to gastric tissue and 5% to 16% to pancreatic

tissue. Some reports have cited ectopic colonic, duodenal, jejunal, hepatic, and endometrial tissues; however, these presentations are rare.[1,9]

ETIOLOGY

Meckel's diverticulum can originate from the effect of acid produced by the ectopic gastric mucosa on the adjacent intestinal mucosa or it can also be due to the obstruction of the diverticulum by enteroliths that form inside, similar to what occurs in appendicitis. acute.[6] Regarding the etiology of enteroliths, it has been hypothesized that Meckel's diverticula without gastric mucosa tend to develop silently for long periods of time, which in turn leads to deposition and stasis of calcium salts. and other minerals inside, which would explain why its detection is more common in adults than in children.[2]

CLINICAL PICTURE AND COMPLICATIONS

In most cases, Meckel's diverticulum is asymptomatic and is discovered during surgery for another cause. The lifetime risk of developing symptoms secondary to Meckel's diverticulum is 4-6% and decreases with age. When symptomatic, it usually manifests as gastrointestinal bleeding, intestinal obstruction, or acute abdomen (diverticulitis or diverticular perforation) in order of frequency. [3,8] The complication rate varies according to different series and ranges between 2 and 40%. [2] The characteristics of each entity will be explained below:

Digestive bleeding

It represents 50% of acute complications and is the main complication in children. This is associated with peptic ulceration of the diverticular mucosa or adjacent bowel, particularly in relation to the presence of heterotopic gastric mucosa and, less frequently, pancreatic mucosa. It gives rise to the classic “dregs in currant jam”.[5]

Occlusion

It is the most common complication in adults, representing 40% of acute complications [19] and the second most common complication in children. The mechanisms involved are diverse: volvulus on a primitive omphalodiverticular flange or on a flange secondary to diverticulitis; Acute intussusception; Reflex ileus from contact with a perforation; Occlusion due to embedment of a coprolite formed in Meckel's diverticulum and expelled into the ileum; Tumor invasion: invasive tumor, peritoneal carcinomatosis and strangulated inguinofemoral hernia containing Meckel's diverticulum («Littré hernia»).[5]

Diverticulitis

It represents 30% of acute complications. Inflammation in Meckel's diverticulum is associated with endoluminal stasis with bacterial overgrowth, which may be facilitated by the presence of foreign bodies (coprolites). Some authors suggest an infection of a heterotopic gastric mucosa by Helicobacter pylori.[5]

Diverticular perforations/peritonitis

Peritonitis secondary to perforation of Meckel's diverticulum occurs early, due to its mesoceliac position and its mobility. It can result from the secondary rupture of a peridiverticular abscess or the perforation of an ulcer over a heterotopic area of gastric or pancreatic mucosa.[5]

DIAGNOSIS

Among the most useful diagnostic tools according to the clinical manifestations we find:

Digestive bleeding

After ruling out common causes by upper and lower endoscopy, massive GI bleeding requires helical computed tomography (CT) angiography, mesenteric arteriography, and exploratory surgery.[5]

Occlusion

Abdominal CT is the emergency method of choice in adults for the positive diagnosis of acute small bowel obstruction, for the diagnosis of mechanical occlusion, and for the etiological diagnosis.[5]

Diverticulitis, diverticular perforations, and peritonitis

Both abdominal ultrasound, if available, or abdominal CT, an examination that is more easily accessible and interpretable by the surgeon, allow the diagnosis of infectious complications related to Meckel's diverticulum. Both exams quickly lead to exploratory and therapeutic laparoscopy.[5]

In general, the most accurate diagnostic method for detecting a Meckel's diverticulum is the technetium-99m pertechnetate test. However, it depends on uptake through the heterotopic gastric mucosa; thus being useful to help diagnose symptomatic patients. In children, the study has a sensitivity of 85% and a specificity of 95%. In adults, the sensitivity is about 62.5%, but the specificity is only 9%. In addition, there are many conditions that can lead to false positive diagnoses in adults, including mucosal hyperemia from any cause, angiomas, urinary tract obstruction, ectopic kidney or uterine blood collection, among others.[1]

Definitive confirmation of the existence of the diverticulum and its complication is made by histological study of the specimen obtained by laparotomy or laparoscopy.[7]

