

Case Report

Contained perforation of Meckel's diverticulum presenting as small bowel obstruction secondary to omental band in an adult: a case report

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ABSTRACT

Meckel's diverticulum is usually asymptomatic, but may rarely present with obstruction or perforation. An omental band simultaneously containing a perforated Meckel's diverticulum and causing small bowel obstruction is exceptionally uncommon. A 28-year-old man presented with obstipation, abdominal distension and vomiting. Imaging suggested small-bowel obstruction without evidence of perforation. Following clinical deterioration, emergency laparotomy revealed an omental band forming a narrow aperture through which an ileal loop was passing. A Meckel's diverticulum, located 30 cm proximal to the ileocaecal junction, was perforated at its tip, which was embedded within the inflamed omental band, limiting peritoneal contamination. Segmental ileal resection with primary anastomosis and proximal loop ileostomy was performed. Histopathology confirmed perforated Meckel's diverticulum with transmural inflammation and omentitis. The patient recovered uneventfully and underwent successful ileostomy reversal after three months. An omental band may simultaneously cause mechanical obstruction and contain Meckel's diverticular perforation. Contained perforation should therefore be considered despite absence of generalized peritonitis.

Keywords: Perforated Meckel's diverticulum, Omental band, Contained perforation, Small bowel obstruction, Case report

INTRODUCTION

Meckel's diverticulum is the most common congenital anomaly of the small intestine. It is formed by incomplete obliteration of the vitellointestinal duct.¹ Although, most cases remain asymptomatic or are incidentally detected. It rarely presents in adults as obstruction, diverticulitis, perforation or neoplasm. Mechanical bowel obstruction related to bands is a recognized complication, but an omental band simultaneously causing small-bowel obstruction and containing a perforation of Meckel's diverticulum represents an unusual clinical and operative scenario. We report this case to highlight the diagnostic challenge and the unusual mechanism by which an omental band produced obstruction while limiting peritoneal contamination from diverticular perforation.

CASE REPORT

History

A 28-year man presented to surgical emergency with chief complaints of inability to pass stool and flatus for 3 days, abdominal distention for 2 days and vomiting for 2 days. Patient had no complaints of fever, bleeding per rectum. Patient had no known comorbidities, surgical history or drug intake history. No significant personal/family history.

Examination

On examination, patient was conscious, oriented. Patient was afebrile. General examination was normal.

Vitals

Presenting vitals were-blood pressure of 120/84 mmHg, pulse rate-103/minute and oxygen saturation 98% on room air, respiratory rate-18/minute.

Systemic examination

Abdomen was distended on inspection, with no visible scar marks or distended veins. On palpation, abdomen was distended with diffuse tenderness, no guarding was appreciated, and bowel sounds were present. All hernial orifices were free of cough impulse. On digital rectal examination, lumen was collapsed and faecal staining was absent. Respiratory, cardiovascular and central nervous system examinations were normal.

Haematological examination

Haemoglobin-17gm/dL, total leucocyte count-15,780 cells/ μ L, total bilirubin-2.99 mg/dL, direct bilirubin-0.6 mg/dL with normal kidney function test, electrolytes and normal liver enzymes.

Radiological investigations

Chest X-ray was grossly normal with abdominal X-ray showing multiple air fluid levels in the central abdomen with dilated jejunal loops. Ultrasonography of abdomen was suggestive of dilated small bowel loops with maximum calibre of 3.1 cm in diameter, sluggish peristalsis and minimal inter-bowel free fluid. Contrast CT of abdomen was scheduled for could not be done due to unavailability at that time for technical reasons; patient kept on conservative management as lack of evidence of perforation or complete bowel obstruction did not warrant urgent CT assessment.

Diagnosis and course in preoperative period

Working diagnosis of acute intestinal obstruction was made, with aetiology under evaluation and patient was managed conservatively for next 2 days. On Day 3, patient developed tachycardia in the range of 110-120 per minute along with on-resolution of abdominal distention. Patient was then taken up for emergency exploratory laparotomy.

