

# Meckel's diverticulum perforation into subumbilical median abdominal wall: A case report

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**Abstract.** Meckel's diverticulum is a congenital anomaly due to the lack of atrophy of the yolk duct. It's typically located in the distal ileum, and it is made up of all three layers of the ileal wall. Surgical treatment is indicated for symptomatic cases. As far as asymptomatic patients are concerned, the option of performing surgery remains controversial and the possible presence of risk factors should be considered. We present a case report of a 59-year-old man who went to the emergency room reporting abdominal pain radiating to the lower quadrants. Contrast-enhanced abdomen computed tomography revealed the presence of a tubular structure with a thickened and contrast-enhanced wall; thus, a radiological diagnosis of Meckel's diverticulum was made. A laparoscopic surgical procedure was performed. The postoperative course was complicated by an abscess of the abdominal wall, which was healed thanks to ultrasound-guided drainage, surgical toilet, and targeted antibiotic therapy. The symptomatic diverticulum can be mistaken with appendicitis, in our case a preoperative diagnosis was possible, which allowed a surgical indication. ([www.actabiomedica.it](http://www.actabiomedica.it))

**Key words:** Meckel's diverticulum, acute abdomen, perforated Meckel's diverticulum

## Introduction

Meckel's diverticulum (MD) is a congenital anomaly resulting from incomplete atrophy of the vitelline duct between the fifth and seventh week of fetal life. It is a true diverticulum comprehending all three layers of the ileal wall, typically located on the anti-mesenteric side of the distal ileum (1).

The reported prevalence of MD is between 0.3% and 2.9% of the general population and decreases with age. Symptomatic disease occurs predominantly in children. Among these children, more than half of those who are symptomatic and require surgery are under 5 years old (2).

Most diverticula remain asymptomatic, and approximately 2% of patients develop complications throughout their lives (3). These patients often manifest signs and symptoms mimicking acute appendicitis,

and the diagnosis is usually confirmed during a surgical exploration. Diagnosis is often made incidentally during radiological examinations, abdominal surgery, or autopsy (4). The most common presenting symptom in the adult population is obstruction, occurring in almost 40% of patients. It is secondary to intussusception, volvulus, or internal hernia. Diverticulitis is the second most common manifestation, and it occurs in 12.7–53.3% of all symptomatic cases, resulting in perforation and peritonitis. Gastrointestinal hemorrhage can be diagnosed, and it has been associated with ectopic tissue. Gastric and pancreatic tissues are commonly the cause of bleeding due to highly acidic and alkaline secretions that result in ulcerations of the adjacent ileal mucosa (3).

Several imaging studies are carried out for diagnosis, mainly ultrasound (US), and computed tomography (CT)/CT-angiography, even though their

accuracy is generally low. Furthermore, a Technetium-99m pertechnetate scan can be useful in the diagnosis of MD, identifying the ectopic gastric mucosa. A recent review of the literature concerning the role of imaging examinations in the diagnosis of MD shows that only 5.7% of cases of MD, symptomatic or asymptomatic, are diagnosed preoperatively (5,6). At CT or CT enterography, MD appears as a blind-ending triangular or tubular outpouching of the distal ileum arising from the antimesenteric wall (5).

### Case report

A 59-year-old man went to the emergency room with abdominal pain irradiated to the lower quadrants, predominantly in the right iliac fossa. He reported the onset of symptoms 24 hours earlier. During the physical examination, there were no abnormalities except for pain. The patient denied food aversion, nonsteroidal anti-inflammatory drugs use, melena, or hematochezia. Vitals were steady. Laboratory findings were normal except for a mildly elevated white blood cell count of 13.3 k/uL. The patient had no history of previous surgery.