TREATMENT AND POSTOPERATIVE COMPLICATIONS

Treatment consists of immediate surgical intervention by laparotomy or laparoscopy with resection of the diverticulum or the segment of ileum that hosts it. The extent of the resection is determined based on intraoperative findings and any intraoperative complications. If the omphalomesenteric remnant has a narrow base and there is no palpable mass within the lumen of the ileum, this diverticulum can be treated with a simple wedge resection, followed by primary closure of the remaining defect. However, if the base of the diverticulum is wide, heterotopic tissue is palpable, or there are ischemic or inflammatory changes in the ileum adjacent

to the diverticulum, resection of the associated bowel and end-to-end anastomosis should be performed.[8,9]

The most common complication after a Meckel diverticulectomy is intestinal occlusion, in 5 to 10% of patients, secondary to postoperative adhesions, although there may also be a leak from the anastomosis or an intra-abdominal abscess less frequently.[3.10]

Meckel's diverticulum is rarely detected preoperatively; since this disorder has clinical characteristics similar to appendicitis; when appendicitis is suspected but appendiceal abnormalities are not found, it is essential to examine the small intestine for its presence.[3]

FORECAST

When a diverticulum causes complications and is therefore surgically removed, mortality, morbidity, and long-term postoperative risks of complications are 2%, 12%, and 7%, respectively. The numbers of patients with incidentally discovered diverticula are 1%, 2%, and 2%, respectively.[1]

CASE PRESENTATION

A 21-year-old male patient with a personal pathological history of allergy to sulfa drugs, began his current condition 12 hours prior to admission, with sudden, colicky/oppressive abdominal pain located in the mesogastrium with subsequent irradiation to the lower hemiabdomen, predominantly in the right iliac fossa. , with a 9/10 VAS, which is exacerbated by physical exertion and later by walking, accompanied by nausea and emesis on one occasion, for which he went to the emergency room for evaluation.

CLINICAL FINDINGS

The patient was admitted with the following vital signs: BP 132/72 mmHg, HR 83 bpm, FR 20 rpm, and T 36°C. On physical examination, a distended abdomen is observed, with the absence of peristaltic sounds, slightly depressed, painful on superficial and deep palpation in the lower abdomen, with defense and muscular rigidity accompanied by positive signs of peritoneal irritation such as McBurney, Obturator, Von Blumberg and Talopercussion. , accompanied by a general matte tone to the percussion.

DIAGNOSTIC EVALUATION

Laboratory analysis was requested which reported a high white formula count: Leukocytes 12.9 103/µl, Absolute segmented neutrophils 10.84 103/µl, Absolute band neutrophils 0.52 103/µl, Absolute lymphocytes 0.52 103/µl. Subsequently, a simple computed tomography of the abdomen was performed, which revealed a sign of fecalization of the intraluminal intestinal content in loops of the small intestine secondary to ileus due to data of an acute appendicular process, based on data of distension of the cecal appendix and an increase in the transverse appendicular diameter greater than 12.5. mm. In addition, fluid was found in the right parietocolic groove and towards the pelvic cavity with suspicion of associated perforation. He was scheduled for urgent laparoscopic appendectomy surgery associated with exploratory laparoscopy.

THERAPEUTIC INTERVENTION

Laparoscopic surgery was performed with the patient under general anesthesia in a supine position, with placement of three ports: 10 mm umbilical, 5 mm right iliac fossa, and 5 mm suprapubic.

The pneumoperitoneum was started with CO2 at 12 mmHg using the Hasson technique.

Resection of the affected ileal segment (from which a sample was obtained for biopsy) and end-to-end anastomosis in two planes was performed. surgical toilet. Appendectomy. Cavity washing, closure and placement of 2 Biovac-type drains of 10 mm each.

The following intraoperative findings were found: presence of purulent fluid in the right parietocolic groove, pelvic cavity, and right subdiaphragmatic bed; Generalized ileitis and perforated Meckel's diverticulum with discharge of purulent material.

Figure 1. Surgical specimen showing resected segment of small intestine with perforated Meckel's diverticulum.