Operative management

Midline laparotomy was done and 300 cc serous peritoneal fluid was drained on opening the peritoneal cavity. Following adhesiolysis, an omental band originating from greater omentum and reaching up to base of appendiceal/caecal region was visualized. This band caused luminal narrowing of ileum at a point upstream to the MD. Bowel loops proximal to the band were grossly dilated with thinned out walls, while bowel was collapsed distal to it. Appendix was found to be normal. On running the bowel, a blind ending

diverticulum was noted on the anti-mesenteric border of the ileal segment 30 cm proximal to ileocecal junction. It was perforated at the tip and grossly inflamed till the base. The perforated tip was embedded into the inflamed omental band and contained by it. Resection of the diverticulum was performed along with the omental band adhered to its tip and 1-2 cm margin of adjacent ileum distal and proximal to the base of diverticulum. Stapled side to side anastomosis of the ileum was done. Diversion loop ileostomy was made proximal to the site of resection and anastomosis. It was fashioned keeping in mind preoperative tachycardia and low threshold of ileostomy creation practice in our institution. Peritoneal lavage was given. Drain insertion and abdominal closure were promptly followed. Patient tolerated surgery well with adequate urine output and no requirement of pressor supports intraoperatively.

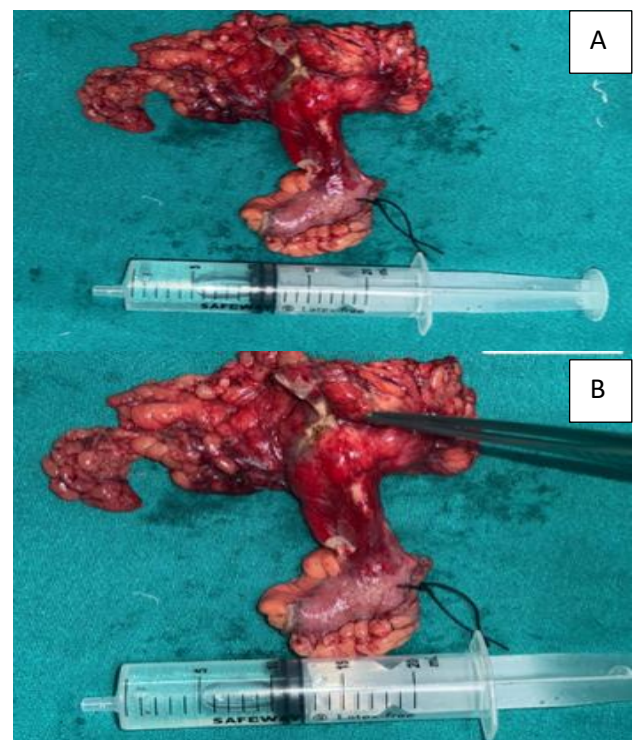


Figure 1 (A and B): Intraoperative specimen of resected ileal segment (inferiorly) with Meckel's diverticulum and omentum adhered to its tip (superiorly).

*Specimen with forceps inside the perforation.

Post operative management

Post operative recovery was uneventful with ileostomy functional since post operative day 3. Patient was kept under observation and ileostomy care and monitoring was explained. With a satisfactory recovery, patient was discharged on post operative day 12. Patient was followed up weekly on outpatient basis. After 3 months, a normal contrast cologram was followed by ileostomy reversal. Patient recovered uneventfully.

Histopathological analysis

Peritoneal fluid cultures were found to be negative, cytology was unremarkable. Histopathological examination of specimen revealed presence of Meckel's diverticulum measuring 4×3×2 cm, identified 2 cm from smaller cut end. A perforation measuring 0.5×0.3 cm identified at the tip of diverticulum with transmural inflammatory infiltrate along with splaying of muscle bundles, consistent with focal perforation. Also, attached omentum measuring 8×5×2 cm showed signs of omentitis. Epithelial lining of the Meckel's diverticulum was intestinal type; no evidence of heterotopic mucosa was found.

Table 1: Clinical timeline and chronology.

Clinical timeline and chronology	
Day 1	Admission obstipation, distension, vomiting X-ray/USG suggest SBO conservative management initiated
Day 2	Initial clinical improvement/stability Continued observation
Day 3	Increasing distension HR 110-120/min Decision for emergency laparotomy-resection of segmental ileal segment with perforated MD with omental band excision with ileostomy
Day 5	Patient allowed orally Drain removed
Day 6	Ileostomy functional
Day 12	Uneventful recovery from surgery Discharged
After 3 months	Normal contrast study Ileostomy reversal executed
After 4 months	Uneventful follow-up

