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Meckel's Diverticulitis: A Rare Cause of Peritonitis in Children

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Abstract

Peritonitis is a rare complication of Meckel's diverticulum. It is difficult to diagnose in a resource-limited setting. We report the case of a 9-year-old patient treated in the paediatric surgery department of the Centre Hospitalier Universitaire de la Mère et de l'Enfant in N'Djamena for acute peritonitis, with intraoperative findings of Meckel's diverticulitis with suspicious peritoneal effusion. Segmental resection of the small intestine was performed, removing the diverticulum, followed by immediate anastomosis. The patient was discharged on the eighth postoperative day with no complications. Conclusion: Meckel's diverticulitis is rare and difficult to diagnose in a resource-limited setting. Its treatment is essentially surgical.

Keywords: Diverticulitis, Meckel, peritonitis, N'Djamena

Introduction

Meckel's diverticulum (MD) is the most common congenital anomaly of the gastrointestinal tract. It is caused by a failure of the vitelline duct to close, resulting in the persistence of a blind-ended sac (Khemekhem, 2013). It appears that Fabricius Hildanus was the first to describe Meckel's diverticulum in 1598. In 1809, Johann Friedrich Meckel clarified the embryological origin of the diverticulum that bears his name (Meckel, 1809). MD is generally latent, but can also be responsible for various complications that constitute diagnostic circumstances: acute intestinal obstruction, intussusception, gastrointestinal haemorrhage, infection (peritonitis, diverticulitis), perforation, etc. Some of these complications are common in children, especially the younger ones (Khemekhem, 2013). The aim of this study was to report on the diagnostic difficulties and management of acute peritonitis due to diverticulitis in a paediatric setting in N'Djamena.

Case report

Clinical presentation

This was a 9-year-old patient referred from a provincial hospital to N'Djamena University Hospital Centre for Mothers and Children for treatment of appendicitis-related peritonitis on 26 December 2021. The history of the illness dated back three days, marked by abdominal pain, vomiting and a cessation of bowel movements and gas, accompanied by fever. Physical examination on admission to the CHU revealed that the patient was in good general condition, with moderate abdominal distension, diffuse tenderness and tenderness around the umbilicus.

Paraclinical data

Abdominal ultrasound was consistent with acute appendicitis with minimal effusion in the abdominal cavity. Plain abdominal X-ray showed air-fluid levels (Figure 1). Laboratory tests revealed an inflammatory syndrome with hyperleukocytosis at 19,000 cells/mm3, predominantly neutrophils, and C-reactive protein (CRP) at 192 mg/L.