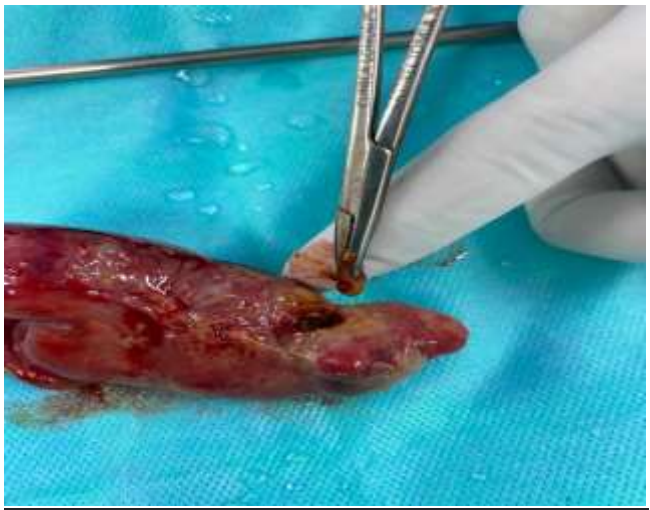

Figure 2. Perforated Meckel's diverticulum with extraction of purulent material.

Figure 3. Meckel's diverticulum with resection of the ileum and cecal appendage.

HISTOPATHOLOGICAL FINDINGS

The report of the biopsy of the surgical piece informs at the macroscopic level segment of intestinal structure that measures 5 cm in length by 2.5 cm, with the presence of a diverticular lesion of 3.5 x 2.5 x 2.5 cm, with greenish-brown serosa with fibrinous material on the surface. Upon complete opening of the segment, the mucosa is light brown and granular, with the presence of an exophytic lesion measuring 2x1.5x0.7 cm, limited to the mucosa. At the microscopic level, a true diverticulum is described, made up of mucosa, submucosa, muscular tunic, and serosa. Presence of a nodule composed of pyloric-type gastric mucosa, without atypia. The intestinal serosa shows fibrin, cellular and polymorphonuclear debris. Therefore, we conclude the presence of a Meckel's diverticulum with extensive pyloric metaplasia, without atypia; fibrinopurulent peritonitis and acute fibrinopurulent periappendicitis.

RESULTS

The patient was maintained on an antibiotic regimen based on ceftriaxone and metronidazole; he recovered without complications and was discharged from the hospital on the fifth postoperative day.

DISCUSSION

The appearance of a Meckel's diverticulum is rare in adults; less than 10% of all symptomatic Meckel's diverticula are diagnosed before the operation, because they do not present signs of pathognomonic symptoms.2 In our case, we suspected abdominal pain. secondary to acute appendicitis since the patient presented pain that began in the mesogastrium with subsequent irradiation towards McBurney's point, followed by nausea and emesis, in addition he presented marked abdominal distension, for which the main differential diagnosis was intestinal obstruction caused by volvulus intestinal, but it was then that only at the time of performing the exploratory laparotomy did we find that, indeed, the appendix was congested but the main cause of the abdominal pain was Meckel's diverticulitis, which was perforated and therefore the clinic of acute abdomen and peritonitis, corroborated in laboratory and office studies.

Meckel's diverticulum clinic can vary, since it can generate ulceration due to the release of gastrin from the ectopic gastric or pancreatic tissue that is sometimes found in the diverticulum, as it is in this case, and other times it can invaginate on the lumen of the ileum and cause a picture of intestinal obstruction that is more common in adults than in children.11

The diagnosis of Meckel's diverticulum is rare even when it is complicated, so considering its clinical suspicion is important in patients with acute abdominal pain.

CONCLUSIONS

Meckel's diverticulum is the most common congenital anomaly of the gastrointestinal tract, but the lifetime risk of developing complications from its presence is 4 to 6%. Complications that require emergency treatment include bleeding, obstruction, diverticulitis, and perforation.

Meckel's diverticulum perforation is rare in adults and is mainly the result of peptic ulceration due to the presence of heterotopic gastric mucosa. The preoperative diagnosis is difficult and exceptional, since it is a rare condition that can mimic other causes of acute abdomen and presents in a non-specific manner in most imaging studies, so it is important to know this entity and evaluate its diagnostic potential. Differential in patients with symptoms associated with its complications. Surgical resection of the damaged intestinal segment is the ideal treatment for both incidentally diagnosed diverticula and complex ones. Finally, the available literature suggests that the laparoscopic approach represents a safe and effective treatment, with results comparable to laparotomy, providing the patient with the benefits of minimally invasive surgery.

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