Case Report

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Surgery Section

Acute Intestinal Obstruction due to Complicated Meckel's Diverticulum in an Adult: A Case Report

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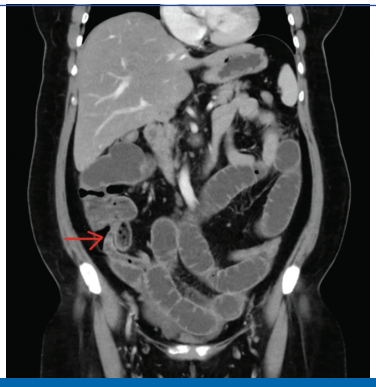
ABSTRACT

Meckel's Diverticulum (MD) occurs in about 2% of the population. Symptomatic MD after the age of 50 years is extremely rare. Hereby, the authors present a case of MD in a 54-year-old female with no previous surgeries, who presented with features suggestive of intestinal obstruction. Diagnostic laparoscopy revealed that the cause of the obstruction was an inflamed MD with a band extending to the inferior aspect of the liver. A laparoscopic release of the band was performed, along with resection of the diverticular segment and the inflamed segment of the ileum, followed by end-to-end anastomosis. The patient recovered well with no postoperative complications. MD causing intestinal obstruction in a middle-aged population is extremely rare and requires careful attention for diagnosis; it is almost always discovered through surgery.

Keywords: Abdominal pain, Fibrous band, Small bowel obstruction

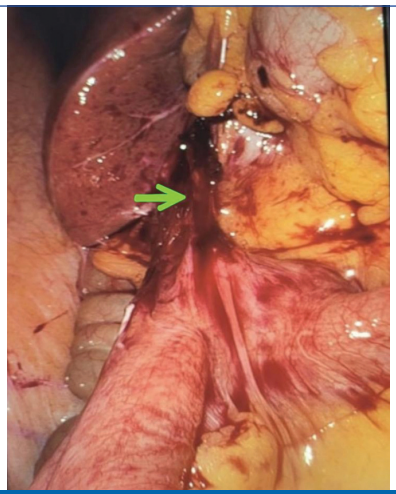
CASE REPORT

A 54-year-old female presented with a 24-hour history of pain in the left iliac fossa, associated with nausea, multiple episodes of bilious vomiting, and obstipation. There was no prior history of similar episodes, and the patient had no previous abdominal surgeries. Her past medical history was significant for hypertension and hypothyroidism. On inspection, her abdomen was mildly distended. Palpation revealed diffuse abdominal tenderness, but no rebound tenderness, guarding, or rigidity. There were no palpable masses. Specific signs such as Murphy's, Psoas, Obturator, and Rovsing's signs were negative. Bowel sounds were hypoactive on auscultation. Based on her clinical presentation, leading differential diagnosis was acute small bowel obstruction. Although the underlying cause was still uncertain at this stage, authors suspected malignancy as a possible aetiology causing the obstruction. Her vitals were stable, with a blood pressure of 110/60 mmHg, a pulse of 84 bpm, a respiratory rate of 18 breaths per minute, and a temperature of 97.8°F. Laboratory investigations revealed leukocytosis (14,400 cells/mm^3) and elevated C-reactive Protein (CRP) levels (CRP=22.35 mg/dL). A plain X-ray of the abdomen in an erect position demonstrated dilated bowel loops with multiple air-fluid levels. The Computed Tomography (CT) scan of the abdomen with Intravenous (i.v.) contrast showed collapsed large bowel loops and abrupt narrowing in the distal ileum, with dilation of the jejunal and ileal loops, suggestive of intestinal obstruction [Table/Fig-1]. The patient was immediately prepped for surgery.



[Table/Fig-1]: Coronal image of CT of the patient (preoperative) showing obstruction at the level of the ileum, as shown by the red arrow, with dilated proximal small bowel loops.

A diagnostic laparoscopy was performed. A 10 mm infraumbilical port and three 5 mm ports were used, positioned in the suprapubic, left iliac, and right lumbar regions. An inflamed MD was visualised on the antimesenteric side of the distal ileum, approximately 70 to 80 cm proximal to the ileocecal junction. A band was seen arising from its summit, extending to the inferior aspect of segment V of the liver, causing ileal obstruction with distal collapsed bowel [Table/Fig-2]. A length of 60-70 cm of the mid-distal ileum was inflamed, with thickening and creeping mesenteric fat. No abnormalities were noted in the remaining portion of the small intestine, ileocecal junction, or large bowel.



[Table/Fig-2]: Intraoperative diagram showing fibrous band (represented by the green arrow) extending from Meckel's Diverticulum (MD) to segment V of the liver.

Laparoscopic release of the band was performed, followed by segmental resection of the MD along with the inflamed portion of the mid to distal ileum [Table/Fig-3], followed by an end-to-end anastomosis using Non tissue Retaining Linear Cutter (NTLC) 75 mm staplers. Histopathology confirmed the diagnosis, showing an MD measuring 2.5×2 cm without heterotopic mucosa. The rectus sheath was closed with synthetic absorbable sutures. The skin was closed after Minivac placement in the subcutaneous plane. After surgery, the patient recovered well with no complications and was discharged on postoperative day 5. The postoperative follow-up was good.

[Table/Fig-3]: Segmental resection specimen showing remnant of Meckel's Diverticulum (MD).

DISCUSSION

Acute intestinal obstruction is a surgical emergency. Its occurrence in a middle-aged adult in a 'virgin abdomen'-meaning no prior surgeries or other known abdominal pathologies-can be due to various aetiologies [1]. Meckel's Diverticulum (MD) is an extremely rare aetiology of small intestinal obstruction in adults. It is the most common congenital anomaly of the gastrointestinal tract, occurring in about 2% of individuals and is more commonly seen in males [2,3].

