

# Meckel's Diverticulum: A Rare Cause of Small Bowel Obstruction in Adults

Carolina Coutinho\*, Sara Castanheira Rodrigues, Vitorino Garrido, Elisabete Barbosa

**\*Corresponding author:**

Carolina Coutinho, M.D.  
Alameda Prof. Hernâni Monteiro  
4200-319 Porto, Portugal  
E-mail: carolinaivbscoutinho@gmail.com

ORCID IDs:

Carolina Coutinho: 0000-0002-0480-8504  
Sara Castanheira Rodrigues: 0000-0001-6836-970X

Department of General Surgery, São João University Medical Center, Porto, Portugal

## ABSTRACT

Small bowel obstruction (SBO) is a common cause of hospital admission. Adhesions are the most frequent etiology, usually associated with past abdominal surgery. Meckel's diverticulum is a rare cause of small bowel obstruction in the adults. We present a case of a 76 years-old male patient presenting at the emergency department with complaints of abdominal pain, vomiting and constipation. Abdomino-pelvic computed tomography scan showed signs of small bowel obstruction. Patient was proposed for surgery and was submitted to an exploratory laparotomy. Small bowel obstruction was due to a torsion of a Meckel's diverticulum. SBO is a very frequent condition in emergency department. Meckel's diverticulum is a rare cause of SBO in adult patients. Despite rare, it should be considered in differential diagnosis of patients with SBO. Surgical resection is the treatment of choice in these situations. Prompt diagnosis and surgery are essential to treatment success.

**Key words:** Meckel diverticulum, intestinal obstruction

## INTRODUCTION

Small bowel obstruction (SBO) is a frequent cause of hospital admission. Usually, patients present with nausea, vomiting, abdominal distention and constipation (1,2). Adhesions are the most common cause of SBO, most frequently happening in patients submitted to previous abdominal surgery (2). Nevertheless, inflammatory conditions or congenital phenomena may be the source of such adhesions (1). The majority of these cases might be solved without surgical intervention, however timely recognition of the need for surgery is of utmost importance (2).

Meckel's diverticulum (MD) is the most common congenital anomaly of the gastrointestinal tract, with a reported incidence of 0,6-4% in most studies, however it represents a rare cause of SBO (1,3,4). It is known to develop from incomplete obliteration of the omphalomesenteric canal leading to a true diverticulum, comprising mucosa, muscularis, and serosa (4,5). Typically, is it lined with ileal mucosa-type epithelium, however there may be heterotopic tissue found, such as gastric or pancreatic tissue (5). When present, MD is usually located within 7 to 200 cm from the ileocecal valve, on the antimesenteric ileal margin (6).

Received: 06.01.2024

Accepted: 11.03.2024

Mostly, MD is clinically silent and is incidentally discovered, usually presenting in pediatric ages (4,5,7). It may be an incidental finding on diagnostic imaging or found during a surgical procedure (4). According to a large population-based study, it is estimated that 4% of individuals with MD need hospital admission during lifetime and 3% need surgical intervention (8). MD is rarely symptomatic; however, it may present as gastrointestinal bleeding, inflammation or bowel obstruction (6,7). In adulthood, bowel obstruction is the most frequent presentation, occurring in 14-40% of symptomatic cases (4,7,8). Its diagnosis requires high clinical suspicion. Computed tomography (CT) scan is the best imaging technique to evaluate MD complications, even though MD is difficult to distinguish from normal small bowel in complicated patients (9). A recently published review stated that only 5,7% of MD cases are diagnosed preoperatively (8). A complicated MD is usually treated with surgical resection, namely diverticulectomy, wedge or segmental resection, done laparoscopically or with laparotomy (8).

## CASE REPORT

A 76-years old Caucasian male patient with a past medical history of diabetes, atrial fibrillation, chronic renal disease and chronic obstructive pulmonary disease, presented to the emergency department with three-day history of diffuse abdominal pain, vomiting and constipation. The pain was diffuse, non-radiating and progressively worsening in intensity. No further symptoms were reported. Patient had no previous abdominal or pelvic surgery. Significant findings on clinical examination revealed a distended abdomen,

with diffuse abdominal tenderness without guarding or rebound tenderness.