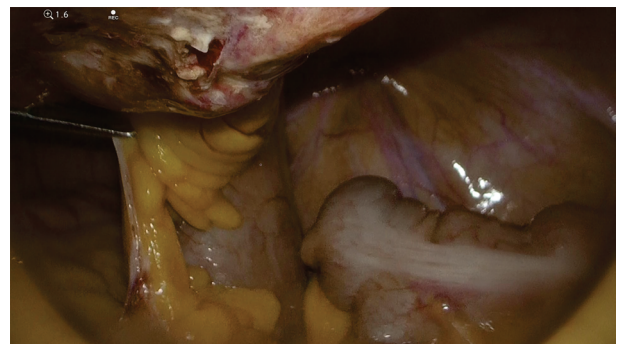
After six hours of observation, despite a normal physical examination, the pain progressively became more severe, therefore the patient underwent a contrast-enhanced abdomen CT that detected in the median hypogastric area a tubular structure with thickened walls and homogeneous contrast enhancement, with inhomogeneity of perivisceral mesentery and segmental ectasia of the contiguous ileal loop (Figure 1). According to these findings, a diagnosis of inflamed Meckel's diverticulum was established, and the patient underwent surgery.

The surgery was performed laparoscopically, by placing a periumbilical trocar, and two operating trocars, one in the left hypochondrium and the other in the left iliac fossa. The laparoscope detected a small bowel segment attached to subumbilical parietal peritoneum with localized peritonitis. After dissection and mobilization of this small bowel segment, an MD perforated into the abdominal wall was evidenced (Figure 2).

During the dissection, a residual urachus was revealed, and a hem-o-lock was placed beneath the



**Figure 1.** Axial contrast-enhanced CT scan shows a tubular structure with thickened walls (arrow).

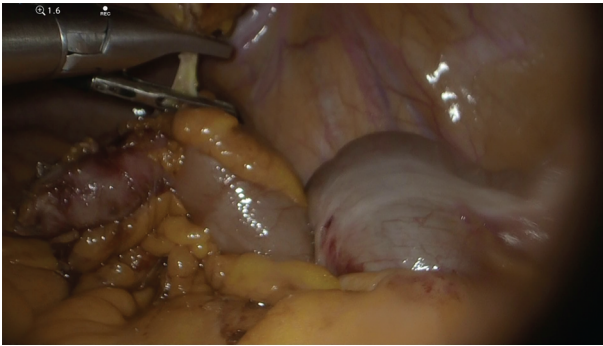


**Figure 2.** Small bowel segment attached to subumbilical parietal peritoneum.

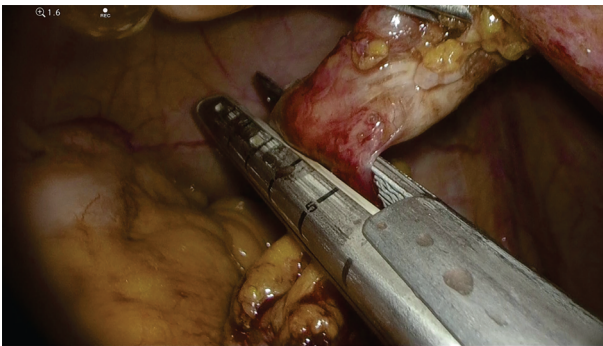
diverticulum, detaching and dissecting the urachus from the wall (Figure 3).

The diverticulum was resected using an endogia vascular type 60 mm (Figure 4).

Afterward, the appendix was exposed, and it did not show any macroscopic sign of inflammation. Despite this, a prophylactic appendectomy was performed. The Meckel's diverticulum and the appendix were extracted through the optical trocar using an endobag. After performing a peritoneal irrigation with 2000 cc of sodium solution and a complete exploration of the



**Figure 3.** Dissection of the residual urachus.



**Figure 4.** Resection of the diverticulum with endogia vascular type 60 mm.

peritoneal cavity, a 19 Fr BD tube was placed in the Douglas. The postoperative course was uneventful, oral intake started on the 3rd postoperative day (POD), the recanalization was observed on the 4th POD, and the patient was discharged on the 6th POD.