DISCUSSION

Incidence of complications in Meckel's diverticulum ranges from 4-16% in literature, with obstruction due to intussusception or adhesions being most common.¹ Perforation is an uncommon but severe complication of Meckel's diverticulum.² It typically occurs secondary to diverticulitis, foreign body or faecolith impaction, or peptic ulceration due to heterotopic mucosa. Of all symptomatic adults, intestinal obstruction, diverticulitis, and gastrointestinal bleeding are the three most common acute presentations of MD.³ On the other hand, infrequently encountered but well-recognized mechanisms of intestinal obstruction resulting from complicated MD include volvulus around a fibrous or mesodiverticular band, intussusception with the diverticulum acting as a lead point, inflammatory adhesions, internal herniation, and incarceration within a hernia sac.⁴

Our case highlights a rare pathology of acute small bowel obstruction with MD, which was secondary to an omental band causing constriction and upstream dilatation of healthy ileum, proximal to the site of Meckel's diverticulum. The omental band, which traversed across the perforated tip of the MD, limited the spillage of luminal contents into the peritoneal cavity. Thus, this patient had an occult perforation as patient lacked signs of peritonitis or findings such as pneumoperitoneum. A focused literature search identified reports of Meckel's diverticulum-associated obstruction due to mesodiverticular/ fibrous bands and reports of perforated Meckel's diverticulum with inflammatory adhesions.^{5,6} However, to the best of our knowledge, we found no previously reported case describing an omental band producing mechanical obstruction while simultaneously containing a perforation at the diverticular tip. In contrast, the omental band in this case caused dual pathophysiology; containment of perforation along with external constriction of proximal ileum presenting as small bowel obstruction. This presentation of perforated MD presenting as acute intestinal obstruction lacking peritonitis is extremely uncommon.

There are several challenges in diagnosing cases of complicated MD, including but not limited to rarity in adult population, non-specific symptoms and signs, overlapping clinical picture with other conditions like acute appendicitis or adhesive bowel obstruction, and lack of identifiable radiological findings.⁷⁻⁹ In our case, small bowel obstruction was evident, however, initial imaging did not outline the presence of Meckel's, its perforation, pneumoperitoneum or the omental band traversing across the perforation, delaying the definitive management significantly. Given the absence of peritonism and clinical features suggestive of perforation, conservative management was initially instituted for presumed uncomplicated functional small-bowel obstruction. CT was planned subsequently; however, the patient's clinical deterioration after 48 hours prompted emergency laparotomy before definitive radiological characterization. This reiterates the need to consider such a pathology while assessing intestinal obstruction, especially in the absence of peritonitis, for prompt recognition of this condition.

Surgery is the cornerstone in acutely complicated MD and has been performed successfully and safely in several reported cases. The surgical choice for such cases lies between segmental bowel wedge resection centred around the diverticula and simple diverticulectomy. Segmental resection is performed more frequently over simple diverticulectomy.^{4,10-15} In cases with a short and wide necked MD, heterotopic tissue is likely to be present in adjacent bowel beyond the base of MD. Resection of ileal segment ensures complete removal of pathological tissue in such cases. Similarly, if base of the MD or adjacent ileum is visibly inflamed, segmental removal of ileum ensures uncomplicated post-operative status. Other factors such as general condition of patient, skill of

operating surgeon and additional findings such as adhesive or omental bands should be considered while choosing the appropriate management. Diverticulectomy would be the less appropriate choice in this case as the base of MD was inflamed and the patient showed early signs of hemodynamic instability preoperatively. In rare cases wherein diagnosis has been made preoperatively, knowledge of afore mentioned factors prior to surgery can help decide provisional surgical plan, however, mostly this decision is individualised intraoperatively.

CONCLUSION

Meckel's diverticulum and its complications in adults still represent a surgical challenge, both in terms of diagnosis as well as in treatment. The absence of clinical peritonitis does not necessarily exclude a contained perforation of Meckel's diverticulum, particularly when an unusual omental band limits intraperitoneal contamination and resulting peritonitis or pneumoperitoneum. Contained perforation of Meckel's diverticulum associated with an omental band should be considered among rare causes of small-bowel obstruction in adults, particularly when obstruction occurs without generalized peritonitis. Further, this case substantiates the role of radiological imaging for clinical suspicion, prompt diagnosis and timely treatment of Meckel's diverticulum complications, even though such cases of dual pathology and uncommon presentations may finally only be diagnosed on laparotomy.

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