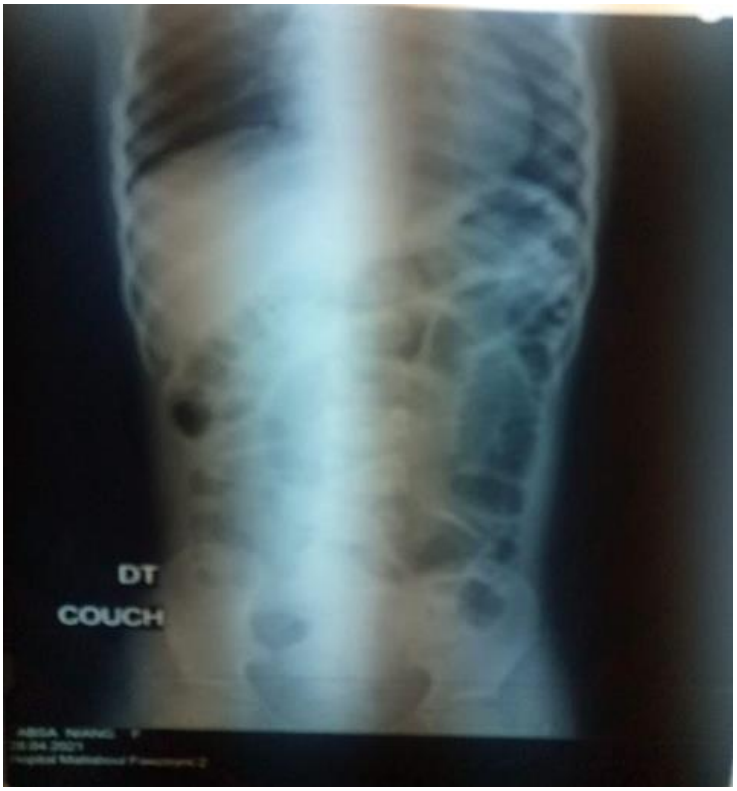

Figure 1 (ASP): presence of hydro-aerial levels

Preoperative diagnosis

The diagnosis of occlusive appendicular peritonitis was made. An exploratory laparotomy was indicated as an emergency procedure after brief resuscitation.

Surgical exploration and procedures

Surgical exploration revealed a foul-smelling peritoneal effusion of approximately 100 millilitres and Meckel's diverticulitis located 60 centimetres from the ileocecal angle at the anti-mesenteric edge (Figure 2).

After abdominal cleansing, a segmental resection of the small intestine was performed, removing the diverticulum with a 5 cm margin on either side. The resection was followed by immediate end-to-end ileal anastomosis (Figure 3).

Figure 2: Meckel's diverticulum with superinfection (surgical view)

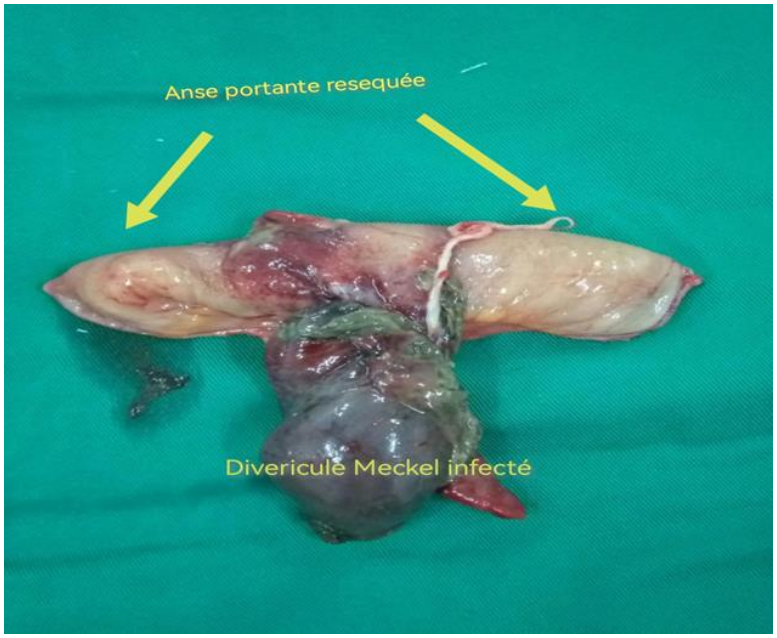

Figure 3 : Monobloc resection of Meckel's diverticulum with the supporting loop

Results

Post-operative complications were minor, with the patient discharged from the hospital on the eighth day after surgery. Macroscopic examination of the surgical specimen revealed a funnel-shaped formation measuring 5 x 4 x 3 cm and communicating with the intestinal lumen. Upon opening the cavity, a greenish fluid and food debris were observed. Microscopically, histological examination of the sections showed a cystic formation attached to the small intestine wall, lined with necrotic intestinal mucosa and containing a dense polymorphic inflammatory infiltrate. This infiltrate extended to the mucosa. Cytobacteriological examination of the peritoneal fluid isolated Klebsiella pneumoniae. We therefore concluded that this was a case of acute generalised occlusive peritonitis due to diverticulitis.