The histological examination of the surgical specimens revealed the presence of small bowel mucosa associated with inflamed tissue. These findings were consistent with the diagnosis of Meckel's diverticulum.

Thirty days after surgery, the patient noticed strangury without fever, which was refractory to antibiotic and analgesic therapy. Therefore, he underwent an abdominal CT which showed the presence of a mesogastric abscess of about 4 cm in size, with an imbibition of the contiguous adipose tissue. The localization of the abscess was the same as the previous adhesion between the diverticulum and the abdominal wall. The abscess was in contact with the bladder dome. Then, the patient underwent surgery to drain the abscess. By

using ultrasound guidance, the site of the lesion was identified in the preperitoneal subfascial space, and the skin above the abscess was incised. The purulent material was sent for culture examination. After washing and cleaning the surgical site, a drainage BD 15 Ch was placed. *Citrobacter freundii* and *bacteroides thetaiotaomicron* were isolated from the culture examination. Drainage was removed on the second POD and the patient was treated with targeted antibiotic therapy until the resolution of the infection, which was confirmed by culture examination (on the fifth POD) and ultrasound (on the seventh POD).

## Discussion

Symptomatic MD is an indication of surgery. Routine resection of incidentally discovered MD remains controversial (7). According to a review based on 2975 patients, the systematic resection of an asymptomatic, accidentally discovered, Meckel's diverticulum is not recommended due to the possible post-operative complications, with a postoperative morbidity of about 5.3% (8). Complications after laparotomy include: infections (such as wound infections/dehiscence, abdominal abscess, anastomotic leak, and sepsis), and intestinal obstruction, including paralytic ileus and adhesive obstruction.

Conversely, several authors claim that incidental Meckel's diverticulum should be resected because of the risk of developing complications. More evidence for this claim comes from the higher morbidity and death rates among patients who underwent surgery for symptomatic illness as opposed to those who underwent surgery for an incidental Meckel's diverticulum diagnosis (9). According to the Mayo Clinic survey, the dimensions of MD are associated with symptom occurrence, and patients with a length of the diverticulum greater than 2 cm are more prone to develop symptoms (10). Furthermore, an additional study suggests a scoring system to stratify the risk of developing symptoms based on 4 items: male gender, patients younger than 45 years of age, diverticula longer than 2 cm, and the presence of a fibrous band (11).

The integrity of the diverticulum base and the surrounding ileum, as well as the existence and position of

ectopic tissue, determine the optimal surgical strategy for symptomatic MD patients. The surgical options are: diverticulectomy; wedge resection (including the excision of the base of the diverticulum) suggested for short diverticula (height-to-diameter ratio <2) with a higher risk of ectopic tissue (12); segmental resection for complicated diverticula such as intestinal obstruction, complicated diverticulitis with or without perforated base (13).

When the diagnosis is uncertain, laparoscopy is a crucial tool for resolving the problem and offers a minimally invasive method using intra-abdominal linear staplers, which is linked to minimal intraoperative or postoperative complications (14). Palanivelu et al. reported 12 cases of intraoperative diagnosis and treatment using endostaplers. The author describes the use of wedge resection only in cases of inflammation of the base without impairment of the ileal lumen. They reported no complications on long-term follow-up (15).

## Conclusions

The diagnosis of complicated MD should be taken into consideration in any instance of acute abdomen with ambiguous clinical and radiological signs since it might mimic sigmoidal diverticulitis or appendicitis. A thorough evaluation of the risks and benefits is necessary due to the absence of clear information regarding the best therapeutic approach for an uncomplicated and asymptomatic diverticulum. For symptomatic diverticula, the surgical indication is clear.

This rare case of preoperative diagnosis of symptomatic Meckel's diverticulum allowed us to make a correct differential diagnosis. Given the decreased frequency of related complications and the ability to perform an exploratory laparoscopy, the laparoscopic technique is the best option. In any case, the possibility of postoperative complications must be taken into consideration.

**Conflict of Interest:** Each author declares that he or she has no commercial associations (e.g., consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article.

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