The MD is a vestigial remnant that originates due to the failure of obliteration of the mesenteric duct [3,4]. It is a true diverticulum located on the antimesenteric side of the ileum, approximately 30 to 90 cm from the ileocecal valve [4-7]. Despite its prevalence, it is generally asymptomatic, with only a 4% risk of patients presenting symptomatically in their lifetime [7], and most of these are paediatric patients. Identified risk factors for developing symptomatic MD include male sex, age <50 years, MD containing ectopic mucosa, and the presence of a band [8]. MD is often an incidental discovery on imaging or during abdominal exploration for some other cause. Symptomatic presentation is usually due to complications of MD such as haemorrhage, diverticulitis, bowel obstruction, intussusception, perforation, volvulus, or, in very rare cases, even malignancy [9,10]. The majority of patients who develop complications present in the early years of life, with most complications due to MD found in children under two years [11]. Leijonmarck analysed around 260 cases of MD over a 15-year period and concluded that the lifetime risk of MD-related complications was 3.7% and 2% at 16 years and 30 years, respectively, and almost negligible in the older population (0.03% per year) [12]. This was further reiterated by a more recent Mayo Clinic experience published in 2005, involving 1,476 patients, where Park found that symptomatic MD was significantly more common in patients below the age of 50 years [13].

Bleeding is the most common manifestation of MD and is likely caused by the presence of heterotopic gastric or pancreatic tissue, which can ulcerate [9,14]. Although MD is an infrequent cause of intestinal obstruction in adults, when symptomatic, it often presents as such [12]. MD causing small bowel obstruction can be due to various mechanisms. These include the presence of a fibrous band extending from MD to the umbilicus, causing volvulus of the small intestine, ileocolic intussusception, torsion, stricture due to chronic diverticulitis, Littre's hernia, MD lithiasis, or MD associated with a band causing entrapment of the bowel [7]. These fibrous bands are most often mesodiverticular, extending from the tip of MD to the mesentery. Kuru S et al., described a case of acute intestinal obstruction in an adult due to a giant MD with a mesodiverticular band [15]. In present case, however, authors found a band extending from the summit of the diverticulum to the inferior part of segment V of the liver, which was responsible for causing the intestinal obstruction.

With symptomatic presentation occurring in a small fraction of the total population, and patients presenting with non specific symptoms or radiological findings, preoperative diagnosis becomes difficult. The characteristic findings of small bowel obstruction on diagnostic imaging, such as the presence of multiple air-fluid levels or a proximal dilated bowel segment with a collapsed bowel segment distal to the obstruction, can aid in the diagnosis of acute intestinal obstruction [16]. However, these findings have limited diagnostic value in determining the exact cause of intestinal obstruction [17]. Although a CT scan is the imaging modality of choice in determining the aetiology of small bowel obstruction in adults, it is of limited value in cases of MD [8]. Technetium-99m (Tc-99m) pertechnetate scintigraphy is a relatively new non invasive diagnostic method for MD in the acute setting. Its effectiveness primarily lies in detecting MD in patients who present with lower gastrointestinal bleeding, due to its affinity for detecting heterotopic gastric mucosa [18]. This makes it particularly more valuable in children and adolescents, in whom it demonstrates superior diagnostic sensitivity. Its sensitivity tends to be lower in adults, making it less effective for identifying MD in this population [17]. When Tc-99m scan findings are inconclusive in diagnosing MD, a diagnostic laparoscopy should be performed without delay [19]. Early action is of utmost importance since, a delay in surgical intervention of more than 36 hours can increase the risk of complications in cases presenting with acute bowel obstruction and strangulation, with mortality rates nearing 25% [8,16].

Treatment for MD is surgical, with laparoscopic techniques now accepted as the gold standard. Surgical methods include diverticulectomy, wedge resection, or segmental resection of the bowel, followed by anastomosis. The choice of surgical intervention largely depends on the condition of the base of the diverticulum and the proximal ileum, the length of the diverticulum, and the presence of ectopic tissue [20]. For MD associated with small bowel obstruction, wedge or segmental resection is often recommended [16]. At surgery, a thorough examination of the wall of the MD must be part of the operative procedure to avoid missing any signs of inflammation, necrosis, perforation, or abnormal thickening, as well as to check for other pathologies. Two laparoscopic techniques have been described for managing MD. The first is a three-port laparoscopic procedure that requires the use of an endoscopic linear stapler-cutting device [21], which was employed in our case. The second is the "Transumbilical Laparoscopic-assisted (TULA) Meckel's diverticulectomy," which involves exteriorising the diverticulum through the navel and performing the diverticulectomy outside the abdominal cavity. The TULA approach has gained recognition for its safety and effectiveness in the management of MD [21].

In a patient older than 50 years, presenting with acute intestinal obstruction in a previously unoperated abdomen usually raises suspicion of other underlying pathologies such as malignancy or inflammatory bowel disease. Surgeons must also be vigilant and keep in mind other rare aetiologies, like MD, which can also cause small intestinal obstruction in adults. The present case reminds us that even in the realm of well-established medical knowledge, intraoperative surprises may arise, necessitating astute judgment and adaptable surgical approaches.

CONCLUSION(S)

The MD is a rare cause of intestinal obstruction in adults. The concomitant presence of a fibrous band is an even rarer phenomenon that increases the risk of complications. Diagnosing this condition preoperatively is difficult and is often missed. A laparoscopic-assisted procedure is feasible and should be considered promptly when dealing with acute obstruction to avoid missing the diagnosis. Resection of the affected segment followed by anastomosis is the recommended treatment in such cases.

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