Discussion

Meckel's diverticulum (MD) is rare, affecting 2 to 4% of the general population. It may remain asymptomatic throughout life (Meckel, 1809; Mohammed, 2019). In Chad, the actual frequency of Meckel's diverticulum is difficult to assess due to the impossibility of compiling a complete inventory of this anomaly. To our knowledge, this is the first observation described in N'Djamena. Young age and a slight male predominance are described in the literature (Khemekhem, 2013; Mohammed, 2019; Ouangré, 2015), as in this case. The distribution by gender appears to be roughly equal in autopsy series. However, it is more common in males in surgical series (Khemekhem, 2013; Meckel, 1809; Mohammed, 2019; Ouangré, 2015). Meckel's diverticulum usually remains asymptomatic and is only diagnosed incidentally or when complications arise. It is often discovered during laparotomy for acute abdomen (Khemekhem, 2013). Advances in medical imaging, particularly small bowel transit, abdominal ultrasound, technetium-99m scintigraphy, abdominal computed tomography and magnetic resonance imaging (MRI), have contributed significantly to a preoperative diagnostic approach in some series (Khemekhem, 2013; Abib, 2018). In this observation, the tests performed (ultrasound and ASP) were not conclusive. It is well established that Meckel's diverticulum can become infected, in a manner similar to the appendix, causing diverticulitis, sometimes referred to as ‘Meckelitis’. The discovery of a healthy appendix during a clear appendicular presentation or febrile obstruction should lead to a systematic search for Meckel's diverticulum (Grapin, 2005). In our practice, preoperative diagnosis is difficult because certain advanced paraclinical examinations are unavailable (small bowel transit, technetium-99 scintigraphy), but it is important to consider this possibility in cases of abdominal emergency. Complications affect 4.1 to 16% of MD cases. There are many reported complications, but the most common are haemorrhagic,

obstructive or inflammatory (Khemekhem, 2013). In children, the most common presentation is gastrointestinal bleeding from an ectopic mucosa (Khemekhem, 2013, Mohammed, 2019). The mechanisms of peritonitis are necrosis, perforation and the spread of diverticulitis (Khemekhem, 2013). In our case, it is peritonitis caused by the spread of infected diverticulitis. Diverticulitis is not uncommon and is caused by fluid stasis with microbial proliferation. The role of Helicobacter pylori infection of the ectopic gastric mucosa or a foreign body in the diverticular lumen has been implicated, particularly food or worms (ascaris) (Mohammed, 2019). In this observation, the incriminated factor would be the obstruction of the diverticular lumen by food debris, without the presence of gastric mucosal heterotopia on pathological examination. Indeed, diverticula consist of mucosal heterotopia, which is gastric in 23 to 60% of cases and pancreatic in 5% (Khemekhem, 2013).

The location of Meckel's diverticulum varies between 10 and 100 cm from the pyloric sphincter in half of cases (Khemekhem, 2013; Meckel, 1809; Mohammed, 2019; Ouangré, 2015; Abib, 2018). In this observation, the MD is located 60 cm from the pyloric sphincter. Treatment of a symptomatic Meckel's diverticulum is always surgical (Grapin, 2005). Several surgical techniques are described, including segmental intestinal resection with end-to-end anastomosis and rhombic (wedge) resection. We performed the first technique, which involves resecting a short segment of the small intestine on either side of the base of the diverticulum. According to the literature, this is the most recommended surgical technique. It prevents the risk of omitting islands of mucosal heterotopias that could perpetuate the symptoms (Grapin, 2005). Furthermore, the risk of carcinomatous degeneration of heterotopic mucosa (gastric, colonic) is not negligible. It should be noted that the initial approach in our case was laparotomy. Some series recommend laparoscopy (Grapin, 2005; Chalkoo, 2016). It can be used for diagnostic and therapeutic purposes, especially in cases of haemorrhagic or inflammatory complications of MD (Chalkoo, 2016). To date, laparoscopy is not part of our emergency treatment arsenal.

Conclusion

MD is the most common abnormality of the small intestine. It results from a failure of the omphalomesenteric duct to regress. Acute peritonitis is very rare among its complications. Treatment is surgical. In children, excision must be extensive due to the frequency of post-operative complications. It should be considered in cases of acute abdomen in children, as pre-operative diagnosis is difficult in our practice with limited resources.

Conflict of Interest: The authors reported no conflict of interest.

Data Availability: All data are included in the content of the paper.

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