Laboratory findings showed an elevated C reactive protein (176,1 mg/L), but no leukocytosis ( $5,27 \times 10^9/L$ ). Cytolysis markers were also elevated (lactic dehydrogenase 172 U/L, creatinine kinase 195 U/L, myoglobin 817 ng/mL). Renal function was aggravated (Cr 3.20 mg/dL), in spite of the patient's known chronic kidney disease. Blood gas was pH 7.373, pCO<sub>2</sub> 35.1, HCO<sub>3</sub><sup>-</sup> 20, lactic acid 1.20.

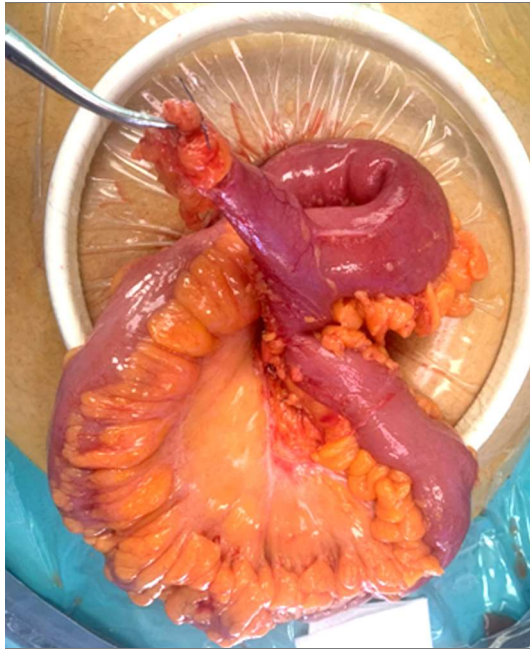
An abdomino-pelvic CT-scan without intravenous contrast (due to acute renal injury) showed a dilation of the duodenum and jejunum with progressive reduction of small bowel loops' caliber with a transition point located in the lower right abdominal quadrant as shown in *fig. 1*. Small bowel showed indirect signs of possible ischemia. These findings suggested SBO with worrisome features with potential bowel ischemia.

Patient was proposed to surgery. An exploratory laparotomy was performed. Intra-operatively, distended small bowels were identified with multiple adhesions from the small bowel to the abdominal wall and between bowel loops. A careful adhesion lysis was performed. Also, a diverticular structure was identified, presumably a MD, with a torsion simulating an internal hernia of the ileum (*fig. 2*). A resection of the MD with an automatic stapler was performed. No signs of permanent ischemia were found, therefore there was no need for bowel resection.

Post-operative period was uneventful. The patient improved clinically, inflammatory markers and renal function started trending down in the first post-operative days and patient was discharged home at 10<sup>th</sup>



**Figure 1 - Abdomino-pelvic CT scan showing small bowel obstruction signs – small bowel distension with a transition point (as shown by the red circle)**



**Figure 2 - Intra-operative image of Meckel's diverticulum**

day after surgery tolerating full diet and with bowel movements restored.

Pathology results of the surgical specimen showed a Meckel's diverticulum with foci of inflammation and no signs of malignancy.

At 30 days post-surgery, patient was asymptomatic and returned to normal daily activities.

## DISCUSSION

MD is the most common congenital malformation in the gastrointestinal tract, resulting in a true diverticulum, containing all the three layers of the intestinal wall (1,3). Based on a recent review of more than a thousand cases of MD identified during surgery over a period of 50 years, symptomatic presentation was most commonly associated with male sex, age less than 50, diverticulum larger than 2 cm and presence of ectopic tissue (1). Still, patients are widely asymptomatic, especially in the adult age. The three most common presentations of symptomatic MD are gastrointestinal bleeding, inflammation, and bowel obstruction, with or without perforation (6,10). SBO is the most common complication of MD in adults, due to several mechanisms, for instance by intussusception (around 4% of cases) or invagination of the Meckel's into the lumen of the small bowel (1,6,11). Repeated inflammation can cause adhesion formation between the diverticulum and the abdominal wall or mesentery. Another possible mechanism is a volvulus of the small bowel around the

diverticular axis. Furthermore, MD can act as a lead point for bezoar formation, causing intestinal obstruction (12). Gastrointestinal bleeding related to MD is often the consequence of acid produced from a patch of ectopic gastric mucosa in the Meckel's lumen, which leads to a bleeding ulcer (13). Inflammation might be of the Meckel's itself, which eventually may lead to perforation of the diverticular wall and consequently peritonitis (6).

The diagnosis of MD preoperatively is usually challenging. In most cases, it is an intraoperative finding, even with adequate imaging done before surgery (12).

In our case, a symptomatic MD was incidentally found during the exploratory laparotomy of a 76-years old patient with a virgin abdomen presenting with SBO. The patient has remained asymptomatic for years up until this complication, which led to the current diagnosis. According to current literature, the approach to such cases is resection, preferably through minimally invasive surgery, if feasible (3).

## CONCLUSION

SBO is a common cause of hospital admission. Its careful and timely diagnosis is essential to adequate treatment, allowing for reduced morbidity and mortality.

Its etiology may be due to intraluminal or extraluminal mechanical compression, being adhesions the most common cause of mechanical SBO in developed countries. Less common causes include hernia, malignancy, as well as congenital malformations, such as MD.

MD is rarely symptomatic in adults and SBO due to MD in the elderly population has not been very frequently described. This case report emphasizes that MD should be considered in the differential diagnosis of an acute abdomen in the adult, especially in cases of bowel obstruction.

Management of MD is not consensual, especially if no symptoms are present. However, surgical resection is recommended in symptomatic patients. Laparoscopy is a feasible and safe option to treat MD both in acute, emergent and elective scenarios.

### *Author's contributions*

All authors have been actively involved in the reported case and take full responsibility for the content of this article.

### *Conflict of interests*

All authors state no conflicts of interest.

*Ethical statement*

All procedures performed in this case were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Helsinki Declaration.

**REFERENCES**

1. Zaatar J, Ghattas S, Al Bitar J, Wakim R. Meckel's diverticulum causing a small bowel obstruction in an 80-year-old male: report of a rare case and review of the literature. *Cureus*. 2023; 15(3):e35990.
2. Bower KL, Lollar DI, Williams SL, Adkins FC, Luyimbazi DT, Bower CE. Small bowel obstruction. *Surg Clin North Am*. 2018;98(5): 945-71.
3. Ahmed M, Elkahly M, Gorski T, Mahmoud A, Essien F. Meckel's diverticulum strangulation. *Cureus*. 2021;13(5):e14817.
4. Kuru S, Kismet K. Meckel's diverticulum: clinical features, diagnosis and management. *Rev Esp Enferm Dig*. 2018;110(11):726-32.
5. Srisajakul S, Prapaisilp P, Bangchokdee S. Many faces of Meckel's diverticulum and its complications. *Jpn J Radiol*. 2016;34(5): 313-20.
6. Hansen CC, Soreide K. Systematic review of epidemiology, presentation, and management of Meckel's diverticulum in the 21st century. *Medicine (Baltimore)*. 2018;97(35):e12154.
7. Lequet J, Menahem B, Alves A, Fohlen A, Mulliri A. Meckel's diverticulum in the adult. *J Visc Surg*. 2017;154(4):253-9.
8. Lindeman RJ, Søreide K. The Many Faces of Meckel's Diverticulum: Update on Management in Incidental and Symptomatic Patients. *Curr Gastroenterol Rep*. 2020;22(1):3.
9. Choi SY, Hong SS, Park HJ, Lee HK, Shin HC, Choi GC. The many faces of Meckel's diverticulum and its complications. *J Med Imaging Radiat Oncol*. 2017;61(2):225-31.
10. Rahmat S, Sangle P, Sandhu O, Aftab Z, Khan S. Does an Incidental Meckel's Diverticulum Warrant Resection? *Cureus*. 2020;12(9): e10307.
11. McGrath AK, Suliman F, Thin N, Rohatgi A. Adult intussusception associated with mesenteric Meckel's diverticulum and antimesenteric ileal polyp. *BMJ Case Rep*. 2019;12(9):e230612.
12. Zhang Y, Guo Y, Sun Y, Xu Y. An internal hernia caused by Meckel's diverticulum: a case report. *BMC Gastroenterol*. 2020;20(1):69.
13. Jan Z, Ahmed N, Aziz N, Tariq M, Khattak D, Sohaib Asghar M. Meckel's diverticulum containing enterolith mimicking acute appendicitis. *Int J Surg Case Rep*. 2022;98:107497.